

STATE LETTERS



Oregon

Theodore R. Kulongoski, Governor

Water Resources Department

Commerce Building
158 12th Street NE
Salem, OR 97301-4172
503-378-3739
FAX 503-378-8130

September 17, 2003

Todd Olson
Project Manager, Klamath Relicensing
PacifiCorp
825 NE Multnomah – Suite 1500
Portland, OR 97232

Re: State of Oregon Hydroelectric Application Review Team Comments on
PacifiCorp's Draft License Application for the Klamath Hydroelectric
Project Relicensing (FERC Project 2082)

Dear Mr. Olson:

Attached please find comments prepared by the State of Oregon's Hydroelectric Application Review Team (HART). HART's comments were prepared in response to PacifiCorp's release of the Draft License Application (DLA) for the Klamath Project (Project) on June 24, 2003.

The Klamath HART is comprised of the Oregon Water Resources Department (OWRD), Oregon Department of Fish and Wildlife (ODFW), Oregon Department of Environmental Quality (ODEQ), Oregon Parks and Recreation Department (OPRD), and Oregon Public Utility Commission (OPUC). HART has participated in this traditional relicensing process since PacifiCorp requested its formation on March 15, 2000.

In addition, HART agencies have participated in what PacifiCorp has termed a "traditional plus" relicensing process in an effort to facilitate improved communication among the applicant, resource agencies, Indian tribes, and the public in the pre-filing consultation process. We believe this process, with its variations on the Federal Energy Regulatory Commission (FERC) Alternative Relicensing Process, has produced greater participation by non-applicants while preserving for PacifiCorp a comfortable level of control over the process.

The Klamath HART is tasked under Oregon law with "participa[ting] to the fullest extent possible in all proceedings conducted pursuant to the FERC relicensing process for the project." ORS 543A.400(4)(b). FERC rules provide a ninety-day period to comment on the DLA. 18 C.F.R. 16.8(c)(5). In fulfillment of these requirements, the following HART agencies have prepared comments, which are attached as follows:

Response to Comment S1-1

The lack of data interpretation in the DLA was a result of PacifiCorp agreeing to expand the scope of studies within the limited time frame for publication of the DLA. The FLA is much more comprehensive in addressing Project impacts and identifying PM&Es.

S1-1

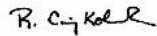
ODEQ	Attachment 1
ODFW	Attachment 2
OWRD	Attachment 3
OPRD	Attachment 4

The HART acknowledges that the DLA contains a significant amount of information. Based on our review, however, certain information required under the Code of Federal Regulation (CFR), has been omitted from the DLA. Also, the DLA does not identify or include a discussion of any proposed protection, mitigation, or enhancement (PME) measures. For HART to effectively evaluate water quality, fish and wildlife resources, water resources, recreation opportunities, and other issues affected by project effects these PME measures are necessary. The attached comments describe specific areas where additional detailed information or clarification is needed.

Again, the HART appreciates the opportunity to provide comments on the DLA and looks forward to continuing to work with PacifiCorp and other stakeholders in a collaborative and productive manner.

If you have any questions or concerns regarding these comments, please do not hesitate to contact me or any other member of the Klamath HART.

Sincerely,



R. Craig Kohanek
Hydroelectric Project Analyst
Oregon Water Resources Department

ATTACHMENT 3

Oregon Water Resources Department

**COMMENTS ON PACIFICORP'S
DRAFT LICENSE APPLICATION**

for

**The Klamath Hydroelectric Project
(FERC P-2082)**

September, 2003



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September 17, 2003

Todd Olson
Project Manager, Klamath Relicensing
PacifiCorp
825 NE Multnomah – Suite 1500
Portland, OR 97232

Re: Oregon Water Resources Department's Comments on PacifiCorp's Klamath
Project Draft License Application (FERC P-2082)

Dear Mr. Olson,

The Oregon Water Resources Department (OWRD) appreciates the opportunity to comment on the Draft License Application (DLA) for the Klamath Hydroelectric Project (Project), issued by PacifiCorp on June 24, 2003.

OWRD oversees the allocation and use of the waters of the State of Oregon, including the issuance of water rights for hydroelectric projects.

OWRD has participated in the traditional relicensing process since PacifiCorp requested the formation of a Hydroelectric Application Review Team (HART) on March 15, 2000. OWRD is committed to resolving the issues identified below, and encourages PacifiCorp to contact OWRD hydroelectric staff to discuss these issues and address any questions or concerns that PacifiCorp may have.

OWRD appreciates the efforts that PacifiCorp has made to bring interested parties together to discuss key hydroelectric reauthorization issues and to scope studies. However, OWRD believes it is important to note that many critical issues remain unresolved and several vital studies are not finalized that are essential to identifying and measuring project impacts.

S1-2

OWRD believes that the DLA is incomplete in several areas. The DLA does not meet several important informational requirements set forth in the Code of Federal Regulations (CFR) or Oregon Revised Statutes (ORS). Specifically, 18 CFR 4.51(f)(2) and (3) require applicants to report on water use and quantity, fish, wildlife, and botanical resources in the vicinity or impacted by the project. These reports must include descriptions of existing resources affected by the project, any anticipated continuing impacts of the project on the resources, and proposed mitigation and enhancement measures for protection or improvement of these resources.

ATTACHMENT 3 – OWRD'S 90-DAY COMMENTS ON KLAMATH PROJECT DLA

2

Response to Comment S1-2

The draft license application (DLA) included a thorough description of the existing Project, its operation, and the Project's effect on the surrounding environment, to the extent it could be described based upon available study results. PacifiCorp and relicensing participants had agreed prior to development of the DLA that it would not be appropriate for PacifiCorp to draw conclusions in the application about the effects of the existing Project on the surrounding environment, unless those conclusions were based upon study results.

As a result of the Klamath Collaborative's extensive changes to the number and scope of studies, few studies were completed in time to inform the development of the DLA. Subsequently, PacifiCorp did not have sufficient information to justify proposing changes to the existing Project. Absent information to the contrary, existing facilities and operations were deemed appropriate.

Now that almost all studies have been completed and reviewed, changes to the Project and its operations have been proposed. This proposed Project, proposed Project operations, and the proposed Project's anticipated enhancement to the surrounding environment are thoroughly described in the final license application.

As per 18 CFR 16.8(c)(2) and (3), an application will not be rejected by FERC as deficient merely because late studies requested by agencies during the second consultation stage are not completed during the second stage.

Response to Comment S1-3

See response to OWRD comment #2, above.

PacifiCorp has made every effort to document all study results available in time for publication of this FLA.

Response to Comment S1-4

PacifiCorp presents information to help meet the above request in the license application Initiation Statement, and in various sections of the license exhibits.

S1-3

In their DLA, PacifiCorp partially meets the requirement of reporting on the different resources that are "in the vicinity or are impacted by the project" by describing the current project. However, PacifiCorp's DLA fails to comply with 18 CFR 4.51(f)(2) and (3) and ORS 543A.095 (1)(b) and (3) by not identifying resources currently affected by the project, by not identifying anticipated continuing impacts, or by proposing any protection, mitigation, or enhancement (PME) measures. Additionally, OWRD believes that PacifiCorp's DLA does not comply with 18 CFR 16.8 (c) (4) (B) (ii), which requires the applicant include a discussion of any PME measures.

Given these deficiencies, the DLA does not provide enough information for OWRD to determine whether the Project's proposed use of water is in compliance with Oregon's standards for hydroelectric water rights, and whether the Project will impair or be detrimental to the public interest. Hydroelectric applicants must disclose the effects of their project on the environment and propose mitigation measures to protect affected natural resources in the new license and water right period.

OWRD is charged with ensuring that the waters of the State of Oregon are used beneficially and without waste. In addition, OWRD coordinates Oregon's process for reauthorizing existing hydroelectric projects, including participation in the federal relicensing process.

This Project operates through a variety of pre-1909 adjudicated claims for water rights, a non-expiring certificated water right, and a time-limited water right. The time-limited water right (HE 180), which is for the development of electricity at PacifiCorp's J.C. Boyle powerhouse, is the only water right requiring reauthorization from the State of Oregon. This right has a priority of 04/17/1951 and is for the use of 2,500 cubic feet per second (cfs) of Klamath River water.

Although OWRD will only determine whether to reauthorize HE 180, the HART will review the entire project in conjunction with the federal process and will be providing state positions regarding the entire project.

OWRD has identified several issues that it would like PacifiCorp to address, as indicated below.

OWRD'S SPECIFIC COMMENTS ON THE DLA

S1-4

1. The DLA does not provide sufficient information for OWRD to evaluate the Project's proposed water usage under Oregon law.

Under Oregon law, before a water right can be reauthorized, OWRD must find that the continued operation of an existing hydroelectric project does not impair or is not detrimental to the public interest. Oregon Revised Statute (ORS) 543A.025. In making this finding, a number of factors must be considered by OWRD, including:

Response to Comment S1-5

This information is contained in Exhibit B and chapter E3 of Exhibit E.

- (a) Conserving the highest use of the water for all purposes, including irrigation, domestic use, municipal water supply, power development, public recreation, protection of commercial and game fishing and wildlife, fire protection, mining, industrial purposes, navigation, scenic attraction or any other beneficial use to which the water may be applied for which it may have a special value to the public;
- (b) The maximum economic development of the waters involved;
- (c) The control of the waters of this state for all beneficial purposes, including drainage, sanitation and flood control;
- (d) The amount of water available for appropriation for beneficial use;
- (e) The prevention of wasteful, uneconomic, impracticable or unreasonable use of the waters involved;
- (f) All vested and inchoate rights to the waters of this state or to the use of the waters of this state, and the means necessary to protect such rights; and
- (g) The state water resources policy formulated under ORS 536.295 to 536.350 and 537.505 to 537.534.

OWRD requests that PacifiCorp submit a letter that specifically identifies how each of the above items is addressed in the DLA. Additionally, OWRD requests that PacifiCorp specifically identify where this information is located when they submit their Final License Application (FLA).

The Project DLA will also be reviewed under the standards found in ORS 543A.120. These standards consider several additional factors, including the following:

- a) Any applicable basin program, the compatibility of the proposed use with applicable land use plans and information set forth in the application report or final report on studies;
- b) An assessment of water availability and the amount of water necessary for the proposed use; and
- c) An assessment of whether the proposed use would result in injury to existing water rights.

OWRD acknowledges the large volume of information that PacifiCorp has provided in its DLA and recognizes that some of the issues described above may have been addressed in the DLA, and we may have overlooked that information. If you believe that the information is included in the DLA, please provide us with a reference to the location of the relevant information.

S1-5

However, OWRD's initial review finds that PacifiCorp has not provided sufficient information to make a determination regarding each of the above areas of consideration. In order to reauthorize hydroelectric water right HE 180, more specific information is needed.

Recommendation

S1-6

PacifiCorp should provide additional information concerning its proposed water usage at HE 180 to allow OWRD to determine whether PacifiCorp has met each of the water right standards set forth in ORS 543A.025 and 543A.120.

S1-7

Specifically, PacifiCorp should provide information demonstrating how its Project conserves the highest use of the water for all purposes. ORS 543A.025(1)(a). This discussion should reference the relevant State of Oregon basin plans, and should describe the other uses that the Project is subordinate to such as irrigation, domestic use, and municipal water supply. Furthermore, PacifiCorp should discuss the current 100 cfs minimum instream flow through the J.C. Boyle Bypass, how this minimum flow rate was established, why the rate remains sufficient, and any other beneficial uses of water provided by the Project.

S1-8

PacifiCorp should also describe how the Project maximizes the economic development of the waters. ORS 543A.025(1)(b). In addressing this standard, PacifiCorp should look to the Klamath Basin Compact, which describes what the State of Oregon considers to be the maximum economic develop of the Klamath River. PacifiCorp should also describe the economic benefit to the area provided by the Project such as how many people it employs, their combined annual salary, direct Project-related purchases in the community, property taxes associated with the Project in addition to recreation-related benefits of the Project, and any other economic benefits provided by the Project's use of water.

PacifiCorp should provide a description of whether and how the Project controls the waters of the state for beneficial purposes, including recreation, drainage, flood control, and sanitation. ORS 543A.025(1)(c).

PacifiCorp should also describe how the Project prevents wasteful, uneconomic, impracticable or unreasonable use of the waters involved. ORS 543A.025(1)(e). In particular, PacifiCorp should characterize the various benefits to recreational boating, fish and wildlife, riparian resources, cultural resources and any other benefits that the Project may provide.

PacifiCorp should describe how the Project will be operated to protect all vested and inchoate rights to the waters of Oregon or to the use of the waters of Oregon. ORS 543A.025(1)(f). PacifiCorp should describe how HE 180 is subordinate to certain other water rights.

S1-9

PacifiCorp should also demonstrate the Project's compatibility with applicable land use plans. ORS 543A.120(2)(b).

Response to Comment S1-6

This information is contained in Exhibit B and chapter E3 of Exhibit E.

Response to Comment S1-7

Comment noted. PacifiCorp is continuing to work with the Instream Flow subgroup on PHABSIM analysis in this reach. Please see Section 4 of Exhibit E for a detailed discussion on Project impacts to fisheries resources and proposed PM&Es.

Response to Comment S1-8

These comments were considered in developing the License Application. Please see Executive Summary, Socioeconomic FTR and License Application Exhibits B and E for this information.

Response to Comment S1-9

Consistency with applicable land use plans is discussed in section E.8.3.2 of the FLA.

- S1-10 [**2. PacifiCorp should install real-time telemetry gauges at each point where water enters a project waterway and at the intakes to each powerhouse.**
- Under Oregon law, water must be used beneficially without waste. ORS 540.610(1). PacifiCorp must demonstrate that this standard is being met.
- S1-11 [PacifiCorp's Link River project is almost 100 hundred years old and has a well-known history of wasting water due to leakage from waterways (i.e. flumes, wooden stave penstocks, canals, and other conduits) due to vandalism and insufficient maintenance and replacement of faulty systems.
- Though PacifiCorp has made capital improvements to these waterways and has committed to continue making improvements, OWRD believes that to ensure that water is not being wasted and that only the permitted amounts are being used, PacifiCorp should install and maintain real-time telemetry gauging. These gauges should be installed at project intakes, headwaters of bypass reaches, and below powerhouses so that PacifiCorp's appropriation corresponds with their water rights and pre-1909 unadjudicated claims.
- S1-12 [Additionally, PacifiCorp's DLA indicates that the Project's combined hydraulic capacity is in excess of PacifiCorp's water rights. OWRD requests that PacifiCorp install gauging to ensure that only the amount of water allowed under their water rights and pre-1909 unadjudicated claims is being used for the specified purpose.
- Recommendation**
- S1-13 [PacifiCorp should provide for the continuous monitoring of flows linked to the gauging station for those flows conveyed past the diversion dam including the power canal, fish ladder, and bypass flows. Flows are to be measured in accordance with methodologies provided in Oregon Administrative Rule (OAR) 690-085-0015, or such other methodologies proposed by PacifiCorp and approved in writing by OWRD.
- S1-14 [**3. PacifiCorp may be appropriating water for hydroelectric generation for which they have no water right.**
- OWRD has become aware that PacifiCorp appears to be using approximately 3.865 cfs of water from five unnamed springs located in the West half of the North East Quarter of Township 41 South, Range 4 East, Section 3 of the Willamette Meridian, for which they have no right or claim.
- Recommendation**
- If PacifiCorp wishes to continue using this water they must consult with OWRD to determine the proper process to follow.

Response to Comment S1-10

Given the means by which the proposed Project will operate, there is no opportunity for wasting water. The water is temporarily diverted to Project turbines and then is returned to the Klamath River.

Response to Comment S1-11

PacifiCorp plans to decommission the East Side and West Side projects, including associated waterways, as described in the FLA.

Response to Comment S1-12

The combined hydraulic capacity is an instantaneous flow rate and does not represent an average flow rate over an extended period of time, which a water right does represent.

Response to Comment S1-13

PacifiCorp has identified instream flows and release mechanisms in Exhibit E.

Response to Comment S1-14

PacifiCorp has submitted a claim for the Spring Water to OWRD.

Response to Comment S1-15

PacifiCorp has not requested a new license length term in the FLA. However, the analysis presented in the FLA is based on a conservative (worst-case) approach of using no less than a 30-year license term to recover investment costs.

S1-15

4. PacifiCorp's request for a 50-year Federal Energy Regulatory Commission (FERC) license is inconsistent with the Federal Power Act.

The Federal Power Act (Act) specifies that "any new license shall be for a term which the Commission determines to be in the public interest, but not less than 30 years, nor more than 50 years. This provision is consistent with Commission policy which was to establish 30-year terms for those projects which proposed no new construction or capacity, 40-year terms for those projects that proposed a moderate amount of new development, and 50-year terms for those projects that proposed a substantial amount of new development."

Based on the DLA, it does not appear that PacifiCorp has proposed enough new development to warrant a 50-year license term.

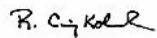
Recommendation

PacifiCorp should clarify how the Project qualifies for a 50-year license term based on the requirements of the Act, or propose a shorter license term.

CONCLUSION

OWRD recognizes PacifiCorp's efforts to conduct a constructive relicensing process. It is our sincere hope that the issues that we have identified can be resolved before PacifiCorp submits their Final License Application (FLA) by February 29, 2004. If you have any questions or concerns regarding these comments, please contact me at (503) 378-8455, extension 289.

Sincerely,



R. Craig Kohanek
Hydroelectric Project Analyst
Oregon Water Resources Department



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Re: State of Oregon Hydroelectric Application Review Team Comments on
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Project Relicensing (FERC Project 2082)

Dear Mr. Olson:

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Response to Comment S2-1

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S2-1

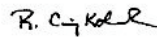
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Again, the HART appreciates the opportunity to provide comments on the DLA and looks forward to continuing to work with PacifiCorp and other stakeholders in a collaborative and productive manner.

If you have any questions or concerns regarding these comments, please do not hesitate to contact me or any other member of the Klamath HART.

Sincerely,



R. Craig Kohanek
Hydroelectric Project Analyst
Oregon Water Resources Department

ATTACHMENT 1

Oregon Department of Environmental Quality
COMMENTS ON PACIFICORP'S DRAFT LICENSE
APPLICATION

for

Klamath Hydroelectric Project
(FERC Project No. 2082)

September 2003



Department of Environmental Quality
2146 NE 4th Street, Suite 104
Bend, OR 97701
(541) 388-6146
Eastern Region
Bend Office

September 16, 2003

Todd Olson, Relicensing Manager
PacifiCorp
825 NE Multnomah, Suite 1500
Portland, Oregon 97232

Subject: ODEQ Comments on the Draft License Application
Klamath Hydroelectric Project - FERC Project No. 2082

Dear Mr. Olson,

The Oregon Department of Environmental Quality (ODEQ; Department) has reviewed and prepared the attached comments regarding PacifiCorp's Draft License Application (DLA) for a new Federal Energy Regulation Commission (FERC) license to operate the Klamath Hydroelectric Project (FERC 2082). As a federal permitting action, the application for a hydroelectric license triggers the need for a Federal Clean Water Act (CWA) § 401 Certificate (401 Certification) from ODEQ. These comments are provided to highlight issues that need to be addressed by PacifiCorp in order to adequately support its future 401 certification and final license applications for the Project.

ODEQ requests that PacifiCorp consider these comments in context with all comments previously provided by the Department. Previous communications from the Department have been provided via formal letters including comments to the First Stage Consultation Document (03/19/01), Second Stage Consultation Document Draft Study Plans (07/27/01), and to the Second Revision of Draft Study Plans (12/28/01 and 02/18/02). ODEQ has also provided multiple letters, electronic mail correspondence and oral comments regarding study plan design and other relicensing matters during and between the numerous relicensing work group meetings that have taken place over the last couple of years.

Several factors limit the Department's ability to provide detailed comments related to current or expected future Project impacts on water quality and water quality related beneficial uses. Many studies have not yet been completed, and, in some cases, study plans have not been finalized. In other cases, where results from completed or ongoing studies have been provided, conclusions are not sufficiently substantiated or the results are insufficient to allow resolution of key objectives such as identification and quantification of Project-related impacts, or selection of Protection, Mitigation, and Enhancement measures (PMEs). In fact, no preliminary opportunity to comment on proposed PMEs is offered since draft PMEs have not been offered in the DLA or attendant Draft Technical Reports (DTRs). As a result, ODEQ's opportunity to provide constructive and detailed comment to PacifiCorp regarding the adequacy of future PMEs, especially from a 401 Certification perspective, will not occur until late in the process at such time as PMEs are offered in Final Technical Reports (FTRs) or in the 401 Certification application.

S2-2

Response to Comment S2-2

Substantial information has been added to the analysis of water quality in the FLA (Exhibit E, chapter E3) and Water Resources FTR. A number of water quality studies have been approved and completed, including review of historic water quality data, extensive monitoring of water quality in the Project area during the period 2000-2003, and detailed water quality modeling of the Klamath River from Link dam to Turwar (near the river's mouth). Measures proposed for enhancement of water quality are described in Exhibit E, section E3.8.

FERC's relicensing regulations require that PacifiCorp request certification under Section 401 of the Clean Water Act for the Project no later than 60 days after FERC issues the notice that the relicensing application has been accepted and is ready for environmental analysis. PacifiCorp will request certification from ODEQ and CSWRCB by that date. PacifiCorp will consult with ODEQ and CSWRCB to prepare a detailed analysis and application for 401 certification to ensure that the Project complies with the applicable provisions of CWA, including applicable State water quality standards or objectives. Further consultation with ODEQ and CSWRCB is particularly important given the many sources and factors contributing to water quality conditions in the Project area, including many that are outside of PacifiCorp's control, and because several of the state water quality standards or objectives are qualitative and narrative, and therefore require interpretation and judgement.

Response to Comment S2-3

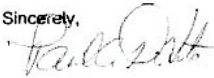
See response to comment #2.

S2-3

Given the generally poor water quality conditions that exist in Project-affected waters, ODEQ suspects that PacifiCorp will likely need to propose very significant, if not drastic changes in Project operations and/or facilities to offset Project-related contributions to non-attainment of water quality standards. Considering this, along with the limited time to develop and receive comment on proposed PME's, and PacifiCorp's expressed intent to minimize changes in Project operations and facilities, it seems quite plausible that issuance of an affirmative 401 Certification based upon a very-soon-to-be-developed 401 Certification application will be quite difficult. ODEQ urges PacifiCorp to move forward quickly with necessary studies and the evaluation and development of PME proposals such that an adequate 401 Certification application can be submitted.

ODEQ appreciates this and previous opportunities to consult with PacifiCorp and other stakeholders regarding the relicensing process. The Department also looks forward to future consultation opportunities to assist PacifiCorp in its efforts to develop adequate 401 certification and final license applications. Please do not hesitate to contact me with questions or comments at the above address, by phone at (541) 388-6146 x 257, or via email at devito.paul@deq.state.or.us.

Sincerely,



Paul A. DeVito
Hydroelectric Specialist

A. General Comments

A.1. Overall Assessment of the Draft License Application

PacifiCorp notified the state Hydroelectric Application Review Team (HART) that it could not file a complete Draft License Application (DLA) with the state one year in advance of filing a Final License Application (FLA) with the Federal Energy Regulatory Commission (FERC). As is allowed under ORS 543A.150, the HART granted a 90-day filing extension to provide PacifiCorp additional time to develop a more complete DLA. Notwithstanding the additional time which ended up stretching to approximately 110 days, PacifiCorp informed the HART that essential information could not be collected and/or analyzed and studies could not be completed in time for inclusion in the DLA.

S2-4 [The DLA lacks detailed information and completed studies necessary to adequately assess Project-related impacts to Klamath River water quality and the state-designated beneficial uses to be made of the river.

S2-5 [**Recommendation:** In preparing the FLA and Clean Water Act (CWA) § 401 Certification (401 Certification) application, PacifiCorp needs to significantly expand upon the information and level of detail presented in the DLA, incorporating scientifically valid analyses of Project-related impacts and expected efficacy of yet-to-be-developed Protection, Mitigation, and Enhancement Measures (PMEs).

A.2. Overall Assessment of the Consultation Process

The Oregon Department of Environmental Quality (ODEQ) appreciates that PacifiCorp, upon significant prompting on the part of many stakeholders, expanded upon its selected "traditional" FERC relicensing process to provide additional opportunities for consultation and collaboration regarding study plan design. The Department believes, and perhaps PacifiCorp recognizes, that any potential opportunity to successfully relicense this major project in a timely manner, cannot be accomplished via implementation of only the minimum consultation requirements of the traditional process.

S2-6 [Though PacifiCorp has generally implemented a collaborative approach to study plan development, there have been disconcerting issues. Some of the field studies have been implemented prior to receiving or incorporating stakeholder recommendations for study plan improvement. In some instances, interim progress and study results have not been shared with the stakeholders. In other cases, studies have not been finalized or implemented due to PacifiCorp's reluctance to incorporate recommendations of the majority of stakeholders. For example, PacifiCorp has resisted the recommendations of many stakeholders to provide serious evaluation of a full range of alternatives as is required by the National Environmental Policy Act (NEPA) process.

S2-8 [**Recommendation:** Initiate studies only after receiving and incorporating stakeholder recommendations for study improvements. Share interim progress and study results with stakeholders as early as possible. PacifiCorp may need to explore a full range of Project alternatives in order to find an alternative that can be certified by ODEQ or to provide FERC with necessary information to adequately conduct an Environmental Impact Statement (EIS) as part of its NEPA process.

Response to Comment S2-4

Please see Section E3 of the FLA for additional detail on water quality and beneficial uses.

Response to Comment S2-5

See response to comment #2, above.

Response to Comment S2-6

Due to timing of relicensing and the need to complete some level of study in key resource areas, PacifiCorp initiated studies prior to Collaborative approval. Efforts were focused to provide study results as soon as possible to the stakeholders at monthly resource meetings. In the case of some study requests, PacifiCorp did not agree with the level of study requested by stakeholders, and declined to include some elements in a study.

Response to Comment S2-7

The final license application (FLA) provides a thorough description of the existing Project, its operation, and the Project's effect on the surrounding environment. In addition, the FLA provides a thorough description of the proposed Project, proposed Project operations, and the proposed Project's anticipated enhancement to the surrounding environment. The proposed Project was developed considering a number of factors, including the issues, questions and concerns raised by participants in the pre-filing collaborative consultation process; existing information; and the results of over 38 environmental studies developed by the Klamath Collaborative.

It is not possible for PacifiCorp to accurately predict the alternatives, or all of the information that FERC may need to analyze these alternatives in their Environmental Impact Statement. Should FERC require additional information, they will likely request it from PacifiCorp.

At the request of relicensing participants and in the interest of collaboration, PacifiCorp conducted intensive fish passage and water quality modeling of at least five variations on dam removal, volitional fish passage and run-of-river operations. In addition, PacifiCorp worked with relicensing participants to try and identify all of the implications of implementing numerous facility and operations scenarios through an exercise entitled System Landscape Options Analysis. All of this information is included in the appended technical reports and consultation record. PacifiCorp has addressed alternatives and their associated issues as a means to inform the subsequent NEPA process.

Response to Comment S2-8

Most resource study plans received the approval of Working Groups and the Plenary. In cases where this did not occur, PacifiCorp elected to complete work it felt necessary for the license application. FERC will determine the alternatives for review in the NEPA process.

A.3. ODEQ's Statutes, Policies, Rules, and Authority under Clean Water Act § 401

ODEQ has authorities and responsibilities related to water quality certification under CWA § 401 and state statute (ORS 468) and rules (OAR 340-041 and 340-048). These have been discussed in detail in earlier Departmental comments provided in response to the First Stage Consultation Document (FSCD) and should be revisited.

With respect to ODEQ's determination of compliance with water quality standards, it is important to reemphasize the components of a standard that are considered. By definition, a water quality standard is composed of three parts:

- (1) Designated beneficial uses of a waterbody which set the water quality goals of a water body (e.g. resident fish and aquatic life, water contact recreation, hydropower),
- (2) Numeric and/or narrative water quality criteria that define the minimum conditions necessary to support the designated beneficial uses, and
- (3) Antidegradation policy that prevents existing water quality from degrading unless specific circumstances apply.

PacifiCorp's 401 Certification application should address all components of the state standards.

S2-9

Recommendation: Revisit the descriptions and citations of ODEQ's authorities and responsibilities under Oregon Revised Statutes (ORS) and administrative rules (OAR) and the Clean Water Act provided in our comments to the First Stage Consultation Document (FSCD). These descriptions also provide vital information regarding ODEQ's application of its authorities and responsibilities. All three components of each state water quality standard will need to be addressed in the 401 Certification application.

A.4. Generalizations

S2-10

The DLA contains many unsubstantiated generalizations or claims that the Project complies with water quality standards or has only insignificant effects on beneficial uses and present natural resource conditions within or outside of Project boundaries.

Recommendation: The FLA and 401 Certification application should include objective and technically supported identification and quantification of temporal and spatial Project impacts (or lack of impacts) on water quality parameters and designated beneficial uses. Data gaps should be identified and corrected in the FLA and 401 Certification application.

A.5. Generalized Presentation of Data

S2-11

Much of the historic and recently collected data for water quality and designated beneficial uses (such as fish and aquatic life) are presented in a composite manner that obscures potential temporal (seasonal or diurnal) and spatial variation. Such presentation limits or defeats the ability to identify and quantify present conditions and Project-related impacts.

Recommendations: Include data analyses that evaluate temporal and spatial variations in water quality and beneficial use support and Project-related impacts thereupon. Project-related impacts should be quantified relative to compliance with state water quality standards

A.6. Lack of Proposed Protection, Mitigation, and Enhancement Measures

Response to Comment S2-9

PacifiCorp describes its understanding of applicable regulatory requirements pertinent to ODEQ's authorities in section E3.4 of Exhibit E.

Response to Comment S2-10

Section E3.5 of Exhibit E provides a description of current water quality conditions in the proposed Project area in the context of applicable water quality standards or objectives. Section E3.8 provides descriptions of measures proposed by PacifiCorp to enhance current water quality conditions. A detailed analysis of how the State water quality standards or objectives apply to the Project, and how the Project meets the standards or objectives will be provided in applications for certification under Section 401 of the CWA for the Project.

As described in section E3.4, PacifiCorp will request certification under Section 401 of the CWA for the Project no later than 60 days after FERC issues the notice that the relicensing application has been accepted and is ready for environmental analysis. Please see response to Comment #2, above.

Response to Comment S2-11

See response to comment #10.

S2-12 PacifiCorp does not propose PME's for compliance with water quality standard criteria and designated beneficial uses. PacifiCorp acknowledges that the DLA is incomplete and revisions are expected when the FLA is filed with FERC in February 2004.

S2-13 **Recommendation:** PacifiCorp should incorporate into the FLA and 401 Certification application PME's that have been developed with stakeholder input for the protection of water quality and designated beneficial uses. The PME's should be evaluated in terms of net quantified benefit and offset of determined existing Project impacts. The PME's and any other proposed changes to the Project should also be evaluated in terms of compliance with the state's antidegradation policy at OAR 340-041-026(a).

A.7. Timing and Opportunity for Additional Study Requests

S2-14 Stakeholders are at a distinct disadvantage for making recommendations for additional studies at this time. Some study plans have not yet been completed and many relicensing studies are just getting underway. Of those studies that are underway, only limited results have been made available. Perhaps more importantly, the results have yet to be evaluated to determine satisfaction of identified objectives. This information is vital to determining study adequacy and identification of remaining information gaps and new considerations, thus limiting the ability of stakeholders to make informed requests for additional studies.

S2-14 FERC rules identify the commenting period following issuance of the DLA as being a critical time in the relicensing process for requesting additional studies. Stymied by the unavailability of study results, and further limited by the lack of information regarding the type of PME's that PacifiCorp might consider, the stakeholders are at a very significant disadvantage in terms of identifying additional study needs. As results and conclusions regarding currently planned or ongoing studies becomes available, stakeholders will be better equipped to provide informed and helpful input regarding additional study needs.

Recommendation: PacifiCorp should send out a formal letter to stakeholders with copy to FERC extending the 90-day timeline for requesting additional relicensing studies. The date should be extended to no sooner than 60 days beyond availability of final study results and findings for at least 75% of the currently planned studies.

B. Specific Comments

B.1. Spatial and Temporal Trends of Water Quality Data

S2-15 In Water Resources DTRs 2.0 and 3.0 and DLA Section E3.0, PacifiCorp identifies spatial and temporal trends of water quality based upon data collected by various entities between 1950 and 2001 in the Klamath River Basin. The collected data spans various flow conditions, basin activities, times of day, seasons, climatic conditions, and sampling methodologies and levels of quality assurance, affecting the accuracy and comparability of the data and making it difficult to interpret and draw reliable conclusions.

Recommendation: While the pattern of differences in water quality among sites along the Klamath River can provide some insight into the dynamics of water quality in the river, PacifiCorp should be cautious in its interpretation and drawing of conclusions regarding

Response to Comment S2-12

Comment noted. Please see Section E3 of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed PM&Es.

Response to Comment S2-13

See response to comment #10, above. Section E3.8 of Exhibit E provides descriptions of measures proposed by PacifiCorp to enhance current water quality conditions.

Response to Comment S2-14

It is not within PacifiCorp's purview to extend FERC timelines.

Response to Comment S2-15

Please see the Water Resources FTR for the detailed analysis of PacifiCorp's water quality monitoring and modeling efforts.

S2-15 identified temporal and spatial differences and trends. Where possible, it would be useful to segregate data of high quality into like groups that allow for more rigorous identification of temporal and spatial relationships as well as trends. ODEQ will place more confidence in water quality interpretations and conclusions drawn from contemporary data for which interrelated conditions (location, season, time of day, flow, and etcetera) have been factored into the analysis.

B.2. Compliance Assessment of Compiled Water Quality Data

S2-16 DLA E.2.4.1 and DTR 2.0 identify methods for database development based upon Study Plan 1.0, *Compilation and Assessment of Existing Water Quality Data*. Per the approved study plan, plots and statistical analyses were to be developed "to assess trends and compliance with Oregon and California water quality standards, criteria, and objectives." Study Plan 1.0 further states, "Gaps in the data and information will be identified by exercising expert professional judgment and by comparing the available data and information with the requirements of Oregon and California 401 certification and the FERC license application." While some generalized plots and statistical analyses are provided in the DLA and DTR, PacifiCorp neglected to assess compliance with state water quality standards. As a result, the need for additional studies or filling of data gaps is unclear. It is quite possible that ODEQ will need to require additional studies and the filling of data gaps in the future, pending PacifiCorp's eventual assessment of water quality data in terms of compliance with state water quality standards and filing of a 401 certification application.

S2-17 **Recommendation:** Compare and evaluate the compiled water quality data in relation to state water quality standards to determine compliance. Identify and conduct additional studies to fill data gaps if needed to resolve critical uncertainties. Consider the temporal (diurnal and seasonal) and spatial aspects of data points to determine the range of temporal and spatial compliance with each of the state water quality standards.

B.3. Monitoring of Water Temperature and Water Quality Conditions in the Project Area

S2-18 There is a discrepancy between the actual sampling effort for 2002 identified in Water Resources DTR 3.0 when compared to that of the stakeholder-approved Study Plan 1.2.

Stakeholder-approved Study Plan 1.2, Section 1.2.4.3 calls for:

- Monthly or biweekly collection of grab samples and in situ measurements of 14 water quality parameters at 42 sites
- Automated data collection at hourly intervals of four water quality parameters at 13 sites
- Automated temperature monitoring at hourly intervals at 18 sites including vertical arrays in Keno, J.C. Boyle, Copco No. 1, and Iron Gate reservoirs.
- Multi-day synoptic sampling at 42 sites, including grab samples and additional automated hourly monitoring, to obtain sub-daily information needed for water quality modeling.

Water Resources DTR Section 3.4.4 reports that actual 2002 sampling effort was:

- Monthly or biweekly collection of grab samples for laboratory or *in situ* measurements of 21 water quality constituents at 31 locations (not all constituents were measured at all places)
- Automated data collection at hourly intervals of four water quality parameters at 5 sites
- Automated temperature monitoring at hourly intervals at 28 sites including vertical arrays in Keno, J.C. Boyle, Copco No. 1, and Iron Gate reservoirs.

Response to Comment S2-16

See response to comment #10.

Response to Comment S2-17

See response to comment #10.

Response to Comment S2-18

Comment noted. The text has been modified to address these comments. PacifiCorp has kept stakeholders informed of studies by posting material on the PacifiCorp relicensing website and presenting results at monthly meetings.

S2-18	Multi-day synoptic grab sampling at 12 sites and 4 additional automated hourly monitoring sites, in addition to the regular monthly sampling, to obtain sub-daily information needed for water quality modeling. Information is not provided regarding the rationale or significance of sampling at significantly lower levels than those approved by stakeholders. Recommendation: Identify the rationale and significance of deviating from the approved study plan for 2002 water quality sampling. Identify the specific deviations in sampling sites, constituents, and frequencies.
S2-19	B.4. Key Water Quality Criteria DLA Tables E2.6-1 (p. E2-9) and E3.4-1 (p. E3-115) identify Oregon and California water quality criteria for key water quality constituents for the Klamath Basin in the vicinity of the Project. While this DLA tables may be intended only to summarize key numeric criteria, other important numeric and narrative criteria are not identified. For instance, with respect to Oregon's dissolved oxygen (DO) criteria, only the state's criteria applicable to cool-water aquatic life is identified in Table E3.4-1, whereas cold-water spawning and rearing are only identified in Table E2.6-1. While ODEQ has designated the Klamath River from UKL to Keno Dam as providing for <i>cool-water</i> aquatic life, the Department designates the waters downstream of Keno Dam to Stateline as habitat for <i>cold-water</i> aquatic life and salmonid spawning and rearing. Though, cool-water, and perhaps even warm water species may be present downstream of Keno Dam to Stateline within the river and J.C. Boyle Reservoir, the more stringent cold-water DO criteria would apply for salmonid (i.e. redband trout) spawning and rearing based upon the periodicity of these life stages in these waters. With respect to temperature, Table E3.4-1 identifies only numeric criteria to support rearing salmonids and to protect against identified low DO levels, whereas Table E2.6-1 only identifies temperature criteria for spawning and rearing salmonids. The state's temperature standard is much broader. Among other considerations, the standard addresses temperatures as they relate to spawning and rearing salmonids, low DO levels, and to protect federally listed T&E species and ecologically significant cold-water refugia. Both tables identify ammonia toxicity as a key water quality constituent of concern for Oregon but neglect to recognize other toxics covered under the toxic standard as a whole. Though there are no 303(d) listings in the upper Klamath Basin other than for unionized ammonia, ODEQ considers many other toxic substances to be of significant concern as well, hence the request for Study Plan 10.0 related to toxics. Recommendation: In order to adequately prepare a 401 Certification application for the Project, PacifiCorp will need to carefully review, identify, and address all applicable aspects of both the <i>numeric</i> and <i>narrative</i> criteria of <i>all</i> the state water quality standards of OAR 340-041 applicable to the Klamath Basin.
S2-20	B.5. Revision of Water Quality Standards DLA Table E3.4-1 identifies current criteria for some of the key water quality standards. Neither in the table nor elsewhere in the DLA or DTRs is there any discussion or acknowledgement that several of Oregon's water quality standards are currently in the process of being revised. In

Response to Comment S2-19

PacifiCorp agrees and will consult with ODEQ and CSWRCB to prepare a detailed analysis and application for 401 certification to ensure that the Project complies with the applicable provisions of CWA, including applicable State water quality standards or objectives. Further consultation with ODEQ and CSWRCB is particularly important given that several of the state water quality standards or objectives are qualitative and narrative, and therefore require interpretation and judgement.

Response to Comment S2-20

See response to comment #19, above.

accordance with the periodic review process dictated by Section 402 of the CWA, ODEQ has reviewed standard criteria for the standards of temperature, turbidity, and toxic substances. Proposed modifications to the standard criteria are currently out for public comment. Following consideration of public comment, ODEQ plans to forward its recommendations to the Environmental Quality Commission for approval by December 5th of this year. ODEQ will evaluate the future 401 application for the Project based upon compliance with the most current revisions to state water quality standards.

Recommendation: PacifiCorp's 401 certification application should assess Project compliance based upon the most current revisions to state water quality standards. If at the time of drafting the 401 certification application the revisions have not yet been approved, PacifiCorp should update its application as appropriate as soon as possible following Environmental Quality Commission approval.

B.6. Near-Term TMDL Effort

DLA Section E3.4.2 states ODEQ's target to develop TMDLs from Upper Klamath Lake to Keno Dam. However, the Oregon has responsibility to set TMDLs that extend down to Stateline. ODEQ is working closely with NCRWQCB and EPA Regions 9 and 10 to coordinate schedules and efforts to develop TMDLs.

Recommendation: The FLA and 401 certification application should acknowledge the most recent target dates and scope of the planned TMDL efforts.

B.7. Other Agency Water Quality Related Resource Management Plans

As indicated under Section E3.4, the DLA lacks discussion of BLM and USFS resource management plans as they relate to water quality. Similarly, the document also lacks discussion of ODFW's Fish and Wildlife Habitat Mitigation Policy and Klamath Basin Fish Management Plan as they relate to water quality.

Recommendation: Describe these plans/policy in the FLA and 401 certification application as they relate to both water quality and designated beneficial use support.

B.8. Compliance with Applicable Water Quality Standards

Tables E3.5-1 and E3.5-2 identify water quality standards that PacifiCorp deems that the Project does not affect or may affect, respectively. It appears that PacifiCorp does not fully understand the state water quality standards and how they are interpreted by ODEQ. Also, some of the rationale provided to argue that standards are not affected by the Project is limited and insufficient to provide reasonable assurance of no impact. More details follow.

Table E3.5-1 - Water quality standards that should not (likely) be affected

ODEQ agrees that some water quality standards are unlikely to be affected by the Klamath Hydroelectric Project. However, some of the statements that a given parameter is not affected by the Project are insufficient in that they do not address the full scope of the standards as interpreted by ODEQ. PacifiCorp will need to provide reasonable assurance that each of these

Response to Comment S2-21

Section E3.4 includes the 303(d) listing status of Project waters and a summary of TMDL activities.

Response to Comment S2-22

Section E3.4 has been revised to describe water quality-related regulatory requirements that are specifically applicable to the FERC process.

Response to Comment S2-23

Section E3.5 of Exhibit E has been revised to provide an assessment of how current water quality conditions in the proposed Project area compare to relevant water quality standards or objectives.

standards is not likely affected by the Project. For some standards, this task may be simple and straightforward, but it must be done for each standard.

ODEQ does not agree with the inclusion of several of the standards included in the list of "Water quality standards that should not be affected." For example, "objectionable liberation of dissolved gases" could potentially be tied to odor complaints at Lake Ewauna/Keno Reservoir associated with Project impoundment-induced sedimentation, giving rise to discharge of methane and sulfur gasses due to summertime anaerobic bacterial activity in the reservoir bottom sediments. Another aesthetics-related standard that should be addressed in more detail is the "tastes and odors" standard. This standard includes concern for palatability for fish caught from Project waters as well as tastes or odors imparted to drinking waters supplied by the Project waters. The "tastes and odors" standard, as well as the development of fungi might potentially be tied to primary production exacerbated by Project effects on nutrient uptake and availability.

With respect to "total dissolved solids", though PacifiCorp may add nothing to the water that would increase TDS, evaporation from reservoir surface may slightly increase concentrations. This standard can likely be dispatched quite readily however, by comparing historic data to that of the standard numeric criterion.

"Bottom or sludge deposits" is interpreted by ODEQ to include sedimentation such as may periodically occur below the JC Boyle overflow facility and within the reservoirs. Reasonable assurance could be provided via bathymetric and modeling analyses of reservoirs, comparing with and without project effects on reservoir sedimentation accumulation and rates.

The "discoloration, scum, oily sleek" standard could be affected by the Project as a result of spills of oil or other material used at Project facilities adjacent to Project waters. Also, routine operations or maintenance activities could potentially result in discharge of materials resulting in violation of this standard. PacifiCorp has not identified any measures being implemented to guard against such spills and discharges.

Table E3.5-2 -- Water quality standards of potential concern

In addition to the identified peaking operations, many other Project-related activities may also adversely affect biological communities related to the "biological criteria" standard. Other Project impacts include rates of ramping (potential stranding), minimum flows, entrainment of fish and aquatic life into power canals and turbines, impingement of fish and aquatic life on screens, ongoing inundation of important spawning grounds, modification of gravel and large wood transport, and blockage of upstream and downstream fish migration. These types of impacts are detrimental to sensitive designated beneficial uses of "resident fish and aquatic life" as well as "salmonid spawning and rearing."

With regard to reasons that dissolved oxygen (DO) and pH may be affected by the Project, 303(d) listings are noted. These 303(d) citations do not identify that JC Boyle is listed for both of these standards.

With respect to total dissolved gas (TDG), the reasons do not capture another typical activity at hydroelectric projects that must be considered related to turbine operations. Upramping of turbines or even steady operations may entrain air giving rise to elevated TDG and must be considered at each of the turbines for a reasonable assurance determination. Of particular concern is the very frequent upramping activity of the JC Boyle powerhouse turbines.

Response to Comment S2-24

The revised Section E3.5 of Exhibit E includes a discussion of the "total dissolved solids" standard.

Response to Comment S2-25

The revised Section E3.5 of Exhibit E includes a discussion of the "bottom or sludge deposits" standard.

Response to Comment S2-26

The revised Section E3.5 of Exhibit E includes a discussion of the "discoloration, scum, oily sleek" standard.

Response to Comment S2-27

ODEQ's web-based 303(d) database indicates that the Klamath River downstream of Keno dam, including J.C. Boyle Reservoir, to the California border is on the current (2002) 303(d) list only for water temperature (summer).

Response to Comment S2-28

Comment noted. Please see Water Resources FTR, Section 7 for total dissolved gas measurements.

S2-29 Regarding the toxics standard, only ammonia (unionized) is captured as a concern. ODEQ has previously expressed in multiple communications with PacifiCorp the concern for accumulation of a variety of toxics in Project reservoirs, particularly Lake Ewauna/Keno Reservoir. Though there may be limited Project-related activities that may potentially contribute various toxic materials to Project waters, such as spills, maintenance activities, and perhaps historic dumping of transformers at a time when such was considered a more practical and acceptable disposal means, the primary concern of ODEQ relates to Project-induced sedimentation. As previously discussed in some detail by ODEQ in earlier correspondence (please revisit) may result in the bioaccumulation of various toxic in fish and other aquatic life, potentially due to a sediment-related pathway. In addition to the adverse impacts to the aquatic organisms themselves, humans and terrestrial organisms consuming the toxic aquatic organisms could be impacted as well. ODEQ appreciates that PacifiCorp is conducting a study looking at bioaccumulation of toxic materials in resident fish species and expects that the results will be reported in the FLA and 401 certification application relative to compliance with the toxics standard.

S2-30 **Recommendation:** Include explanations in the 401 certification application why each particular standard is or is not a known or potential issue for this hydroelectric project. Explanations claiming that the Project does not affect compliance with given standards should be grounded in justification providing reasonable assurance. Consider ODEQ's full interpretation of the standards as well as previously expressed concerns when addressing Project impacts and when dismissing potential Project affects.

B.9. Water Quality Modeling

S2-31 Water Resources DTR 4.0 and DLA Section E3.7.5.1 provide discussion of PacifiCorp's water quality modeling effort. The DLA discussion is very limited, providing a brief overview of the modeling work. The DTR provides more discussion, primarily focused on set-up of the model (model implementation) and presentation of graphical temperature results for the initial simulations – Existing Conditions (EC), Steady Flow (EF), and Without Project (WOP).

The DTR does not include tabular results nor discussion and comparison of simulation results to the state water quality standards. Tabular results, in addition to the graphical results, would aid PacifiCorp's efforts to identify and quantify project related adverse impacts (contributions to non-attainment of standards).

S2-32 As PacifiCorp did not have simulation results for parameters other than temperature at the time of drafting the DTR and DLA, the documents do not present the results of such simulations. Aside from the initial three modeling scenarios, no other scenarios have been simulated. Ultimately, PacifiCorp will need to evaluate other scenarios to identify and quantify suitable PME's to support water quality certification.

S2-33 ODEQ expects that certification of the Klamath Hydroelectric Project will hinge upon PacifiCorp's ability to successfully model and forecast water quality of the Klamath River within and downstream of the Project. While compilation and careful evaluation of historic and current data can help identify current Project-related water quality impacts, successful modeling can provide a tool for quantification of the impacts and for predicting future impacts under modified operations and facilities. Thus, PacifiCorp's water quality models, if properly set-up, calibrated, and validated (verified), can provide a means for evaluating the efficacy of future PME's from a water quality standards compliance standpoint.

Response to Comment S2-29

A study conducted by CDFG in Project reservoirs and Upper Klamath Lake is reviewing a variety of toxics, not just ammonia. Please see the Water Resource FTR for a summary of the study and it's status.

Response to Comment S2-30

See response to comment #10.

Response to Comment S2-31

The DTR has been significantly revised. Please see the Water Resources FTR and Section E3 of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed PM&Es.

Response to Comment S2-32

PacifiCorp has agreed to run the SLOM scenarios in addition to the three water quality modeling scenarios presented in the DLA. Please see Section E3 of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed PM&Es.

Response to Comment S2-33

Substantial information has been added to the analysis of water quality in the FLA (Exhibit E, chapter E3) and Water Resources FTR, including water quality modeling of the Klamath River from Link dam to Turwar (near the river's mouth). Water quality modeling includes analysis of scenarios for existing conditions, "steady flow operation", and without-Project (all facilities removed) as described in section 4 of the Water Resources FTR. Additional modeling was conducted to

examine the effect on incremental instream flow releases from J.C. Boyle dam, selective withdrawal from Iron Gate reservoir for downstream temperature management, and hypolimnetic oxygenation in Iron Gate reservoir. This additional modeling is described in section E3.8 of Exhibit E.

Stakeholders requested modeling of other potential Project removal alternatives (e.g., Iron Gate and Copco I and II removed, Iron Gate removed) to complete a System Landscape Options Matrix (SLOM) assessment. The results of model runs of these SLOM scenarios are not discussed in the FLA or FTR, because the SLOM scenarios are not a necessary component of PacifiCorp's evaluation for this license application. These SLOM runs are intended to assist stakeholders to complete an assessment of whether information will be available to FERC to examine potential Project removal alternatives. PacifiCorp plans to complete the SLOM scenarios and present them to stakeholders in early Spring 2004.

Response to Comment S2-34

Comment noted.

Response to Comment S2-35

Please see the Water Resources FTR. PacifiCorp believes that the information necessary to peer review the model inputs, calibration and verification, and the sensitivity analysis is provided. PacifiCorp does not know why the modeler's notebooks are necessary, therefore, that information is not included in the FLA nor is an executable model file.

Response to Comment S2-36

Draft model documentation was made available on PacifiCorp's website earlier in the licensing process. Please see Section E3 of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed PM&Es.

S2-34 Considering the significant role that water quality modeling will likely play in the 401 certification process, it is imperative that a scientifically sound, robust, and defensible modeling effort be applied and the effort be well documented. ODEQ considers the selected models (RMA-2, RMA-11, and CE-QUAL-W2) to be among the better water quality models for riverine and reservoir systems. However, considering the many complexities posed by the Klamath system (such as multiple irrigation inputs/outputs, very large algal blooms and die-offs, relatively uncharacterized sediment kinetics, diffuse spring inputs, etc.), even these models may need significant customization. ODEQ recognizes that PacifiCorp's consultant has been working diligently to manipulate these models in an effort to ensure that they will work adequately on the Klamath. The Department also recognizes that PacifiCorp's consultant is actively and iteratively re-calibrating and re-verifying the models to improve model fit as new information becomes available. Considering the importance of the water quality modeling effort, ODEQ intends to use either in-house or external modeling expertise to review the modeling documentation and, perhaps, the model itself for purposes of 401 certification.

S2-35 Model documentation should provide clear discussion of assumptions, theory, and parameterization that is detailed enough so that others can fully understand the model output. In addition to documenting the modeling set-up (implementation), calibration, verification, and simulation results, the model documentation should also include the following elements:

- Documentation of acceptance criteria for input data
- Documentation of acceptance criteria for model calibration and verification
- Sensitivity analyses documentation
- Evaluation of how well the model outputs reflect the observed data
- All records, including modeler's notebooks, and electronic files

Recommendation:

S2-36 Provide draft model documentation to stakeholders as soon as possible. Collect additional information as necessary to improve model implementation, calibration and verification to ensure defensible simulations. Identify and quantify Project-related contributions to non-attainment of water quality standards. Conduct additional scenario simulations as necessary to develop and demonstrate adequate PMEs for compliance with water quality standards. In addition to graphical presentation, present tabular results of simulations that allow ease of comparison to state water quality standards. As the modeling effort progresses, provide model documentation updates and presentation of results.

B.10. Determination of Sediment Oxygen Demand in Project Reservoirs

Successful modeling of the water quality of the Klamath River will depend largely on the quality of the physical and chemical characterization of the river and reservoir system. Sediments in the vicinity of the Klamath Hydroelectric Project are particularly enriched and have very high oxygen demand. Source water from the highly productive Upper Klamath Lake, coupled with agricultural return flows, point source discharges, and current and historic log storage and handling likely contribute significantly to settling of nutrient-rich organic materials within Lake Ewauna/Keno Reservoir. While settling of organic materials in downstream reservoirs may be less significant than in Lake Ewauna/Keno Reservoir, the demand and nutrient-release dynamics may still significantly influence the water quality in the downstream reservoirs, too.

Response to Comment S2-37

Additional sediment oxygen demand studies were conducted in 2003. The results of the work conducted by PacifiCorp agree closely to that performed in 2002 and to those by USGS in 2003. The text of the FTR and FLA has been modified to incorporate these results.

Response to Comment S2-38

Please see Water Resources FTR for further information on this particular study.

As reported in Water Resources DTR 9.0 and DLA E3.7.4., PacifiCorp has performed laboratory measurement of oxygen demand and nutrient release of sediment cores collected from the Project reservoirs. It is reported that the biochemical oxygen demand (BOD) of the water in the upper portion of the Project overshadowed the effects of the SOD. It is not clear, however, whether or not this would be the case year-round. Though the SOD likely varies little on a seasonal basis, the BOD likely does as a reflection of season cycles of algae photosynthesis and decomposition. Thus, at times when BOD levels are lower, perhaps the SOD is the more dominant oxygen demanding source within the upper portion of the Project. It is also not clear whether or not processing the samples with deionized water (BOD = 0) would allow for better evaluation of SOD, by eliminating the confounding additional oxygen demanding source. This was discussed in a water quality work group meeting following the study as an improvement to the analysis.

In addition to PacifiCorp's SOD study effort, the USGS in cooperation with USBR recently performed an in-situ evaluation of SOD in Lake Ewauna/Keno Reservoir this last spring. USGS used a methodology that was successfully used previously in Upper Klamath Lake. Some of the sites that were proposed for sampling by USGS were the same as that sampled by PacifiCorp, and could provide a useful comparison check.

Recommendation:

S2-37 [Conduct additional sediment sampling and testing as is warranted to better parameterize the water quality models. Consider the results of sensitivity analysis in making the determination for additional sampling and testing. As appropriate, use deionized water or perhaps in-situ measurement analysis to provide higher confidence in the results. Compare the results and conclusions of the USGS study against that of the PacifiCorp study for Lake Ewauna/Keno Reservoir and discuss potential reasons for any identified departure as well as the implications of using one entity's results or the other.

B.11. Monitoring of Water Quality during Project Maintenance Activities

S2-38 [Only a placeholder is provided for Water Resources DTR 7.0, "Monitoring of Water Quality during Project Maintenance Activities." The DLA Section E3.7.5.4 provides only a one paragraph description of purpose, but neglects to identify study objectives, methods, results, or even study status. The schedule of the stakeholder-approved Study Plan 1.6 indicates that a final technical report was due out in advance of the DLA. However, PacifiCorp has not provided even a draft technical report for stakeholder consideration. Thus, no preliminary results or conclusions are available for discussion or for flagging needs for follow-up.

Recommendation:

Provide stakeholders with results and conclusions from this study as soon as possible. Schedule additional monitoring of Project maintenance activities as is determined appropriate following stakeholder consideration of study results.

B.12. Macroinvertebrates

Response to Comment S2-39

See the Fish Resources FTR for the detailed analysis of the Spring and Fall macroinvertebrate sampling.

S2-39

Water Resources DTR 8.0 discusses PacifiCorp's Fall 2002 macroinvertebrate bioassessment study while DLA Section E3.3.2.7 provides an overall summary. The fall macroinvertebrate bioassessment was performed in response to Study Plan 1.11.

The introductory sections lay out the general purpose and sampling approach. Altogether nine objectives are listed for this macroinvertebrate study. The final conclusions of the report specifically mention four of these objectives. It would be helpful if the conclusions discussed information relevant to the other objectives as well.

The majority of analysis is based on a longitudinal comparison of sites using cluster analysis of habitat and macroinvertebrate metrics. This analysis showed some distinct difference in habitat between major sections of the river and some longitudinal changes in macroinvertebrate metrics. The macroinvertebrate metrics however, did not appear to tell a consistent story and generally did not show significant changes from upper to lower river reaches. Exceptions were the Fall Creek sites and the varial zone sites, which did show distinctly different invertebrate community characteristics from the main channel sites.

While the analysis does not show significant changes below the J.C. Boyle powerhouse, except in the varial zone, compared to the bypass reach, the current analysis seems somewhat limited in scope and may be missing information that would help interpret effects of the Project. For example:

- There is no discussion of the types of changes to the macroinvertebrate community that might be expected based on the literature from studies of other peaking dam facilities. Peaking operations often limit diversity to those species that are more mobile and able to better cope with frequently changing flows. Does the Klamath River show similar changes in species composition? If not why not, and how does that relate to operation options?
- Other than a discussion of metrics (e.g. change in EPT) there was no analysis or comparison of shifts or changes in individual taxa between the different segments of the river. For example, it often occurs that the number of EPT taxa remains constant but the types of taxa that make up the EPT list changes. This can be important in understanding possible effects of the Project on the community. Since the cluster analysis was only performed on metrics, specific species shifts would not be identified. Some characteristics to consider would be did changes in dominant species composition occur, did taxa shift from species sensitive to flow changes to species tolerant of flow changes in the full flow reach compared to other reaches, and did any common taxa completely disappear within certain segments of the river?
- One of the significant issues facing this project is the effect of peaking operations on fish abundance and production. One of the listed objectives of the invertebrate study was "determine the quality of the macroinvertebrate assemblage as a food source for fish and wildlife." The results and discussion sections however provided only a very limited assessment of this objective. For example, no estimates of invertebrate abundance were discussed. While the sampling method does not allow for a quantitative measure of abundance, it is still possible to calculate abundance* and identify large changes if they occur. This would be important in assessing changes in food for fish.

*Abundance estimate calculation: The laboratory that sorted and analyzed the samples should have information on how much of the sample was subsampled during the sorting process. That information can then be used to calculate an estimated abundance per

Response to Comment S2-40

Please see the Water Resources FTR for the detailed analysis of PacifiCorp's water quality monitoring and modeling efforts.

area. For example, if a sample represents 9 square feet of stream bottom and ¼ of the sample was sorted by the laboratory and they counted a total of 505 organisms in the sub-sample, then the total estimated abundance would be $505 \times 4 = 2020$ org./9 square feet or 224 organisms per one square foot. This could also be converted to number of invertebrates per sq. meter. The reason it is an estimate is that the samples were collected with a D-frame net, which does not isolate a defined area like a Surber or Hess sampler does. Field crews disturb an area of one square foot in from of the net, but this is a visual estimate, and therefore it won't be an exact area each time. None-the-less, invertebrate abundance from D-frame samples can be calculated and they do give some useful information on abundance. If one site has 224 org/sq. ft. and another site has 1820 org/sq. ft. that is a significant difference that could influence fish.

Overall this report provides a general assessment of invertebrate metrics. By only considering metrics and not the specific taxa that make up the metrics, however, some important effects of the Project can be missed.

Recommendation:

S2-39 Provide further analyses, as outlined above, to provide a better understanding of the overall impacts of the Project on the aquatic invertebrate fauna.

B.13. Evaluation of Flow Fluctuation on Aquatic Resources

S2-40 In reviewing both Sections 3.0 (Water Use and Quality) and 4.0 (Fish Resources) of DLA Exhibit E, it appears that there is an absence of discussion of Draft Study Plan 1.16, *Evaluation of Effects of Flow Fluctuation on Aquatic Resources Within the J.C. Boyle Peaking Reach*. Though this proposed study is included as a list item under E4.4 (consultation with stakeholders), no status description is provided under E4.5 (status of fish studies).

Fish and aquatic life have been designated by ODEQ as designated beneficial uses to be protected within the peaking reach as well as all the other Project waters within Oregon. Likewise, the NCRWQCB has designated similar beneficial uses for waters within and downstream of the Project in California. As such, ODEQ views it important to conduct a study that pulls together pertinent study elements from the multiple studies relative to questions on the effects of peaking-related flow fluctuations on aquatic resources.

With respect to water quality, the August 2003 draft study plan identifies the following resource study objectives:

- How do water temperatures change during flow fluctuations?
- How does water quality (e.g., dissolved oxygen, suspended sediments, nutrients) change during flow fluctuations?
- Do these water temperature and water quality changes affect fish growth or survival?

With respect to the first objectives, it will be important to identify and compare the temperature and water quality endpoints, ranges, and rates-of change experienced under simulated peaking and non-peaking regimes.

Response to Comment S2-41

Comment noted. Please see the Fish Resources FTR and Section E4 of Exhibit E for a full analysis of the ramping studies that PacifiCorp conducted and the proposed PM&Es.

With respect to the second objective, additional water quality parameters should be included. Other water quality parameters of concern with respect to aquatic resources include hydrogen ion activity (pH), unionized ammonia, and turbidity.

Fish and aquatic organisms can be very sensitive to extremes in pH as well as rapid changes in pH. If the pH of the spring water is markedly different than that of J.C. Boyle reservoir water, then the aquatic life within the peaking reach may be impacted by fluctuations in pH.

Very small concentrations of unionized ammonia can cause chronic or acute toxicity to sensitive aquatic species such as trout. High temperatures and pH cause greater partitioning of ammonia to the toxic unionized form. Peaking operations should be examined relative to non-peaking to identify whether or not ammonia toxicity is exacerbated by peaking operations.

Turbidity can significantly influence predation and avoidance in addition to feeding behavior. Turbidity can also influence the abundance and growth rates of periphyton and macrophytes. The periphyton and macrophytes in turn affect dissolved oxygen and pH levels, nutrient uptake, and forage availability. Greater proportions of reservoir water to spring water would most likely result in higher turbidities which would possibly affect the above identified factors during daylight hours. Ramping and rates of ramping, especially upramping, can also result in entrainment of turbidity causing materials from the river banks.

Recommendation:

S2-40 Modify the proposed study plan to include the above identified water quality parameters and considerations.

B.14. Ramping Rates

The DLA lacks information that adequately characterizes the range and variation of daily and hourly flow for each Project reach. A brief description of Project ramp rates is provided in DLA E4.2.5.1. The current FERC license allows up and down ramping rates of nine inches per hour within the J.C. Boyle peaking reach. Ramping in the remaining Project reaches is guided by agreements developed since the license was issued in response to numerous fish kills over the years. Excessive down ramping can result in stranding of fish as well as incubation and rearing mortality. Excessive up ramping can entrap terrestrial organisms and cause erosion and increased turbidity. Flow fluctuations can also affect the transport and deposition of fine sediments and gravels.

S2-41 Information is needed to determine the magnitude, duration, and frequency of Project-induced ramping on affected habitat. The DLA lacks information from site-specific studies. Study Plan 1.7, *Evaluation of Ramping*, aside from one brief field study of stranding observations in the J.C. Boyle peaking reach, provides only a summary of literature on ramping.

The DLA does not propose modified ramping rates for any of the Project reaches. Lacking adequate analysis of the impacts of existing or future proposed ramping rates, ODEQ will likely prescribe conservative ramping rates or run-of-river operations in any 401 certification issued by the Department for the Project.

Recommendation: PacifiCorp should consult with stakeholders to clearly identify Project impacts and develop potential PME for impacts related to ramping and peaking operations.

B.15. Fish Entrainment and Turbine Mortality

Aside from a screen at the J.C. Boyle diversion, the remaining Project facilities are without fish screens or bypass facilities. The J.C. Boyle facilities do not meet federal or state passage criteria for trout, anadromous salmonids, or native suckers and lamprey.

The DLA does not adequately describe Project impacts. PacifiCorp has been unwilling to conduct relicensing studies to evaluate entrainment or turbine mortality at any of the Project facilities. Instead, PacifiCorp intends to perform a literature search and apply the results from other studies at other Projects.

Recommendation:

ODEQ recommends that PacifiCorp propose in the FLA the installation and operation of new fish screens and bypass facilities at all of the Project diversions to provide effective downstream fish passage for all native resident and anadromous fish species. PacifiCorp should consult with stakeholders to clearly identify Project impacts and develop potential PME's for safe downstream passage at all Project facilities.

B.16. Fisheries Assessment

ODEQ will need adequate fisheries assessment data and analyses characterizing the existing riverine and reservoir fish communities. Specific objectives proposed for assessment by Study Plan 1.9, *Fisheries Assessment*, include relative abundance, growth, length frequency distribution, condition factor, and age structure of fish populations. Such information will be needed by the Department for its 401 certification application review and determination of compliance with the Biological Criteria water quality standard as well as determination of protection of the designated beneficial use of "resident fish and aquatic life."

To date, the fisheries assessment study has not been approved by stakeholders due to disagreement regarding the application of standard scientific methodology procedures and sufficiency of data collection to represent reaches, sampling periods and inter-annual variation.

Recommendation:

PacifiCorp should consult with the stakeholders to clearly identify and state Project impacts to resident fish and to develop potential PME's to address these impacts.

Response to Comment S2-42

Through FERC relicensing, PacifiCorp has been working with the stakeholders to gather information relevant to identifying Project impacts. The impacts are documented in the FTRs. Based on the data collected, PacifiCorp has proposed measures that protect resident and anadromous fish species, while at the same time balancing other resource concerns.

Response to Comment S2-43

PacifiCorp feels that the fish assessment work conducted in 2000 and 2001 as part of relicensing, combined with other existing fish assessment work done in the Project area (e.g. OSU, Salt Caves, Hardy and Addley), is sufficient to characterize the existing fish community. Please see Section E4 of Exhibit E for a detailed discussion on Project impacts to aquatic resources and proposed PM&Es.



State of California - The Resources Agency

DEPARTMENT OF FISH AND GAME

<http://www.dfg.ca.gov>

601 Locust Street
Redding, CA 96001
(530) 225-2300

GRAY DAVIS, Governor



September 19, 2003

Mr. Toby Freeman, Hydro Licensing Director
PacifiCorp
825 N.E. Multnomah, Suite 1500
Portland, Oregon 97232

Ms. Magalie R. Salas
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Dear Mr. Freeman and Ms. Salas:

**Comments on Klamath River Hydroelectric Project "Draft License Application"
Federal Energy Regulatory Commission (FERC) No. 2082**

The California Department of Fish and Game respectfully submits the following comments on the June 2003 Draft License Application (DLA) prepared by PacifiCorp (Licensee) for the Klamath hydroelectric project (Project). These comments are based upon a review of the DLA as well as our participation in the relicensing process pursued by the Licensee since December 2000. These comments are submitted to the Licensee and FERC in accordance with provisions of the Fish and Wildlife Coordination Act (16 US Code [U.S.C.] 661 et seq.), the Endangered Species Act (16 U.S.C. 1531 et seq.), the National Environmental Policy Act (42 U.S.C. 4321 et seq.), and the Federal Power Act (16 U.S.C. 791 et seq.).

Relicensing Process

In the "Executive Summary," the DLA describes a traditional licensing process (TLP) that has "evolved into a robust collaborative effort . . . to develop study plans and review study results" (page 2-3). The Department is included in the list of active stakeholders and we can verify that the Licensee and stakeholders have indeed met over 100 times since the process began. The primary goal of the meetings was to develop study plans to document Project impacts. The aggressive meeting schedule (approximately one week of meetings every month for the past year and a half) was in response to time frames established under the TLP, the inadequacies of the first stage consultation document, and the need to gather important information as quickly as possible. Under this compressed schedule, a study plan would receive

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plenary approval to proceed if the stakeholders agreed that they could "live with" the proposal. While 36 study plans have received plenary approval approximately 15 remain under discussion, it is important to understand the history behind this "collaboration" to approve study plans.

S3-1 Numerous approved study plans constitute simple compilations of background information that would normally be presented in a first stage consultation document. Stakeholders agreeing on the need for baseline information does not translate into significant progress. Another reason for the proliferation of study plans (both approved and under discussion) is the Licensee's tendency to split one complex study into smaller proposals that stakeholders can live with individually. For example, the need to document the impacts of the J.C. Boyle peaking operations on aquatic resources has generated not only three approved study plans but also constitutes significant portions of three unapproved study plans as well as two studies still in the concept phase. In some cases where a contentious study could not be segregated into acceptable portions, conditional plenary approval was granted as reflected in the "additional considerations" or "next steps" section of the study plan. Some of these outstanding concerns are significant. For example, both the study of rainbow trout movement and the study of the fish pathogen, *Ceratomyxa shasta*, conclude with the statement "[s]ome stakeholders feel strongly that additional information will be needed. PacifiCorp is willing to consider the need for additional information after completion of this study plan." The conditional approval granted to many studies is limited to initial phases leaving the bulk of the work unaddressed. The simple enumeration of "36 approved study plans" oversimplifies the amount and nature of agreement reached by the collaborative effort to date.

Finally, the remaining unapproved study plans (as well as those still in the concept phase) represent some of the most important areas of Project impacts and potential protection, mitigation, and enhancement (PM&E) measures. These include the basic assessment of fish community response to Project features, an evaluation of fish passage options, determining instream flow relationships, and a comparative evaluation of socioeconomic impacts. These critical topics represent a significant amount of disagreement even after 2.5 years of effort.

With only six months left until the final license application is due, the Department has grave concerns about the progress of this relicensing. The Department does not consider the first stage of consultation to have been completed yet, much less an adequate collection of field data. Even under the best scenario six months would be an inadequate amount of time to design complex studies, collect data, interpret results, and then develop PM&E measures. The DLA explains the lack of timely progress to date by

Response to Comment S3-1

Parsing out study plans in an effort to move forward on where there is agreement is a reasonable means to maintain progress. We agree that much effort was given by all stakeholders to reach agreement on study plans. In fact, work continued following the distribution of the DLA in June, 2003. In addition, those referenced study plans ultimately received Plenary approval. PacifiCorp continues to work with stakeholders to resolve issues on studies like Fish Passage modeling and the instream flow analysis. Outstanding disagreements and PacifiCorp's position on these disagreements is documented in Exhibit E, Appendix E1-A. PacifiCorp maintains that the First Stage was completed consistent with FERC regulations.

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Response to Comment S3-2

PacifiCorp disagrees and maintains that the Collaborative Process did lead to meaningful progress. However, as noted in the comment, some study plan development did not turn out as stakeholders requested. Such disagreement took too much time away from other aspects of the collaborative process. In such study disagreement, PacifiCorp presented the level of study effort needed for decisions to be made. PacifiCorp disagrees that the level of effort made by the company is insufficient. A great effort has been made to conduct numerous studies and evaluations of the Klamath Hydroelectric Project.

Noting " the level of collaboration during the second stage has extended the time line on adopting and executing study plans; therefore many studies are not yet complete" (Exhibit E , page 1-1). The Department does not accept this explanation. Constraints on the time and effort devoted to study plan development, data collection, and analyses of results are a direct result of the Licensee's self-imposed limitations on staff and budget. During development of several study plans, the Licensee has repeatedly expressed reluctance to collect empirical data. In these cases, the Licensee opts to conduct literature reviews or to conduct coarse, screening analyses in lieu of field work. This strategy of postponing collection of site specific data until literature reviews or high level analyses are proven inadequate has been a major source of delay. To illustrate the magnitude of delay involved, we reference the copious meeting minutes compiled by the meeting facilitators (and posted on the Licensee's website: www.pacificorp.com/Article/Article15959.html). These minutes document a consistent pattern of:

1. stakeholder suggestions of scientifically based methodologies;
2. Licensee response that such studies are too costly and a counteroffer to perform a literature review or high level analysis;
3. the presentation of background/high level information;
4. the identification of data gaps; and
5. the realization that there is not enough time left to conduct the appropriate field work suggested initially.

Granted that a collaborative process requires additional time and effort by all interested parties, however, the collaborative process is not responsible for the lack of meaningful progress in this relicensing.

While we cannot recapture lost time, the Department recommends that the Licensee increase the current level of resources committed to the on-going relicensing process to accomplish the fundamental task of developing a complete administrative record for resource agencies to base recommendations within statutory filing deadlines. Given the biological and socioeconomic significance of the Klamath River's anadromous fishery resource as well as the level of public scrutiny the Klamath watershed receives, development of a comprehensive and statistically valid record of the Project's environmental impacts should be a top priority for the Licensee. The Department does not believe that the Licensee has committed a level of resources commensurate with the magnitude of Project impacts on the natural resources of the Klamath River.

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Draft License Application

S3-3 In the Federal Power Act, Title 18 of the Code of Federal Regulation (CFR), Section 16.8 presents the sequence of consultation required for applicants seeking a new license. As discussed above, the Department does not consider the first stage of the consultation (i.e., the identification of studies necessary to understand Project impacts) to be complete. The second stage of consultation is traditionally marked by the completion of necessary studies and the submission of a DLA (18 CFR 16.8 (c)).

S3-4 Even setting aside the critical studies which have yet to be identified and implemented, the Licensee's DLA is inadequate. The fundamental purpose of a DLA is to characterize the existing environment, disclose Project impacts on resources, and propose PM&E measures to address said impacts. The resource agencies in turn are allowed 90 days to prepare written comments on the information provided in the DLA and identify areas of substantive disagreement (18 CFR 16.8 (c) (5)). The DLA contains an incomplete characterization of the existing environment and essentially no discussion of Project impacts or potential PM&E measures. Given this absence of information, the Department must proceed conservatively in interpreting what resource data is available as well as in developing appropriate recommendations for PM&E measures.

The Department's specific comments and recommendations follow the same general order as the exhibits and technical reports of the DLA. This order is complicated somewhat by the structure of the DLA, whereby, a single resource topic is covered multiple times (e.g., in the Executive Summary (ES), Exhibit E, Draft Technical Reports (DTR), and the Consultation Record) with slightly different information presented each time. In general, the following comments attempt to consolidate the multiple sources for each topic/resource area.

Initial Statement

S3-6 The Licensee states they are applying for a new 50-year license (Initial Statement, page 1). This is an inappropriate length of time for relicensing this Project. The Klamath River is part of a highly impacted and very dynamic watershed. To predict resource impacts and design PM&E measures to address these impacts over just the next 10 years is a challenge. Beyond the need to keep the license relatively short and flexible to stay in synchrony with an evolving watershed, the DLA proposes no PM&E measures that might justify a longer license period to allow recovery of substantial environmental expenditures. The Department recommends that the license term be kept to an absolute minimum.

Response to Comment S3-3

PacifiCorp maintains that it has satisfactorily completed the First Stage.

Response to Comment S3-4

The draft license application (DLA) included a thorough description of the existing Project, its operation, and the Project's effect on the surrounding environment, to the extent it could be described based upon available study results. PacifiCorp and relicensing participants had agreed prior to development of the DLA that it would not be appropriate for PacifiCorp to draw conclusions in the application about the effects of the existing Project on the surrounding environment, unless those conclusions were based upon study results.

As a result of the Klamath Collaborative's extensive changes to the number and scope of studies, few studies were completed in time to inform the development of the DLA. Subsequently, PacifiCorp did not have sufficient information to justify proposing changes to the existing Project. Absent information to the contrary, existing facilities and operations were deemed appropriate.

Now that almost all studies have been completed and reviewed, changes to the Project and its operations have been proposed. This proposed Project, proposed Project operations, and the proposed Project's anticipated enhancement to the surrounding environment are thoroughly described in the final license application.

As per 18 CFR 16.8(c)(2) and (3), an application will not be rejected by FERC as deficient merely because late studies requested by agencies during the second consultation stage are not completed during the second stage.

Response to Comment S3-5

See response to comment #4, above.

Response to Comment S3-6

PacifiCorp has conservatively applied a 30-year licensing term in its assessment of power production costs and reasonable returns on investment.

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S3-7 The section which lists the pertinent Oregon and California statutory and regulatory requirements (i.e., §1601 and § 5981 of the California Fish and Game Code) is incomplete (Initial Statement pages 2-3). A brief listing of omitted pertinent sections of the Fish and Game Code includes §1802 which establishes the Department as a trustee agency and an agency with special expertise with regard to the State of California's fish and wildlife resources¹. In addition, the Salmon, Steelhead Trout, and Anadromous Fisheries Program Act (Act) (§6900 et seq.) requires the Department to undertake major efforts to restore the State's salmon, steelhead trout, and anadromous fisheries. Some of the waters and lands associated with the Project represent a major component in the Department's efforts to maintain and restore anadromous fish populations in accordance with the Act. Beyond the Department's broad authorities of trustee agency and restoration planning responsibilities, Fish and Game Code §5900 et seq. addresses the need to provide fishways at dams, sufficient flow below dams to keep fish in good condition, and hatcheries as mitigation in lieu of passage at dams. The California Endangered Species Act (§2050 et seq.) addresses activities involving the Lost River and shortnose suckers (listed as State endangered) and coho salmon (candidate for listing) which occur within the Project's area of impact. The Lost River and shortnose suckers are also covered under §5517 which addresses fully protected fish species.

Water Quality

S3-8 The DLA describes a series of studies to compile existing water quality data, characterize water quality conditions, and assess maintenance effects on water quality (ES, pages 3-7 and 3-8). While the technical report includes a substantial amount of raw data from previous and on-going water sampling efforts, there are no corresponding analyses or conclusions. The presentation of the data does not facilitate an independent analysis or determination of Project impacts. For example, turbidity data is averaged over a 50-year period (Water Resources DTR, page 2-14), providing a meaningless measure of this highly variable parameter. Overall, the water quality section lacks consistency between the numerous graphs and an absence of explanatory legends which hampers independent analysis. While the majority of relevant water quality information currently available may well have been compiled by the Licensee, the DLA does not utilize that information to adequately characterize the exiting water quality condition. Finally, the DLA presents no Project impacts on water quality and, as a consequence, proposes no PM&E measures to improve water quality.

S3-9

¹As used in this response, "fish and wildlife resources" include all wild animals, birds, plants, fish, amphibians, and related ecological communities including the habitat upon which these species depend for their continued viability. (Fish & Game Code, § 711.2, 1802.)

Response to Comment S3-7

The Initial Statement has been revised to reflect these additional statutory and regulatory requirements.

Response to Comment S3-8

Significant revisions have been made to section E3 of Exhibit E, including improved graphs, discussions on the Project's effect on water quality and PacifiCorp's proposed PM&E measures.

Response to Comment S3-9

See response to comment #8.

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Response to Comment S3-10

During monthly stakeholder meetings, PacifiCorp agreed to model the scenario "without Project 2" which tries to "even out" USBR flows. PacifiCorp also agreed to model the "SLOM" runs which does look at different Project configurations. Modeling results are with Project, without Project, and Run-of-River Project are presented in the Water Resources FTR, Section 4.

Response to Comment S3-11

Section E3 of Exhibit E has been updated to include up to date study results and an assessment of Project impacts.

Beyond baseline information, one of the most important water quality information needs is identification and isolation of Project effects on water quality. In response to an almost unanimous request for such information from stakeholders, the Licensee has developed a water quality model to assess individual reaches, sets of reaches, and to simulate conditions throughout the system. The DLA does assess the primary boundary conditions of inflow at Upper Klamath Lake (UKL) and outflow at Iron Gate Dam (IGD) using the hydrology and meteorology of one year, 2000. The DLA presents a preliminary comparison of mean daily water temperature at a variety of locations along the Klamath River under three scenarios:

1. existing conditions;
2. steady flow; and
3. without Project (Figures 4.7-18 through 4.7-40).

This preliminary comparison hints at interesting and complex interactions between Project facilities and water temperature. For example, the maximum mean daily temperature below IGD is achieved around September 1 under the existing conditions, a month later than the projected August 1 date under the without Project scenario. Shifts in the duration and occurrence of adverse water quality conditions can have significant biological consequences for vulnerable anadromous salmonids migrating toward spawning grounds. The Department recommends continued refinement and use of this analytical approach using additional meteorological and hydrological inputs to understand the full range of responses of the system. We also request much greater clarification of the assumptions behind the hypothetical scenarios. For example, when applying the 2000 hydrology for the "without Project" scenario, were current U.S. Bureau of Reclamation (USBR) operations assumed? If so, this would be a source of error. It is reasonably foreseeable that the current ramping rate required by the National Marine Fisheries Service (NMFS) Biological Opinion at the IGD outlet would be applied to whatever structure provides the most downstream point of control (i.e., Link River or Keno Dam in the without Project scenario). This would alter the hydrologic inputs into the model significantly from the 2000 USBR operations. Finally, we request that the model runs include incremental changes in the Project such as a stepwise removal of facilities to provide meaningful input on more than just the extremes represented by the existing condition, steady flow, and without Project scenarios.

Our request for a more incremental modeling approach illustrates an important limitation of the water quality results presented in the DLA. The DLA lacks an assessment of water quality impacts within and between Project features. The results are presented in a "black box" context focusing on changes in boundary conditions above and below the Project. Understanding the within Project impacts on water quality

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S3-11 is fundamental and the results of the water quality modeling effort will be important for understanding the results of many other studies such as fish assessment, fish passage, and hydrology. The consequence of errors resulting from inaccurate or incomplete analyses at this preliminary step will be amplified at each subsequent step in the process.

S3-12 In the absence of modeling results that clearly illustrate the "within Project" impacts, the Department will rely on basic water quality principles. For example, attached algae in river systems normally filter and clean water. At the April 2003 Western Division of American Fisheries Society's (WDAFS) Annual Meeting, a presenter hypothesized that one of the greatest impacts of the Project on water quality was the reduced assimilation of nutrients, in part due to constant scouring of algae in the varial zone (Dr. Michael Deas, Watercourse Engineering, Inc., personal communication). The Project operations serve to interrupt natural treatment of the eutrophic water released from UKL and this delay extends the downstream boundary of poor water quality to approximately the Seiad Valley. This illustrates a Project impact (delay in nutrient assimilation) that is not identified by the DLA's black box comparison of inflow from UKL to outflow at IGD.

S3-13 Another water quality issue which receives no discussion in the DLA is the impact of Project facilities and operations on access to thermal refugia within the Project boundary. Thermal refugia are essential for the survival of anadromous species with life histories that include holding in the main stem during the warmer months (e.g., spring-run Chinook and summer steelhead). Coldwater refugia on the Klamath are found not only in tributaries such as Jenny, Fall, Shovel, and Spenser creeks, but in the main stem springs documented in the J.C. Boyle bypass reach today and described historically in the Copco area prior to 1910 (Boyle, 1976). The geographic extent of main stem springs appears to have extended downstream of Copco as indicated by the presence of spring-run Chinook in at least one pool below the Copco facilities pre-IGD (Michael Belchik, Yurok Fisheries Biologist, personal communication). Once IGD was completed in 1962 and access to thermal refugia (both tributary and main stem springs) was blocked, the spring-run Chinook population downstream of the dam began a serious decline. By 1980 the Iron Gate Hatchery stopped trying to trap spring-run adults due to almost nonexistent returns. Today, the mouth of the Salmon River (over 130 miles downstream of IGD) marks the upper limit of a remnant spring-run population in the Klamath River. Based on the timing of the decline of the spring-run population below Copco, it is reasonable to conclude that the presence of the Project dams and reservoirs and the associated loss of access to thermal refugia constitute a significant impact on the health and distribution of anadromous Klamath River species which are present during the warmer months.

Response to Comment S3-12

Please see Section 3E of Exhibit E for an updated and detailed discussion on the Project's effect on water quality.

Response to Comment S3-13

While Copco dam has an effect on anadromous fish, the report by Hardy and Addley (2001) reported that the decline of spring-run Chinook occurred prior to the completion of Copco dam and cited overexploitation, and activities such as placer, gravel, and suction mining as factors contributing to the decline.

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S3-14 To address the within Project impacts discussed above, (i.e., a delay in nutrient assimilation and blocked access to thermal refugia) the Department recommends the license application consider:

- S3-15
1. seasonal limitations on peaking operations; and
 2. installation of new release structures at the two largest dams (Iron Gate and Copco1) in conjunction with volitional fish passage facilities.

S3-16 One objective of modifying peaking operations would be to facilitate nutrient assimilation. One objective of the new release structures would be to allow conversion of the reservoirs into riverine systems during critical times of year. Such release structures could be utilized to minimize adverse water temperature impacts from the two impoundments. In addition, intermittent conversion to a riverine system along with volitional passage would facilitate access to critical coldwater refugia in Fall, Jenny, Shovel, and Spenser creeks, the springs in the J.C. Boyle reach and the springs currently inundated by Iron Gate and Copco 1 reservoirs.

Hydrology

S3-18 The DLA analysis of hydrology is flawed by a focus on the flows above and below the Project and a discussion that ignores the impacts of Project facilities and operations in either the short or long-term. The KPOPSIM model simulations cited in the DLA do not include any inputs for Project-specific facilities or operations and thus no analysis of within Project impacts on hydrology. The Department and other stakeholders have recommended that the Licensee apply the Indicators of Hydrologic Alteration (IHA) method developed by Richter et al. (1996) to assess the hydrologic impacts of Project operations. The Licensee has declined to perform this well accepted analysis until it is determined to be necessary based on a review of existing information (Water Resources DTR, page 5-7). Based on the lack of Project specific impacts presented in the DLA, we recommend the Licensee pursue the IHA analysis as soon as feasible to avoid further delay in obtaining baseline information on the impacts of the Project on hydrology.

One brief effort to summarize Project impacts is provided in Figure 5.7-11 (Water Resources DTR, page 5-30). This graph shows an inconsistent effect of the Project on monthly flows during different water year types. Based on our interpretation of the figure, the Project reduces monthly flow in June and August during extremely wet and dry years but increases the monthly flow in those same months during wet and critically dry years. The written discussion of Project impacts on hydrology is limited to the statement "PacifiCorp operational effects are not nearly as great as the Klamath Irrigation Project operational effects" (Water Resources DTR, page 5-29) with no explanation of the source or the meaning of the unusual hydrologic relationship illustrated in Figure 5.7-11.

Response to Comment S3-14

Adjustments to peaking operations have been considered. Please see Exhibit E for a detailed discussion on the Project's effect on water quality and PacifiCorp's proposed PM&E measures.

Response to Comment S3-15

Please see Exhibit E for an analysis of Project effects on fisheries resources and water quality, and the proposed PM&E measures. PacifiCorp is currently not proposing fish passage at Copco No. 1.

Response to Comment S3-16

PacifiCorp's proposed PM&E measures are commensurate with its assessment of its effects on water quality. Please see Exhibit E.

Response to Comment S3-17

Comment noted. The value of cold-water refugia for fish is being discussed as part of on-going modeling efforts.

Response to Comment S3-18

Substantial information has been added to the analysis of hydrology in the FLA (Exhibit E, chapter E3) and section 5 of Water Resources FTR to describe flow effects by Project development and/or reach. PacifiCorp concludes that an additional analysis using the Indicators of Hydrologic Alteration (IHA) method is not needed to support this FLA. The analysis of hydrology in the FTR includes information on

monthly discharge conditions, duration of flows, peak (flood) flows, low flows, and rate and frequency of flow changes, all categories similar to those assessed using the IHA method. In addition, the IHA is mostly intended as a tool to compare existing conditions to pre-Project (or unimpaired) "baseline" flow conditions. Treating pre-Project (or unimpaired) flow conditions as "baseline" conditions in a FERC license application is not appropriate since FERC considers "baseline" to be the existing Project-related environment.

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S3-19 Project impacts are also absent in the discussion of short-term hydrologic effects (Water Resources DTR, pages 5-31 through 5-39). This section addresses variations in the surface elevation in Lake Ewauna/Keno Reservoir with an emphasis on USBR operations but neglects to discuss any of the hydrologic impacts of the Project's peaking operations where flows vary from 300 cubic feet per second (cfs) to 3,000 cfs daily. Again, the application of an appropriate IHA analysis would help identify short-term as well as long-term impacts of Project operations.

Geomorphology

S3-20 While the Department generally considers the study plans presented in the geomorphology section to be appropriate, key information such as the character of the sediment underneath the reservoirs is still outstanding. This hampers any effort to evaluate the potential effect of reservoir drawdown or removal as part of a PM&E package. Geomorphology is a foundational ecological process that cuts across multiple resource areas, both aquatic and terrestrial. Delays in obtaining basic data such as pebble counts, bed mobility, and reservoir bathymetry prevent timely development of a sediment budget and preclude any effort to understand complex relationships such as the interaction between hydrology, substrate, and riparian community composition within the Project. We recommend that the Licensee increase the resources they have dedicated to all ongoing studies to facilitate data collection and analysis in a timely manner and to allow agencies to develop informed recommendations.

Fish Resources

S3-21 This fundamental resource topic includes most of the unapproved study plans: fishery sampling, fishery assessment, fish genetics, fish passage evaluation and planning, fish entrainment, and migratory behavior of juvenile salmonids. There are also several unapproved studies that focus on the relationship of flow to aquatic resources which clearly include impacts on fish. The lack of a statistically valid description of the current fish community within the Project area of impact undermines all related efforts to document Project impacts or design appropriate PM&E measures. In contrast to the DLA omission of impacts or PM&E measures, the Department asserts that there is substantial evidence of Project impacts on fish resources and a significant need for modification of current Project facilities and operations.

a. Fish Assessment

S3-22 The DLA presents some historical fisheries information in Section 4.1 of Exhibit E purportedly in response to the requirements of 18 CFR 4.5(f) (3). However the literature review is severely limited in geographic and temporal scope. The review excludes a variety of tributaries important to fishery resources (e.g., Jenny Creek, Camp

Response to Comment S3-19

See response to comment #18, above.

Response to Comment S3-20

Except for the character of the sediment beneath Project reservoirs, these comments are addressed in Chapter 6 of the Water Resources FTR. Delays in data collection were created by a dry summer, not by limited staff resources. Geomorphologists started working with the Fish Passage Work Group in November 2003 to refine the characterization of river bed conditions beneath project reservoirs.

Response to Comment S3-21

PacifiCorp maintains that the fish assessment work conducted in 2000 and 2001 as part of relicensing combined with other existing fish assessment work done in the Project area (e.g. OSU, Salt Caves, Hardy and Addley) is sufficient to characterize the existing fish community. Please see Section 4E of Exhibit E for a detailed discussion on Project effects to aquatic resources and proposed PM&E measures.

Response to Comment S3-22

The Fish Passage Work Group is continuing to work on these issues as they populate the EDT and KlamRas models.

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Response to Comment S3-23

See response to comment #21, above.

Creek, Scotch Creek, Long Prairie Creek, Edge Creek, Tom/Hayden Creek, and Frain Creek). In addition, the summary provides no discussion of the historic anadromous habitat upstream of IGD. Such information will be essential to evaluate the habitat that would become available to anadromous species if access is restored.

Response to Comment S3-24

Please see Section E4 of Exhibit E for a discussion on PacifiCorp's proposed instream flows that are presented as PM&E measures.

Existing fish communities are typically described with quantitative measurements of relative abundance, growth rate, length frequency, condition factor, and age structure. Due to an inherent variability in fish communities, sampling is performed multiple times to provide a statistical basis of comparison. The repetitive sampling plan should be designed to include biologically relevant times of year and important mesohabitat types. In addition to the incomplete literature review, the DLA presents only one full year of fishery assessment data (along with a limited pilot study) that is characterized by an inconsistent effort across different habitat types and seasons. When informed that baseline fishery assessments generally rely on consistent and repeated efforts over at least 3 to 5 years, the Licensee declined to collect a second year of fishery data. The disconnection between the Licensee's approach and standard scientific practice is at the root of the Department's reluctance to approve many of the fish resource study plans. Overall, the fish resource study plans do not adequately respond to the information requested by the Department pursuant to Section 16.8 (b), Title 18, CFR, and required under Section 16.8 (c) (4) (i) (B), Title 18, CFR, and provide no reasonable basis for designing PM&E measures. The Department recommends implementation of additional fishery assessment field work as soon as possible employing well accepted methods to collect quantitative, statistically robust, baseline data.

b. Instream Flow

Department representatives have worked extensively with the Licensee in an effort to collaboratively develop an instream flow study plan and in general there has been consensus on the approach used in the data collection performed to date. The geographic scope of the studies, however, continues to be a point of significant disagreement. The Licensee has declined to perform an instream flow evaluation downstream of IGD citing a lack of responsibility, a lack of control, and the existence of previous flow studies (Fish Resources DTR, page 3-3). The Department disagrees with the argument that, due to the activities of other parties in the watershed (particularly the USBR), the Licensee has no obligation to identify appropriate instream flows and operate the Project to the best of their ability to meet those flows. We are unaware of any FERC license that does not include an instream flow release requirement as a primary PM&E measure and cannot envision a new license that abdicates all

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S3-24 responsibility for flow management to non-Project entities. In the case of the Klamath River basin, current regulation of flows out of UKL by the USBR is very dynamic and any assumptions regarding future releases are subject to substantial error. It is S3-25 inappropriate to ignore the Licensee's responsibility to actively participate in investigations to develop long-term solutions to flow issues in the Klamath River watershed.

S3-26 In response to the Licensee's assertion that they have limited storage and, thus, an insignificant amount of control over downstream flow, we concur that the current active storage at the facilities is relatively small (i.e., around 6,000 acre-feet (ac-ft) for Copco 1 and less than 4,000 ac-ft for Iron Gate). However, this limited storage is a result of current structural constraints. Alternatively, installation of low level release structures and reoperation of the reservoirs could access the total storage capacity of these reservoirs which at 77,000 and 59,000 ac-ft, respectively, have the potential for providing a significant amount of sustained flow to meet the needs of downstream resources. Currently, the Project can provide a release of 710 cfs (i.e., the minimum release required under the existing FERC license) for only about 4 and 2.5 days, respectively, before the active storage is exhausted. In contrast, low level release structures could provide a flow of 710 cfs utilizing the total storage in just Copco 1 for over 50 days. Additionally, utilizing the total storage in just Iron Gate reservoir would provide 710 cfs for another 40 days. In other words, together these two reservoirs could sustain a minimum release, independent of USBR inflow, for almost three months. We recommend that the new license application include consideration of low level release structures at both Iron Gate and Copco 1 reservoirs. One objective of the new release structures (beyond increased flexibility to mitigate adverse water quality conditions and provide seasonal access to coldwater refugia) would be to increase the amount of active storage and the Project's ability to meet short-term downstream flow needs.

The Department also asserts that while an instream flow study has been performed in the Klamath River below IGD (i.e., the 2001 Hardy Phase II Report), the goals and objectives of previous work were not designed to support a new FERC license application. In addition, the USBR has declined to adopt the flow regime recommended in the Hardy Report. Instead, the USBR is currently operating the Klamath Irrigation Project consistent with the May 2002 Biological Opinion (BO) issued by NMFS which has substantially different minimum flow requirements than those recommended by the Hardy Phase II Report². The difference in the Hardy Report objectives as well as the decision by the USBR not to implement the Hardy recommendations, limits the applicability of this work to this relicensing.

² As an example of the dynamic nature of instream flow recommendations within the Klamath basin, on July 14, 2003, the United States District Court for the Northern District of California found the NMFS 2002 BO to be arbitrary and capricious and remanded the BO to the NMFS for amendment of deficiencies. Meanwhile, the USBR is permitted to continue to operate the Klamath Reclamation Project in accordance with the 2002 BO.

Response to Comment S3-25

PacifiCorp is continuing to work with the Instream Flow subgroup on PHABSIM analysis above Iron Gate Dam. Please see the Fish Resources FTR for a detailed report on the instream flow study and Section E4 of Exhibit E for PacifiCorp's proposed instream flows at each development.

Response to Comment S3-26

The use of total reservoir storage recommended by the CDFG in this comment would result in deep or complete reservoir drawdown that is not necessary to meet downstream instream flow needs. The current and proposed instream flow schedule below Iron Gate dam is based on the Klamath Project 2003 Operations Plan. This plan was developed by USBR in consultation with the U.S. Fish and Wildlife Service and NOAA-Fisheries based on detailed instream flow studies in the Klamath River below Iron Gate dam. This current and proposed instream flow schedule is protective of ESA-listed species, and can be met without the need to access reservoir storage beyond the existing level of active storage.

PacifiCorp is considering a water quality enhancement measure involving low-level release for downstream water temperature management (see Exhibit E, section E3.8). However, the volume of cool water storage for such release is already limited, such that downstream temperature benefits from a low-level release would be modest (about 2°C or less) and short-term (days or weeks in duration). The deep or complete reservoir drawdown recommended by the CDFG in this comment would, if anything, reduce and more quickly evacuate the volume of reservoir cool water storage.

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Response to Comment S3-27

The Battle Creek analysis evaluated the potential impediment to salmonid passage caused by river hydraulics at various flows. PacifiCorp knows of no such flow barriers downstream of Iron Gate dam. In addition, the fact that salmon and steelhead already migrate to Iron Gate dam indicates that downstream hydraulics do not currently impede migration. Flows below Iron Gate dam are directed by USBR's Klamath Project 2003 Operations Plan, not by PacifiCorp. The current and proposed instream flow schedule in the Klamath Project 2003 Operations Plan was developed by USBR in consultation with the U.S. Fish and Wildlife Service and NOAA-Fisheries based on detailed instream flow studies in the Klamath River below Iron Gate dam.

Response to Comment S3-28

PacifiCorp is continuing to work with the Instream Flow subgroup on PHABSIM analysis above Iron Gate dam. Please see the Fish Resources FTR for a detailed report on the instream flow study.

Response to Comment S3-29

The Fish Resources DTR has been significantly revised, including more detailed discussions on the ramping study. The FLA contains an integrated assessment of Project effects on fisheries resources, as well as addressing proposed PM&E measures.

S3-27 One reason the Hardy Phase II Report by itself is insufficient, is that the report focuses on the relationship between flow and habitat suitability criteria (HSC). The report did not address passage issues such as how much flow is necessary to trigger upstream migration of salmonids. The Hardy Report assumes that the recommended flows based on HSC would be more than sufficient to provide unimpeded passage. However, with the implementation of significantly lower flows based on the 2002 BO instead of the Hardy Report, this assumption was invalidated. In the wake of the 2002 fish kill in the Lower Klamath River, it is of great concern to the Department to understand the relationship of flow and passage at critical points below IGD such as Coon Creek and Ishi Pishi Falls (see the Department's 2003 preliminary fish kill analysis). The Hardy Report has no information on what flows block passage, what flows delay passage, and what flows provide unimpeded passage. Answers to these critical questions cannot be found in any existing instream flow study. Furthermore, solutions to these passage problems could well be found within the current storage capacity of the Licensee's reservoirs, not to mention the enhanced range of storage which could be created through the new release structures recommended previously. The Department recommends that the Licensee perform a salmonid passage barrier assessment downstream of IGD similar to the 1998 study performed on Battle Creek by Thomas R. Payne and Associates to address this important data gap.

S3-28 While the Department generally concurred with the (geographically limited) instream flow study design as it was implemented during the fall of 2002, we have not seen any of the raw data generated by that field work. The DLA contains only the habitat mapping which was utilized to select transects. The Department requests the raw data and preliminary analyses be distributed to interested stakeholders as soon as feasible to permit an independent verification of the analyses to date. We also note that various components of a comprehensive instream flow study (such as assessments of the relationship of fry, spawning, and macroinvertebrate habitats to flow) are still to be completed in every reach of the Project. Finally, the instream flow study plan (no. 1.12) lacks detail concerning the analytical approach the licensee intends to utilize as part of the Physical Habitat Simulation (PHABSIM). Without knowing for example which variables will be used to calculate weighted usable area (WUA), how these variables will be defined and manipulated, how transects and mesohabitats will be weighted, or how variable flows in the peaking reach will be analyzed, we do not consider the study plan to provide an adequate description of the proposed methodology. We recommend that the Licensee finalize and then conduct these remaining studies as quickly as feasible to avoid further delays.

c. Peaking

S3-29 While the Executive Summary lists an "evaluation of the effects of fluctuations on aquatic resources within the J.C. Boyle peaking reach" as an ongoing fish resources study plan (ES page 4-7), the Fish Resources DTR does not address this particular

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Response to Comment S3-30

Please see the Fish Resources FTR and Exhibit E for a full analysis of the ramping studies that PacifiCorp conducted and the proposed mitigation.

study in any detail. In theory the proposed "peaking" study will integrate the results of numerous studies and include data on fish movement and migration, fish stranding, macroinvertebrate production, fish spawning and incubation, water quality and temperature, hydrology, geomorphology, riparian composition, and amphibian distribution in the peaking reach as compared to similar nonpeaking portions of the river. In this instance a delay in implementing the appropriate analyses is understandable given the necessity for multiple other studies to be completed first. The Department is concerned, however, that not even the framework of this important step of integrating Project impacts is discussed in the DLA. The presence of unsupported conclusions discounting potential peaking impacts such as the determination that "[f]ish community comparisons with the Keno [and peaking] reach do no[t] indicate major differences. Trout populations are good in both reaches. . ." (ES page 4-5) add to our concern that empirical data documenting the effects of peaking operations will not be presented or analyzed by the Licensee. This qualitative statement of "no Project impact" lacks supporting data and is not a statistically defensible conclusion. The Fish Resource DTR provides some raw data (from the one year of fish sampling) but the presentation and analysis of biological data such as age structure, growth rates, and diet is deferred to the Comparative Trout Section, page 2-45, which is blank. There is no quantitative support for either the conclusion of no major differences or the determination that the populations in the Keno and peaking reaches are "good."

S3-29

Given the lack of data provided in the DLA, the Department must rely on alternative sources of information, which though generally older, employ standard methodologies. For example, as opposed to the DLA conclusion that there is no evidence of impact on trout in the peaking reach, the 1990 "Final Environmental Impact Statement" (EIS) prepared by the FERC for the proposed Salt Caves Project found low adult trout densities in the upper end of the peaking reach. The EIS also noted that trout in the upper peaking reach had relatively low growth rates and large trout were underrepresented in the age structure (pages 3-25 and 3-27). The data supporting these conclusions included five years of reports compiled by the City of Klamath Falls (from 1986 through 1990). In contrast to the low densities and growth rates in the upper peaking reach, the Keno reach was considered "productive," based on average size and growth rates from the Oregon Department of Fish and Wildlife (ODFW) Mini-management Plan (1987). The FERC concluded that "[f]low fluctuations below the J.C. Boyle powerhouse (RM 220) are a chronic stress on trout and cause stranding of trout eggs, fry, and juveniles. Stress occurs from daily flow fluctuations and related changes in water temperature and water quality. Flow fluctuations require that trout continually seek new feeding and resting habitat. Water temperature changes alter metabolism and feeding rates." In the absence of any substantive new information, we concur with the 1990 FERC conclusion that there is a significant impact from the J.C. Boyle peaking operations on trout populations. This conclusion is also supported by the scientific literature which provides ample evidence of the negative environmental impacts of

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peaking operations (see Cushman, 1985 and Wootton et al. 1996). We recommend that the Licensee's final application consider a substantial reduction in the duration and magnitude of peaking currently performed at the J.C. Boyle powerhouse. The objective of reduced peaking operations (beyond the improvement in water quality noted earlier) would be to minimize the adverse impacts of repeated rapid flow fluctuation on a wide variety of aquatic species and life stages.

d. Fish Passage

In 1991, the Klamath River Basin Fisheries Task Force (Task Force) prepared the Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program (Long Range Plan).³ The Department is a member of the Task Force and signatory to the Long Range Plan. The Long Range Plan clearly identifies the lack of passage through and beyond the Project as a significant impact to the Klamath River anadromous fishery (page 2-72). The issue of fish passage is central to any evaluation of Project impacts on aquatic resources, particularly anadromous fish. The DLA approach to the issue of fish passage basically has three components:

1. an engineering evaluation of potential new facilities;
2. a modeling effort to rank the effect and effectiveness of different fish passage solutions on resident and anadromous fish species; and
3. an evaluation of the current fish passage mitigation measures (Fish Resources DTR, pages 5-1 and 5-2).

While one (yet to be approved) study plan generally encompasses all of these components, the following comments will be segregated into these three areas.

i. Fish Passage Engineering Evaluation

For the engineering evaluation, the DLA places heavy emphasis on the cost for bringing the facilities into compliance with current agency criteria. The DLA does not identify any preferred measures for fish passage for the Project (Exhibit E page 4-100, Proposed Enhancement Measures for Fish Resources). While the brief analysis of downstream and upstream fish passage facilities in the Fish Resources DTR clearly provides cost estimates for facilities, it omits any discussion of reliability or effectiveness of the options under consideration. For example, in the summary tables (Tables 5.3-3 through 5.3-16), almost all of the volitional facilities which have the benefit of "meets agency criteria" or "would improve passage" are followed by the drawback of "cost." We cannot draw any meaningful conclusions from this superficial summary other than the Licensee is very concerned about cost.

Response to Comment S3-31

Estimates of system effectiveness have been presented at meetings of both the Aquatics and Fish Passage Work Groups. Currently, these effectiveness assumptions are being reviewed, and used in on-going KlamRas and EDT Modeling efforts. Section E4 of Exhibit E describes PacifiCorp's proposed fish passage improvement's and outlines plans for further review on fish reintroduction above Iron Gate dam. Cost is an evaluation factor pertinent to all entities, be they public or private, and is a reasonable consideration in a FERC licensing process when balancing public interests.

³ The Department of Interior (DOI) submitted copies of the Long Range Plan to the FERC in May 2003 to be included in the record of comprehensive plans with relevancy to this relicensing.

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Response to Comment S3-32

The consultant numbers included the cost of construction only, and did not include design, administrative and legal fees, etc.

Response to Comment S3-33

Comment noted.

As a general comment, the estimates of the capital costs to construct new fish screens and fish ladders presented in the Fish Resources DTR appears excessive. In many cases, the estimates appear to be inflated when compared to the estimates developed by the Licensee's consultant, CH2M Hill, and presented to the collaborative team in February 2003. While the DLA makes it difficult to verify the estimates by providing only minimal supporting documentation, CH2M Hill has previously supplied cost summary tables that provide some, albeit limited, information on the basis of the cost estimates. Notwithstanding the limited documentation, Department hydraulic engineers representing the Department have developed estimates of the capital costs to construct fish screens and fish ladders at Iron Gate, Copco 1, and Copco 2 using available references. The following table compares Department cost estimates with those presented by both the Licensee and CH2M Hill. Unfortunately, the Licensee has not provided the necessary information to verify cost estimates for fish locks, fish lifts, trap and haul facilities, or tailrace barriers.

Comparison of Klamath River Fish Passage Facility Cost Estimates (2003 dollars)			
	DLA Estimate	CH2MHill Estimate	CDFG Estimate
I. Iron Gate Dam			
Fish Ladder (140 ft)	\$21.0M	\$16.0M	\$4.2M - \$8.5M ¹
Fish Screen	\$15.1M	\$7.6M	\$8.9M
II. Copco 1			
Fish Ladder (125 ft)	\$18.9M	\$18M	\$3.8M - \$7.6M
Fish Screen	\$23.4M	\$18.8M	\$16.4M
III. Copco 2			
Fish Ladder (22 ft)	\$3.3M	\$2.2M	\$0.7M - \$1.3M
Fish Ladder (147 ft)	\$22.1M	\$18M	\$4.5M - \$8.9M
Fish Screen	\$21.4M	\$18.8M	\$16.4M

¹ Estimate does not include costs associated with modifications to existing ladders or sorting facilities.

When developing the cost estimates for fish ladders, the Department relied upon the criteria presented by Charles H. Clay (1995).¹ In this reference, the author suggests basing the cost of fish ladders on the volume of the structure. Clay suggests an approximate cost of between \$20 per cubic foot and \$40 per cubic foot (1987 dollars). Using typical fishway dimensions suggested by Bell (1991), Department engineers estimated the fishway volume for a given fishway height. The volume was then multiplied by the cost range presented by Clay to estimate the fishway costs in 1987 dollars. The average change in the Consumer Price Index between 1987 and 2003 is 3.1% and this value was used to convert the 1987 cost estimates to 2003 dollars.

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When developing cost estimates for fish screens, the Department relied upon information compiled by the Washington Department of Fish and Wildlife (WDFW) regarding the average cost per cfs of screens constructed in the Pacific Northwest. The average costs range from \$5,837 per cfs for screens between 50 and 100 cfs to \$4,537 for screens greater than 1,000 cfs (1999 dollars). The required screen size was determined by dividing the diversion rate by the allowable approach velocity. The screen size was then multiplied by the applicable WDFW cost range to estimate the screening costs in 1999 dollars. For consistency, the 1999 estimates were converted to 2003 dollars using the same change in the Consumer Price Index (3.1%).

In contrast the DLA appears to have used an interest rate of 6.6%. The difference between a CPI-based interest rate and the Licensee's selected interest rate has a significant impact on costs when converting from 1987 to 2003 dollars. For example, the Department's estimate of the cost to construct a new fishway at IGD ranges from \$4.2M to \$8.5M using the CPI-based interest rate to convert between 1987 dollars and 2003 dollars. However, applying the Licensee's interest rate to convert between 1987 dollars and 2003 dollars increases the costs to between \$7.2M to \$14.5M (comparable to the estimate developed by CH2M Hill).

S3-34 The DLA cost estimates appear inflated even when compared to the cost estimates prepared by the Licensee's own consultants. The following is an excerpt from CH2MHill's February 26, 2003, Technical Memorandum No. 9 regarding the Klamath Hydroelectric Project Iron Gate Fish Passage Facilities. "Based on an approximate cost of \$100,000 per foot, the 140-foot ladder, plus the modifications to the existing ladders and sorting facilities would cost approximately \$16.0M. The new ladder would require approximately 40 cfs to operate." In contrast, the applicable paragraph in the Fish Resources DTR (page 5-63) reads "Based on an approximate construction cost of \$100,000 per foot, the 140-foot ladder, plus the modifications to the existing ladders and sorting facilities, would cost approximately \$21.0M. The new ladder would require approximately 40 cfs to operate." As can be seen, the cost estimate increased by \$5.0M between February and June 2003. In fact, the costs reported in the Fish Resources DTR are 25% higher than the latest Capital Construction Cost estimates developed by CH2M Hill.

S3-35 In addition to questions regarding the DLA cost estimates, the Department also has concerns with the range of fish passage technologies described in the Fish Resources DTR. Department representatives have attempted to convey Department preferences and criteria concerning fish passage technologies throughout the collaborative process. Based on the content of the Fish Resources DTR, we feel obligated to reiterate this information.

Response to Comment S3-34

Both the \$16.0M and \$21.0M Iron Gate fish ladder costs are correct. The \$16.0M cost is a **construction** capital cost. The \$21.0M cost is a **project** capital cost. The project capital cost includes the construction capital cost plus allowances for engineering and design, owner's legal and administrative costs and services during construction. These additional items add approximately 25% to the base construction capital cost.

Response to Comment S3-35

The range of technologies explored as part of the fish passage analysis was developed in consultation with the stakeholders. Facilities examined included high speed screening systems as well as conventional screening systems that meet agency criteria. In regards to adult passage, the engineering group examined both ladders and trap-and-haul systems at all project facilities.

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S3-36 To provide In terms of downstream passage, the reservoir intakes of the Iron Gate, Copco 1, and Copco 2 diversion facilities should be equipped with properly designed fish screens. The Department's June 19, 2000, Statewide Fish Screening Policy specifically requires screens on diversions in anadromous waters unless sampling demonstrates otherwise. The Department's Fisheries Engineering Team (FET) does not support the use of high speed intake screens. The approach velocity of these fish screen designs exceeds the allowable velocity specified in the Department's June 19, 2000, Fish Screening Criteria. High speed screens are considered experimental technology and have not been adopted by the Department. As such, high speed screens are not recommended for the Copco 1, Copco 2, or Iron Gate reservoir intakes. In addition, the FET does not support the use of gulper-type surface collectors. S3-37 These surface collectors do not provide a positive barrier against entrainment and are also considered experimental technology. Gulper-type surface collectors are not recommended for either Copco 1 or Iron Gate reservoirs. While the Department may consider the use of trap and haul in specific situations, the trap and haul of downstream migrating fish from River Mile 204 to below IGD is not a preferred solution. Trap and haul may subject the fish to numerous stressors, such as handling and poor water quality, which may affect survival. The FET prefers options that provide volitional passage. S3-38 S3-39 S3-40

S3-41 If upstream fish passage is not provided through removal of Project facilities, fish passage should be provided through the use of well designed, commonly accepted fish passage technologies. The FET would support the use of a properly designed fish ladder at either IGD, Copco 1 Dam, or Copco 2 Dam. In addition, the FET would support the use of either a properly designed fish lift, or Borland-type fish lock at IGD or Copco 1 Dam. While the Department may consider the use of trap and haul in specific situations, such as transport to a hatchery for spawning, the trap and haul of upstream migrating fish from below IGD to River Mile 204 is not a preferred solution. Trap and haul may subject the fish to numerous stressors, such as handling and poor water quality, which may affect spawning and/or survival. The FET prefers options that provide volitional passage. S3-42

S3-43 Finally, the FET supports the application of a properly designed fish screen and ladder at the Fall Creek diversion site. The FET would also support relocating the diversion 0.3 mile downstream to near the existing falls to extend the available fish habitat although a properly designed fish screen may still be required to prevent entrainment.

S3-44 Through the Fish Engineering Subgroup, the Department has assisted with the development of the table "Options for Potential Fish Passage Facilities." However, the table presented at the end of the DTR (Table 5.3-20) does not reflect all of the

Response to Comment S3-36

In the FLA, PacifiCorp has proposed measures to reduce Project-related impacts to resident fish populations. These measures include a combination of new and improved fish passage facilities and habitat actions designed to protect and enhance resident fish populations.

Response to Comment S3-37

PacifiCorp is not currently proposing to install high-speed screens at Project facilities. These systems were examined at the direction of the stakeholders who were interested in reviewing all possible technologies.

Response to Comment S3-38

PacifiCorp engineers and biologists are of the opinion that a well-designed gulper system is capable of significantly reducing entrainment at Project facilities. Data collected on the Baker River gulper in Washington State show that their simple system collects up to 70 percent of the juvenile coho, and sockeye arriving at the Upper Baker River Project.

Response to Comment S3-39

PacifiCorp agrees that where they make biological sense, the construction of volitional fish passage systems are the preferred method for passing both upstream and downstream migrants. However, in a situation like the Klamath River where, (1) water temperatures are not conducive for providing good upstream or downstream fish migration conditions, and

(2) juveniles and adults must pass through multiple dams and reservoirs, it is our opinion that both adult and juvenile survival would be higher under a trap-and-haul system.

Response to Comment S3-40

See response to comment #37, above.

Response to Comment S3-41

See response to comment #37, above.

Response to Comment S3-42

See response to comment #37, above. We also note that volitional passage systems expose fish to many of the same stressors listed for the trap-and-haul system. For example, adult fish arriving at Iron Gate dam from June through October would have to pass through multiple reservoirs and fish ladders with water temperatures (>21 C) near the upper range of their tolerance levels. Exposure to high water temperatures also decreases egg survival and may increase mortality due to disease (e.g. Ceratomyxosis).

Response to Comment S3-43

Comment noted. This issue has been addressed in the FLA.

Response to Comment S3-44

Comment noted. The draft table was distributed to the Engineering Subgroup for their direct input. The final table contains the comments from all agency representatives on the subgroup who responded. Table will be updated with the new information provided by CDFG.

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S3-44 comments that the Department has previously submitted to the collaborative team. The comments that follow reiterate comments that the Department has made on this table over the past two years.

S3-45 • East Side Upstream: A. Eastside Tailrace Barrier—Modify the Department of Fish and Game's comment to read: "CDFG supports ODFW's comments regarding a tailrace barrier at the Link River Eastside Powerhouse."

S3-46 • J.C. Boyle Downstream: B. Surface Collector—This item was originally located under Copco 1 Downstream. The Department of Fish and Game's comment should be modified to read: "As previously noted, CDFG does not support the use of a Baker Gulper-type surface collector. CDFG's June 19, 2000, Statewide Fish Screening Policy specifically requires screens on diversion in anadromous waters unless sampling demonstrates otherwise."

S3-47 • Copco 1 Upstream: C. Trap and Haul — This item was not in the original table for potential technologies at Copco 1. The California Department of Fish and Game's comment should be modified to read: "CDFG does not consider trap and haul to River Mile 204 to be a viable long-term solution."

S3-48 • Copco 1 Downstream: A. Fish Screens for Intake — The following sentence should be added to the Department of Fish and Game's comment: "CDFG does not support the use of high speed intake screens. High speed screens are considered experimental technologies and have not been adopted by CDFG. In addition, the approach velocity of these screen designs exceeds CDFG's June 19, 2000, established Fish Screening Criteria."

S3-49 • Copco 2 Downstream: A. Fish Screen on power intake — The last sentence of the Department of Fish and Game's comment, which reads "As previously noted, CDFG does not support the trap and haul of anadromous fish to River Mile 204," is misplaced and should be deleted.

S3-50 • Iron Gate Downstream: A. Fish Screens for Intake — Add the following sentence to the California Department of Fish and Game's comment: "CDFG's June 19, 2000, Statewide Fish Screening Policy requires screens on diversions in anadromous waters unless sampling demonstrates otherwise."

• Iron Gate Downstream: B. Surface Collector - Add the following sentence to the California Department of Fish and Game's comment: "CDFG's June 19, 2000, Statewide Fish Screening Policy requires screens on diversions in anadromous waters unless sampling demonstrates otherwise."

Response to Comment S3-45

Comment noted. See the response to comment #44, above.

Response to Comment S3-46

Comment noted. See the response to Comment #44, above.

Response to Comment S3-47

Comment noted. See response to comment #44, above.

Response to Comment S3-48

Comment noted. See the response to comment #44, above.

Response to Comment S3-49

Comment noted. See the response to comment #44, above.

Response to Comment S3-50

Comment noted. See the response to comment #44, above.

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Response to Comment S3-51

PacifiCorp and other stakeholders agree that the decision is a policy question that only the agencies can address, we believe that models provide a valuable tool for identifying key uncertainties, and the probable risks and benefits associated with reintroducing anadromous fish to the Upper Klamath basin. Thus, we believe that the models will help inform the decision-making process regarding this issue.

- Iron Gate Downstream: C. High Speed Fish Screen – Add the following to the California Department of Fish and Game's comments: "CDFG does not support the use of high speed intake screens. High speed screens are considered experimental technologies and have not been adopted by CDFG. In addition, the approach velocity of these screen designs exceed CDFG's June 19, 2000, established Fish Screening Criteria."
- Iron Gate Downstream: D. Behavioral Devices - Add the following to the California Department of Fish and Game's comments: "CDFG does not support the use of behavioral devices in lieu of proven positive barrier technologies. In addition, CDFG's June 19, 2000, Statewide Fish Screening Policy specifically requires screens on diversions in anadromous waters unless sampling demonstrates otherwise."
- Iron Gate Downstream: E. Through Turbine Passage – Add the following to the California Department of Fish and Game's comments: "CDFG does not support the application of 'through turbine passage' methods for juvenile anadromous fish, except for low head situations where there is virtually no potential for harm due to runner strike or pressure gradients. CDFG's June 19, 2000, Statewide Fish Screening Policy specifically requires screens on diversions in anadromous waters unless sampling demonstrates otherwise."
- Iron Gate Downstream: F. Louvers – Add the following to the California Department of Fish and Game's comments: "CDFG does not support the use of louvers. CDFG's June 19, 2000, Statewide Fish Screening Policy specifically requires screens on diversions in anadromous waters unless sampling demonstrates otherwise."
- Iron Gate Downstream: G. Any Net Only System - Add the following to the California Department of Fish and Game's comments: "CDFG does not support the use of 'net only' systems, unless they meet CDFG's established screening criteria. CDFG's June 19, 2000, Statewide Fish Screening Policy specifically requires screens on diversions in anadromous waters unless sampling demonstrates otherwise."

ii. Effect and Effectiveness of Fish Passage Options

The current state of analysis of the second component, the effect and effectiveness of a range of fish passage options, is still in the development phase (ES page 4-7). The Department and other stakeholders have disagreed with the purpose and outcome of this study which is summarized in the ES on page 4-7 as "results of fish

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Response to Comment S3-52

PacifiCorp, in collaboration with the stakeholders, is currently modeling the 300 miles of stream habitat assumed available for anadromous salmonids in the Upper Klamath River basin. As the Department is aware, some of this habitat may be highly productive salmon habitat, other portions may not support salmon production at all. Three separate reviews conducted by the fisheries agencies in this basin have each concluded that anadromous fish should not be reintroduced into the Upper Klamath for a myriad of reasons. Despite this, PacifiCorp is working with its partners to re-examine the issue one more time to see if reintroduction is feasible.

Response to Comment S3-53

PacifiCorp is currently working with stakeholders to model five different fish passage alternatives, including dam removal. The results of these analyses will be available for review in mid-2004.

Response to Comment S3-54

The final license application (FLA) provides a thorough description of the existing Project, its operation, and the Project's effect on the surrounding environment. In addition, the FLA provides a thorough description of the proposed Project, proposed Project operations, and the proposed Project's anticipated enhancement to the surrounding environment. The proposed Project was developed considering a number of factors, including the issues, questions and concerns raised by participants in the pre-filing collaborative consultation process; existing information; and the results of over 38 environmental studies developed by the Klamath Collaborative.

passage modeling to test the feasibility of anadromous fish reintroduction." It is inappropriate to use the hypothetical output of a model to answer a policy question of this magnitude. The Department has participated in development of a fish passage modeling effort for the purpose of gaining insight into the relative merits of various fish passage options, not for the purpose of deciding if fish passage is "worth the effort" for the Licensee. The DLA does not present any analysis of the effect or effectiveness of various passage alternatives and does not even define current impacts of the Project. In lieu of new information, the Long Range Plan noted that the Project blocks salmon and steelhead access to 75 miles of main stem river plus tributaries which historically supported anadromous fisheries and reach well above UKL (Long Range Plan, page 2-72.) Fortune et al. (1966) estimated that the Project blocked access to habitat for 9,000 Chinook and 7,500 steelhead spawners. An effort to update this information by the NMFS and presented at the 2003 WDAFS estimates the loss of anadromous habitat from the Project at over 300 miles (Steve Edmondson, personal communication). The Department considers these estimates of lost habitat and production to represent at a minimum the effect and effectiveness of the Project's current fish passage alternative.

Since March 2001, the Department has recommended that the Licensee evaluate volitional fish passage (upstream and downstream) at all facilities using the best available methodologies. The range of methodologies considered should include dam decommissioning in an incremental stepwise sequence. The Licensee to date has resisted a comprehensive evaluation of an adequate range of fish passage and Project operating alternatives stating their objective is to gather data to support their preferred alternative. While the DLA does not describe the preferred alternative, the Licensee has stated that dam decommissioning will not be part of their preferred alternative. The Licensee has agreed to an undefined "high level" review of various fish passage options (Consultation Record, page 8) as opposed to a full National Environmental Policy Act (NEPA) alternatives analysis. In contrast, the stakeholder group has consistently recommended an analysis of the full range of scenarios with enough detail to guide collection of appropriate data and to provide the FERC with a sufficient record to perform the NEPA alternatives analysis.

To keep the initial analysis within a reasonable scope, the Department has condensed the range of fish passage scenarios which we recommend for analysis by the Licensee analyze at a minimum to the following:

- A. All dams and facilities (except Keno) removed;
- B. Link River, Keno, and J.C. Boyle remain with the California dams removed. Volitional fish passage at remaining facilities. No peaking at J.C. Boyle; and
- C. Volitional passage at all facilities.

It is not possible for PacifiCorp to accurately predict the alternatives, or all of the information that FERC may need to analyze these alternatives in their Environmental Impact Statement. Should FERC require additional information, they will likely request it from PacifiCorp.

At the request of relicensing participants and in the interest of collaboration, PacifiCorp conducted intensive fish passage and water quality modeling of at least five variations on dam removal, volitional fish passage and run-of-river operations. In addition, PacifiCorp worked with relicensing participants to try and identify all of the implications of implementing numerous facility and operations scenarios through an exercise entitled System Landscape Options Analysis. All of this information is included in the appended technical reports and consultation record. PacifiCorp has addressed alternatives and their associated issues as a means to inform the subsequent NEPA process

Response to Comment S3-55

The fish passage modeling (using EDT and PasRAS) being conducted by PacifiCorp includes an assessment of alternatives (including those listed) as developed in consultation with the Aquatics Work Group.

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S3-56 To understand Project impacts we must have an independent and cumulative
S3-57 assessment of the limitations of each current Project development on upstream and
S3-58 downstream fish passage as well as the potential benefits available under the above
range of Project modifications. Further, the two primary modeling efforts (i.e., water
quality and fish passage), should be integrated to ensure that both models analyze all
Project scenarios for consistency and comparability. In addition, all technical
workgroups (i.e. water quality, fish passage, aquatics, terrestrial, socioeconomic,
recreation, and cultural) should consider each scenario and propose how best to
integrate their individual study plans and results into an impacts assessment framework.

iii. Existing Fish Passage Mitigation

S3-59 The third component of the DLA assessment of fish passage involves an
evaluation of existing passage mitigation, namely the Iron Gate Hatchery and various
fish passage structures in the Oregon portion of the Project. We believe that a critical
examination of these existing mitigation measures demonstrates a consistently
inadequate effort on the part of the Licensee to address the fish passage impacts of the
Project.

S3-60 The Iron Gate Hatchery provides the current mitigation for the Project impacts on
anadromous salmonids. It is important to note that the hatchery only provides mitigation
for construction of the Iron Gate Development and the associated loss of access to the
main stem and tributaries between IGD and Copco 2 Dam. The hatchery does not
address any other component of Project impacts. Given this limited geographic scope,
the hatchery should be evaluated not only for effectiveness at meeting goals set back in
the 1960s to address a relatively small portion of the Project but also for the potential to
contribute to and be affected by future mitigation measures. Constraints on rearing
space and less than optimal water quality conditions limit current hatchery operational
flexibility and resource management options. The DLA does not consider any potential
future modifications of the hatchery as part of a PM&E package. Almost any fish
passage option will necessitate changes in the hatchery facilities and operations. We
recommend that the license application provide, at a minimum, an overview of potential
hatchery-related mitigation measures. For example, installation of low level release
structures would have significant impacts on the hatchery water supply, necessitating
different operations/facilities during periods of impaired water quality.

As an initial step in evaluating the hatchery, in our March 27, 2001, first stage
consultation the Department recommended:

S3-61 "... that the [Licensee] fund and participate in development of methods
for evaluating current hatchery operations as they relate to meeting
existing license mitigation requirements, as well as impacts of hatchery

Response to Comment S3-56

Comment noted. FERC in their NEPA process will address the
issue of cumulative impacts.

Response to Comment S3-57

The EDT model used for analyzing anadromous fish
production is utilizing water quality data as input.

Response to Comment S3-58

Comment noted.

Response to Comment S3-59

Please see Section E4 of Exhibit E, which describes fish
passage considerations.

Response to Comment S3-60

Please see Section E4 of Exhibit E, which addresses proposed
PM&E measures at the Iron Gate hatchery. Consideration of
production goals can also be examined against results of fish
production through the EDT fish passage modeling.

Response to Comment S3-61

See both Section E4 of Exhibit E and the Fish Resources FTR
for a detailed discussion on the Iron Gate hatchery.

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operations on the naturally producing Klamath River fishery. There is a similar effort already underway at the Department's Trinity River Hatchery funded by the [US Bureau of Reclamation] with contract oversight by the Hoopa Valley Tribe. The [Licensee] should coordinate with this research and, at a minimum: Fund studies that would (1) identify potential hatchery operational and structural improvements, (2) develop an on-going monitoring program with adaptive management objectives, (3) evaluate the effects of hatchery fish on natural stocks and (4) evaluate the hatchery role in the recovery of ESA-listed fish species. Items 2 through 4 . . . will require extensive marking or tagging of hatchery production, downstream sampling of outmigrating juveniles and recovery of adults and data analysis. The Department would take the lead in developing and conducting the studies and the entire effort should be funded by the [Licensee]."

S3-61

In response to our request for a comprehensive evaluation of hatchery operations and impacts, the Licensee distributed an audit questionnaire to the Iron Gate Hatchery staff in 2001. This questionnaire was originally developed for assessment of the Columbia River system's federally run hatcheries which have different constraints as well as different management goals and objectives. Upon completion, it was generally agreed by Department representatives, as well as the Licensee's consultants, that the questionnaire was not applicable to the Iron Gate facilities and had limited utility for informing the current relicensing effort. In addition, the DLA section summarizing the evaluation to date (Section 5.4) contains multiple numeric errors in the tables and text; apparently, the result of relying on outdated records. We will provide a number by number correction of the erroneous information at the next hatchery workgroup meeting. For now, we will only correct the DLA's statement that "[s]teelhead production at the Iron Gate Hatchery began in 1966 and has achieved the 200,000 yearling goal in all but 4 years" (Fish Resources DTR, page 5-84). Actually, steelhead production goals have only been achieved in 21 out of the 37 years since 1966. The steelhead return numbers dropped drastically during the 1990s and have rebounded slightly in the past few years (Kim Rushton, Hatchery Manager, personal communication).

S3-62

S3-63

Given the small amount of information gathered to date, additional efforts to evaluate the effectiveness of the Iron Gate Hatchery are clearly warranted. The DLA discusses increasing the current level of Chinook tagging and marking (i.e., 5%) to the 25% recommended by the Department and other stakeholders in the Fish Resources DTR (page 5-85). After detailing the cost and effort associated with this necessary step, the DLA does not present any conclusion about the Licensee's commitment to

S3-64

Response to Comment S3-62

Comments noted. Corrections will be made in the FLA with updated information obtained from hatchery personnel.

Response to Comment S3-63

Comment noted. Corrections will be made in the FLA with updated information obtained from hatchery personnel.

Response to Comment S3-64

PacifiCorp has committed to the recommended marking program to assist CDFG fisheries management (see Exhibit E of the FLA).

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S3-64 performing this study. When questioned directly at the May 5, 2003, fish passage work group meeting, Mr. Todd Olson of PacifiCorp stated that the earliest the Licensee would consider implementing a 25% constant fractional marking program would be in 2007 or postlicense. In effect, commencement of this study has been shifted from the appropriate first stage of data collection to the postlicense monitoring phase where it will not provide any input into PM&E development. The Department asserts that a 25% constant fractional marking effort is not only necessary to evaluate the hatchery's current and future mitigation role but would also provide valuable input for other relicensing studies such as the fish production and survival modeling effort. After 2.5 years of contemplation by the Licensee, this basic step of marking and monitoring hatchery fish in a statistically valid manner has been delayed to the point where any results will be meaningless for the relicensing.

S3-65 Beyond the lack of studies, the Licensee's approach to the role of the Iron Gate Hatchery in mitigating impacts of the Project has been a source of concern to the Department ever since 1961. At that time, the Department petitioned the FERC to require the Licensee to erect and maintain a fish hatchery to mitigate for the displacement of salmon and steelhead trout by construction of the Iron Gate development. The Licensee answered our petition by denying the need for a hatchery or other fish facilities, citing the benefits to the anadromous fishery resulting from elimination of flow fluctuations (fluctuations caused by the Licensee's own peaking operations upstream), as well as the recreational benefits provided by Iron Gate Reservoir, as fulfilling their mitigation obligation. While the FERC did issue a March 14, 1963, order to construct, operate, and maintain a fish hatchery, they assigned only 80% of the combined annual cost of operation and maintenance for the hatchery to the Licensee. The remaining 20% of hatchery costs were left to be assumed by the State of California. This division of costs was apparently based on the State of California's commitment back in 1919 to assume financial responsibility for the Fall Creek facility which had been built by the Licensee to mitigate for construction of the Copco No. 1 dam. In 1966, the Department appealed the partial funding aspect of the FERC order to the U.S. Supreme Court but did not receive a favorable decision. As a result, for almost 40 years, citizens of the State of California have funded 20% of the Iron Gate Hatchery operations, providing mitigation for the Project impacts on anadromous salmonids. We recommend that the final application include full funding of any new mitigation and enhancement of hatchery operations.

S3-66 In regard to nonhatchery mitigation measures, the DLA does not identify any Project impacts at existing fish passage facilities (all of which are in Oregon). Although these facilities are outside the Department's jurisdiction, ecological processes do not segregate along jurisdictional boundaries and environmental impacts in the Oregon portion of the Klamath watershed have significant implications for the California portion.

Response to Comment S3-65

PacifiCorp acknowledges the important contribution that the Iron Gate hatchery makes to the downstream fisheries. PacifiCorp proposes to continue funding the hatchery operations at the 80% level, however; additional measures at the hatchery will be 100% funded by PacifiCorp. See Section E4 of Exhibit E of the FLA.

Response to Comment S3-66

Please see Section E4.3 of Exhibit E for a discussion on fish passage considerations and proposed PM&E measures. PacifiCorp is continuing to work with the Fish Passage Work Group on anadromous fish reintroduction issues.

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Fish passage throughout the Project is an example of an issue important to the Department which transcends State lines. Unimpeded passage is an essential component of not only a healthy resident fishery but also any successful reintroduction of native anadromous species to their historic range.

The Licensee did not perform any site-specific biological evaluations (e.g., monitoring of migration via radio-tags or a mark and recapture program) to assess the effectiveness of the existing passage structures. Without site-specific information, Table ES 4.4-1 nonetheless asserts "[u]se of the fish ladder at J.C. Boyle dam has declined markedly since the dam was built but not due to ladder function. . . ." The analysis of the J.C. Boyle ladder function lacks empirical support and simply refers to a June 2002 technical memo from one of the Licensee's consultants. In response to stakeholder input, the Licensee has recently initiated a "pilot" trout movement study below the J.C. Boyle powerhouse to evaluate trout passage through the bypass reach and over the ladder. This is a start towards gathering relevant empirical data, but the proposed preliminary study is also limited by small sample size.

Until new data assessing ladder function becomes available, we refer to field studies done by Hanel and Gerlach (1964) and the ODFW from 1988 to 1991 (Buchanan 1991, Hemmingsen et al. 1992). These research efforts indicate that 95-98% of adult fish passage at the J.C. Boyle Dam has been lost with current passage less than 5-10% of that documented one year after construction of the J.C. Boyle Dam. We conclude that the structural design and operation of the facility at J.C. Boyle have combined to almost eliminate fish passage through this portion of the Project. This is a significant Project impact, not only for the relicensing but also as a general compliance issue as the J.C. Boyle ladder is a requirement in the current FERC license (article 32). Based on the best available information, the Department recommends that the Licensee application consider replacement of the current ineffective ladder at the J.C. Boyle Dam with new, state-of-the-art volitional fish passage facilities. The objective of the new facilities would be to provide unimpeded upstream and downstream passage and the associated access to critical habitat such as springs and tributaries.

Representatives of the ODFW have also expressed concerns with the Keno Dam ladder including a slope that is much steeper than current criteria for passage of suckers. In addition, ODFW has noted that automated weirs 25 through 28 lack adequate orifice passage and fish using the ladder have to jump over these last four weirs to pass into the reservoir (Amy Stuart, personal communication). Overall ODFW found that steep gradient, hydraulic barriers and problems with entrances limit passage effectiveness of the Keno facility. The Department concurs with the ODFW recommendation to perform additional hydraulic and biological evaluation to address effectiveness of the ladder for all species including native trout, suckers, lamprey, and anadromous fish.

Response to Comment S3-67

PacifiCorp proposed juvenile survival studies in 2002 and 2003 that would have provided some of this information. However, because stakeholders were uncomfortable with study protocols and possible interpretation of study results these studies were not undertaken. However, PacifiCorp and the stakeholders have agreed to perform a study to determine fish behavior in Copco 1 and Iron Gate reservoirs in 2004.

Response to Comment S3-68

Comment noted. Please see the Fish Resources FTR for reporting of the trout movement study.

Response to Comment S3-69

Field studies have been conducted at J.C. Boyle. Please see the Fish Resources FTR and Section E.3 of the FLA for the results of these ladder function studies. PacifiCorp is not proposing a new fish ladder at J.C. Boyle dam for those reasons enumerated in the FLA.

Response to Comment S3-70

PacifiCorp has proposed to exclude Keno dam from the proposed FERC boundary. The company's responsibilities at Keno will be considered outside the FERC process.

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S3-71 The fish passage section of the DLA concludes with a section listing studies which are still under development. One of these outstanding study needs is the assessment of stock genetics and life histories (Fish Resources DTR page 5-111). The Department has requested an analysis of the genetic composition of both historic and current anadromous stocks within the Klamath River. This information is necessary to identify appropriate stocks for reintroduction as well as to develop a successful strategy. The DLA describes a proposed literature review of historical information concerning the distribution and life histories of anadromous species in the Klamath River basin above Iron Gate Dam (IGD). While this information will be helpful in designing a successful reintroduction strategy, it does not address the issue of the genetic composition or suitability of available stocks. The DLA notes that the Licensee has agreed to "additional genetics study tasks" but defers a description of any such tasks until a later date (Fish Resources, DTR, page 5-111). Given the short amount of time remaining in this traditional relicensing process, this deferral will likely result in inadequate genetic information for agencies to rely on in developing appropriate PM&E measures.

S3-72 Another proposed study is a literature review of entrainment impacts on resident fish species (Fish Resources DTR, page 5-112). Conducting a literature review in lieu of site-specific entrainment/turbine mortality studies will not provide a statistically valid quantification of Project impacts. Entrainment and mortality studies are necessary to evaluate losses due to Project facilities and operations. The literature is convincing that hydropower entrainment and mortality often result in significant impacts to both native and sport fisheries. The literature also reveals significant variability in entrainment and mortality impacts between facilities, necessitating site specific assessment. Without site specific observations or verification, the proposed literature review and analyses will not provide the level of information necessary for the Department to develop appropriate PM&E measures for the entrainment/turbine mortality related impacts of the Project.

S3-73 Site-specific entrainment studies need to utilize data collected over a representative range of Project operations and biologically meaningful time periods based on the life histories of the species of concern. In the case of the California reservoirs, this is a wide range of species. There are five special-status species within the Iron Gate and Copco reservoirs: Lost River (*Delistes luxatus*) and shortnose suckers (*Chasmistes brevirostris*) which are fully protected species, and Klamath large-scale suckers (*Catostomus snyderi*), Klamath River lamprey (*Lampetra similes*) and blue chub (*Gila coerulea*) which are California special concern species. (Note: the DLA erroneously omits blue chub from the list of special status fish species [Fish Resources DTR, Section 1.14]). There is also a diverse assemblage of warmwater sport fish

S3-74 including yellow perch, crappie, pumpkinseed, channel catfish and several other centrarchids as well as the supporting bait fish species (e.g., golden shiners and fathead minnows). To assess Project impacts, the entrainment/turbine mortality studies should address all of these reservoir species as well as the more riverine species which migrate through the Project area such as rainbow trout and small-scale suckers.

Response to Comment S3-71

The results of the genetic study are in the Fish Resources FTR. PacifiCorp believes that the identification of appropriate stocks for reintroduction should be done collaboratively within the Fish Passage Work Group.

Response to Comment S3-72

PacifiCorp has addressed fish impacts from entrainment through Project facilities in the FLA. Proposed PM&E measures are designed to reduce project impacts on ESA listed suckers, native and non-native resident fish species where these actions are supported by the data collected as part of the relicensing proceedings. The literature review of turbine and spillway mortality, as well as fish survival through reservoirs, is deemed sufficient to allow the Department to determine possible impacts on key management species. PacifiCorp has been unwilling to collect site-specific data on fish entrainment at Project facilities without the Department and other agencies setting performance criteria from which to evaluate study results. To date, the resource agencies have expressed the opinion that facilities must be screened if even one resident fish is entrained and lost. Additionally, the resource agencies have stated that facilities will need to be screened if and when anadromous fish are reintroduced into the Project area or upstream of Keno dam. Given the opinion expressed by the agencies regarding this issue, it seems that entrainment studies would have no impact on agency recommendations as to the need for screening.

Response to Comment S3-73

See response to comment #72, above.

Response to Comment S3-74

See response to comment #72, above.

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Response to Comment S3-75

Comment noted. Please see Section E4.3 of Exhibit E of the FLA for an explanation of PacifiCorp's proposed ongoing studies on fish reintroduction.

Response to Comment S3-76

To clarify, PacifiCorp has stated that it is impossible to test multiple test conditions in a single migration year. This is especially true in the first year of a study where data does not exist to predict how long it will take juveniles to migrate through each reservoir, or the number that will even survive passage. This type of data is needed to determine how long a single test condition must be maintained and the sample size required to draw statistically valid comparisons of alternative outcomes. Additionally, project spillway and turbine openings are surface oriented, i.e. within about 36-ft of the reservoir surface. Thus, reservoirs cannot be drawn below this point and still pass water, thus limiting the range of reservoir levels that can be examined. Finally, in-flows to the Project are controlled by Mother Nature and the Bureau of Reclamation. As PacifiCorp has little control of the flow entering the project area, it is difficult to adjust flows on the monthly time-step basis that would be needed for testing multiple conditions during a single migration period.

PacifiCorp agrees that study protocols proposed are biased by the size of the test specimens used. However, it should be noted that the size of fish being tested would be representative of a typical Klamath River fall Chinook or coho smolt. The limitations of the antennas have been considered in study design. Researchers conducting the survival tests will be testing antenna reception in the reservoirs, at turbine and spillway intakes, and in the tailwater of each project.

S3-75 Another study still under development but only mentioned briefly in the DLA Consultation Record (page 1-26) is a description of migratory behavior of juvenile salmonids through Project reservoirs using about 120 radio-tagged smolts per reservoir in the spring of 2004. This study is just one of the most recent additions to a package of studies that the Licensee proposes to conduct to test the "feasibility" of reintroducing anadromous fish to their historic ranges (Fish Resources DTR, page 5-108). The Department sees value in a study which addresses the question of how anadromous species would be impacted during the out-migration period (once fish passage through the Project is provided and there is a successful reintroduction of native salmonids to historic habitat). In particular, we hope to identify the best strategy for reintroducing native anadromous salmonids and want to analyze the relative "feasibility" of reintroduction under a range of fish passage options including dam decommissioning. However, we are concerned that the Licensee is limiting their "feasibility" analysis to reintroduction under essentially a status quo scenario that will involve no major modification of current facilities or operations. We do not support such a short sighted approach.

S3-76 Given the above clarification of the purpose of the juvenile passage assessment, the study faces significant logistical constraints and will only evaluate the behavior of fall Chinook and coho salmon under existing Project operations. The Licensee has stated they have no ability to modify Project operations to provide a comparison of different reservoir levels or flow patterns. Such a "gaming" of Project impacts will have to rely on modeling estimations. Another study limitation results from residualization in a significant proportion of the out-migrating hatchery steelhead in the Klamath. This phenomenon makes hatchery steelhead poor candidates for a migration study. There are also biases within the proposed methodology since radio tags require fish of a minimum size and the reliability of the telemetry antennas is limited by water depth. It is also important to note the study cannot describe, even under ideal circumstances, the causes of delay and/or mortality in the out-migrating juveniles.

S3-77 While the Department continues to work with the collaborative group to refine the juvenile migration study, by itself the radio tagged effort is not enough. Based on results from sampling by Department biologists in the Klamath River estuary, it appears that young of the year (YOY) Chinook are an important component of the out-migrating juvenile community (Mike Wallace, Associate Fisheries Biologist, personal communication). The proposed smolt radio tag study would not evaluate this life-stage. We recommend a supplemental juvenile study using a mark and recapture sampling of Chinook YOY from Iron Gate Hatchery to provide information on this life stage. Such a study would ideally involve a large sample size (in the thousands as opposed to a few hundred) and will facilitate a more statistically robust analysis. Information from the estuary also indicates that fall Chinook yearling out-migration may be part of a normal

Antennas will be designed and located in a manner that results in a known detection efficiency that will be used in calculating detection rates at each project.

Response to Comment S3-77

The stakeholders and PacifiCorp have recognized that the first year of the study is in reality a pilot evaluation of study protocols.

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life history variability for this species. Therefore, we recommend expansion of the current spring time release of radio tagged smolts to include a late-fall to early-winter release of Chinook yearlings. Finally the Department recommends a follow-up dye study in the reservoirs to describe surface water currents and provide insight into mortality results as well as fine-tune the placement of recapture gear necessary for the YOY study.

Terrestrial Resources

During the first stage consultation, the Department requested development of a comprehensive list of wildlife species likely to inhabit the landscape in and around the Project boundary. Subsequent to development of the species list we recommended analysis of life histories to identify those likely to be impacted by (1) inundation due to Project features, (2) peaking/ramping operations, and (3) Licensee land use practices such as grazing and timber harvest. Actual impacts to susceptible species could then be characterized. For example, given current deer population information, it is likely that the Iron Gate and Copco 1 reservoirs have impacted deer access to winter range. We recommended comparing historical and current deer migration patterns and overlaying the analysis with a topographic map of inundated lands. At a minimum, Project maps should include quantification and typing of inundated habitat as well as associated land uses throughout the area of Project impact and up major tributaries at least as far as the Licensee's property lines.

While the DLA presents several wildlife species lists as a first step, there is no substantial investigation, analysis, or even plan to identify Project impacts to wildlife resources. As an example, to address the concern that Project features impact deer migration and access to winter range, the DLA states that a South Cascade deer study documented "at least some movement across the river either across or near Iron Gate reservoir" (Exhibit E, page 5-98). The DLA also cites a 1996 study by the Bureau of Land Management (BLM) that involved radio tagging of 20 elk near Long Prairie and Jenny creeks. This is the extent of the investigation by the Licensee into the connectivity and migration issue and the basis for their conclusion "there is no evidence that the Project facilities create adverse effects on big game movement." (Exhibit E, page 5-98). We do not consider this cursory review of existing information to be an adequate effort to describe what is a predictable Project impact on wildlife.

The DLA discussion of the on-going effects of reservoirs on wildlife is a narrative description of current wildlife use of the reservoirs. There does not appear to be any attempt to predict the extent and composition of riparian community and associated wildlife habitat that would be provided if Project reservoirs were removed. This reluctance to consider the full range of potential future alternatives and the consistent application of appropriate fish passage scenarios for the Project is reflected in almost all of the resource areas.

Response to Comment S3-78

Pre-Project mapping of all areas currently inundated by Project reservoirs has been conducted and incorporated into the FTR. Results of the pre-Project mapping and habitat assessment, including the quantification and typing of all inundated lands, is provided in the Terrestrial Resources (TR) FTR, Section 3.7. Coupled with the results of vegetation cover type mapping for non-inundated lands provided in the FTR, Section 2.7, the FTR now provides current and historical quantification and typing of all lands located within the Licensee's property boundaries.

Response to Comment S3-79

All wildlife studies conducted as part of relicensing for FERC Project #2082 were initiated in consultation with CDFG, USFWS, ODFW and other state and federal resource agencies and biological experts, to identify and address potential Project impacts to terrestrial species. Species inventories were conducted as an initial step to determine species and populations likely to be affected by continued Project operations. The Terrestrial Resources FTR provides a detailed account of potential Project impacts based upon relicensing studies and past research for each biological resource group (FTR Sections 2.8, 3.8, 4.8, 5.8, 6.8, 7.8, 8.8, 9.8 and 10.8). The FLA provides a summary of ongoing Project impacts to terrestrial wildlife species and includes specific PM&E measures.

Response to Comment S3-80

PacifiCorp has conducted mapping of vegetation communities that existed prior to construction of Keno, J.C. Boyle, Copco, and Iron Gate dams. This information is described in Section 3.7 of the Terrestrial FTR. There is no guarantee that this habitat would develop if reservoirs were removed.

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Socioeconomics

S3-81 The DLA provides an existing socioeconomic condition which is a brief literature review (Exhibit E, Section 9.1). This section lacks meaningful detail; for example the commercial ocean salmon fishery is summarized in five sentences, none of which involve any estimation of the dollar value of this vital component of the Klamath River's economic health. Two socioeconomic studies proposed for the future are (1) a "high level" analysis of the socioeconomic impacts of other alternatives suggested by the stakeholder group and (2) an analysis of the socioeconomic impacts of some yet to be defined preferred alternative. The DLA offers no characterization of the Project's socioeconomic impacts and proposes no PM&E measures. The proposed studies will not document current impacts, just the differences between existing conditions and the (Licensee) preferred alternative. The interim study, the high level analysis of other alternatives will apparently consist of a table listing possible alternatives across the top and resource issues down the side. The intersecting boxes will be filled in with either a "+", a "-", or a "0" to summarize the socioeconomic impact of the alternative (e.g., dam decommissioning) on the resource (e.g., recreation). Such an analysis will be inadequate to inform any attempt by agencies to compare and balance the socioeconomic impacts of various alternatives on a range of resource areas.

S3-82 We recommend that the Licensee conduct an economic analysis that examines the costs and benefits of the full range of Project alternatives as soon as possible. We reference the work done by Loomis and Feldman (1995) and Loomis (1996 and 1998) as examples of appropriate methodologies for estimating the socioeconomic value of environmental resources associated with hydroelectric Projects.

Next Step - Preparing a Complete Application

S3-83 One of the Department's greatest concerns with the overall scope and content of the DLA is how poorly this document sets the stage for the next phase of relicensing: the filing of a complete application for acceptance by the FERC. This third stage of consultation marks the initiation of the appropriate Federal and State environmental reviews as described in 18 CFR 16.8 (d) and (f). Acceptance of a complete application triggers initiation of the NEPA review process under the direction of the FERC. The complete application must include a request for Clean Water Act Section 401 "Water Quality Certification" from the appropriate State water quality agencies - in this instance both the Oregon Department of Environmental Quality (ODEQ) and the California State Water Quality Control Board (SWRCB). In California, an application for 401 Water Quality Certification must comply with the requirements of the California Environmental Quality Act (CEQA).

Response to Comment S3-81

Additional details on the existing condition, especially as it relates to the current value of the salmon commercial fishery, have been added to the FLA.

Response to Comment S3-82

The proposed high level analysis (i.e., Phase 2 study) of the landscape options was re-directed by the Plenary. Therefore, the Phase 2 study proposed by PacifiCorp, which had not been approved by the Socioeconomic Work Group members, will not be included in the Final Technical Report or the Final License Application.

Response to Comment S3-83

The analysis of the full range in alternatives is expected to occur under the NEPA process. The desire by stakeholders for PacifiCorp to begin this process sooner (i.e., during the license application process) has been noted by PacifiCorp in the Socioeconomic Issue Paper.

Response to Comment S3-84

Continuing stakeholder work group meetings and information exchange was intended to augment the DLA and to "set the stage" for a collaborative process.

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Response to Comment S3-85

See response to CDFG comment #54.

Response to Comment S3-86

See response to CDFG comment #54.

Response to Comment S3-87

PacifiCorp concludes that the studies and analysis presented in the FLA and associated FTRs will be sufficient to support a complete and detailed application for Section 401 certification. FERC's relicensing regulations require that PacifiCorp request certification under Section 401 for the Project no later than 60 days after FERC issues the notice that the relicensing application has been accepted and is ready for environmental analysis. PacifiCorp will request certification from ODEQ and CSWRCB by that date.

Response to Comment S3-88

The Department's assertions of Project impacts have been noted.

S3-85 The Interagency Task Force (ITF) Report (dated April 26, 2001) on NEPA Procedures in FERC Hydroelectric Licensing recommends that a detailed analysis of a decommissioning alternative should begin early in the NEPA process. In response to repeated requests from stakeholders to develop information based on a full range of alternatives including decommissioning the Licensee has consistently refused, arguing that it is not their responsibility to do a NEPA analysis. While we agree the actual NEPA alternatives analysis is performed by the FERC, the Licensee has the responsibility to supply sufficient information in an application to allow an analysis by the FERC. S3-86 Similarly, the SWRCB (the lead CEQA agency for this Project) notified the Licensee in a December 23, 2002, letter that development of a study plan to address decommissioning issues would be necessary to fully assess the impacts of the Project under CEQA. The December 2002 letter noted the SWRCB concern that the Licensee S3-87 had not begun development of all the information considered necessary to support a complete application for Section 401 certification.

Perhaps in anticipation of the general reluctance of applicants to pursue decommissioning studies, the ITF also encourages resource agencies to provide information as soon as feasible relating to the beneficial or adverse effects of decommissioning a given Project on a variety of resources and interests including but not limited to:

- S3-88
- (1) listed or threatened or endangered species,
 - (2) economic viability of the Project including the costs of PM&E measures,
 - (3) potential for fish recovery,
 - (4) feasibility of fish passage,
 - (5) consistency with comprehensive plans,
 - (6) protected river status,
 - (7) effectiveness of past and the availability of future mitigation measures,
 - (8) support by the applicant or other party,
 - (9) tribal lands, resources or interests
 - (10) water quality issues,
 - (11) recreational opportunities,
 - (12) physical condition of the Project,
 - (13) Project-dependent developments,
 - (14) nonpower Project dependent benefits,
 - (15) Project-dependent resources,
 - (16) need for power and ancillary services,
 - (17) historic properties.

Several of the topics recommended for early consideration by the ITF are outside the Department's area of expertise, but the majority are of great concern to us. In the interest of facilitating comprehensive and timely NEPA and CEQA processes, and given the absence of relevant information in the DLA, we offer the following comments in roughly the order listed in the ITF report.

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Response to Comment S3-89

Information missing in this section of the DLA is now included in the License Application.

Response to Comment S3-90

PacifiCorp expects that of all the alternatives examined, dam removal will provide the largest benefits to anadromous fish species. However, PacifiCorp maintains that other alternatives will provide significant benefits to anadromous fish species, while at the same time protecting and balancing other public resources such as recreational rafting, power generation, cultural resources, and water quality.

S3-88(B) (1) There are special status fish species above, within, and below the Project. As described in the sections on water quality and fish resources, we assert that the Project has adverse impacts on a variety of aquatic resources including blocked access to cold-water refugia, seasonal exacerbation of impaired water quality, scouring of potential rearing and feeding habitat in varial zones, impediment of passage for both anadromous and resident species, and entrainment at unscreened intakes. These adverse effects are not unique to coho or listed suckers but impact the entire aquatic ecosystem within the area of Project impact.

S3-89 (2) The Department cannot provide expertise regarding the economic viability of the Project. We can only note that Appendix D of the DLA, Statement of Costs and Financing, is incomplete with no estimated costs for PM&E measures (page 2-1) no estimated levelized annual operating costs (page 4-1) and no estimated annual levelized value (page 5-1).

(3), (5), (9), and (11) In terms of the ITF issues that involve restoration, planning, Tribal, and recreational resources: in 1986 Congress found that "the Klamath and Trinity Rivers have outstanding anadromous fishery values and provide fishery resources necessary for Indian subsistence and ceremonial purposes, ocean commercial harvest, recreational fishing and the economic health of many local communities" (16 CFR §460 et al, a.k.a. the "Klamath Act"). While Congress also noted a significant reduction in the anadromous resources due to a variety of impacts (including dams and hydroelectric projects), they did not deem the river beyond restoration. Instead they budgeted over 20 million dollars to be spent over 20 years to restore the anadromous fish, primarily salmon and steelhead, of the Klamath River Basin. One of the first products of the restoration effort was development of the Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program, which as noted previously, has been submitted to the FERC as a comprehensive plan with relevancy to this relicensing. The Long Range Plan specifically speaks to a goal of restoring "the biological productivity of the Klamath River Basin in order to provide for viable commercial and recreational ocean fisheries and in-river tribal (subsistence, ceremonial, and commercial) and recreational fisheries" (page 1-12). The Long Range Plan goes on to formally state the objective of protecting salmon and steelhead habitat from harmful effects of water and power projects in the Klamath Basin (page 8-10).

S3-90 (4) In the 1966 Fortune analysis of the feasibility of providing passage, the researchers evaluated the best available technologies at that time and noted that downstream passage for fry and juvenile fish through the Project impoundments seemed to be the most severe passage problem. It is important to note that the Fortune report is almost 40 years old now and in 1966 they never considered the possibility of decommissioning to provide passage. While the current modeling effort to evaluate the

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effects and effectiveness of various fish passage alternatives remains in the preliminary phase, the consultants performing the work have repeatedly stated that decommissioning is naturally the most effective form of fish passage (Kevin Malone, Mobrand Biometrics, Inc., personal communication). It remains to be seen how other alternatives will compare. Meanwhile, the Department considers decommissioning a very viable passage alternative.

(6) In 1974, the six-mile reach of the Klamath River upstream of Copco Lake to the Oregon border was designated as a wild trout area by the California Fish and Game Commission and is currently managed by the Department's wild trout program. In 1994, the 11 miles of the Klamath River upstream of the California-Oregon border to the J.C. Boyle powerhouse was designated as a Wild and Scenic River. Additionally, beginning less than a mile below IGD, 197 miles of the Klamath River (i.e., downstream to the mouth) were designated as "Wild and Scenic" in 1981.

(7) The current mitigation provided by the Licensee for the lack of anadromous fish passage involves funding a portion of the operations at Iron Gate Hatchery. The Iron Gate Hatchery currently operates under stocking goals and constraints mutually agreed upon by the Department and Pacific Power and Light Company (PacifiCorp's predecessor) in 1996. The goals and constraints are designed to mitigate for the loss of salmon and steelhead spawning and nursery habitat resulting from the construction of IGD (i.e., the loss of access to seven miles of main stem plus Jenny and Fall creeks). The hatchery currently meets the goals for Chinook and coho salmon but not for steelhead trout. As discussed previously in the fish passage section, the Licensee has declined to perform a meaningful evaluation of the current hatchery operations. The Project provides no mitigation for the lack of fish passage at the two Copco facilities. Moving upstream, as discussed previously, the ODFW has noted on-going problems with the existing fish ladders at the Boyle and Keno facilities. An August 8, 2003, letter from the DOI expresses the concern that these existing structures do not appear to be operating correctly and may represent noncompliance with current license requirements.

In terms of future mitigation, the DLA presents a brief discussion of potential volitional fish passage options but does not provide a detailed discussion of the effectiveness of these facilities. The DLA does provide very high cost estimates for conventional fish passage facilities (i.e., well over \$200 million) which would tend to reduce the "availability" of such measures. Meanwhile, the need to provide effective access to lost anadromous fish habitat has been a high priority for resource agencies in the basin for almost 20 years (Long Range Plan, page 8-10).

(8) The Licensee does not support decommissioning of any portion of the Project. However consideration of a full range of fish passage alternatives, including decommissioning of part or all of the Project, has been requested numerous times by a

Response to Comment S3-91

Comment noted. [Forrest to expand.]

Response to Comment S3-92

The hatchery sub-working group met several times to provide input on PacifiCorp's hatchery analysis. Future options for the hatchery have been reviewed by PacifiCorp. Please see Exhibit E Section 4 for related hatchery PM&Es.

Response to Comment S3-93

[Forrest to address.]

Response to Comment S3-94

PacifiCorp proposes decommissioning its East Side and West Side developments and eliminating the Keno development from the proposed FERC boundary. A high-level alternative analysis is being conducted. Such an analysis affords a reasonable review of fish passage and water quality benefits and constraints. PacifiCorp has addressed its position with stakeholders numerous times as to why it has not "elected" to fully evaluate decommissioning.

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majority of the stakeholders actively participating in the relicensing process (and listed in the ES on page 2-3). Supporters of a comprehensive evaluation of the benefits and costs of a decommissioning alternative include representatives of tribes, agencies, and nongovernmental organizations.

(9) The tribal interests cited in the Long Range Plan include the Klamath, the Shasta, the Karuk, the Hoopa, and the Yurok tribes. Tribal include portions of the watershed above, within, and below the Project boundary.

(10) Degraded water quality in the Klamath River is an important issue for many resource management agencies including the Department. Based on the information available, the Project seasonally exacerbates poor water quality conditions including daily maximum water temperature and high nutrient levels and blocks access to essential coldwater refugia. While there may be operational and technological remedies for these impacts, removal of the two largest dam-reservoir complexes (Iron Gate and Copco 1) would mitigate for a significant proportion of the Project impacts to water quality.

(11) The Klamath River downstream of the Project, as well as much of the riverine portion within the Project, has Wild and Scenic River status. The US Forest Service notes the lower river is popular with rafters as well as campers seeking a rustic experience (see the Six Rivers National Forest recreation website at www.fs.fed.us/r5/sixrivers/recreation/orleans). The Klamath River below the Project is one of the finest steelhead rivers in the nation and is popular for trout, steelhead, coho and Chinook salmon with multiple access sites. Historic accounts of pre-Project conditions indicate that this exceptional fishery once extended all the way to UKL (Boyle 1976). It is reasonably foreseeable that decommissioning would result in the reestablishment of steelhead and salmon angling opportunities throughout the current Project boundary. Conversion of the Project reservoirs to riverine reaches would likely shift current reservoir-based recreation patterns toward the activities experienced downstream in the wild and scenic portion in the national forests (e.g., rafting instead of water skiing, wading instead of trolling).

(12) While the Department cannot specifically address the physical condition of the Project, we note that many of the facilities are quite old. For example, the Fall Creek powerhouse is 100 years old while the Copco 1 development and the Westside and Eastside powerhouses are over 90 years old and the Copco 2 development is roughly 80 years old. The remaining facilities are relatively modern with the J.C. Boyle dam being about 50 years old and the Keno and Iron Gate developments around 40 years old.

Response to Comment S3-95

Measures proposed by PacifiCorp for enhancement of water quality are described in section E3.8 of Exhibit E. These measures do not include removals of Iron Gate and Copco 1 dams.

Response to Comment S3-96

Comment noted. These are the types of comparison that would be made during the FERC NEPA analysis.

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- S3-97 (13) There is currently a residential development around the Copco 1 reservoir with homes abutting the reservoir. The Department is unaware of other Project-dependent developments.
- S3-98 (14) According to the Licensee, they have very limited control of flow due to the lack of active storage in their reservoirs (Water Resources DTR, page 5-17) and thus cannot provide significant flood control benefits. The primary purpose of Keno dam appears to be to stabilize water surface elevations in Keno reservoir for the benefit of upstream irrigators (Exhibit B, page 6-3).
- S3-99 (15) Several commercial outfitters take advantage of the intermittently high flows provided by peaking operations at the J.C. Boyle powerhouse. There is an active Copco Sportsman's Club which utilizes the warmwater fishery provided at Copco 1. The DLA Recreation Resources DTR contains a fairly comprehensive listing of current recreational uses but does not present any analysis of how these resources would shift if portions or all of the Project were decommissioned. Clearly reservoir based activities would be lost and in some fashion eventually replaced by river oriented recreation. We consider recreational patterns in the free flowing portions of the river within and immediately below the Project (see item [11] above) to offer the best projection of how recreation use postdecommissioning would develop.
- S3-100 (16) Staff at the California Energy Commission (CEC) recently completed a preliminary analysis of the energy issues associated with decommissioning one or more dams in the Project (April 2003). The assessment indicates, "from the perspective of potential impacts to electric resource adequacy, decommissioning is a viable alternative that should be examined during the Federal Energy Regulatory Commission (FERC) proceedings on renewal of the hydroelectric license for these facilities" (page 1).
- (17) The Department cannot comment on historic properties of the Project beyond the relatively old age of several of the facilities as discussed in item (12).
- S3-101 Given the Licensee's inability to compile meaningful information to facilitate an evaluation of any alternative that involves removal of part of or all of the Project, stakeholders have begun independent assessments to address some of the above issues. As mentioned previously, the CEC at the request of staff from the SWRCB and the California Resources Agency has conducted a preliminary analysis of the impacts on energy supply of decommissioning. Similarly the National Marine Fisheries Service (NMFS) has conducted a preliminary analysis of the potential changes in coho habitat under different scenarios including decommissioning (Steve Edmondson, personal communication). The Department supports these independent efforts and commends those organizations for devoting time and resources to address these critical information

Response to Comment S3-97

The proposed Phase 3 study includes an assessment of Project-induced impacts on Property values.

Response to Comment S3-98

The purpose of Keno reservoir and its benefits are described in Exhibit B.

Response to Comment S3-99

Comment noted. Project decommissioning was generally not investigated during the recreation relicensing studies and is not a required analysis since it is not being proposed by the licensee. However, as noted by CDFG, Project decommissioning would likely result in a loss of reservoir-based recreation opportunities which would potentially be replaced by river-based recreation opportunities. Such comments would be addressed during the FERC NEPA analysis.

Response to Comment S3-100

PacifiCorp acknowledges that decommissioning is an alternative for FERC to evaluate as it chooses in the course of the license proceedings; however, the April 2003 guidance does not direct the applicant to provide this evaluation.

At the request of relicensing participants and in the interest of collaboration, PacifiCorp conducted intensive fish passage and water quality modeling of at least five variations on dam removal, volitional fish passage and run-of-river operations. In addition, PacifiCorp worked with relicensing participants to try and identify all of the implications of implementing numerous facility and operations scenarios through an exercise entitled System Landscape Options Analysis. This information

is intended to inform FERC's evaluation.

Response to Comment S3-101

The licensee has addressed "Project" impacts and has proposed PM&Es for those impacts related to the Project. PacifiCorp maintains it has satisfied its First Stage obligations. See response to CDFG comment #3.

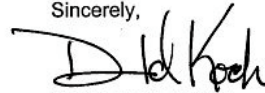
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needs. However, we must emphasize that collection of adequate information to describe Project impacts and design appropriate PM&E measures is a basic responsibility of the Licensee as described in the Federal Power Act's requirements for consultation (18 CFR 16.8). The information provided to date by the Licensee does not meet the definition of an adequate first stage consultation document much less a draft application (18 CFR 16.8 (b) and (c)).

Summary

The information provided in the DLA will not allow a full and adequate consideration of relevant resource issues as required by the Federal Power Act and other applicable laws. We are concerned that the Licensee's delay in developing and implementing rigorous study plans will compromise the quality and availability of information necessary to form the basis for our recommendations and prevent timely issuance of a new license. The DLA provides only general literature reviews or high level analyses on critical areas such as unimpaired hydrology, fish entrainment, and socioeconomics. Adequate study plans for other resource areas have finally been prepared after 2.5 years of consultation but basic raw data has yet to be shared much less analyzed. Still other study areas such as anadromous stock genetics and the potential impacts of alternatives that include decommissioning are not addressed with any study plan either due to a perceived conflict with the Licensee's preferred alternative or simply a lack of resources. Without a comprehensive identification and quantification of Project impacts, the Department will be unable to develop balanced PM&E measures that address Project impacts while still providing a reliable source of energy. This concludes the Department's comments on the Licensee's DLA. If you have any questions regarding these comments, please contact Environmental Scientist Annie Manji at (530) 225-3846.

Sincerely,


DONALD B. KOCH
Regional Manager

cc: see page thirty-eight

Response to Comment S3-102

See response to CDFG comment #3.

Response to Comment S3-103

PacifiCorp maintains that the information included in the License Application will be sufficient for timely issuance of a new license.

Response to Comment S3-104

PacifiCorp maintains that the License Application provides sufficient information to review Project impacts and identify new license measures that adequately consider power and non-power values.

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References

- Bell, M.C. 1991. Fisheries Handbook of Engineering Requirements and Biological Criteria. Portland, Oregon. Fish Passage Development and Evaluation Program, Corps of Engineers, North Pacific Division.
- Boyle, J.C. 1976. 50 Years on the Klamath. Klocker Printery, Medford, OR. 146p.
- Buchanan, D.V. 1991. Direct and rebuttal testimony of David Buchanan. Oregon Department of Fish and Wildlife. Proposed Salt Caves Hydroelectric Project.
- California Department of Fish and Game. 2003. September 2002 Klamath River fish kill: preliminary analysis of contributing factors. Prepared by the Northern California-North Coast Region, Redding CA 63p.
- California Energy Commission. 2003. Preliminary assessment of energy issues associated with the Klamath Hydroelectric Project. California Energy Commission Report. Prepared for the California Resources Agency and State Water Resources Control Board. Sacramento, CA 15p.
- California Fish and Game Code. 2003. LawTech Publishing, San Clemente CA 567 p.
- Clay, C.H. 1995. Design of Fishways and Other Fish Facilities. 2nd ed. Boca Raton: Lewis Publishers.
- Cushman, R.M. 1985. Review of the ecological effects of rapidly varying flows downstream from hydroelectric facilities. North American Journal of Fisheries Management, 5, pp 330-339.
- Federal Energy Regulatory Commission. 1990. Final Environmental Impact Statement, Proposed Salt Caves Hydroelectric Project, Klamath County, Oregon, FERC 10199-00. Office of Hydropower Licensing, Washington D.C.
- Fortune, J.D., A.R. Gerlach, and C.J. Hanel. 1966. A study to determine the feasibility of establishing salmon and steelhead in the Upper Klamath Basin. Oregon State Game Commission and Pacific Power and Light. 129p.
- Hanel, J., and A. Gerlach. 1964. Klamath River flow study at J.C. Boyle project. Pacific Power and Light Company, Portland, Oregon. (Unpublished Report).

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Hardy, T.B., and R.C. Addley. 2001. Evaluation of interim instream flow needs in the Klamath River. Phase II. Final Report. Prepared for the U.S. Department of Interior. November 21, 2001.

Hemmingsen, A.R., R.A. French, D.V. Buchanan, D.L. Bottom, and K.P. Currens. 1992. Native trout project. Progress Reports, Oregon Department of Fish and Wildlife, Fish Research Project F-136R. Annual Progress Report. Fish Division. Portland, OR. 22 p.

Klamath River Basin Fisheries Task Force. 1991. Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program, Yreka.

Loomis, J., and M. Feldman. 1995. An economic approach to giving "equal consideration" to environmental values in FERC hydropower relicensing. Rivers, 5 (2), pp 96-108.

Loomis, J. 1996. Measuring the economic benefits of removing dams and restoring the Elwha River: Results of a contingent valuation survey. Water Resources Research, 32 (2), pp. 441-447.

Loomis, J. 1998. Estimating the public's value for instream flow: Economic techniques and dollar values. Journal of American Water Resources Association, 34(5), pp. 1007-1014.

National Marine Fisheries Service. 2002. Biological Opinion regarding the Bureau of Reclamation's Klamath Project operations from June 1, 2002 through March 31, 2021 on Southern Oregon/Northern California Coasts (SONCC) Coho salmon (*Oncorhynchus kisutch*).

Oregon Department of Fish and Wildlife. 1987. Mini-management plans: management of the mainstem Williamson River, Klamath River (below Keno dam) trout management program including Spenser Creek.

Richter, B.D., J.V. Baumgartner, J. Powell, and D.P. Braun. 1996. A method for assessing hydrologic alteration within ecosystems. Conservation Biology, 10, pp 1163-1174.

Thomas R. Payne and Associates. 1998. Battle Creek fisheries studies task 4: surveys of barriers to the upstream migration of anadromous salmonids. Prepared for the California Department of Fish and Game, June 1998. 36p.

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U.S. Fish and Wildlife Service. 2001. Fish Passageways and Bypass Facilities Course Notebook, National Conservation Training Center.

U.S. Fish and Wildlife Service. 2002. Biological/Conference Opinion Regarding the effects of operation of the U.S. Bureau of Reclamation's proposed 10-year Operation Plan for the Klamath Project and its effect on the endangered Lost River sucker (*Delistes luxatus*), endangered Shortnose sucker (*Chasmistes brevirostris*), threatened Bald eagle (*Haliaeetus leucocephalus*) and proposed Critical Habitat for the Lost River and Shortnose suckers. U.S. Fish and Wildlife Service, Klamath Falls Office, OR, May 31, 2002.

Washington Department of Fish and Wildlife. 1999. Washington State Fish Screening Unit Costs. Fish Passage Technical Assistance.

Wootton, J.T., M.S. Parker, and M.E. Power. 1996. Effects of disturbance on river food webs. Science, 273, pp. 1558-1561

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Ms. Magalie R. Salas
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cc: Ms. Magalie R. Salas, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426
(eight copies)

Mr. John Mudre
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Ms. Frankie Green
The Louis Berger Group, Inc.
620 Jones Way
Sacramento, CA 95818

Mr. David Diamond
Office of Policy Analysis
Department of the Interior
1849 C Street, N.W.
Washington, DC 20426

Ms. Barbara Machado
Bureau of Land Management
1301 South G Street
Lakeview, OR 97603

Mr. John Hamilton
US Fish and Wildlife Service
1829 South Oregon Street
Yreka, CA 96097

Mr. Randy Brown
US Fish and Wildlife Service
1655 Heindon Road
Arcata, CA 95521

Mr. Ron Larson
US Fish and Wildlife Service
6610 Washburn Way
Klamath Falls, OR 97603

Ms. Robbie Vandewater
Klamath Forest
US Forest Service
1312 Fairlane Road
Yreka, CA 96097

Ms. Julie Tupper
US Forest Service
650 Capitol Mall, Suite 200
Sacramento, CA 95814

Mr. Steve Edmondson
National Marine Fisheries Service
777 Sonoma Avenue, Suite 325
Santa Rosa, CA 95403

Mr. Harry Williamson
National Park Service
801 I Street, Room 156-B
Sacramento, CA 95814-2510

Mr. Dave Sabo, Area Manager
Klamath Basin Area Office
US Bureau of Reclamation
6600 Washburn Way
Klamath Falls, OR 97603

Ms. Ronnie Pierce
Intertribal Commission
1111 Forson Road
McKinleyville, CA 95521

Mr. Ron Reed
Karuk Tribe
Post Office Box 282
Orleans, CA 95556-0282

Mr. Mike Belchik
Yurok Tribal Fisheries
15900 Highway 101 North
Klamath, CA 95548

Mr. Toby Freeman
Ms. Magalie R. Salas
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Page Thirty-Nine

cc: Mr. Dave Hillemeier
Yurok Tribe
15900 North Hwy 101
Klamath, CA 95548

Messrs. Elwood Miller and Larry Dunsmoor
Klamath Tribes
Post Office Box 436
Chiloquin, OR 97624-0436

Mr. Mike Orcutt
Hoopa Valley Tribal Fisheries Department
P.O. Box 417
Hoopa, CA 95546-0417

Mr. Paul DeVito
Oregon Department of
Environmental Quality
2146 NE 4th Street, Suite 104
Bend, OR 97701

Ms. Amy Stuart
Oregon Department of Fish and Wildlife
3042 SE Paulina Highway
Prineville, OR 97754

Mr. Roger Smith
Oregon Department of Fish and Wildlife
1850 Miller Island Road W
Klamath Falls, OR 97603

Mr. David Leland
North Coast Regional Water
Quality Control Board
5550 Skylane Boulevard, Suite A
Santa Rosa, CA 95403

Mr. Russ Kanz
Division of Water Rights
State Water Resources Control Board
Post Office Box 2000
Sacramento, CA 95812-2000

Mr. James McKinney
Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

Mr. Todd Olson
PacifiCorp
825 N.E. Multnomah, Suite 1500
Portland, OR 97232

Mr. Curtis Knight
California Trout, Inc.
Post Office Box 650
Mt. Shasta, CA 96067-0650

Mr. Chuck Bonham
Trout Unlimited
828 San Pablo Avenue, Suite 208
Albany, CA 94706

Mr. Steve Rothert
American Rivers, California Region
2140 Shattuck Avenue, Floor 5
Berkeley, CA 94704

Mr. Felice Pace
Klamath Forest Alliance
P.O. Box 820
Etna, CA 96027-0820

Mr. Glen Spain
Fisherman's Association
Pacific Coast Federation
Post Office Box 11170
Eugene, OR 97440

Ms. Keri Green
288 Ninth Street Alley
Ashland, OR 97520

Mr. Toby Freeman
Ms. Magalie R. Salas
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Page Forty

cc: Ms. Anna West
Keams & West, Inc.
475 Sansome Ste. 570
San Francisco, CA 94111

Mr. Kim Rushton
Department of Fish and Game
8638 Lakeview Road
Hornbrook, CA 96044

Mr. Mike Rode
Department of Fish and Game
#3 North Old Stage Road
Mt. Shasta, CA 96067

Mr. Mike Wallace
Department of Fish and Game
5341 Ericson Way
Arcata, CA 95521

Mr. Stephen G. Puccini
Department of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

Mr. Gary Smith and Mr. Robert Hughes
Native Anadromous Fish and Watershed Branch
Department of Fish and Game
830 S Street Street
Sacramento, CA 95814

Mark Stopher, Gary Stacey, Steve Turek,
Pat Overton, Bob McAllister, Neil Manji,
and Ms. Annie Manji
Department of Fish and Game
601 Locust Street
Redding, CA 96001



State Water Resources Control Board

Division of Water Rights
1001 I Street • Sacramento, California 95814 • (916) 341-5341
Mailing Address: P.O. Box 2000 • Sacramento, California • 95812-2000
FAX (916) 341-5400 • Web Site Address: <http://www.swrcb.ca.gov>



Gray Davis
Governor

Response to Comment S4-1

The Consultation section in the Executive Summary of the license application now reflects that SWRCB was not a party to the collaborative process.

SEP 18 2003

Mr. Todd Olson
Licensing Project Manager
PacifiCorp
825 NE Multnomah, Suite 1500
Portland, Oregon 97232

Dear Mr. Olson:

DRAFT APPLICATION FOR NEW LICENSE, KLAMATH HYDROELECTRIC PROJECT,
FERC #2082

PacifiCorp issued a Draft Application for New License (draft application) for the Klamath Hydroelectric Project, FERC #2082 (Project) on June 24, 2003. PacifiCorp requested that comments be submitted by September 22, 2004, which is 90 days from date of issuance of the application. State Water Resources Control Board (SWRCB) staff and North Coast Regional Water Quality Control Board (NCRWQCB) staff reviewed the draft application for conformance with the requirements of 18 Code of Federal Regulations (C.F.R.) sections 16.8(c) and 4.51, and with the requirements for a complete application for Clean Water Act section 401 certification (401 certification).

PacifiCorp is following the "traditional relicensing process" rules for the relicensing of the Project. In response to stakeholder requests PacifiCorp agreed to enter into a collaborative effort to develop study plans, review and interpret results of study plans, and craft Protection, Mitigation, and Enhancement (PM&E) measures for the Project. For reasons stated in our letter of June 21, 2002, the SWRCB is not a member of, or party to, the collaborative. This may prove to be a significant issue affecting the success of PM&E measures developed by the collaborative because of the mandatory conditioning authority afforded by the 401 certification. PacifiCorp failed to acknowledge that the SWRCB is not a party to the collaborative in the draft application. The Application for New License (application) should disclose that the SWRCB is not a party to the collaborative.

As you are well aware, SWRCB staff have been active in this relicensing process. SWRCB staff have provided input to help PacifiCorp and the other parties to the collaborative understand the information that will be required to complete an application for 401 certification. SWRCB staff have made their best efforts to respond to inquiries regarding information requirements for certification under section 401. However, neither SWRCB nor its staff can commit to the outcome or content of any section 401 certification.

In addition to attending meetings, SWRCB staff have provided the following written correspondence to PacifiCorp:

Mr. Todd Olson

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Response to Comment S4-2

First Stage Consultation Package Comments – March 23, 2001
Second Stage Consultation: Study Plans – August 15, 2001
Relicensing Process and Study Plans – December 21, 2001
Second Revision of Draft Study Plan – January 29, 2002
Second Revision of Draft Study Plan – February 28, 2002
Collaborative Process and California Environmental Quality Act Compliance – June 21, 2002
Study Plans – December 23, 2002

S4-2

We have requested both in writing and verbally during meetings a number of studies to be completed by PacifiCorp. The studies requested by SWRCB staff will help PacifiCorp develop information to support a 401 certification application for the Project. An incomplete First Stage Consultation Document, the slow progress on development of study plans, and the lack of study results and proposed PM&E measures in the draft application, have made it difficult to determine the full extent of studies that are necessary for this project. Therefore, the SWRCB is maintaining it's right to require additional studies at a later time.

Clean Water Act Section 401 Certification

Section 401 of the federal Clean Water Act (33 USC §1341) (CWA) requires any applicant for a federal license or permit, which may result in any discharge to navigable waters, to obtain certification from the State that the discharge will comply with the applicable water quality parameters in the Act. In this case the federal agency issuing the license is the Federal Energy Regulatory Commission (FERC). States are authorized to condition any section 401 certificate to assure compliance with state law related to water quality. The sections of the CWA for which a state must certify compliance before issuing a section 401 certification include sections 301 and 302 (effluent limitations), section 303 (water quality standards and implementation plans), section 306 (national standards of performance for new sources), and section 307 (pretreatment effluent standards).

Under section 303 of the CWA and under section 13240 of the California Water Code, the NCRWQCB has adopted and must review from time to time water quality standards. The NCRWQCB adopted the standards as part of a Water Quality Control Plan that designates the beneficial uses of waters to be protected along with the water quality objectives necessary to protect those uses. The Basin Plan for the North Coast Region lists municipal and domestic supply, industrial service and process supply, ground water recharge, freshwater replenishment, hydropower generation, water contact recreation, non-contact water recreation, commercial and sport fishing, warm and cold fresh water habitat, wildlife habitat, migration, spawning, reproduction and/or early development, aquaculture, and rare, threatened and endangered species as beneficial uses of the Klamath River. The beneficial uses of the water at Copco and Iron Gate Reservoirs are listed as freshwater replenishment, hydropower generation, water contact recreation, non-contact water recreation, commercial and sport fishing, warm and cold fresh water habitat, wildlife habitat, migration, spawning, reproduction and/or early development, aquaculture, and rare, threatened and endangered species.

The Basin Plan also contains water quality objectives that set or describe the water quality limits necessary to achieve and protect the beneficial uses. PacifiCorp must evaluate the quality of the

PacifiCorp plans to continue to work with the SWRCB beyond the relicensing process to provide information needed for a 401 certificate for the Klamath Hydroelectric Project.

Mr. Todd Olson

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Response to Comment S4-3

S4-3 waters stored within and discharged from its reservoirs in order to determine whether it complies with all applicable water quality objectives in the Basin Plan, and that it is protective both of the established beneficial uses for the reservoirs as well as for the Klamath River. Of the various applicable water quality objectives, the most critical are dissolved oxygen, temperature, and nutrients. However, PacifiCorp should evaluate their waters for compliance with all water quality objectives in the Basin Plan, as well as other applicable objectives and criteria, such as those included in the California Toxics Rule (CTR), the Department of Health Services' Maximum Contaminant Levels (MCLs), etc. If any of the waters do not comply with one or more of the water quality objectives or criteria then PacifiCorp must describe the actions that it will take to bring its waters into compliance with the applicable water quality limits in order to protect and maintain the beneficial uses. Please note that in cases where there are multiple criteria for the same constituent, the more/most stringent criterion applies.

As you know this Project operates in both California and Oregon. Accordingly, there is a potential that discharges from parts of the Project that are located in Oregon may adversely affect the ability to meet the water quality standards in California. Additionally, the Tribes (Hoopa, Yurok and Karuk) may develop water quality standards, which may be affected by discharges from the Project. Two agencies must issue 401 certifications for this Project, the Oregon Department of Environmental Quality (ODEQ) and the SWRCB. The SWRCB comments primarily will focus on the aspects of the Project in California. However, we have requested studies in Oregon to determine the impacts to water quality in California. We have been working, and will continue to work, closely with the ODEQ on coordination of the Clean Water Act section 401 certification issues for this Project.

California Environmental Quality Act

Issuance of the section 401 certification by the SWRCB is a discretionary action under the California Environmental Quality Act (CEQA) (Public Resources Code §21000. et. seq.). Accordingly, the SWRCB will be required to comply with CEQA before issuing a water quality certification.

S4-4 Under the California Code of Regulations, title 14, section 15065(a), the lead agency must prepare an Environmental Impact Report (EIR) if a project has the potential to have a significant adverse environmental impact. An EIR is required if changes in the Project could have significant adverse environmental impacts or if the alternatives or mitigation measures could have significant adverse impacts, including incidental adverse impacts of changes that otherwise will provide an overall environmental benefit. An EIR can be prepared directly by, or under contract to, the lead agency. With our June 21, 2002 letter, we enclosed a third party Memorandum of Understanding (MOU) that the SWRCB uses for contracting the preparation of EIRs. Because EIRs can be time consuming to prepare, and to avoid future delays resulting from preparation of an EIR, we repeat our request that PacifiCorp select a contractor acceptable to the SWRCB as soon as possible.

Status of Study Plans

S4-5 The complete status of each study plan should be included in the application. The status should include the level of collaborative approval and the proposed date of completion. Any disputes

Section E3.5 of Exhibit E provides a description of current water quality conditions in the proposed Project area in the context of applicable water quality standards or objectives. Section E3.8 provides descriptions of measures proposed by PacifiCorp to enhance current water quality conditions. A detailed analysis of how the State water quality standards or objectives apply to the Project, and how the Project meets the standards or objectives will be provided in applications for certification under Section 401 of the CWA for the Project.

As described in section E3.4, PacifiCorp will request certification under Section 401 of the CWA for the Project no later than 60 days after FERC issues the notice that the relicensing application has been accepted and is ready for environmental analysis. PacifiCorp will consult with ODEQ and CSWRCB to prepare a detailed analysis and application for 401 certification to ensure that the Project complies with the applicable provisions of CWA, including applicable State water quality standards or objectives. Further consultation with ODEQ and CSWRCB is particularly important given the many sources and factors contributing to water quality conditions in the Project area, including many that are outside of PacifiCorp's control, and because several of the state water quality standards or objectives are qualitative and narrative, and therefore require interpretation and judgement.

Response to Comment S4-4

PacifiCorp will coordinate with CSWRCB as appropriate on CEQA requirements and documentation.

Response to Comment S4-5

Appendix E1-A of the FLA, "PacifiCorp Consultation Record for Relicensing the Klamath Hydroelectric Project," provides a summary status of each study plan included in the application. The summary identifies outstanding disputes.

Mr. Todd Olson

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Response to Comment S4-6

PacifiCorp agrees that the juvenile survival study is important and will implement this study in 2004.

Response to Comment S4-7

See response to CDFG comment #72.

Response to Comment S4-8

Comment noted. Please see Sections 3 and 4 of Exhibit E for detailed discussions on Project impacts to aquatic resources and proposed PM&Es.

Response to Comment S4-9

CSWRCB staff indicated that PacifiCorp would be required to develop a water temperature objective (for Klamath River salmon and steelhead) for use in the Klamath River. On that basis, PacifiCorp agreed to prepare a study plan, or technical approach, to develop such a water temperature objective. In the process of investigating and preparing a technical approach, PacifiCorp has determined that other stakeholders in the basin have already begun coordination and research on potential basin-specific water temperature criteria. In addition, PacifiCorp has determined that extensive reviews and recommendations on water temperature criteria for salmonids are already available from CSWRCB, ODEQ, and EPA Region 10 that likely is applicable to Klamath River salmon and steelhead. PacifiCorp will consult further with CSWRCB and the North Coast Regional Water Quality Control Board (who is responsible for the existing temperature objective in the Klamath Basin) on this matter. The outcome of this

S4-5 over approval of study plans must also be explained, including the method of resolution of the dispute. Several of the study plans that have not been completed are essential for the development of a full range of alternatives and/or mitigation measures for project impacts. Study plan 1.18, Investigation of Juvenile Anadromous Fish Behavior and Survival Through Upper Klamath Lake and Hydroelectric Project, is essential for evaluating the success of alternative fish passage facilities/options. The Characterization of Resident Fish Entrainment and Turbine-Induced Mortality study has been in dispute for some time. Information on fish entrainment will be necessary to analyze project impacts on beneficial uses in the EIR. We do not expect that literature alone will provide adequate information on the number of fish being entrained at project facilities, and that some site specific studies will be required. Information from a number of studies is being used to evaluate the peaking impacts below the J.C. Boyle Powerhouse. It is important to have adequate information to evaluate the impact of the peaking operation on the redband trout in this designated wild trout section. The application should contain a thorough analysis of the impacts of the peaking operation on the wild trout in this reach.

S4-9 At the request of SWRCB staff, PacifiCorp has committed to develop a study plan with the objective of developing numeric water quality objectives for Klamath River salmon and steelhead. The basin plan contains a narrative water quality objective for water temperature that will require the development of numeric water quality objectives. We expect PacifiCorp to develop a study plan that addresses this issue for our review and approval. After SWRCB staff approval of the study plan, we expect the completion of the study in a timely manner by PacifiCorp.

General Comments

S4-10 The draft application was reviewed under the requirements in 18 CFR sections 16.8(c) and 4.51. The application does not contain all of the information required by these sections and PacifiCorp chose to not include proposed PM&E measures. The lack of study results and choice to exclude PM&E measures has resulted in a draft application that is deficient or patently deficient (18 CFR § 4.32 (e)). The draft application is the only opportunity provided to agencies and Tribes to identify areas of disagreement with the Project as proposed by the licensee. Because this draft application did not adequately describe the proposed Project, the impacts of the project, or identify PM&E measures, SWRCB staff are not able to identify areas of dispute.

S4-11 The draft application is poorly organized and repeats the same information several times. For example, each volume has a list of abbreviations and acronyms, and a glossary. This is redundant and unnecessary and this information should only be included once. Volume 1 contains an executive summary, volume 2 has a more complete summary for each resource, with technical information/study results in the Draft Technical Reports (DTR). This organization makes the document very hard to review, with information presented multiple times, and often conflicting. We recommend a more concise format for the application. Finally, the DTR should contain all of the raw data, not just summaries of the data collected.

The project impacts of concern to SWRCB and NCRWQCB staff at this time are those to water quality (specifically the cold fresh water habitat beneficial use) and fisheries (spawning, migration, and rare, threatened and endangered species beneficial uses). The Klamath River once

further consultation will be used in preparing the application for certification under Section 401 of the CWA for the Project.

Response to Comment S4-10

The draft license application (DLA) included a thorough description of the existing Project, its operation, and the Project's effect on the surrounding environment, to the extent it could be described based upon available study results. PacifiCorp and relicensing participants had agreed prior to development of the DLA that it would not be appropriate for PacifiCorp to draw conclusions in the application about the effects of the existing Project on the surrounding environment, unless those conclusions were based upon study results.

As a result of the Klamath Collaborative's extensive changes to the number and scope of studies, few studies were completed in time to inform the development of the DLA. Subsequently, PacifiCorp did not have sufficient information to justify proposing changes to the existing Project. Absent information to the contrary, existing facilities and operations were deemed appropriate.

Now that almost all studies have been completed and reviewed, changes to the Project and its operations have been proposed. This proposed Project, proposed Project operations, and the proposed Project's anticipated enhancement to the surrounding environment are thoroughly described in the final license application.

As per 18 CFR 16.8(c)(2) and (3), an application will not be rejected by FERC as deficient merely because late studies requested by agencies during the second consultation stage are not completed during the second stage.

Response to Comment S4-11

Since not every stakeholder is interested in every volume of the License Application and Technical Appendices (FTRs), some redundancy was necessary to aid a broader audience. The provision of "all" raw data would conflict with the intention to be as concise as practical.

Mr. Todd Olson

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Response to Comment S4-12

PacifiCorp proposes to decommission the East Side and West Side facilities. PacifiCorp will consult with the agencies to determine information and approvals necessary to decommission these facilities. No decommissioning of other Project facilities is proposed or anticipated. As such, PacifiCorp concludes that a study plan providing details of studies and reports necessary to decommission these other facilities is not required.

To address salmon passage, PacifiCorp is conducting detailed and comprehensive analysis of anadromous fish reintroduction and Project fish passage options using EDT and PasRAS models. The models assume various Project scenarios, including dam removal, as described in the Fish Resources FTR and chapter E4 of Exhibit E. EDT and PasRAS modeling is being done in consultation and coordination with the Aquatics Work Group.

Response to Comment S4-13

PacifiCorp plans to decommission the East Side and West Side projects as described in the FLA. No other decommissioning of Project facilities is proposed.

Response to Comment S4-14

See the Fish Resources FTR for an evaluation of the Iron Gate Hatchery.

Response to Comment S4-15

See response to SWRCB comment #3.

sustained large runs of steelhead and salmon, and is described as the third greatest salmon and steelhead river on the West coast, only behind the Sacramento River and Columbia Rivers. All of the anadromous fish in the Klamath River are protected by designated beneficial uses (cold fresh water, spawning, and migration), which the SWRCB and the NCRWQCB have the responsibility to implement. Modeling shows the Project increases water temperature downstream of Iron Gate Dam during the fall, while the dams block passage to historic salmonid spawning and rearing habitats. This cumulative impact has resulted in significant impacts to anadromous fish. This is reflected by the National Oceanic and Atmospheric Administration (formerly National Marine Fisheries) listing of the Southern Oregon/Northern California coho salmon as a threatened species in 1991, the substantial decline in numbers of fall run Chinook salmon, steelhead, and the extirpation of spring run Chinook salmon. Anecdotal information indicates that the last spring run Chinook salmon disappeared from the Middle Klamath River soon after the construction of Iron Gate Dam (Mike Belchik, per. com.). The key to stopping the decline of salmon is the removal of dams and/or the protection and/or restoration of their spawning streams (Moyle, 2002). Dam decommissioning therefore, must be an alternative fully evaluated in the application as mitigation for the water quality impacts. In our letter dated December 23, 2002, we requested that PacifiCorp develop a study plan consisting of a list of studies and engineering reports that would be necessary to decommission any of the project facilities (dams and powerhouses). Should final studies show that water quality impacts caused by the project could be mitigated through decommissioning, the study will be used to direct the completion of the necessary studies and reports. If decommissioning is selected as mitigation for project impacts, the impacts of decommissioning must be disclosed in our environmental review. This requested information has not been submitted by PacifiCorp.

Iron Gate Hatchery was developed as mitigation for the loss of anadromous fish from the operation of Iron Gate Dam. While the hatchery does provide for the production of fall run Chinook salmon, coho salmon, and steelhead, it has not mitigated for the project impacts to spring run Chinook. In addition, the hatchery may cause secondary impacts to the Klamath River fisheries, including residualism in steelhead, and genetic impacts to wild strains. The hatchery may also be causing water quality impacts to the river from its effluent. The full impact of the hatchery must be evaluated in the application.

Despite the obvious impacts of this project the application fails to fully address all of the project impacts on water quality, specifically the beneficial uses of the Klamath River. The application must disclose all of the water quality impacts and provide a list of measures to avoid or mitigate project induced impacts to water quality. Without this information the SWRCB will not be in a position to complete the EIR or issue a certification under section 401.

The draft application contains a number of charts, graphs, isopleth diagrams, and other graphics that appear to have been generated in color and have been copied in black and white, which has left many of the graphics unreadable. SWRCB staff must be provided color copies of all graphics in the application.

Response to Comment S4-16

Figures and charts in the FLA have been reproduced in a manner that affords better data interpretation.

Mr. Todd Olson

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Specific Comments

Volume 1

Draft Initial Statement, Page 3 – #8, Water Code section 101 is not the correct citation; you should reference Water Code sections 106.7, and 1250.5 which address the appropriation of water for hydropower. In #9, instead of section 3160, you should reference Water Code section 13160 which authorizes the SWRCB to issue certification under section 401. The citation to section 3855 should be edited to read, California Code of Regulations, title 23, section 3855. This section lists the requirements for water quality certification. The correct reference for laws applicable to the safety of dams, including construction, repair, inspection, and maintenance of dams is Water Code section 6000 et. seq., not section 6102. You should also add Clean Water Act Section 401 to the list, as well as other applicable federal laws and regulations.

Draft Initial Statement, Page 5 – Many of the water rights listed are either cited or incorrectly or are altogether incorrect. A quick review of our records revealed the following application numbers or permitted or licensed appropriative rights (preceded by A) and claims of water rights in statements of diversion and use (preceded by S):

Iron Gate Reservoir:

A017527 – Pacific Power, direct diversion of 3300 cfs

S012968 – Pacific Power, direct diversion of 48 cfs

Copco:

S015375 – PacifiCorp, direct diversion of 3200 cfs

S015374 – PacifiCorp, direct diversion of 3200 cfs

Fall Creek:

S015373 – PacifiCorp, direct diversion of 50 cfs

S015372 – PacifiCorp, direct diversion of 50 cfs

S012966 – Pacific Power and Light, direct diversion of 10 cfs

Please review these water rights and let us know if PacifiCorp has or claims to have additional water rights.

S4-17

S4-18

S4-19

S4-20

Draft Executive Summary, Page 3-7 – The reference to the study status in section E2.7.2.1 of Exhibit E is incorrect. The correct section should be referenced.

Draft Executive Summary, Page 4-2 – To our knowledge delta smelt do not occur in the Klamath River (Moyle, 2002). You may have intended to include eulachon (*Thaleichthys pacificus*).

Draft Exhibit B, Page 6-3 – PacifiCorp should provide additional information about the operational flexibility of Keno Dam/Reservoir. The draft application states that the reservoir elevation is held steady through the coordinated efforts of PacifiCorp and the U.S. Bureau of Reclamation (USBR). Reservoir levels are held steady by adjusting flows through East and West Side Powerhouses with coordination of flows in the Lost River and Straits Drain. Why does the water surface elevation need to be held constant? When and/or where does flexibility exist in the

Response to Comment S4-17

The California Water Code and Water Rights sections in the license application - Initial Statement have been revised per further investigation into this comment.

Response to Comment S4-18

The correct section has been noted in the FLA.

Response to Comment S4-19

Comment noted.

Response to Comment S4-20

Keno dam/reservoir are no longer part of the Project for which a license is being requested.

Mr. Todd Olson

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operation of the reservoir? It has never been clearly stated how this dam provides benefits to the project. The benefits to the project, as well as to irrigators should be clearly explained. Monitoring results, and modeling of the reservoir have shown that every summer the dissolved oxygen level drops to 0, with a complete die-off of algae. These significant water quality impacts affect water quality downstream of Keno Dam into California, and possibly below Iron Gate Dam. PacifiCorp should explore a range of alternatives for the operation of this facility that will mitigate the significant impact. The range of alternatives considered should include, but not be limited to, reoperation of the reservoir, moving the dam upstream, or removing the dam.

Volume 2 Exhibit E

Page 2-31 – The interpretation of spatial trends in this volume conflicts with the same section in the Draft Technical Report (DTR). While the DTR states that it is unwise to attempt a detailed interpretation of spatial trends in the historical data, this volume states the overall picture of the Klamath River that emerged from the historical data was one of higher production and organic matter in the upper reaches of the river changing to lower production and lesser organic matter in the lower reaches. These statements appear to conflict, and will require resolution in the application.

This section also contains some general statements such as the Klamath Straits Drain appears to be an important source of BOD, organic nitrogen, dissolved solids, turbidity, and phosphorus, and higher production and organic matter in the upper reaches of the river changes to lower production and lesser organic matter in the lower reaches. These general comments must be supported by data, otherwise it is not possible to validate the conclusions.

Page 3-3 – PacifiCorp has an agreement with the USBR that provides PacifiCorp use of stored water in Upper Klamath Lake under certain conditions. Endangered Species Act restrictions on Upper Klamath Lake water elevations have reduced the flexibility provided to PacifiCorp through the agreement. The draft application states that PacifiCorp has "...little or no control over storage in Upper Klamath Lake..." PacifiCorp should explain in detail what control over Upper Klamath Lake Storage it has.

Page 3-11 – Since 1997 PacifiCorp has operated the Project to provide instream flow releases below Iron Gate Dam as directed by the USBR Project Operation Plan. PacifiCorp should explain how this change in operation has affected power production and water quality.

Page 3-52 – Provide a copy of the unpublished USBR dissolved oxygen data.

Page 3-72 – Provide the raw data, and a summary of the temperature data from the reservoirs that shows the daily temperature fluctuations at the 40 and 60 foot depths of Iron Gate and Copco Reservoirs. All of the temperature data collected in the reservoirs should be included, both in summary form and the raw data.

Page 3-76 – Provide data to support the statements concerning ammonia, orthophosphate, total phosphorus, and TKN concentrations in Iron Gate and Copco Reservoir. The conclusion that Iron Gate does not stratify until as late as July should be validated with data.

Response to Comment S4-21

The text has been modified to address this comment.

Response to Comment S4-22

Comment noted. Please see Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed mitigation measures.

Response to Comment S4-23

The text has been revised to say "no control."

Response to Comment S4-24

Water quality impacts have primarily been assessed by comparing present conditions under the recent Biological Opinion to proposed Project conditions into the future. PacifiCorp reasonably assumed that required instream flows would not revert to pre-1997 conditions. Exhibit B of the FLA describes Project operations and resulting power production. In addition, a white paper was presented to the stakeholders that described current Project operations and the constraints or limitations of PacifiCorp's ability to generate power under USBR instream flow and reservoir stage requirements.

Response to Comment S4-25

The data in question must be obtained from the USBR. Under the terms of the data release agreement, PacifiCorp is not able to distribute unpublished USBR data.

Response to Comment S4-26

The Water Resources FTR includes summaries of all the water quality data collected during PacifiCorp's relicensing studies. PacifiCorp believes it is unnecessarily cumbersome to include the raw data. Copies of the data sheets can be specifically requested.

Response to Comment S4-27

The Water Resources FTR includes summaries of all the water quality data collected during PacifiCorp's relicensing studies. PacifiCorp believes it is unnecessarily cumbersome to include the raw data. Copies of the data sheets can be specifically requested.

Response to Comment S4-28

Comment noted. Please see the Water Resources FTR for a detailed discussion on Project reservoirs.

Response to Comment S4-29

Comment noted. Please see the Water Resources FTR for a detailed discussion on Project reservoirs.

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- S4-30 [Page 3-78 – Provide the water quality data that shows water quality changes just a few hundred meters downstream of Iron Gate Dam. The only possible source of nutrients immediately downstream of Iron Gate Dam is the fish hatchery. PacifiCorp should conduct sampling of the outflow of the fish hatchery to determine the impact of the hatchery on water quality.
- S4-31 [Page 3-109 – PacifiCorp collected riverine drift samples of macroinvertebrates from nets in the J.C. Boyle Peaking Reach. Nets were set in the thalweg and in the varial zone of the river. Agencies requested this information to determine the distribution of drifting macroinvertebrates during the peaking flow events. The information listed does not provide the information that was requested, including the quantity of insects captured in each of the nets, and the location of each of the nets. All of the data from the study must be included in the application.
- S4-32 [Page 3-118 – This page has a section on compliance with applicable water quality standards. In this section PacifiCorp concludes that historical data do not indicate any significant trends in water quality attributable to the Project. This conclusion is reached despite the inclusion of a list of standards for which exceedances have been measured. Water quality standards consist of both beneficial uses of water, and the water quality objectives necessary to protect those uses. To determine Project impacts on water quality standards, impacts to both the beneficial uses and water quality objectives must be analyzed. PacifiCorp has failed to include such an analysis in the draft application. The analysis must include Project impacts to the anadromous fisheries of the Klamath River, which are a beneficial use of the river. Project compliance with water quality objectives, and their impact on the beneficial uses must also be included. The application must analyze any impacts to the beneficial uses of Iron Gate Reservoir, Copco Reservoir and Klamath River, as well as disclosing violations of water quality objectives or the antidegradation policy.
- S4-33 [Page 3-122 – As stated above, the application must include an analysis of impact of water quality objectives violations on the beneficial uses. Modeling has shown that water temperature below Iron Gate Dam is higher in the fall and early winter with the project (compared to a no-project alternative). The basin plan objective for temperature states that the temperature of waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses. PacifiCorp must provide an analysis of the impact of increased temperature on the fishery below Iron Gate Dam.
- S4-34 [When the basin plan lists narrative objectives, such as the one for temperature, the Regional or State Board must develop numeric objectives through literature review or site specific studies. The Klamath River experiences very warm temperatures in the summer and fall, which have increased due to a number of anthropogenic sources. Anadromous fish endemic to this system may have adapted to elevated water temperatures. To answer this question, and ultimately determine the impact of increased water temperatures on anadromous fish, SWRCB staff requested that PacifiCorp complete a study that can be used to develop site specific numeric water quality objectives for Klamath River salmon and steelhead. We expect PacifiCorp to develop a study plan that addresses this issue for SWRCB and NCRWQCB staff review and approval. Once the study plan is approved, PacifiCorp should complete the study and concomitant report and provide it to the SWRCB and NCRWQCB for review and further action.

Response to Comment S4-30

Discharge from the fish hatchery below Iron Gate dam is permitted by the State of California. PacifiCorp assumes that this discharge is meeting the state water quality standards. PacifiCorp believes that the sampling sites are adequate to describe the Project's influence on water quality.

Response to Comment S4-31

Comment noted. Please see Sections 8 and 12 in the Water Resources FTR for a detailed discussion on the Fall and Spring macroinvertebrate sampling.

Response to Comment S4-32

See response to SWRCB comment #3, above. PacifiCorp's fish resources studies (see Fish Resources FTR) includes a review of anadromous fisheries in the Klamath River, and describes the use of EDT and PasRAS models to assess potential anadromous fish (including coho) reintroduction. EDT includes water quality as one of the environmental attributes considered in assessing historic, current, and potential conditions for anadromous fish.

Response to Comment S4-33

Comment noted. Please see Section 3 of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed mitigation measures.

Response to Comment S4-34

CSWRCB staff indicated that PacifiCorp would be required to develop a water temperature objective (for Klamath River salmon and steelhead) for use in the Klamath River. On that basis, PacifiCorp agreed to prepare a study plan, or technical approach, to develop such a water temperature objective. In the process of investigating and preparing a technical approach, PacifiCorp has determined that other stakeholders in the basin have already begun coordination and research on potential basin-specific water temperature criteria. In addition, PacifiCorp has determined that extensive reviews and recommendations on water temperature criteria for salmonids are already available from CSWRCB, ODEQ, and EPA Region 10 that likely is applicable to Klamath River salmon and steelhead. PacifiCorp will consult further with CSWRCB and the North Coast Regional Water Quality Control Board (who is responsible for the existing temperature objective in the Klamath Basin) on this matter. The outcome of this further consultation will be used in preparing the application for certification under Section 401 of the CWA for the Project.

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S4-35 [Page 3-131 – SWRCB staff requested that PacifiCorp conduct a total dissolved gases study during spill at Iron Gate Dam. It was our understanding that this study was completed, but the results were not included in the draft application. Additional information has been provided that indicates total dissolved gases may be a problem during normal operations at Iron Gate Dam. If operation of the generators at Iron Gate result in the entrainment of gases, a study must be conducted during worst case conditions. This information will also be required in the J.C. Boyle and Copco 2 tailraces.

S4-38 [Page 3-132 – The final application must include a thorough water quality study, or contain acceptable mitigation measures to prevent water quality impacts from the operation of the J.C. Boyle Emergency Spillway. PacifiCorp must also provide information on the water quality impacts from the erosion of sediments in the river channel.

S4-39 [Page 3-134 – PacifiCorp conducted limited rapid bioassessment sampling during the fall of 2002 and spring of 2003. Based on this small data set PacifiCorp states there has not been a loss of biological integrity, and the river is in fact supporting a balanced community of organisms of the type one would expect in a natural community. Data, including the reference data, supporting the conclusion must be provided to support these conclusions.

S4-40 [Page 3-134 – The application should provide a more complete explanation of the conclusion that water quality conditions appear to be adversely affecting recreation beneficial uses. PacifiCorp should also provide a list of controllable factors or mitigation measures that could correct this impact.

S4-42 [Page 3-135 – The draft application states that Keno Reservoir is exposed to sun and wind, and there are few anthropogenic sources of heat load to the river. The creation of the reservoir, the reduction of riparian cover (shade), destruction of the historic marsh complex, and the input from the Straits Drain may affect the temperature of the river below Keno Dam. Data to support this conclusion must be included in the application.

Page 3-151 – The report titled *Bathymetry and Sediment Classification of the Klamath Hydropower Project Impoundments* must be included in the application.

S4-43 [Page 3-157 – It is stated that PM&Es will be developed in consultation with the water quality workgroup and aquatics work group and included in the final application. As all of the members of the collaborative are aware, not all of the studies will be completed prior to March 2004 when the application must be submitted to the FERC. As a result of incomplete studies, and the time required to develop PM&E measures, SWRCB staff are not confident that the collaborative will develop PM&E measures prior to March 2004. If the collaborative does not develop PM&E measures, we assume that PacifiCorp will include PM&E measures in the application.

S4-44 [Page 4-16 – The draft application concludes that there is little or no spawning habitat for trout in the peaking reach, and the amount of spawning gravel is limited because of J.C. Boyle Dam. The Salt Caves Project Application is cited as a reference for these conclusions. The Salt Caves Project Application states that the largest potential spawning area for trout is located near river

Response to Comment S4-35

Please see Section 7 of the Water Resources FTR for the total dissolved gas (TDG) measurements. TDG sampling was conducted over a range of Project operations, including spill, and none of the values exceeded either Oregon or California's TDG criteria.

Response to Comment S4-36

Comment noted.

Response to Comment S4-37

Comment noted.

Response to Comment S4-38

Comment noted. Please see Section 3 of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed PM&Es.

Response to Comment S4-39

Comment noted. Please see Sections 8 and 12 in the Water Resources FTR for a detailed discussion on the Fall and Spring macroinvertebrate sampling.

Response to Comment S4-40

PacifiCorp does not believe that water quality is adversely affecting recreation beneficial uses. See the Recreation FTR for an analysis of recreational use in the Project area.

Response to Comment S4-41

See response to comment #38.

Response to Comment S4-42

Temperature impacts from Straits Drain are discussed. The creation of the reservoirs, and the destruction of historic marsh complexes are beyond the scope of this relicensing.

Response to Comment S4-43

Comment noted. Please see Section 3 of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed PM&Es.

Response to Comment S4-44

See response to comment #43.

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S4-44

mile 214. Because peaking operations start when trout eggs are in the gravel, they would become desiccated (City of Klamath Falls, November 1986) from the reduction in daily peaking flow magnitude and duration.

S4-45

Page 5-56 & 118 – Foothill Yellow Legged Frog (FYLF) is a California Species of Concern and a candidate for Federal Endangered Species Act listing. FYLF is declining throughout its range in California. Completion of this study plan is important to understand project impacts on this amphibian.

S4-46

Page 7-63 – Water contact recreation, non-contact recreation, and commercial and sport fishing are designated beneficial uses of the waters of Iron Gate and Copco Reservoirs and the Klamath River. Unfortunately, PacifiCorp has consistently scheduled recreation group meetings at a time when SWRCB staff were not available to attend. As a result SWRCB staff have had little input into the development of the recreation study planning process. The draft application contains extensive information on boatable ranges for a number of craft and for fishing in the J.C. Boyle reach. However, the draft application does not address the changes in opportunity that occurred in response to changes in J.C. Boyle Powerhouse operations in 2000 and 2001. The application must contain a complete analysis of the impact of the changes in operation on boating opportunity. Clearly there is a trade off between matching peak power production and the availability of boating opportunities in this reach. Changes in timing of peaking operations have a large impact on white water boating opportunities. PacifiCorp must provide a full analysis of the value in lost power versus the number of boatable days in the application. The impacts of these operations on fishing should also be included.

S4-47

Water Resources Draft Technical Report

Page 1-2 – Study 1.20 is the Spring Macroinvertebrate study.

S4-48

Page 3-47 – A copy of the Eilers and Raymond report on sediment oxygen demand should be included in the application and submitted to the SWRCB and NCRWQCB.

S4-49

Page 4-97 – Water Course Engineering, the consulting firm conducting the modeling for PacifiCorp, has presented results from water temperature modeling to the water quality workgroup on a number of occasions. This information must be included in the draft application. Past presentations have clearly shown that water temperature below Iron Gate Dam is warmer during the fall, with the project in place, when compared to a no-project alternative. The draft application does not reflect these modeling results. The application must fully disclose all of the modeling results, and the impacts of the project on water quality. If the quality of the data presented in the application is inadequate, SWRCB staff will have to require additional analysis by the EIR consultant during the preparation of the EIR.

S4-50

Page 8-1 – SWRCB staff were actively involved with the development of the study plan for macroinvertebrates. Following is a list of comments on this study:

Response to Comment S4-45

Studies on the foothill yellow-legged frog have been conducted in 2003 in accordance with the final study plan. Results of foothill-yellow legged frog studies are presented in the Terrestrial Resources FTR Section 4.0.

Response to Comment S4-46

The Recreation Resources FTR describes the impact of various flow regimes on boating and fishing opportunities. The balancing of power and non-power values and licensee proposed flows below the J.C. Boyle powerhouse are addressed in the FLA.

Response to Comment S4-47

Comment noted.

Response to Comment S4-48

See Section 9 of the Water Resources FTR for a detailed report on sediment oxygen demand in selected Project reservoirs.

Response to Comment S4-49

Water quality modeling results and Project impacts on water quality are included in the FLA.

Response to Comment S4-50

The macroinvertebrate study has been completed and the methodologies are documented in the Water Resources FTR.

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Response to Comment S4-51

Comment noted. See the Fish Resources FTR for the detailed analysis of the Spring and Fall macroinvertebrate sampling.

- The taxa lists for each of the sample sites must be submitted, including the lentic and lotic sites.
- The results of the 20% QA/QC must be included.
- The location of lentic sampling sites must be submitted.
- Metrics for each of the sample sites must be included.
- The results from the varial zone sampling is incomplete. The location of the sampling stations should be shown. The location of the sampling nets, across the river, and relative to water surface elevation should be included (in addition to Figure 8.7-8). The size of the net and mesh size should be listed. It is not clear how the bugs from each of the drift nets were classified/measured. Provide complete information on the drift net samples, including species and quantity captured. It is important to understand the number and type of insects in each of the nets to aid in evaluation of the impact of the peaking flows.
- In addition to the cluster analysis it is beneficial to complete a relative ranking using at a minimum, the 9 metrics found to be reliable responders to disturbance (Karr and Chu, 1999), which are taxonomic richness, ephemeroptera taxa, plecoptera taxa, tricoptera taxa, tolerance value, percent tolerant organisms, percent intolerant organisms, percent dominant taxon, and percent predators. Although not described by Karr and Chu, Shannon diversity index can also be included.

S4-50

The NCRWQCB staff reviewed the Water Resources Draft Technical Report. Their comments are enclosed, and they will supplement the comments provided above. As you know, SWRCB staff and NCRWQCB staff have been working together coordinating the 401 certification and Total Maximum Daily Load (TMDL) issues relevant to this project. NCRWQCB staff are involved with this project because the information generated by the relicensing process may be useful in developing TMDLs for the Klamath River. The Klamath River is on the state List of Impaired Waterbodies (Clean Water Act section 303(d) list). The Project impacts water quality in the river, and is therefore relevant to the TMDL analysis. The SWRCB may not be able to issue a 401 certification for this Project until the Project's contribution to the 303(d) listing are fully understood, and loads are allocated.

S4-51

Conclusion

We look forward to working with PacifiCorp, agencies, Tribes, and NGO's on the relicensing of this Project. If you have any questions, or want to discuss the details of these comments, please contact me by phone at (916) 341-5341 or e-mail at rkantz@waterrights.swrcb.ca.gov.

Sincerely,



Russ J. Kanz
Environmental Specialist
Division of Water Rights

Enclosure

Mr. Todd Olson

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References:

Belchik, Mike. 2002. Yurok Tribal Fisheries
City of Klamath Falls. November 1986. Application for new license Salt Caves
hydroelectric project
Karr J. R and E. W. Chu. 1999. Restoring life to running rivers. Island Press, Covelo, CA
Moyle, Peter B.. 2002. Inland fishes of California. University of California Press, Berkeley, CA

cc: See enclosed Mailing List.

**Klamath Hydroelectric Project
Mailing List**

Mr. Curtis Knight
P.O. Box 650
Mt. Shasta, CA 96067

Ms. Magalie R. Salas, Secretary
Federal Energy
Regulatory Commission
888 First Street, N. E.
Washington, DC 20426

Mr. John Mudre
Federal Energy
Regulatory Commission
888 First Street, N. E.
Washington, DC 20426

Mr. David Leland
North Coast Regional
Water Quality Control Board
5550 Skylane Blvd., Suite A
Santa Rosa, CA 95403

Mr. Paul DeVito
Oregon Department of
Environmental Quality
2146 NE 4th Street, Suite 104
Bend, OR 97701

Ms. Amy Stuart
Oregon Department of
Fish and Wildlife
3042 SE Paulina Highway
Prineville, OR 97754

Ms. Barbara Machado
Bureau of Land Management
HC10 Box 337
Lakeview, OR 97630

Ms. Katherine Spivak
North Coast Regional
Water Quality Control Board
5550 Skylane Blvd., Suite A
Santa Rosa, CA 95403

Ms. Annie Manji
Calif Department of Fish and Game
601 Locust Street
Redding, CA 96001

Ms. Ronnie Pierce
Inter-Tribal Fish and Water
Commission
1111 Forson Road
McKinleyville, CA 95521

Mr. Robbie Van de Water
US Forest Service
1312 Fairlane Road
Yreka, CA 96097

Mr. David Diamond
Department of the Interior
Office of Policy Analysis
1849 C Street, N.W.
Washington, D.C. 20426

Mr. Bernie Burnham
Bureau of Indian Affairs
911 NE 11th Avenue
Portland, OR 97232

Mr. Mike Belchik
Yurok Tribal Fisheries
15900 Highway 101 North
Klamath, CA 95548

Mr. John Hamilton
U.S. Fish and Wildlife Service
1829 South Oregon Street
Yreka, CA 96097

Mr. Chuck Bonham
Trout Unlimited
828 San Pablo Avenue, #208
Albany, CA 94706

Mr. Frank Fryman
Bureau of Indian Affairs
2800 Cottage Way
Sacramento, CA 95825

Mr. Steve Rothert
American Rivers, California Region
2140 Shattuck Avenue, Floor 5
Berkeley, CA 94704

Ms. Kelly Catlett
Friends of the River
915 20th Street
Sacramento, CA 95814

Mr. Glenn Spain
Pacific Coast Federation of
Fishermen's Association
P.O. Box 11170
Eugene, OR 97440-3370

Mr. Steve Edmondson
National Marine Fisheries Service
777 Sonoma Avenue, Room 325
Santa Rosa, CA 95404-6528

Ms. Julie Tupper
U.S.D.A. Forest Service
Regional Foresters Office
650 Capitol Mall, Room 7524
Sacramento, CA 95814

Mr. Larry Dunsmoor
Klamath Tribes Natural Resources
PO Box 436
Chiloquin, OR 97624

Mr. Ron Reed
Karuk Tribe
Post Office Box 282
Orleans, CA 95556

Mr. Ron Larson
US Fish and Wildlife Service
6610 Washburn Way
Klamath Falls, Oregon 97603

Mr. Dave Hillemeier
Yurok Tribe
15900 North Hwy 101
Klamath, CA 95548

ATTACHMENT

2

Oregon Department of Fish and Wildlife
COMMENTS ON PACIFICORP'S DRAFT LICENSE
APPLICATION

for

Klamath Hydroelectric Project
(FERC 2082)

September 2003

Oregon Department of Fish and Wildlife
Prineville, Oregon



Oregon

Theodore R. Kulonowski, Governor

September 16, 2003

Todd Olson, Licensing Project Manager
Toby Freeman, Relicensing Manager
PacifiCorp
825 NE Multnomah, Suite 1500
Portland, Oregon 97232

Department of Fish and Wildlife
High Desert Region
Prineville Office
2042 SE Paulina Hwy
Prineville, OR 97754
(541) 447-5111
FAX (541) 447-806
Internet WWW: <http://prihydro@crestviewcable.com/>



Subject: FERC 2082 – Klamath Hydroelectric Project
Comments on the Draft License Application

Dear Mr. Olson and Mr. Freeman,

S5-1(B)

The Oregon Department of Fish and Wildlife (ODFW) has reviewed the Draft License Application (DLA) provided by PacifiCorp for the relicensing of the Klamath Hydroelectric Project (Project). Pursuant to Federal Energy Regulatory Commission (FERC) regulations, 18 CFR 4.51(f) and 18 CFR 16.8 (c)(5), ODFW submits the attached comments to assist PacifiCorp in completing relicensing studies and preparing the Final License Application (FLA).

ODFW has participated in the State of Oregon Hydroelectric Application Review Team (HART) to develop a unified state position to the FERC for relicensing. Oregon's Hydroelectric Reauthorization Law requires mitigation for new and ongoing adverse impacts to fish and wildlife habitat caused by the Project or its operation. (ORS 543A.025). This state law also requires appropriate measures to promote restoration and rehabilitation of fish and wildlife resources to support goals expressed in statute or in standards, plans, guidelines, and policies adopted by rule by the Oregon Fish and Wildlife Commission.

ODFW regards this relicensing effort to be of critical importance to resource protection and restoration in the Klamath River Basin. A number of fish and wildlife species listed under the state and federal Endangered Species Acts exist in the Project area. The Project now forms the upstream boundary for anadromous fish populations in the mainstem Klamath River and affects their remaining habitats downstream. Because of these and other important natural resource issues, ODFW has participated fully in this relicensing effort since PacifiCorp officially initiated relicensing in 2000. We have participated in resource work groups, Plenary Work Group meetings, site visits, and consultations associated with relicensing the Project. ODFW has provided data, information and expertise on various aspects of fish and wildlife species distribution and abundance, and habitat quality and utilization. Staff has actively contributed to issue scoping and study planning.

Overall, we anticipate reaching agreement with PacifiCorp on many of the protection, mitigation, and enhancement (PM&E's) measures that should be included as conditions of a new license. We still have concerns, however, regarding several important fish and wildlife issues. In particular, ODFW believes additional effort is needed on fish passage, fish assessments, instream flow, ramp rates, water quality, and

Response to Comment S5-1(B)

PacifiCorp appreciates the efforts of ODFW throughout this licensing process. You will find that the FLA and technical appendices (FTRs) provide a significant degree of data updates and study clarifications. In addition, the FLA describes the proposed Project impacts and proposed PM&E measures. PacifiCorp is continuing to collaborate with the Aquatics Work Group on fish passage, instream flow, and water quality issues and is also hopeful that outstanding issues can be resolved collaboratively. In cases where PacifiCorp maintains that the scope of study both executed and planned is sufficient for FERC purposes, contrary to the opinions of others, these disagreements have been documented in Appendix E1-A of the FLA.

information for potential dam decommissioning and removal. We are hopeful that these issues can be resolved through continued discussions with PacifiCorp, the federal and state resource agencies, Native American Tribes, and interest groups.

During relicensing consultation, PacifiCorp modified the formal traditional process by adding an informal collaborative process with other partners in the region such as tribal and federal agencies and non-governmental organizations (NGO's), and state agencies to formalize and approve studies to identify and assess the impacts of the Project. Despite this effort, ODFW notes that the DLA lacks information to address potential resource impacts. In many cases, field studies and data analyses are not completed. This has resulted in a DLA that lacks detailed descriptions of existing conditions, affected resources, Project impacts, and proposed PM&E measures. In some cases, PacifiCorp either chose not to conduct certain studies recommended by ODFW, or chose not to use standard study methodologies recommended by ODFW. For example, the unapproved fisheries assessment study (Study Plan 1.9), that should provide a baseline of information for existing fish populations, is technically flawed and cannot meet the stated objectives of understanding the baseline conditions of fish populations and Project impacts. Results of an approved and technically qualified study would have been used to assess Project effects and then identify appropriate PM&E's. Similarly, the Fish Passage Study Plan (Study Plan 1.10) also has not been approved via the collaborative process and does not meet the stated objectives of describing current conditions, completing adequate studies and developing PM&E's.

As described by FERC regulations, the purpose of the FLA is to fully disclose effects of the Project on the environment, provide sufficient information for FERC to meet its obligations under the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA) as well as tribal trust responsibilities, and propose PM&E's that will mitigate for the impacts of the Project. The FLA needs to address study deficiencies and identify a process to conduct studies needed to determine appropriate PME types and scale. The FLA should present conclusions of comprehensive studies that have been requested by ODFW and other participants, including description of the scope, methods, results, and analysis of such studies. Additionally, the FLA needs to describe current conditions, Project impacts and PM&E's. In the absence of such information, ODFW will need to submit conservative 10j recommendations that are conservative in order to ensure resource goals and objectives and state statutory requirements are met.

The Project's FERC boundary traverses approximately 55 miles of the Klamath River in Oregon, and includes the Link River diversions, and Keno and JC Boyle dams and reservoirs. The FERC boundary also extends downstream along the Klamath River approximately 20 miles in California, and includes the Copco 1 and 2, and Iron Gate dams and reservoirs. While ODFW's comments are focused on Project impacts in Oregon, our interests are also affected by Project operations in California. Oregon coastal fishers have utilized anadromous fish originating from the Klamath Basin for over a century. The health of Klamath stocks affects allocation of fish resources for Oregon, Washington, California and Alaska users, as well as numerous tribes with fishing treaties with the United States government. The Klamath populations also factor into harvest allocation agreements between the United States and Canada, regulated by the Pacific Salmon Treaty. Water quality from Oregon affects water quality in California and lack of passage at California dams prevents anadromous fish access to historic habitat in Oregon. Therefore, while ODFW's comments primarily address the adequacy of the DLA in evaluating current conditions, Project impacts, and PM&E's in Oregon, we also provide recommendations that encompass the entire Project boundary and area of Project effects.

SS-1(B)

We look forward to working with PacifiCorp throughout the remainder of the relicensing process and beyond for the benefit of fish, wildlife, and habitat resources. ODFW appreciates the opportunity to provide comment on the DLA and wishes to continue our cooperative working relationship with PacifiCorp. If you have any questions or need additional information, please call me at 541-447-5111, ext. 27, or send email to prihydro@crestviewcable.com.

Sincerely,



Amy M. Stuart
Hydro Power Program Biologist
High Desert Region

c: Klamath HART (Kohanek, Marbut, DeVito, Houck, McNamee)
Klamath CAPS (Marbut, Elicker, Llewellyn, Byler)
S. Kirk, ODEQ
L. Prendergast, PacifiCorp
M. Rode, G. Smith and A. Manji, CDF&G
R. Vandewater, USFS
D. Reck, BIA
S. Edmundson, NMFS
J. Hamilton, G. Curtis, L. Simons, USFWS
M. Belchik, H. McConnell, and C. Chamberlain, Yurok Tribe
S. Senter, B. Machado, S. Snedaker, M. Turaski, BLM
R. Pierce, KRITFC
D. Leland, NCRWQCB
R. Kanz, Cal SWRCB
S. Rother, American Rivers
C. Bonham, TU
K. Catlett, Friends of the River
B. Barr, World Wildlife Fund
C. Huntington
L. Dunsmoor, R. Hamilton, Klamath Tribes
M. Salas, FERC, Washington DC plus 8 copies
J. Mudre, FERC, Washington DC

Comments of the Oregon Department of Fish and Wildlife
on
PacifiCorp's Draft License Application – June, 2003
Klamath Hydroelectric Project (FERC 2082)

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GENERAL COMMENTS

OVERALL ASSESSMENT OF THE DRAFT LICENSE APPLICATION

The Federal Energy Regulatory Commission's (FERC) regulations (18 CFR 16.8(c)(4)) require hydropower licensees to provide a draft of the proposed license application for a major Project of an existing dam to consulting agencies. Applicants are required to report on water use and quantity and fish, wildlife, and botanical resources in the vicinity or impacted by the Project. These reports must include descriptions of existing resources affected by the Project, any anticipated continuing impacts of the Project on resources, and proposed mitigation and enhancement measures for the protection or improvement of such resources.

SS-1 Under state law, applicants must submit a Draft License Application (DLA) to the Hydroelectric Application Review Team (HART) no later than one year prior to filing the Final License Application (FLA) (ORS 543A.095). PacifiCorp informed the state that it could not meet the state's deadline for the DLA because many of the resource studies would not be completed within this timeframe. The HART granted a 90-day extension for filing the DLA to enable PacifiCorp to develop a more complete DLA. Even with the additional time that resulted in approximately 110 additional days, PacifiCorp informed the HART that essential information could not be collected, and studies could not be completed in time for inclusion in the DLA.

SS-2 The DLA is lacking critical information and completed studies needed to assess Project impacts; including fish passage and entrainment, fish assessment, macroinvertebrate and water quality, ramping rate, and instream flow studies. Without this essential information, ODFW believes the application is incomplete and does not provide sufficient information to evaluate the impact of the Project on the state's fish and wildlife resources nor to support recommendations for protection, mitigation, and enhancement measures (PM&E's).

Oregon's Hydro Reauthorization Law requires ODFW to prepare "provisional" terms and conditions (those that later in the FERC process may be submitted in revised form to FERC as section 10(j) recommendations) based on an applicant's DLA prior to filing of the FLA (ORS 543A.095(4)(c)). In order to meet this requirement, ODFW will be including provisional 10(j) recommendations in the HART provisional state position that are necessarily conservative to ensure resource goals and objectives and state mandates are met. In order to develop and submit ODFW's actual 10(j) recommendations at the time when FERC begins its NEPA process, ODFW will need the FLA to be expanded in scope and analyses, including results of appropriate field studies, identification of Project impacts, and appropriate PM&E's for fish and wildlife and their habitats.

OVERALL ASSESSMENT OF CONSULTATION PROCESS

SS-3 ODFW has a long history of working closely with PacifiCorp biologists and Project operators on the Klamath Hydroelectric Project as well as at other PacifiCorp Projects in Oregon. Prior to initiating formal consultation, PacifiCorp seemed very interested in conducting pre-relicensing studies. However, ODFW noticed that PacifiCorp took a different approach during relicensing and would not agree to conduct many of the studies requested by ODFW.

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Response to Comment S5-1

Due to a variety of reasons, many studies were not completed in time for submitting the DLA. The final license application includes missing information or identifies the remaining work and schedule to complete outstanding studies.

Response to Comment S5-2

The lack of data interpretation in the DLA was a result of PacifiCorp agreeing to expand the scope of studies within the limited time frame for publication of the DLA. The FLA is much more comprehensive in addressing Project impacts and identifying PM&E measures.

The FLA documents the analyses on those subjects listed in your comment. The PM&E measures presented for fish passage will be further refined upon acceptance by FERC and regulating agencies.

Response to Comment S5-3

PacifiCorp deemed some studies requested by ODFW as unnecessary for Project relicensing.

Response to Comment S5-4

Due to the timing of relicensing and the need to complete some level of study in key resource areas, PacifiCorp initiated studies prior to the Collaborative's approval. Efforts were focused to provide study results as soon as possible to the stakeholders at monthly resource meetings.

Response to Comment S5-5

The final license application (FLA) provides a thorough description of the existing Project, its operation, and the Project's effect on the surrounding environment. In addition, the FLA provides a thorough description of the proposed Project, proposed Project operations, and the proposed Project's anticipated enhancement to the surrounding environment. The proposed Project was developed considering a number of factors, including the issues, questions and concerns raised by participants in the pre-filing collaborative consultation process; existing information; and the results of over 38 environmental studies developed by the Klamath Collaborative.

It is not possible for PacifiCorp to accurately predict the alternatives, or all of the information that FERC may need to analyze these alternatives in their Environmental Impact Statement. Should FERC require additional information, they will likely request it from PacifiCorp.

At the request of relicensing participants and in the interest of collaboration, PacifiCorp conducted intensive fish passage and water quality modeling of at least five variations on dam removal, volitional fish passage and run-of-river operations. In addition, PacifiCorp worked with relicensing participants to try and identify all of the implications of implementing

S5-4

Throughout the relicensing process, ODFW identified important scoping issues, potential opportunities for PM&E's, and provided information requested by PacifiCorp regarding ODFW's statutes, rules, goals, and plans. In several instances, PacifiCorp initiated field data collection without incorporation of agency recommendations for improvement of draft study plans. Interim progress and study results commonly have not been shared with ODFW.

S5-5

ODFW has noted little movement on PacifiCorp's part regarding evaluation of whether any one or more of the Project facilities should be decommissioned or removed. The purpose of this evaluation would be to consider a range of Project alternatives that would mitigate for ongoing and continuous impacts and restore and protect environmental resources. The stakeholders of the Plenary Group have requested sufficient information in the administrative record of the relicensing process so that FERC can conduct an Environmental Impact Statement (EIS) that analyzes the full range of Project alternatives.

S5-6

We understand PacifiCorp's position is that it is not utilizing an alternative licensing process, and therefore does not need to provide information for a full range of alternatives as required by the National Environmental Policy Act (NEPA) process. Instead, PacifiCorp has stated that under the traditional licensing procedures, FERC is responsible for producing the alternatives analysis. ODFW believes this interpretation is inconsistent with FERC's guidance. FERC's Handbook states that "The traditional license application contains an Exhibit E. Exhibit E must contain sufficient information to allow the Commission to prepare an EA or EIS." (Hydroelectric Project Licensing Handbook, Federal Energy Regulatory Commission, Washington, DC, April 2001 at pg. 2-3). "An applicant should attempt to anticipate the information needs of a NEPA document and design studies accordingly", including "alternative Project designs and operations to improve fish habitat and any needed fish passage". Id. at p. 3-16.

In our March, 2001 comments to the First Stage Consultation Document (FSCD), ODFW identified several studies for PacifiCorp to conduct to evaluate Project impacts (ODFW 2001). The results of these studies should be used to determine appropriate PM&E measures to reduce or eliminate impacts. Consistent with 50 CFR 17.11/17.12, our comments address the adequacy of the DLA, and eventually the FLA, to meet the intent of the NEPA to provide all the necessary information for FERC to carry out its analysis of potential impacts of a federal action on the environment.

DECOMMISSIONING ALTERNATIVE

S5-7

The relicensing process is designed to determine whether an existing Project should be granted a new license. To answer that question, the Commission, the public, and policy makers must have information on the Project's impacts and benefits as a whole, not just the changes proposed by the licensee. Due to the high public interest in this Project relicensing, FERC will need to complete an EIS on the relicensing of the Klamath Project based on FERC's regulation requiring it to consider "the degree to which the effects on the human environment are likely to be highly controversial." (40 CFR 1508.27). FERC's development of an EIS will require analysis of a full range of alternatives, including the alternatives of issuance of a non-power license or Project retirement, for any one or more of the Project facilities. Regulation 16 U.S.C. s 808(b) states that "Non-power licenses may be issued at the motion of an interested party or on the Commission's [FERC's] own motion". FERC could determine that a non-power license is necessary if it concluded that power production needs were outweighed by recreational or environmental considerations. Therefore, the consideration of what conditions to attach to a new license and the questions involved in determining whether a non-power license is necessary requires the preparation of an EIS. In accordance with FERC guidance, PacifiCorp should anticipate this NEPA need and include in its FLA an evaluation of decommissioning alternatives.

numerous facility and operations scenarios through an exercise entitled System Landscape Options Analysis. All of this information is included in the appended technical reports and consultation record. PacifiCorp has addressed alternatives and their associated issues as a means to inform the subsequent NEPA process.

Response to Comment S5-6

PacifiCorp does not interpret the handbook language as requiring an alternatives analysis of "no project operation."

Response to Comment S5-7

See response to ODFW comment #5.

ODFW STATUTES, POLICIES, AND RULES

ODFW's goals and objectives for the fish and wildlife populations affected by the Project are found in the following Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR). In addition, ODFW has authority pursuant to Section 10(j) of the Federal Power Act (FPA) and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) to provide recommended terms and conditions to FERC to protect, mitigate and enhance fish and wildlife and their habitat affected by operation and management of the Project.

- Wildlife Policy (ORS 496.012)
Establishes wildlife management policy to prevent serious depletion of any indigenous species and maintain all species of fish and wildlife at optimum levels.
- Oregon Plan for Salmon and Watersheds (ORS 541.405)
Restore native fish populations, and the aquatic systems that support them, to productive and sustainable levels that will provide environmental, cultural, and economic benefits.
- Policy to Restore Native Stocks (ORS 496.435)
Establishes goal of the State of Oregon to restore native stocks of salmon and trout to their historic levels of abundance.
- ODFW's Fish Passage Law (ORS 509.580 - 509.645)
Establishes as state policy that upstream and downstream passage is required at all artificial obstructions in those Oregon waters in which migratory native fish are currently or have historically been present. For existing hydroelectric Projects, relicensing by the Federal Energy Regulatory Commission (FERC) is the "trigger" that initiates consideration of fish passage.
- General Fish Management Goals (OAR 635-007-0510)
Fish shall be managed to take full advantage of the productive capacity of natural habitats, and ODFW shall address losses in fish productivity due to habitat degradation through habitat restoration.
- Natural Production Policy (OAR 635-007-0521 thru -0524)
Protect and promote natural production of indigenous fishes.
- Native Fish Conservation Policy (OAR 635-007-0501 thru -0506)
Conserve and recover native fish in Oregon to avoid serious depletion of native fish, provide ecological and societal benefits, and opportunities for fisheries and other societal uses.
- Wild Fish Management Policy (OAR 635-007-0525 thru -0529)
Protect genetic resources of wild fish.
- Wild Fish Gene Resource Conservation Policy (OAR 635-007-0536 thru -0538)
Manage wild fish to maintain their adaptiveness and genetic diversity.
- Trout Management (OAR 635-500-0100 thru -0120)
Maintain the genetic diversity and integrity of wild trout stocks; and protect, restore, and enhance trout habitat.

- Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0000- thru 0025)
Require or recommend mitigation for losses of fish and wildlife habitat.
- Oregon's Elk Management Plan
Protect and enhance elk populations in Oregon to provide optimum recreational benefits to the public and to be compatible with habitat capability and primary land uses.
- Oregon's Black Bear Management Plan
Maintain healthy populations of black bear consistent with public desires and state law.
- Oregon's Cougar Management Plan
Maintain healthy populations of cougar consistent with public desires and state law.
- Wildlife Diversity Plan (OARs 635-100-0001 thru -0030)
Maintain Oregon's wildlife diversity by protecting and enhancing populations and habitats of native wildlife at self-sustaining levels throughout natural geographic ranges.
- Klamath Basin Fish Management Plan (OARs 635-500-3600 thru -3860)
Protect and promote natural production of indigenous species and protect and restore those habitats through coordination and cooperation with other agencies, entities and landowners

RELICENSING ISSUES

PacifiCorp issued its First Stage Consultation Document (FSCD) in December 2000. ODFW reviewed the document and provided written comments to PacifiCorp (ODFW 2001). We identified important relicensing issues and recommended methodologies to collect information for assessing Project impacts. ODFW believes these issues should be addressed in the FLA to support PM&E's for relicensing. Project relicensing issues identified in ODFW's review of the FSCD included the following:

- Upstream Fish Passage
- Downstream Fish Passage/Fish Entrainment in Power Canals
- Project Operations and Hydrology, and Sediment and Geomorphology in the Klamath Basin
- Seasonal Minimum Flows in All Reaches
- Ramping Rates for Bypass and Peaking Flow Reaches
- Water Quality Modeling and Macroinvertebrate Surveys
- Habitat Surveys for Potential Anadromous Fish Production in the Upper Basin
- Native Trout and Wild Fish Surveys; Stock Assessments for Anadromous Fish
- Terrestrial and Botanical Resources; Noxious Weeds
- Cumulative Impacts

In our comments below, ODFW reviews these issues along with our assessment of the information provided in the DLA and recommendations for how PacifiCorp might address our concerns in the FLA.

I. Upstream Fish Passage

The lack of adequate fish passage facilities at all 6 Klamath River mainstem dams adversely affects resident and anadromous fish populations in the Klamath basin. The DLA does not adequately describe current conditions, Project impacts, or identify proposed measures to address this major Project impact.

SS-8

Current condition – Of the six dams that make up the Klamath Hydroelectric Project, only Link River, Keno and JC Boyle dams have upstream fish passage facilities, while the California dams have no fish passage facilities and completely block native resident and anadromous fish movement. ODFW believes the fish ladders at the Oregon dams are ineffective and do not meet federal or state passage criteria for trout and anadromous salmonids, nor do they adequately pass native suckers and lamprey.

SS-9

The DLA is lacking information regarding upstream fish passage because study plans are still being reviewed and other studies are still in progress. Although requested by ODFW and other participants during the relicensing consultation period, PacifiCorp has not conducted field studies of upstream fish passage effectiveness. Without the information from these studies, there is uncertainty whether all the objectives in section 5.1.2 will be met.

SS-10

In Section 5.3, PacifiCorp summarizes a conceptual engineering analysis of the pros and cons of alternative fish passage facilities for each Project facility. This analysis relies heavily on generalized cost information (construction, O&M, and present worth of estimated energy costs). The cost estimates for fish passage facilities should account for the potential need to modify the structure, modify facility operation (e.g. reduce diversion flows), or upgrade the ladder if biological performance standards can not be achieved. New upstream fish passage facilities will also require physical and biological evaluations to ensure design criteria and performance standards are met. The cost of these evaluations should also be included in the cost analysis of the proposed alternatives.

SS-11

In addition to the lack of field studies to evaluate existing fish passage facilities, PacifiCorp chose not to conduct a literature review of existing conditions. The DLA excludes existing information regarding ongoing problems at JC Boyle and Keno ladders. Instead, it concludes that fish passage is not a problem based on the Olson Technical Memorandum of June 26, 2002. The DLA misrepresents current conditions and incorrectly concludes that fish passage at these ladders has not contributed to declining redband trout populations in the upper Klamath Basin. This conclusion contradicts early passage studies by Hanel and Gerlach (1964) and ODFW research studies conducted from 1988 to 1991 (Buchanan 1991, Hemmingsen et al. 1992). Quantitative evidence prepared by ODFW regarding redband trout passage at JC Boyle Dam indicates that adult fish passage through the ladder has decreased by 95-98% of that present when the ladder was initially constructed. Contemporary passage continues to be less than 5-10% of that reported 1 year after Project construction of JC Boyle Dam. The ladder at JC Boyle is steeper than current ODFW criteria for trout and its entrance location, flow and water quality relative to the river likely provides poor attraction for upstream migrating fish.

SS-12

No hydraulic, physical or computational models were used to evaluate facility effectiveness at any of the Project facilities. PacifiCorp did not evaluate locations of the entrance, weir design, flow velocity, hydraulic gradients and water quality to determine the suitability of the existing structures for passage of redband trout, lamprey, suckers, or potential anadromous fish. A team of PacifiCorp's consulting engineers along with agency engineers made only 2 facility site visits.

Biological evaluations are usually conducted via a variety of methodologies including radio-tagged fish, netting and trapping to assess passage effectiveness, migration delays, fallback or injury, fishway

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Response to Comment S5-8

Study results do not fully support all of these conclusions. The commenter is referred to Section 4.3 of Exhibit E for the assessment on fish passage.

Response to Comment S5-9

PacifiCorp tagged resident redband trout in 2003 as a means to monitor fish movement and usage of fish passage facilities at J.C. Boyle. The results of this study showed that fish were able to pass through the ladder and exit into the J.C. Boyle reservoir.

Response to Comment S5-10

PacifiCorp staff will conduct evaluation studies for all new fish passage facilities constructed at the Project. The costs of these evaluations are included in the FLA.

Response to Comment S5-11

Number of fish using the J. C. Boyle ladder has according to previous studies, decreased. The cause of this decrease continues to be a point of disagreement. Please see the Fish Resources FTR for PacifiCorp's point of view.

Response to Comment S5-12

Comment noted. PacifiCorp did not see it as necessary to complete such modeling for determination of proposed PM&E measures.

S5-12

entrances, ladder configurations, and velocity gradients or barriers. PacifiCorp only recently initiated a "pilot" trout movement study in February 2003 below JC Boyle as a preliminary evaluation of trout passage through the bypass reach and over the ladder. ODFW commented on the limitations of the existing study such as small sample size that may preclude drawing clear conclusions from study results (ODFW email to PacifiCorp January 22, 2003).

S5-13

Project impacts - The DLA does not adequately describe Project impacts. The DLA indicates that historic runs of anadromous fish including Chinook *Onchorhynchus tshawtscha*, steelhead *Onchorhynchus mykiss*, coho *Onchorhynchus kitsutch*, and Pacific lamprey *Lampetra tridentata* were in the upper basin. However, the DLA does not mention that passage barriers at Copco 1 and 2 and later Iron Gate Dam blocked passage to the upper basin that encompasses 65% of the total Klamath River Basin area. More than 300 miles of migration, spawning, and rearing habitat for salmon, steelhead, and Pacific lamprey was lost by construction and operation of the California dams of the Klamath Hydroelectric Project. All species of anadromous fish in the Klamath Basin have been on a general decline for much of the past century. While the DLA enumerates the decline of fish runs since the early 1900's, PacifiCorp did not in its relicensing studies evaluate its contribution to this decline caused by blocking native species from historic habitats in reaches in and above the Project.

S5-14

A large part of the Fish Passage Study (1.10) is incomplete and does not include study approaches and methods recommended by ODFW and other stakeholders. ODFW requested PacifiCorp to develop a life cycle fish passage computer model to use as a tool in deciding the relative benefits of improved fish passage at the various dams and to identify where fish survival would need to be improved in order for reintroduction to be successful. While PacifiCorp eventually agreed to undertake some computer modeling, the Ecosystems Diagnostic Treatment (EDT) and Klamath Risk Assessment Simulation (KlamRAS) models have not been completed and are still in the verification phases. These models are intended to compare production of fish as a function of various scenarios such as volitional passage and dam removal. The models should not be used to test "feasibility" of anadromous reintroduction. The Fish Passage Work Group specifically requested deletion of this word, as it is misleading. The models produce index values to analyze when, how much, and how fish passage is implemented and relative fish production under various passage alternatives.

S5-15

PM&E's - PacifiCorp does not propose any PM&E's for fish resources in section E4.6 of the DLA, but includes several very general conceptual proposals and designs for each diversion dam in section 5.3. PacifiCorp does not propose any post-construction evaluation of fish facilities.

PacifiCorp acknowledges the DLA is incomplete, and revisions are expected when the FLA is filed with FERC in February 2004. The FLA needs to clearly identify what, if any, new or modified fish passage facilities PacifiCorp proposes to construct as part of its new license. Additionally, the FLA needs to recognize that post-construction evaluations of new or modified fish passage facilities will need to be part of a new license.

ODFW Recommendations -

ODFW recommends that PacifiCorp propose new or improved fish ladders at all California and Oregon Klamath hydroelectric facilities to provide volitional fish passage for all native resident and anadromous fish species. PacifiCorp needs to consult with ODFW, the federal fish agencies, California Department of Fish and Game and other interested stakeholders to clearly identify Project impacts and potential PM&E's for upstream fish passage at all Project facilities. Assessment of Project impacts and identification of PM&E's is necessary in the FLA to fully disclose effects of the Project on the environment and to provide adequate information for FERC to meet its NEPA, ESA and tribal trust obligations. Properly functioning upstream fish passage

Response to Comment S5-13

PacifiCorp has acknowledged that the construction of Copco and Iron Gate dams eliminated all anadromous fish production upstream of the Project.

Response to Comment S5-14

Comment noted. The Fish Passage Group is continuing to refine the KlamRas and EDT models to address the anadromous fish reintroduction issues.

Response to Comment S5-15

Please see Chapter E 4 of Exhibit E for a detailed discussion on Project impacts to aquatic resources and proposed PM&E measures. PacifiCorp is continuing to work with the Fish Passage Working Group on anadromous fish reintroduction issues.

PacifiCorp is not proposing volitional fish passage at all facilities at this time since current study results do not support such an action given conditions within the basin beyond PacifiCorp's control.

Response to Comment S5-16

Based on the data collected during relicensing, PacifiCorp believes that the current fish ladder at Keno dam meets the objectives ODFW outlines in the comment.

facilities or other alternatives that ensure connectivity of fish populations are needed to mitigate for the impacts of the Project. These impacts continue to prevent restoration of native fish populations. Effective mitigation for these impacts will further ODFW's resource management objectives for native resident and anadromous fish.

The FLA needs to include information on a range of fish passage alternatives, including dam decommissioning and removal, to enable FERC to conduct alternatives analysis required by the NEPA. In the FERC Hydroelectric Project Licensing Handbook (April 2001), FERC indicates that Exhibit E of the FLA should contain enough and sufficient evidence to evaluate impacts and their significance. For example, removal of the lower 3 California hydroelectric dams would immediately provide 35 miles of anadromous fish habitat with no obstructions to fish passage and cool water refugia from Fall, Spring and Jenny creeks. The remaining 3 Oregon dams could be retrofitted to provide more effective passage to over 260 miles of historic habitat.

With respect to PacifiCorp's proposal to use a decision structure analysis for making decisions on PM&E's, ODFW requests that this method be carefully reviewed. This method needs to include enough information to consider a full range of alternatives. For example, a test of the decision structure could be used to analyze how new instream flows in the JC Boyle bypass reach would affect other decisions such as fish passage. ODFW requests opportunity to review and approve methods and data used in this analysis.

ODFW proposes the following specific recommendations for each Project facility. In addition, once new facilities are installed, PacifiCorp will need to conduct post-construction hydraulic and biological evaluation of the fish facilities, and modify facilities based on results and agency approval, to ensure proper performance.

Keno Dam (Exhibit E 4.2.4.2.2 and DTR 5.3.4)

Additional hydraulic and biological review of current fish passage facilities is needed. Species of concern for passage include native trout, suckers, lamprey and anadromous fish. Preliminary reviews to date have shown the following barrier conditions may occur: low attraction rates at the fishway entrance; fishway gradient steeper than sucker fish are known to negotiate; step heights greater than 0.5 ft (ODFW criteria for trout); and lack of orifices in several weirs near the fishway exit, forming a probable barrier for lamprey, which don't jump.

The current ladder configuration has a much steeper slope (1V:10.5H) than the criteria for passage of suckers. Automated weirs 25 through 28 lack adequate orifice passage and fish using the ladder have to jump over these last four weirs to pass into the reservoir. While trapping studies indicated that trout use the ladder, the existing structure does not meet ODFW criteria for passage of trout. Additional hydraulic and biological evaluation is needed to address effectiveness of the ladder for all species including native trout, suckers, lamprey and anadromous fish.

ODFW Recommendations –

ODFW's objective for upstream fish passage at Keno Dam is to provide effective passage for native trout, suckers, lamprey and anadromous fish. To meet this objective, ODFW recommends that PacifiCorp construct and operate a new ladder at Keno Dam, utilizing a design similar to that developed by US Bureau of Reclamation (USBR) for Link River Dam. The FLA needs to describe proposed fish passage measures, including conceptual designs for a new fish ladder, the scientific basis for the design, and a process for review and approval of designs and post-construction evaluations by ODFW and federal fisheries agencies.

Response to Comment S5-17

The results of the 2003 redband radio-tag study indicate that fish are able to successfully find the J.C. Boyle ladder entrance and ascend the ladder structure. None of the tagged fish showed any kind of migration delay, and in fact, moved quickly through the structure. As no problems were observed, PacifiCorp does not believe that additional studies are needed to address this issue.

JC Boyle Dam (Exhibit E 4.2.4.2.3 and DTR 5.3.5)

Improving upstream fish passage is an identified objective of the ODFW's Klamath River Subbasin Fish Management Plan (ODFW 1997) and is a goal of other agencies involved in this Project relicensing. To meet this objective, new, more effective upstream fish passage facilities need to be designed and constructed at JC Boyle Dam. The existing ladder has never functioned effectively to pass resident salmonids or other species. Existing information regarding the performance of the current facilities establishes the biological rationale for replacement of the existing facilities. PacifiCorp proposes no fish passage improvements in section E4.6 of the DLA. The primary basis for analysis of passage improvements appears to be cost (Section 5.0). However, estimated costs for ladder and tailrace barrier facilities appear extraordinarily high without supporting rationale.

Existing Design Problems:

- The design parameters used for the construction of the existing upstream adult fish ladder are outdated and there is no practical or cost-effective means to reconstruct the facilities to meet current standards to allow for more efficient fish passage.
- The JC Boyle Dam has a pool and weir fish ladder with submerged orifices built during the 1957-1958 dam construction. The ladder is 569 feet long and the change in elevation between pool 1 and pool 57 is approximately 67 feet. Criteria at the time included 12-inch drops between pools and a vertical to horizontal slope of 1:8.5. Contemporary criteria for resident trout fishways are 6 to 9 inch drops between pools and minimum of 1:10 slope, and a minimum of 1:22 slope for suckers.
- Flow in the ladder was estimated in September 2001 at 0.6 cfs through the 4-inch orifices and 20 cfs over the 6 foot wide weirs (CH2MHill 2003). With an approximate flow volume of 21 cfs, the turbulence factor for the typical pool is estimated at 6.8 ft-lb/s/ft³, which is 1.7 times the modern recommended value of less than 3.0 ft-lb/s/ft³ for trout. Given the current pool size, and a turbulence factor of 3 for trout, fishway flows transition to turbulent conditions around 14 cfs.
- Attraction flow is limited to about 2% of the 10% annual exceedance flow, whereas 5 to 10% is preferred for modern fishway design. The 10% annual exceedance flow for the flow duration curve is approximately 3400 cfs.
- Existing pool volume is generally too small for proper energy distribution. In general, pools are 6 feet wide by 8 feet long by 6 feet deep. Typical pool volumes for modern well-designed ladders are 8 foot wide by 10 foot long by 6 feet deep, allowing for fish to rest and stage for the next jump in the ladder.
- An automated gate with an auxiliary water supply system provides a total of about 80 cfs for attraction flow at the entrance, which is a discrepancy from the 2003 CH2MHill report. It is uncertain, at the time of this review where the auxiliary water comes in – at the forebay or down the ladder. However, during observations by visiting biologists from ODFW and USFWS, and during the 1988-91 ODFW study, ladder flows have ranged from nonexistent to intense whitewater.
- The existing entrance location to the fishway is difficult for fish to find during spill events and may be obscured by hydraulic problems and water quality differentials. The location of the entrance could be improved by performing hydraulic study and/or site observations and basing the new entrance on the results of the study.
- There are also suspected problems associated with differences in water temperature and other water quality parameters between flow exiting the ladder and flow released below the dam to meet diversion reach minimums. Additionally, high water temperatures in the ladder during certain months may also inhibit upstream fish passage.
- Design and construction of a new facility should include maximum flexibility to respond to future management decisions (e.g. anadromous fish reintroduction). This should include sorting and trap-and-haul facilities, adjustments to spillway and downstream facilities.

Biological Studies and Results:

- A radio telemetry study is currently underway with 3 groups of 14 trout in each group tagged at locations below JC Boyle dam. ODFW has previously informed PacifiCorp that the study designs were not sufficient to evaluate the adequacy of the facility in regard to passing fish. Because of constraints in the study (e.g. sample size of test fish, duration and timing of study) conclusions from these studies will not clearly establish the degree to which adult fish passage is compromised by the lack of adequate fish passage facilities at JC Boyle Dam.
- Trapping in the fish ladder done in 1959 documented and estimated upstream passage of 5,529 redband trout (Hanel and Gerlach 1964). Internal correspondence by Hanel (1959) reported that 83% of the total catch of rainbow trout migrating over JC Boyle occurred in the fall of the year. The estimate did not include January to mid-May when several more thousand fish may have moved through.
- Estimates in 1960 and 1961 were 3,882 and 2,295 fish, respectively.
- Trapping efforts by Beak consultants in 1981 showed a small run of trout in the spring and the 1984 study showed a very small spring migration and a larger one in the fall.
- Beak consultants tagged 453 redband trout over 200 mm in the fall of 1988 downstream of the powerhouse (City of Klamath Falls 1989). ODFW monitored fish passage at the ladder from late 1988 through 1991. None of the tagged fish were observed in the fish ladder, and of those sampled in the ladder, 64% were less than 200 mm long.
- Research done from 1988-91 showed that by 1991 passage of redband trout over the dam had dropped to as low as 2% of the 1959 estimate (Hemmingsen et al. 1992). Numbers of fish were 507, 588, 412, and 70 in 1988, 1989, 1990, and 1991, respectively.
- Fluctuating flow through the fish ladder was frequently reported in the monthly ODFW research reports. Fish passage is compromised by constantly changing flows in the ladder, causing fish to avoid or wash out of the fishway. The September 1989 flow fluctuation caused all fish to wash out of the trap twice. ODFW's monthly report in June 1989 documented wild fluctuations of flow, including one extreme event, when the ladder flow dropped to 0 cfs on one day.
- ODFW research staff also noted numbers of fish captured in the JC Boyle Ladder trap increased sharply in days following periods of spill from the dam.
- The attraction water diffusion pool may not be properly screened, allowing fish to enter and become trapped in this chamber. The April 1988 monthly report noted that electroshocking samples regularly caught trout from 220-316 mm in size.

In addition, temperature changes may affect fish passage at JC Boyle fish ladder, where fish are given a choice between warm water from the reservoir and blended spring and river water. Studies by Bureau of Commercial Fisheries indicated that adult salmonids avoid temperature changes and prefer to remain in river temperature water, prefer cooler water when given no alternative, and took longer to pass through the test facility in water heated or cooled compared to river water (Weaver et al. 1972).

Because passage efficiency at this ladder may be adversely affected not only by inadequate design, but by water quality, temperature or other factors affected by the Project; modifying the ladder without significant design changes may not improve fish passage. In 1998 and 1999, ODFW had several meetings with PacifiCorp Environmental Services to discuss conducting a native trout study, first focused on native trout ecology from Upper Klamath Lake to Copco Reservoir, and secondly focused on passage at Link, Keno and JC Boyle dams. ODFW and PacifiCorp staff objectives spent a considerable amount of time to identify methodology, costs, equipment and labor needs; and study tasks. Unfortunately, both studies were dropped when Scottish Power purchased PacifiCorp. These studies are still necessary to collect information on specific fish passage problems at J.C. Boyle Dam.

In the DLA, PacifiCorp places heavy reliance on the cost for facility comparison and these cost estimates are high. PacifiCorp has not proposed any measures for fish passage at this site (DLA, Section E4.6 Proposed Enhancement Measures for Fish Resources). The brief analysis of upstream fish passage facilities in section 5.3.5.3 relies heavily on cost rather than feasibility, reliability and effectiveness. For example, one of the "Cons" for a "fish ladder to forebay" (Table 5.3-10) is the "high cost". ODFW believes the PacifiCorp consultants significantly overestimated the ladder cost estimate. In the last year, we have reviewed ladder designs at other Projects, and believe that \$9 million for a ladder at JC Boyle is high. ODFW recently reviewed cost estimates for a ladder to pass trout, salmon, and lamprey over a 77 ft. high dam. The assumptions used for the estimate were also independently reviewed, and the final estimate was \$1.0 to \$3.1 million. At another dam that is 100 ft high, costs of a new ladder with multiple entrances are estimated at \$5 million. We recognize that costs may be higher at Boyle due to its remote location, however, we question why this should double the cost.

Without any design details for a tailrace barrier, PacifiCorp evaluates the tailrace barrier entirely based on cost (\$7.92 million). ODFW's recent review of tailrace barriers for diversions of 1,500 to 1,550 (approximately half of J.C. Boyle) resulted in estimates of \$0.9 to \$1.2 million. ODFW cannot analyze the cost estimate any further because a design is not included in the DLA; however, PacifiCorp's cost estimate appears to be extraordinarily high.

ODFW Recommendations

ODFW believes sufficient information presently exists to support the need for a new fish ladder at JC Boyle Dam. Additional study is needed, however, to identify ladder entrance location and other design elements in order to ensure that a new ladder will effectively pass resident fish, including suckers, as well as anadromous salmonids and lamprey if reintroduction is determined feasible. Studies should include the following:

Radio tag sufficient numbers of trout to determine:

- Migration patterns within the J.C. Boyle bypass reach,
- The risk of migration delays due to poor attraction conditions at the spillway, near the ladder entrance, or elsewhere in the bypass reach,
- Effect of water temperature and other water quality parameters on migration,
- Length of time for a fish to pass through the ladder,
- Whether fish hold for long periods in the ladder, or partially ascend the ladder.

Concurrent with monitoring fish movement, PacifiCorp should document Project operation for spill conditions and hydraulic conditions in the fish ladder, including stage/discharge relations upstream and downstream of the dam and fishway, and the location of eddies, standing waves, excessive turbulence, primary current patterns and temperature effects of various flow sources.

The FLA should include proposed measures to provide fish passage, the scientific rationale for the design, and functional design plans with sufficient detail so the agencies can review and provide comment.

Fish ladder design will need to be based on the following objectives:

- Maximize protection and safe and timely passage of all migratory fish species including native trout, suckers, lamprey and anadromous fish through effective design and, if necessary, modification of Project operation.

Response to Comment S5-18

PacifiCorp has included a description of all proposed fish passage facilities in the FLA. We have not submitted an analysis of a full range of possible fish passage alternatives in the FLA as this is not required as part of the standard FERC process. However, we are providing the resources needed for the HMG to evaluate, through modeling, eight different fish passage alternatives. The results of this analysis are expected in mid-2004.

Response to Comment S5-19

A description of proposed fish passage facilities is provided in Section 4.3, Exhibit E of the FLA. In addition, we have attempted to provide a better description of current conditions and Project impacts to fisheries resources in the FLA. The Fish Resources FTR provides a description of the methodology used to evaluate existing and recommended fish passage measures. See response to Comment #18, above.

- Achieve fisheries management objectives (i.e. restore connectivity for migratory fish).
- Maximize productivity from upstream and downstream habitats, and
- Develop a design with ease of operations and maintenance under a variety of hydraulic conditions.

Analysis of the appropriateness of a given design should not be based solely on cost, but should include consideration of the technical/engineering feasibility, reliability, and biological effectiveness of the design in meeting passage objectives. ODFW requests PacifiCorp provide us with the basis for its fishway and tailrace barrier cost estimates.

California Dams (Copco 1 and 2 and Iron Gate Dam) (Exhibit E 4.2.4.1 and DTR 5.3.6, 5.3.7, and 5.3.8)

There are currently no fish passage facilities at any of the 3 California Klamath hydroelectric dams. This lack of fish passage facilities has prevented federal and state agencies from meeting fish and habitat management objectives such as restoration of anadromous fish to historic habitat, reconnecting native resident fish populations, and improving production of native fish populations.

ODFW Recommendations-

ODFW recommends that PacifiCorp include in the FLA proposals to construct and operate fish ladders or other fish passage facilities at all California hydroelectric facilities to provide volitional fish passage of all native resident and anadromous fish species. ODFW recommends that PacifiCorp provide sufficient information in the FLA for FERC to analyze the full range of alternatives to mitigate for ongoing impacts of lack of upstream fish passage to historic habitats and lack of connectivity of resident fish populations. These should include options for dam removal of one, several or all of the facilities. Each individual facility should be evaluated for its relative impact to fish passage, the PM&E's necessary to bring it to full volitional fish passage, and whether decommissioning and removal would be more effective biologically and economically than providing fish passage.

II. Downstream Fish Passage/Fish Entrainment in Power Canals (Executive Summary, Exhibit E 4.0, Fish Resources DTR 5.0, Exhibit E Appendix E1-A p.32-33))

No downstream fish passage facilities to protect fish from entrainment in power canals and potential mortality and injury associated with turbine passage exist at PacifiCorp's diversions at Link, Copco 1 and 2 and Iron Gate dams. Existing fish screens at JC Boyle Dam do not prevent fish entrainment into the power canal and do not meet present-day hydraulic standards for fish protection. The DLA does not adequately describe current conditions, Project impacts, or identify proposed measures to address this major Project impact.

Current conditions - The DLA does not adequately describe current conditions. Primary measures of downstream fish passage including flow patterns, turbine mortality, and entrainment have not been evaluated by PacifiCorp. Only JC Boyle diversion has a screen while none of the remaining facilities in Oregon or California dams have screen or bypass facilities. The JC Boyle fish passage facilities are ineffective and do not meet federal or state passage criteria for trout, anadromous salmonids, or native suckers and lamprey.

The EDT model results for a test run of Spencer Creek, along with full analysis of the upper basin are not complete. Like any model, results of the EDT model need to be placed in the context of the limitations of EDT products. For example, PacifiCorp needs to identify all the input parameters and clearly state model assumptions. PacifiCorp also needs to cite source information. The model needs to be properly validated and calibrated to an existing nearby subbasin of the Klamath River with model results that reflect known populations in other subbasins. The preliminary results of Spencer Creek "test" run need to be shared with the Fish Passage Work Group. PacifiCorp also needs to conduct a sensitivity analysis of model results to identify those parameters that have the greatest effect on model results, and determine how these sensitivities correspond to what is known about the real world.

PacifiCorp did not conduct studies requested by ODFW and other agencies to evaluate surface currents using drogues or current meters at Klamath reservoirs, and to predict their effects on downstream movement of resident and potential anadromous fish. These studies are critically important to evaluate attraction flows, and design and locate bypass facilities proximate to shorelines where many species typically migrate.

Project impacts - The DLA does not adequately describe Project impacts. In comments on the FSCD as well as in subsequent requests to the Fish Passage Work Group, ODFW has requested PacifiCorp to conduct a literature review of existing Project-related downstream fish passage information. This preliminary information is still not available in the DLA. PacifiCorp has been unwilling to conduct entrainment or turbine mortality studies at any of the Project facilities. The Fish Passage Study (1.10) is generally incomplete and no agreement was reached with stakeholders on study scope and methodologies.

Prior to initiating relicensing, PacifiCorp did conduct an entrainment study at the Eastside and Westside diversions from 1997 to 1999 (Gutermuth et al. 2000). Based on entrainment indices calculated from number of fish collected, percent of canal flow sampled and sampling efficiency, an estimated 792,000 fish passed through the Eastside powerhouse from July 1997 to October 1999. Similarly, an estimated 528,000 fish passed through the Westside powerhouse. The study concluded that large amounts of fish were diverted, generally proportional to the volume of the flow diverted. The study indicated that large amounts of juvenile and adult suckers were captured moving downstream, through the spring, and especially during late summer and early fall. Overall, Westside catch rates were very high often following re-opening of the canal after a period of closure. Within the late summer period of high sucker entrainment, sucker and all fish entrained increased with canal flows. Some redband trout were also entrained during the study although they were a small percentage of the catch. ODFW staff has noted the Oregon Natural Resources Council (ONRC) recent notice of intent to sue PacifiCorp due to the lack of screening at Eastside and Westside canal diversions.

The EDT and KlamRAS models have not been completed and are still in the verification phases. These models are intended to compare relative fish survival and productivity rates as a function of various passage scenarios such as volitional passage, dam removal, etc. The models should not be used to test "feasibility" of anadromous reintroduction. The Fish Passage Work Group specifically requested deletion of this word as it is misleading. The models produce index values to analyze when, how much, and how fish passage is implemented and relative fish production under various passage alternatives.

PacifiCorp states in the DLA that it has no plans to conduct entrainment studies and that its approach instead will be to conduct a "literature review and apply results from other studies and apply to fish assessment study." (Exhibit E 4-98) However, the fish assessment study has many technical problems, which include sample size, repeatability, frequency and seasonality of sampling that application of the fish assessment to entrainment will produce questionable results. Mr. Toby Freeman, PacifiCorp, has also stated in meetings that PacifiCorp will not conduct any entrainment studies because costs for studies

Response to Comment S5-20

PacifiCorp will work collaboratively with ODFW to develop methods to evaluate any new, proposed, fish passage facility to be constructed in Oregon waters. See responses to your earlier comments.

are too expensive. However, California Department of Fish and Game (CDF&G) has pursued cost estimates for the use of hydroacoustics to estimate entrainment by a reputable consultant, Biosonics. Although this approach precludes species identification for each fish entrained, it does provide initial estimates of the numbers of all species that are entrained and can also provide relative percentages of fish entrained versus those in the reservoir or passing through another route. The estimates were \$100,000 for 6 months at any one facility, thus indicating that entrainment could be determined at reasonable relicensing costs.

PM&E's – PacifiCorp proposes no PM&E's for downstream fish passage in the DLA. While the DLA describes an array of fish passage scenarios from a conceptual engineering perspective with relative costs, there is no commitment by PacifiCorp to initiate downstream fish passage protection at any of its facilities. No information is provided to the stakeholders or FERC to assess the full range of alternatives, including dam decommissioning and removal.

ODFW has authority under state law to protect downstream migrating fish at water diversions. ORS 498.311 and 509.615. These statutes require installation, operation, and maintenance of a fish screen on any diversion of water in Oregon by the Project diverter, in this case, PacifiCorp. In our comments to the FSCD, ODFW provided to PacifiCorp hydraulic design criteria for fish screens at hydroelectric Projects with specific guidance and criteria on implementing screening facilities that best protect fish species in Oregon. There are additional criteria to reflect the unique needs for sucker juveniles. New facilities will need to be constructed at all PacifiCorp's diversions in the Klamath Hydroelectric Project to meet the needs of lamprey and suckers in the basin as well as salmonids.

ODFW Recommendations

ODFW recommends that PacifiCorp propose in the FLA to install and operate new fish screens and bypass facilities at all of its California and Oregon Klamath Project diversions to provide effective downstream fish passage for all native resident and anadromous fish species. PacifiCorp needs to consult with ODFW, the federal fish agencies, CDFG and other interested stakeholders to clearly identify Project impacts and potential PM&E's for downstream fish passage at all Project facilities.

The FLA needs to include information for FERC on the full range of alternatives to mitigate for ongoing impacts of non-existent and ineffective fish passage at each facility, including dam removal of one or more of the facilities. Each facility should be evaluated for its relative impact on fish passage, the PM&E's necessary to provide effective downstream fish passage, and the biological benefits of decommissioning and removal.

Effective mitigation for these impacts will further ODFW's resource management objectives for native resident and anadromous fish.

Implementation of new facilities will require biological and hydraulic evaluations of screens to test their effectiveness for bypassing juveniles. Techniques include the use of nets and traps for trapping fish and radio tags for tracking fish movement. Hydraulic studies must include evaluation of approach and sweep velocities, screen material, size openings and porosity, flow "hot spots", seals or leakage, seasonal operation at various flows, type of screen, cleaning methods and frequency, etc.

ODFW proposes the following specific recommendations for each Project facility along with site-specific post-construction hydraulic and biological evaluation of the fish facilities, and modification if necessary based on results and agency approval, to ensure proper performance.

Link River Dam (Exhibit E 4.2.4.2.1 and East Side (DTR 5.3.2) and West Side (DTR 5.3.3))

Typical diversion flows for the East Side and West Side are 1,200 cfs and 250 cfs respectively (Fishpro 2000). Neither of these diversions is screened to prevent entrainment of fish into the power canals. ODFW believes screens are needed at these locations to protect lamprey, suckers, and resident trout (DLA, Table 5.3-20). The "high speed" screens proposed in the DLA will not provide protection for ammocetes, larvae, and fry of these species. The conceptual design of the "high speed" screen appears to be simply a "shortened" conventional screen with inadequate screen area to achieve criteria approach velocity. Typically, experimental screens are approved for locations where construction of a conventional screen is infeasible or fry sized fish are not present. The conceptual designs indicate that construction of a conventional screen is feasible at both locations. Fish protection at PacifiCorp's diversions should provide at least the same level of protection as facilities recently constructed on other diversions within the basin, such as the A-Canal, 1,900 feet upstream from Link River Dam.

ODFW Recommendations-

ODFW recommends PacifiCorp consult further with ODFW and the federal fish agencies to develop functional designs for screens that will meet agency objectives for fish protection. The FLA should include proposed measures to protect fish from entrainment, the scientific rationale for the design, and functional design plans with sufficient detail so the agencies can review and provide comment.

Keno Dam (Exhibit E 4.2.4.2.2 and DTR 5.3.4)

Lack of downstream passage facilities at this dam may cause fish injury and mortality at low flow conditions. Keno Dam does not divert water to a power canal and passes stream flow through spill gates or the fish ladder, auxiliary water supply, and sluice conduit. Fish moving downstream must pass through one of these routes. Fish passing under the spill gates during low flow conditions (narrow spill gate opening) could be subject to mechanical or hydraulic-caused injury and mortality. If PacifiCorp intends to propose using the spill gates as the downstream passage facility, then it needs to ensure this provides a safe and effective route.

ODFW Recommendations-

ODFW requests that PacifiCorp conduct a biological evaluation to determine whether fish are harmed by passing through the small gate openings. PacifiCorp should use results of this evaluation to determine whether spillway modification is necessary. The evaluation could be conducted by radio-tagging groups of fish released upstream of the dam, setting up receiver antennas in the spill gate openings, and monitoring passage. Mortality can be assessed by continued tracking. Injury can be assessed by trapping a sample of fish as they exit through the spill gates, and examining for physical injury.

JC Boyle Dam (Exhibit E 4.2.4.2.3 and DTR 5.3.5)

ODFW believes new, more effective fish screens and bypass facilities need to be designed and constructed at JC Boyle Dam. The existing fish screens at the J.C. Boyle diversion do not meet ODFW hydraulic design criteria for fish protection because mesh size and approach velocity is exceeded. Existing information regarding the performance of the current facilities establishes the biological rationale for replacement of these facilities. The screens have not been effective at preventing entrainment into the

Response to Comment S5-21

PacifiCorp has chosen to decommission its East Side and West Side developments. Decommissioning plans are outlined in the FLA.

Response to Comment S5-22

PacifiCorp has chosen to remove the Keno dam from the hydroelectric Project boundary. Please see Exhibits A and B for explanation. The company's responsibilities for Keno are under review.

Response to Comment S5-23

As part of its proposed PM&E measures for fish resources, PacifiCorp plans to install a gulper system to address juvenile downstream passage issues. See Section E4.7 of Exhibit E for proposed PM&E measures to address fish passage improvement at the J.C. Boyle development.

power canal and fish impingement on the screens causes injury and mortality. The surface collector is not an acceptable fish passage facility.

Existing Design Problems:

- The design parameters used for the construction of the existing downstream juvenile screens and bypass facilities are outdated and there is no practical or cost-effective means to modify the facilities to meet current standards to allow for more efficient fish passage. Improving downstream fish passage with installation of screening facilities is an identified objective of the ODFW's Klamath River Subbasin Fish Management Plan (ODFW 1997) and is a goal of other agencies involved in the FERC relicensing.
- Presently, each of the four entrances at the intake structure is equipped with Rex vertical travelling screens to prevent entrainment of fish into the power canal (CH2MHill 2003). The existing screens are 11'2" wide and 29'6" high at a low forebay of 3,788 ft. This screen height assumes 6 inches at the bottom of the screen is ineffective due to the normal seal arrangement. The gross approach area for each of the four screens is 329.4 square feet for a total gross area of 1,318 square feet. The resulting approach velocity with an intake flow is 2.3 feet per second (fps), which is almost six times ODFW's current standard of 0.4 fps. The existing screen bypass system does not meet modern design standards. The flow rate for the existing bypass is estimated at 20 cfs.
- High pressure spray systems are intended to keep the screens free of debris buildup. Fish screen housings were modified in 1988 to allow year-round operations. Prior to that time, screens were removed during the winter period to avoid ice buildup. Metal screens were replaced in 1992 with 1/8-inch mesh, but debris occasionally damages the screens requiring time-consuming repair with no backup screens in place during repair.

Biological Studies and Results:

- Beak Consultants placed a fyke net in the fish ladder and fished once a week for a 24 hour period from April to mid-June and August through mid-October (City of Klamath Falls 1986). They estimated a downstream movement of 128, 246 juveniles.
- Researchers monitored downstream movement below JC Boyle Dam at the bypass outflow and in the river to measure possible recruitment from Spencer Creek but low capture numbers prevented adequate estimates of downstream migrating juveniles (Hemmingsen et al. 1992). While trap efficiency was unknown, researchers felt that low numbers of fish captures likely reflected juvenile recruitment and is therefore likely inadequate to seed the population in the river between JC Boyle Dam and the state line. However, based on informal assessment of angler catches, the trout populations appear to be sustaining a fishery with extremely conservative regulations of one trout per day, flies and lures only (ODFW 1997).
- ODFW described in its monthly reports fish salvages in the JC Boyle power canal of 133, 12 and 68 trout in July 1988, 1990 and 1991, respectively, when the Project was shut down for annual maintenance. Fish ranged in size from 50-300mm. This was reported as "alarming as only a small percentage of the total volume of water in the canal was sampled, and that fish screens had been operating at JC Boyle since the last shutdown. The finding of fish in the canal seems to indicate the effectiveness of the Boyle dam fish screening devices are limited at best". The July 1989 salvage report was missing. In addition, there were thousands of nongame fish that were not sampled or enumerated, undoubtedly including listed suckers (Rod French, ODFW biologist personal communication).
- The May 1988 monthly report also reported sampling the attraction flow diffuser chamber at Boyle Dam with a backpack electroshocker, and 7 redband trout ranged in size from 142-337 mm.
- The ODFW downstream trap captured a total of 37,483 juvenile redband trout in Spencer Creek from October-November 1990, March through September 1991, October and November 1991 and March

Response to Comment S5-24

Comment noted. PacifiCorp has proposed new measures in Section E4.7 of Exhibit E that are designed to address these concerns.

Response to Comment S5-25

Comment noted. However, surface collectors, including gulpers, are being utilized throughout the Columbia River with great success. In regards to gulpers, data collected on the Baker River (Washington State) show that their simple facility collects up to 70 percent of migrating anadromous juveniles. Improvements to this facility over time have increased adult returns to the Baker River dramatically over the last 20-years. This system is so successful that WDFW, NOAA and USFWS have all recommended that the gulper continue as the preferred juvenile fish passage system in the new license for the Baker River project.

Response to Comment S5-26

Please see Section E4.7 of Exhibit E for an updated discussion of proposed fish passage improvements at J.C. Boyle development. PacifiCorp recognizes that continued coordination with the resource agencies will be required to design, construct, and monitor these facilities proposed in the License Application. Please see response to Comment #17 regarding new studies.

through May 1992. These numbers were not adjusted for trapping effort but show patterns of downstream timing and relative abundance. However, the downstream screw trap in the Klamath River immediately below JC Boyle fish bypass captured only 152 juveniles from April through December 1991, and late February through May 1992.

- PacifiCorp has documented all suckers and trout salvaged during Project shutdown and maintenance operations since 1995. Since 1995, a total of 785 suckers and 919 redband trout have been salvaged during maintenance activities. Of the 785 suckers, 228 were federally listed species, of which shortnose and Lost River suckers comprised 24% and 5%, respectively. Of the 785 suckers, 533 were unidentified due to a small size of less than 6 inches which makes species identification impossible.
- Fish entrainment and mortality at hydroelectric Projects is site-specific and varies with amount of water diverted, fish species, seasonal and diurnal variability, and physical and flow features of the site. The only facility with a site-specific two-year entrainment study at the Klamath Hydro Project is the Eastside and Westside power canal diversions at Link River Dam. The results indicated that entrainment was proportional to flow and catch rates were often very high following re-opening of the canal after a period of closure.

The "high speed" screen proposed in the DLA will not provide adequate fish protection. The conceptual design of the "high speed" screen appears to be simply a "shortened" conventional screen with inadequate screen area to achieve criteria approach velocity. Typically, experimental screens are approved for use in locations where construction of a conventional screen is infeasible or fry-sized fish are not present. The conceptual designs indicate that construction of a conventional screen is feasible at this location.

One of the "Cons" of a conventional screen listed in Table 5.3-9 is that it must be very large. The size of the screen reflects the fact that the Project diverts a very large amount of water for power production (3,000 cfs). It would seem that PacifiCorp would consider diverting a large amount of water for power production to be a "pro" rather than a "con."

Surface Collector

ODFW does not consider the surface collector to be an acceptable fish passage facility. ODFW has not supported its use at other hydropower Projects. There are several problems associated with this downstream passage facility that compromises fish passage, such as, difficulty in sealing sides and bottom, and lack of fish protection during maintenance. The facility does not meet criteria necessary to protect downstream migrants.

ODFW Recommendations-

PacifiCorp needs to design and construct a screen and bypass downstream passage facility based on ODFW and federal fish agencies' criteria and with agency consultation. There may be environmental and/or operational factors that complicate fish passage at this site such as surface currents in the reservoir and daily drawdown operations for peaking. Knowledge about all of the factors that affect downstream fish passage will ensure adequate design, placement and operation. Post-construction biological and hydraulic monitoring and evaluation studies will be necessary to evaluate performance of the screen and bypass system and ensure safe passage of fish. New screens will need to include a trap in the screen bypass and PacifiCorp will need to fund studies that evaluate the efficiency of the bypass at passing fish, the potential for injury, and potential for predation at the bypass outflow.

Response to Comment S5-27

The FLA does not propose any fish passage improvements at California developments with the exception of Fall Creek where a fish ladder and screen are proposed. Anadromous fish reintroduction is currently being reviewed by the Aquatics Work Group. PacifiCorp has outlined a plan of study in the FLA (Section E4.3).

To provide sufficient information to ensure screen and fish collection facilities perform as intended, PacifiCorp needs to conduct pre-construction biological monitoring studies. These studies may include the following:

Radio-tag sufficient numbers of juvenile rainbow trout to determine

- Migration patterns within the JC Boyle reservoir,
- Effects of water temperature and surface currents and other water quality and flow patterns, and
- Length of time for fish to pass through screen and bypass facilities.

Concurrent with monitoring fish movement, PacifiCorp should document Project operations for spill and/or hydraulic conditions in the reservoir and downstream fish passage facilities. The FLA should include proposed measures to provide effective downstream fish passage past the Project, the scientific rationale for the design, and functional design plans with sufficient detail for the agencies to review and provide comment.

Fish screen and bypass facilities design will need to be based on the following objectives:

- Maximize protection and safe and timely passage of all downstream migrating fish including native trout, suckers, lamprey and anadromous salmonids through effective design and, if necessary, modification of Project features or operations.
- Achieve fish management objectives, including restoring connectivity of migratory fish.
- Maximize production from upstream and downstream habitats, and
- Develop a design with ease of maintenance and operations under a variety of flow and hydraulic conditions.

California Dams (Copco 1 and 2 and Iron Gate Dam) (Exhibit E 4.2.4.1 and DTR 5.3.6, 5.3.7, and 5.3.8)

There are currently no downstream fish passage facilities at any of the three California Klamath hydroelectric dams. This lack of fish passage facilities has prevented ODFW and federal fish agencies from meeting fish and habitat management objectives such as preventing restoration of anadromous fish in historic habitat, entrainment and mortality of native riverine and reservoir fish populations, and highly constrained recreational fisheries to protect native fish populations.

ODFW Recommendations-

ODFW recommends that PacifiCorp include in the FLA proposals to construct and operate fish screen and bypass facilities at all Project intakes in California to provide volitional fish passage of all native resident and anadromous fish species. ODFW recommends that PacifiCorp provide sufficient information in the FLA for FERC to analyze the full range of alternatives to mitigate for ongoing impacts of entrainment, injury and mortality associated with passage through power canals and turbines. These should include options for dam removal of one, several or all of the facilities. Each individual facility should be evaluated for its relative impact to fish passage, the PM&E's necessary to bring it to full volitional downstream fish passage, and whether decommissioning and removal would be more effective biologically and economically than providing fish passage.

III. Project Operations and Hydrology, and Sediment and Geomorphology in the Klamath Basin

A. Project Operations and Hydrology (Exhibit E 3.0, Draft Water Resources DTR 5.0, Draft Executive Summary 3.0, Draft Exhibit B Chapter 3.0, and Consultation Record).

PacifiCorp has not adequately assessed the altered instream flows and high, frequent ramping fluctuations that reduce a stream's carrying capacity for fish by falling below levels needed to support fish life history requirements. The DLA does not adequately describe current conditions and Project impacts, nor does it propose PM&E's to mitigate for ongoing impacts.

Current conditions – The DLA has a thorough analysis in the Draft Exhibit B and Water Resources DTR explaining the impact of other water users and managers in the basin and its contractual obligations with USBR. However, it does not describe or analyze the impacts caused by the hydro Project, such as water storage and peaking aspects in different reaches of the Klamath River that have been altered by impoundment of flow regulation. Most of the long-term impacts associated with altered daily and seasonal flows are attributed to USBR operations and the short-term impacts caused by Project facilities are largely a discussion of facilities, minimum flow releases, ramp rates, and lake level operations.

The Draft Executive Summary for the Project Operations and Hydrology study (p. 3-7) states that the study "has provided a detailed explanation and understanding of flow regulation into, within, and downstream of the Project area." It also states that the study "will assess the potential effects of PacifiCorp's operations and activities on the hydrologic regime, including the magnitude, duration, and timing of monthly discharges, annual high flows, and daily and hourly fluctuations in river flows and reservoir water levels" (p. 3-7). However, ODFW was unable to find any detailed information in the DLA on specific effects of the Project on basin hydrology. ODFW requested in comments on the FSCD that PacifiCorp calculate the magnitude, duration and timing of flow fluctuations associated with Project peaking, but this information is not presented in any of the DLA reports.

ODFW is also concerned that the DLA does not present a thorough analysis of "within-Project" effects. Only boundary conditions of inflow at Upper Klamath Lake (UKL) and outflow at Iron Gate Dam (IGD) are assessed. There is no assessment of Project impacts within the Project area and no proposed PM&E's. ODFW has identified this analysis of "within Project" effects as a fundamental study that is important for understanding the results of many other studies such as fish resource assessments, recreation, and water quality. Incomplete information from this study affects the analyses and conclusions reached in these other resource studies.

The Draft Consultation Record (DCR) does not correctly describe the disagreements between PacifiCorp and many stakeholders regarding necessary hydrology studies. In one instance, the DCR reports that an Indicators of Hydrologic Alteration (IHA) evaluation was requested but deferred "until determined necessary based on results of other hydrologic analyses" (p.1-5). Based on ODFW staff participation in multiple work groups and our review of the record, ODFW believes a more accurate representation would be that despite multiple requests from ODFW and other stakeholders, PacifiCorp was unwilling to conduct the IHA study. From the information presented in the DLA, ODFW believes PacifiCorp must still conduct an IHA for an adequate understanding of hydrologic alteration in the basin by the Project. In another instance, the DCR reports that the Water Quality Work Group deferred to the Aquatics Work Group regarding a study to locate and quantify accretion or spring flows as habitat and refuge areas for fish and other aquatic biota. Again, ODFW staff recalls the chain of events differently, in that both work groups requested the study, yet PacifiCorp declined to conduct it. Another disagreement not included in the DCR is that PacifiCorp was unwilling to conduct a study requested by ODFW to analyze the

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ODFW Comments on Klamath DLA

Response to Comment S5-28

PacifiCorp is continuing to work with the Instream Flow subgroup on PHABSIM analysis above Iron Gate dam. Please see the Fish Resources FTR and Section 4E of Exhibit E for a full analysis of the ramping and instream flow studies that PacifiCorp conducted and its proposed PM&E measures.

Response to Comment S5-29(B)

PacifiCorp presents an instream flow analysis for Proposed Project reaches. Based on this analysis PacifiCorp has proposed minimum flows for a future license. These proposed flows account for power and non-power resources.

Response to Comment S5-29

Substantial information has been added to the analysis of hydrology in the FLA (Exhibit E, chapter E3) and section 5 of Water Resources FTR to describe flow conditions and effects by Project development and/or reach.

Response to Comment S5-30

The Exhibit E Consultation Report has been amended to address ODFW's comments.

SS-30

magnitude, duration and frequency of flow changes in the Link, Keno, and JC Boyle peaking reaches to understand impacts on aquatic resources.

SS-30(B)

The bulk of Draft Exhibit B discusses the boundary conditions of flow into the Project at Upper Klamath Lake and out of the Project at Iron Gate Dam. However, it does not assess the impact of flow regulation by the hydro Project and does not describe how each facility reduces or alters natural flow in each reach. For example, Draft Exhibit B (p.2-7) states that PacifiCorp's reservoirs only store "8.2% of the mean annual flow" and only "actively" store about 0.8% of the mean annual flow. This mischaracterizes the impact that Link River diversions, Keno Dam and JC Boyle Dam have on instream flow below each of the dams. Similarly, the Water Resources DTR, chapter 5 focuses the discussion of impacts to hydrology by USBR using boundary conditions from the USBR flow model, KPOPSIM.

PacifiCorp concludes, based on 1985-97 water year simulations, that monthly flows are higher with Klamath Irrigation Project operations than the "no Projects" river flows by an average of 25-35% in July and August and as much as 100% in July in dry years (Water Resources DTR 5-29). This is in contradiction to the Balance Hydrologics (1966) and Ayres Associates (1999) reports that both concurred that shifts in seasonal averages of flows had occurred along with higher winter flows and low summer flows (Water Resources DTR 5-18). It is also in contradiction to the results and discussion of Water Resources DTR 5.7.1 (p. 5-9) that concludes "upper Klamath Basin operations and diversions have generally resulted in an increase in winter flows, and a decrease in late-spring and early-summer flows in the river just downstream of Iron Gate dam."

SS-30(C)

The term "natural flows" as used in the DLA is confusing in how it was developed or defined. There is no documentation on channel geometry. One of the study objectives of the hydrology study (Study Plan 1.4) is to provide information for other studies including fisheries, recreation, and water quality, but it is not clear how this information is transferred and used with other resource areas. ODFW requested PacifiCorp to conduct a "without Project" hydrologic scenario to compare to current operations. However, PacifiCorp's analysis mischaracterizes this "without Project" scenario by including peaking in the mainstem Klamath River. As a result, the "without Project" scenario does not represent "natural flows" but shows major peaking on a 3 day time step as a result of the USBR Project.

In the absence of adequate information and conflicting conclusions with other studies, ODFW will use other hydrologic information such as USGS gauge records and instream flow studies to make recommendations that best protect fish and wildlife habitat.

SS-30(D)

The descriptions of purpose and management of Keno dam and reservoir are confusing and conflicting. It is described as a "run-of-the-river" facility (Draft Executive Summary (DES) p.3-3), with a "modest effect on the general shape and trend of the hydrograph". Then, it is later described as a diversion and re-regulating facility...that helps buffer flows downstream of Keno Dam from inflow and outflow changes originating from USBR's Project" (Draft Exhibit B 1-2). Then, Keno Reservoir is described as a reservoir to maintain lake elevations at minimal drawdown to maintain irrigation pumps (Draft Exhibit B 6-3). Finally, the Keno Reach is further characterized in the Fish Resources DTR (3-16) as flows that mimic instream flow patterns downstream of Iron Gate Dam. However, Figure 2.2-3 on page 2-15 of the Fish Resources DTR demonstrates that Keno Dam is more of an oscillating than a reregulating facility and typical flows in one month's time can vary dramatically.

Similarly, the DLA has conflicting descriptions of how JC Boyle Dam affects streamflows. In one case, it is described as "generally scheduled and operated in a peaking mode when river flows are less than about 3,000 cfs" and "...throughout the years outside the spring months when flows are highest" (Draft Executive Summary p.3-4). However, 3 pages earlier (DES p.3-1), JC Boyle and the 2 Copco facilities

Response to Comment S5-30(D)

The Keno reservoir is managed for certain water elevations to allow water diversion to USBR's Irrigation Project and other local irrigators. Because the reservoir elevation fluctuates only a minimal amount, the downstream reach responds to larger inflow changes and therefore fluctuates accordingly. Peaking at J.C. Boyle is based on available inflow and not time of year.

Response to Comment S5-30(C)

Natural flows were identified as "without hydroelectric Project." Limitations of the analysis were in place to recognize non-hydroproject impacts.

Response to Comment S5-30(B)

Exhibit B is intended to describe Project operations and power production. USBR flow regulations affect Project operations. The actual impacts of USBR's UKL operations vary greatly by water year type. The Project's effects on instream flow are appropriately described in Exhibit E, not Exhibit B.

Response to Comment S5-31

Substantial information has been added to the analysis of hydrology in the FLA (Exhibit E, chapter E3) and section 5 of Water Resources FTR to describe flow effects by Project development and/or reach. Flow-related measures are described in sections E3.8 and E4.8 of Exhibit E. It should be noted that the analysis of instream flow is still on-going with stakeholders as described in the FLA, and revisions to instream flow measures as proposed in the FLA may be revised upon completion of this analysis.

PacifiCorp concludes that an additional analysis using the IHA method is not needed to support this FLA. The analysis of hydrology in the FTR includes information on monthly discharge conditions, duration of flows, peak (flood) flows, low flows, and rate and frequency of flow changes - categories similar to those assessed using the IHA method. In addition, ODFW has never specifically described how the requested IHA analysis would be used. PacifiCorp has learned that IHA is mostly intended as a tool to compare existing conditions to pre-Project (or unimpaired) "baseline" flow conditions. Treating pre-Project (or unimpaired) flow conditions as "baseline" conditions in a FERC license application is not appropriate since FERC considers "baseline" to be the existing Project-related environment.

S5-30(D)

are described as run of river for late winter and spring, with peaking maximized at JC Boyle in summer and fall.

S5-31

Project Impacts – Description of impacts on streamflows caused by operation of the Project are largely absent in the DLA or in some cases, misrepresented. For example, the descriptions of how Keno Dam and Reservoir are managed are conflicting and imply that the Keno Reach is moderated in flow fluctuations by Keno Dam. The reverse is true since the Keno Reach fluctuates severely while the Keno Reservoir pool is held relatively constant.

The DLA interpretation inappropriately states that without the Project, the river would be ramped dramatically due to the USBR Project. However, in the absence of any hydroelectric project, USBR facilities would be required to meet U.S. Biological Opinion ramp rates.

The DLA draws inappropriate conclusions such as in "an average water year, USBR can provide enough water for all obligations with no restrictions to timing and quantity" (Water Resources DTR p. 5-16)." This is based on the general quantification of water allocation for irrigation storage, flood protection, ESA needs, and tribal trusts. The DLA further concludes that water not allocated to these needs is released to the Klamath River (900,000 acre feet) while the USBR Project uses a fraction of the mean annual flow 350,000-400,000 acre feet. However, with the highly publicized conflicts over water in the past decades, the listing of two species of suckers in and above the Project and one species of salmon below the hydro Project, and tribal water claims, simple averaging of water use over the entire year does not give an accurate picture of water use in the Klamath Basin.

The DLA does not assess long term impacts of the hydro Project on hydrology and watershed function. Riparian and wetland areas are known for their natural ecological functions of storing water during high flows and release of water during low flows, thereby moderating extreme flows in river systems. With construction of Keno, JC Boyle, Copco 1 and Iron Gate dam, much of the mainstem riparian riverine and nearby wetland system along the mainstem river was inundated. In addition, peaking flows in the JC Boyle have coarsened the bedload and much of what was once the riparian along the mainstem has become a varial zone of alternately wetted and dried river bed with little riparian function left.

The DLA only examines boundary conditions for long-term effect with inflows at Upper Klamath Lake and output at Iron Gate Dam. Despite obvious extreme flow fluctuations that are graphically evident at USGS website gauging stations, which could have been synthesized from USGS gauging records over the past 3 years since the NOI was released, PacifiCorp states that it will summarize short term impacts in the FLA.

The USBR has management control over Upper Klamath Lake and Iron Gate Dam flow releases via a Biological Opinion for endangered suckers and coho, respectively. However, the *operational flexibility* that PacifiCorp has for managing the 6-mainstem dams, with respect to the USBR's mandates for meeting the Biological Opinions, is unclear to stakeholders. The DLA explains its loss of operational flexibility from the six dams in the Water Resources DTR (P. 5-16). However, it does not summarize how instream flows and power generation have specifically changed since the 1992 Biological Opinion to protect endangered suckers. The FLA needs summary tables that document changes in flows through the Project pre- and post-Biological Opinion to demonstrate the purported lost operational flexibility.

The study also needs to evaluate the hydrology of the basin if the Project were not in place. The analysis should display a wide range of scenarios of how the Project could be managed, with flows at each facility that would mimic a more natural historic regime, recognizing that other habitat alterations have occurred in the basin.

Response to Comment S5-32

Additional geomorphological studies were conducted in the interim between the publication of the DLA and FLA. Please see the Water Resources FTR and Section E3 of Exhibit E for data updates, an analysis of Project effect, and proposed PM&E measures.

PM&E's – The DLA does not propose any PM&E's on water use and managing the hydrograph to avoid or minimize short or long term Project impacts. The DLA assumes that water management will be tied to the Biological Opinions in perpetuity. However, over the 30-year license period, demand for water and flow management may change. Thus PM&E's need to be developed to address Project specific impacts and provide Project specific mitigation.

ODFW Recommendations –

PacifiCorp needs to consult with ODFW, federal fish and wildlife and land management agencies, tribes, and other interested stakeholders to clearly state Project impacts and potential PM&E's for alteration of hydrologic function by Project facilities. The FLA needs to fully disclose effects of the Project on the environment, contain adequate information for FERC to meet its NEPA, ESA and tribal trust obligations, and propose PM&E's that will fully mitigate for Project impacts. ODFW will recommend water management PM&E's to minimize short-term hydrologic impacts at all California and Oregon Klamath hydroelectric facilities to improve habitat and instream flow conditions for all native resident and anadromous fish species. ODFW also recommends that PacifiCorp provide sufficient information in the FLA for FERC to analyze the full range of alternatives to mitigate for ongoing impacts of alteration of basin hydrology by each facility. Similar to fish passage options, these should include options for dam removal of one, several or all of the facilities. Each individual facility should be evaluated for its relative impact to short-term and long-term hydrology and the PM&E's necessary to restore and protect fish and wildlife habitat. PacifiCorp should parse out its own Project effects from other basin impacts such as the USBR irrigation Project.

In the FLA, PacifiCorp should effectively assess and demonstrate Project short-term effects in the peaking and bypass reaches with USGS graphical flow gage data. PacifiCorp should display the hourly data of flow change below JC Boyle and Keno dams that demonstrate visual representation of short-term Project effects. ODFW recommends that PacifiCorp proceed with an IHA analysis. ODFW has requested this study in previous meetings and comment letters. The Water Resources DTR (p. 5-7) states that an IHA analysis was “deferred until determined necessary based on results of other hydrologic analyses”. ODFW believes that it is time for PacifiCorp to conduct this analysis and not delay a study that is necessary to understand Project impacts on hydrology.

Spring, summer and fall months are especially critical times for juvenile fish survival and out migration, and for water flow and quality problems that affect fish life including temperature, DO and pH. Developing and analyzing alternatives will help facilitate a range of scenarios with more flexible release schedules that would simulate a more natural flow regime and improve habitat for fish.

B. Sediment and Geomorphology (Draft Executive Summary p. 3-8, Water Resources DTR 6.0)

The DLA does not describe current conditions, Project impacts or propose PM&E's for sediment and geomorphology in Project-affected reaches.

Current conditions – The DLA does not describe current conditions, Project impacts, or provide any PM&E's because many of the other studies are still in progress. Some of the descriptions of current conditions and data and results are preliminary. There are some preliminary results presented in the DLA on current conditions and some comparisons with historical photos and USGS topographic maps. Some studies have preliminary results and analysis including channel typing and pebble counts but there are no conclusions on Project impacts. However, there are big data gaps on the sediment budget and delta

accumulation of sediment. Preliminary results indicate that the channel bed has coarsened with removal of small particles due to entrapment and peaking effects of the Project.

Most studies are ongoing and have not completed analysis of Project facilities and operations on sediment transport and river geomorphology. With the presence of Project dams, the channel is out of synchronization of sediment and seasonal flows. The native species in the Klamath River evolved under the seasonal variability of an unregulated river, with a freely moving bedload.

Two objectives of the study are to assess how Project facilities and operations affect fluvial geomorphic processes and identification of PM&E's to meet resource management goals for Project effects on sediment transport and river geomorphology (Water Resources DTR p. 6-1). The study includes a reservoir sedimentation analysis, classification of reservoir sediments, geomorphic delineation of reaches, review of previous studies, and review of historical aerial photos. In representative study reaches field observations and measurements were made of channel profiles, bed material, floodplain and terrace features, riparian vegetation, and large woody debris, and pebble counts. Other aspects of the study were channel classification, bedload and suspended sediment sampling, measurements of sediment pathways, tributary delta surveys, and bathymetric surveys, a tracer gravel study, and estimation of bedload mobility, and a sediment budget. Some preliminary results are presented in some aspects of the study on current conditions. Many of the studies are ongoing and expected to be completed in 2003. There is some discussion of potential Project impacts based on literature reviews that indicate that the Project could cause coarsening of the substrate and alter the shape of the hydrograph, resulting in changes in the extent of riparian vegetation establishment (Water Resources DTR p. 6-24).

There are also preliminary results for discharge estimates to mobilize bedload and the FLA proposes to include "unimpaired" thresholds of mobility at each transect in the final report (Water Resources DTR p. 6-71). Similarly, the bedload transport rate analysis has preliminary rates for 5 cross sections (p. 6-72) and proposes to present a discussion on potential impacts of Project facilities on bedload transport rates and significant geomorphic consequences for different Project reaches.

Preliminary analysis of historical photos revealed "local changes to channel features in the JC Boyle bypass and full flow [peaking] reaches, the Copco 2 bypass reach, and in reaches downstream of Iron Gate dam" (Water Resources DTR P. 6-50). However, the study also indicates that with the resolution used in the analysis, that more detailed mapping of patterns of changed may be required to test specific effects of Project operations such as the peaking that occurs in the reach. Thus, the objective of identifying Project impacts has not been met due to the resolution used in the analysis.

Project impacts – The Project impacts discussion in the DLA is very general with a brief discussion of sediment trapping and sediment movement in bypass reaches. Below Project dams, with lack of sediment from flushing flows, the bedload composition becomes "armored" with material too coarse to be moved by the river, until in some cases, bedrock is exposed (Collier et al. 1996). Impacts that have been documented for other hydro Projects that likely occur at the Klamath Hydroelectric Project include sediment entrapment behind dams and peaking operations that coarsen the bedload and alter riparian vegetation recruitment. As a result, these impacts continue to prevent federal and state agencies and numerous tribes from meeting their resource objectives of protection and restoration of native resident and anadromous fish by altering habitat quantity, quality and productivity.

PM&E's – PacifiCorp proposes no PM&E's in the DLA.

Response to Comment S5-33

An extensive geomorphology study has been completed and is fully described in section 6 of the Water Resource FTR and summarized in chapter E3 of Exhibit E. Measures resulting from the geomorphology study (related to gravel augmentation) are described in section E4.8 of Exhibit E. Substantial information has been added to the analysis of hydrology in the FLA (Exhibit E, chapter E3) and section 5 of Water Resources FTR to describe flow effects by Project development and/or reach.

Response to Comment S5-34

PacifiCorp is not planning on conducting an instream flow modeling study in the Keno Reach. During monthly stakeholder meetings, the Aquatic Work Group agreed that the number of transects used in both the BLM study (this study used the same transects that were used in the Salt Cave FERC application) in the J.C. Boyle peaking reach and the BIA study in the Link River bypass reach were inadequate to represent the habitat in these reaches. In addition to expanding the number of transects in these reaches, PacifiCorp continues to work with an Instream Flow subgroup on PHABSIM analysis for the J.C. Boyle bypass and peaking reaches, Fall Creek, and the Copco No.2 bypass reach. PacifiCorp is proposing to not include the Link River and Keno developments in the new license. Please see the Fish Resources FTR and Section 4E of Exhibit E for a detailed analysis on the instream flow study and proposed PM&E measures.

ODFW Recommendations –

PacifiCorp needs to consult with ODFW and federal fish and wildlife and land management agencies, tribes, and other interested stakeholders to clearly state Project impacts and propose potential PM&E's for impacts to sediment movement and alteration of river geomorphology. The FLA needs to fully disclose effects of the Project on the environment, contain adequate information for FERC to meet its NEPA, ESA and tribal trust obligations, and propose PM&E's that will fully mitigate for the impacts of the Project. PacifiCorp should include sediment management measures to protect and restore ecological processes of sediment dispersal at all Klamath hydroelectric facilities to improve conditions for all native resident and anadromous fish species. The FLA needs to include sufficient information for FERC to analyze the full range of alternatives to mitigate for ongoing impacts of alteration of sediment movement by each facility. These should include options for dam removal of one, several or all of the facilities. Each facility should be evaluated for its relative impact to short-term and long-term hydrology and the PM&E's necessary to restore and protect fish and wildlife habitat.

IV. Seasonal Minimum Flows in All Reaches (Exhibit E 4.0, Water Resources DTR 3.0, Draft Executive Summary)

Alteration and manipulation of streamflow regimes in several Project reaches are substantial, with significant reductions in some and frequent large variations in others. The FLA needs to fully disclose Project effects on streamflow and aquatic habitat and propose PM&E's that will mitigate for these impacts.

Current condition - The DLA is lacking in information that adequately characterizes each Project reach with information on range and frequencies of variations in non-diverted and diverted flow regimes. Some descriptions of general flow regimes are scattered throughout various sections of the DLA, and a brief description of Project Instream Flow Releases is contained in Exhibit E3.1.6. This latter description mentions that there is a 100 cfs minimum flow release from J.C. Boyle Dam, but fails to mention that there is no required flow release into 22 miles of the J.C. Boyle Peaking reach, below the J.C. Boyle Powerhouse.

Diversion of the bulk of streamflow is a major impact in three Project stream reaches, Link River, J.C. Boyle Bypass and Copco 2 Bypass reaches. Extreme daily flow fluctuations create a major impact in the J.C. Boyle Peaking reach. Flow manipulations to maintain upstream lake levels or regulate inflow into the J.C. Boyle Reservoir result in significant flow variations in the Keno Reach.

Information is needed to understand and display the effects of current water diversions and minimum instream flows in all Project reaches and the extent to which flows have been altered and affected habitat. Under the current license, there is a mixture of adopted flow agreements for the Oregon section of the Klamath River, both in the FERC license and flow agreements with ODFW. For example, the Link River bypass and the Keno reaches of the Klamath River have adopted minimum flow requirements of 90 cfs and 200 cfs, respectively, as per agreements between ODFW and PacifiCorp (FSCD 5-18). The bypass reach below JC Boyle has a minimum flow requirement of 100 cfs, although springs augment the flow up to 300 cfs or more approximately one half mile below the dam.

The following summarizes existing flow agreements for flows in the Oregon portions of the Klamath River:

- *Link River bypass reach:* The current agreement is 90 cfs from the Link River Dam to just upstream of the Eastside Powerhouse. During site visits in recent years, most recently the PacifiCorp tour on

September 26, 2000, barely an estimated 25-30 cfs was flowing downstream from the dam, primarily dam leakage and flow via the fish ladder. PacifiCorp is conducting a PHABSIM study to determine necessary flows for the bypass reach, however, data and results of the study have not been made available.

- *Link River below the bypass:* Minimum flows below the Eastside powerhouse are 450 cfs as per PacifiCorp's draft operations and maintenance plan and to address concerns of homeowners in the reach. Flows below this require fish salvage efforts by a Project biologist and PacifiCorp staff.
- *Keno Reach:* The minimum flow requirement below Keno Dam, per FERC article 58 and ODFW agreement is 200 cfs. PacifiCorp states that flows below Keno Dam, in the Keno Reach are dependent entirely on what is delivered to the Keno Reservoir by the BOR and other irrigation operations and that PacifiCorp has no discretion or control over flows in the Keno Reach. However, PacifiCorp can and does alter flows in the Keno Reach for hydroelectric Project purposes, including maintenance actions. For example, in June 2003 flows in the Keno Reach were reduced by PacifiCorp in order to limit the amount of inflow to the J.C. Boyle Reservoir during a Project outage for maintenance at the J.C. Boyle Powerhouse. Due to both rapid declines in flow, the sustained low flow of 250 cfs and hot weather, a fish kill occurred in the Keno Reach. ODFW concludes that PacifiCorp, not the BOR, altered flows in the Keno Reach, for hydroelectric Project purposes, which resulted in adverse impacts to fish and aquatic resources. This example demonstrates that a minimum flow regime needs to be established as part of the new license.
- *JC Boyle Bypass Reach:* There is an established minimum flow of 100 cfs released at the J.C. Boyle Dam. An additional 200 to 250 cfs enters the bypass reach beginning approximately one half mile downstream, increasing the total flow to around 300 – 350 cfs by the time the flow reaches the J.C. Boyle Powerhouse.
- *JC Boyle Peaking Reach:* Below the Powerhouse, downstream 22 miles to Copco 1 Reservoir, there is no minimum flow. When the J.C. Boyle turbines are shut down, the flow is approximately 300 to 350 cfs composed solely of flows from the J.C. Boyle bypass reach. When the turbines operate, flow in the Peaking Reach fluctuates up to about 1500 cfs or 3000-cfs depending on whether one or two turbines are running. At times these fluctuations occur daily as PacifiCorp follows electrical load demands. At other times, when river flows are sufficient, turbines run at a more constant level. The result is the Peaking Reach is subject to widely varying, adverse flow fluctuations. While the river has evolved a race of redband trout that live in the warm, nutrient rich waters of the Klamath River, the production capacity is limited by disruptive peaking flows which essentially restrict habitat to the low flow stream levels and cause daily dramatic changes in water temperatures.

Relicensing should result in establishing minimum flows in Project affected reaches that will provide greater potential to meet fish management goals and objectives through restoration of stream habitat. Seasonal minimum flows that reflect a closer approximation to the natural historic flow regime will improve habitat for native salmonids and endangered suckers.

Project impacts – The DLA does not describe impacts within each Project reach due to Project flow manipulations and operations. Descriptions of existing flow changes due to operation are extremely limited, precluding a reasonable description of how those flow changes might potentially impact fish, aquatic, riparian and other resources.

Instream flow studies being conducted by PacifiCorp have not been completed and significant outstanding data collection and analysis issues remain in the instream flow study plan that has not been approved by the Aquatics Working Group. To date, PacifiCorp has not provided any data or results, beyond habitat surveys from the instream flow studies to the Aquatics Working Group, precluding any opportunity to describe or evaluate potential impacts. Results of the ongoing instream flow studies may,

if conducted according to analyses requested by the Aquatics Work Group, provide adequate information with which to describe and evaluate continuing Project impacts.

PM&E's – In the DLA, PacifiCorp does not propose any form of PM&E's for instream flows for any Project reach. In lieu of information and analysis provided by PacifiCorp, ODFW has used existing available information as the basis for preliminary flow release recommendations.

ODFW Recommendations –

PacifiCorp needs to consult with ODFW and federal fish and wildlife and land management agencies, tribes, and other interested stakeholders to clearly state Project impacts and potential PM&E's for impacts to instream flows. The FLA needs to fully disclose effects of the Project on the environment, contain adequate information for FERC to meet its NEPA, ESA and tribal trust obligations, and propose PM&E's that will fully mitigate for the impacts of the Project.

- *Link River:* The Bureau of Indian Affairs (BIA) conducted a PHABSIM study in the Link River as part of studies conducted in support of their claim under the Klamath Basin Adjudication. Twelve PHABSIM transects were sampled and modeled to represent redband trout habitat. Results indicate that 700 cfs is needed to provide adequate habitat in the reach. Based on this information, ODFW recommends a minimum bypass reach flow of 700 cfs. This flow recommendation is not inconsistent with the flows adopted for the 2002 Biological Opinion for ESA-listed suckers. The Biological Opinion required *at least 250 cfs* from June to October when needed and were best estimates of flows that could be provided during summer months during critical water quality episodes associated with high water temperatures and low dissolved oxygen. These flow recommendations were set as a minimum flow specifically for ESA-listed suckers and not based on recognized scientific methodology. The Biological Opinion flows also were not established for other sensitive species in the river such as salmonids, including redband trout, which was the species used in the BIA PHABSIM analysis study.
- *Keno Reach:* ODFW is not aware of any instream flow studies in the Keno Reach. The existing minimum flow agreement calls for 200 cfs, which has resulted in fish kills during hot summer conditions. ODFW and other stakeholders have consistently requested incremental instream flow studies in order to determine the necessary flow regime for the reach. PacifiCorp has proposed application of "standard setting" hydrologic based methods based on its assertion that the Project does not manipulate flows within the reach. However, current and historic operations, as recent as June, 2003 when flows were reduced to 250 cfs, resulting in fish and aquatic invertebrate kills, clearly demonstrate that PacifiCorp can and does regulate flows in the Keno Reach for hydroelectric operation purposes. ODFW regards the proposed standard setting hydrologic based methods as inappropriate for evaluating incremental tradeoffs between Project operations and fish and aquatic resource impacts. Results from an incremental based instream flow study are needed in order to identify appropriate minimum flow regimes for the Keno Reach.
- *J.C. Boyle Bypass Reach:* Results of studies being conducted by PacifiCorp have not been made available. In lieu of those results, ODFW draws upon results of the PHABSIM analysis conducted by the Bureau of Land Management (BLM) for the "lower reach" of the J.C. Boyle Peaking Reach (BLM 2002). The BLM examined flow regimes necessary in the Peaking Reach based on existing PHABSIM data, from the lower gradient area around the Frain Ranch, termed the "Upper Reach" and within the higher gradient reach within the Caldera/Hells Corner reach, termed the "Lower Reach". Gradient, substrate and other channel

characteristics within the J.C. Boyle Bypass Reach are most similar to this "Lower Reach". The PHABSIM analysis for the Lower Reach probably serves as a reasonable surrogate for the J.C. Boyle Bypass Reach. The BLM analysis shows that flows from 600 to 900 cfs optimize juvenile and adult habitats, respectively, when velocity shelters were not considered. When velocity shelters are incorporated, flows from 900 to 1000 cfs optimize these habitats. ODFW recommends a minimum bypass reach flow of 900 cfs to protect juvenile and adult fish habitat.

- *J.C. Boyle Peaking Reach:* Results of studies being conducted by PacifiCorp have not been made available. The BLM conducted a PHABSIM analysis of transect data previous collected within the Peaking Reach for the proposed Salt Caves Project (BLM 2002). The BLM analysis incorporated key life history strategies, such as the use of stream margin vegetation and shallow water habitats by fry and velocity shelters by adults and juvenile life stages. Fry habitat was absent at about 300 cfs and increased steadily and rapidly to a maximum at 1700 cfs. The BLM analysis further showed that when flows fluctuate between 363 cfs and 1530 cfs, no effective fry habitat is available. Adult and juvenile habitats were lowest at 300 cfs and increased rapidly to peaks at about 1400 cfs for juveniles and 1800 cfs for adults, after which habitat leveled off. An analysis incorporating velocity shelters, an important bioenergetically efficient strategy, the shape and peaks of the juvenile and adult habitat relationships were essentially the same, except for showing approximately one-third less habitat overall. The BLM analysis also considered flows for benthic macroinvertebrates and examined flow regimes through the use of habitat time series analysis. The BLM's conclusion, considering a balancing of life stage requirements, was that a flow of 1700 cfs would best protect all life stages. ODFW supports the BLM's conclusions and recommends a minimum flow for the J.C. Boyle Peaking Reach of 1700 cfs.
- *Copco 2 Bypass Reach:* ODFW is not aware of any instream flow study information on which to base a flow recommendation for the Copco 2 Bypass Reach. The existing flow is around 20 cfs, from leakage and a minor fish bypass pipe. PacifiCorp has proposed to conduct a PHABSIM study in the reach and has performed habitat surveys for selection of study sites and transects. Habitat surveys have been conducted at two flow levels, 20 cfs and 200 cfs. All participants in the Instream Flow Work Group agreed a flow level of 20 cfs was so low as to be inadequate and inappropriate for even characterizing habitats. Work group participants concurred that a flow of 200 cfs was much better for fish habitat, as water filled the basic channel and provided edge habitat. However, even at a flow of 200 cfs, it is clear there will be substantial changes in habitat characteristics at higher flows and a vast increase in edge and complex habitats associated with vegetation. Gradient and other channel characteristics of the Copco 2 Bypass Reach are similar to the J.C. Boyle Bypass Reach and the "Caldera" reach of the J.C. Boyle Peaking Reach. Available information on these reaches suggests flows on the order of 900 cfs are necessary to provide adequate habitat for juvenile and adult redband trout. Link River Bypass reach is highly encroached with woody and other vegetation, similar to the Copco 2 Bypass Reach, and while probably not as steep or hydraulically complex as the Copco 2 Bypass Reach, may shed some light on necessary flows for the Copco 2 reach. Based on PHABSIM studies conducted in the Link River, the BIA concluded a flow of 700 cfs was necessary for the Link River. In lieu of results from yet to be conducted studies, ODFW recommends a minimum flow in the Copco 2 Bypass Reach of 700 to 900 cfs.

SS-34

Response to Comment S5-35

Please see Section E4 of Exhibit E for a more thorough analysis of Project impacts on fisheries resources related to ramping operations, and the proposed PM&E measures. It should be noted that the East Side, West Side, and Keno developments are not being proposed for inclusion with the new Project as defined in the FLA. PM&E measures include ramping modifications.

V. Ramping Rates for Bypass and Full Flow Reaches (Draft Executive Summary, Exhibit E 4.0, Fish Resources DTR 4.0)

Alteration and manipulation of streamflow regimes via peaking and ramp rates in several Project reaches are substantial. The FLA needs to fully disclose effects of the Project on the environment, contain adequate information for FERC to meet its NEPA, ESA and tribal trust obligations, and propose PM&E's that will fully mitigate for the impacts of the Project.

Current condition - The DLA lacks information that adequately characterizes each Project reach with information on range and variations of non-diverted and diverted flow regimes. Some descriptions of general flow regimes are scattered throughout various sections of the DLA, and a brief description of Project ramp rates is contained in Exhibit E4.2.5.1. This latter description mentions the FERC ramp rate of 9 inches per hour in the JC Boyle peaking reach, which is an extreme ramp rate that has affected aquatic life, while all the remaining reaches have agreements that were never actually evaluated but implemented in response to numerous fish kills over the years.

Ramping and flow fluctuations are substantial in several Project reaches of the Klamath River. Extreme daily flow fluctuations are a major impact in the J.C. Boyle peaking reach, while weekly or unscheduled flow fluctuations occur regularly at the Keno and Link River reaches. Flow manipulations to maintain upstream lake levels or regulate inflow into the J.C. Boyle Reservoir results in significant flow variations in the Keno Reach.

Information is needed to determine and display the effects of current water diversions and the magnitude, duration and frequency of flow alteration on affected habitat. Under the current license, there is a mixture of adopted ramp rates for the Oregon section of the Klamath River, in the FERC license, flow agreements with ODFW, and recent biological opinions by the USFWS for ESA listed suckers. For example, the Link River bypass reach has an adopted ramp rate fluctuation for 20 cfs/5 minutes for 0-300 cfs, 50 cfs/30 minutes for 300-500 cfs, and 100 cfs/30minutes for 500-1500 cfs (Exhibit E 4-72). Therefore, the river can be ramped from the 250 cfs USFWS Biological Opinion flow during summer conditions with poor water quality to the existing minimum of 90 cfs, an almost 3 fold change in river flow in 40 minutes. These ramp rates have not been field verified for impacts to aquatic habitat and fish life. Fish salvages have been required in the Link River during certain down ramp periods.

Below Eastside powerhouse in the Link River, there is no ramp rate, only a minimum flow of 450 cfs. The JC Boyle peaking reach has an up and down ramp rate of 9 inches per hour (the only existing FERC license ramp rate) which happens daily when river flows are less than 3,000 cfs (Exhibit E 4-75).

The following summarizes existing flow agreements for flows in the Oregon portions of the Klamath River:

a. Link River bypass reach: The current agreement is 20 cfs/5 minutes for 0-300 cfs, 50 cfs/30 minutes for 300-500 cfs, and 100 cfs/30minutes for 500-1500 cfs. There is no formal FERC ramp rate. Fish salvages are required per the 1996 biological opinion below 300 cfs.

b. Link River below the bypass: There is no formal or informal ramp rate.

c. Keno Reach: PacifiCorp states in the DLA that it utilizes a self-imposed, non-regulatory ramp rate of 500 cfs or 9 inches per hour. This ramp rate has not been discussed or formalized with ODFW or other fish management agencies and is a new disclosure to ODFW.

d. JC Boyle Bypass Reach: The DLA identifies a bypass reach up and down ramp rate of 9 inches per hour. This ramp rate has not been discussed or formalized with ODFW or other fish management agencies and is a new disclosure to ODFW.

e. JC Boyle Peaking Reach: The existing ramp rate, incorporated in the FERC license, is an up and down ramp rate of 9 inches per hour.

Production capacity of redband trout has been limited by disruptive peaking flows, which essentially restrict habitat to the low flow stream levels and cause daily dramatic changes in water temperatures. Extreme flow fluctuations in daily and seasonal flow patterns created below hydroelectric power operations lead to dewatering of spawning beds, and both low flow and high flow induced spawning interference, incubation mortality, and rearing mortality of resident fish (Marcus et al. 1990). Downstream dewatering and desiccation of spawning habitat was documented in the JC Boyle peaking reach (City of Klamath Falls 1986). PacifiCorp has not studied the extent and cumulative impacts of stranding in the JC Boyle peaking, but the occurrence of larval stranding was documented in a previous study (City of Klamath Falls 1987). Daily temperature fluctuations of up to 12° C occur in the JC Boyle Full Flow reach during the middle of the summer (City of Klamath Falls 1986) as a result of daily peaking events. Effects of these large diurnal temperature fluctuations on the existing fish populations have not been studied in the JC Boyle peaking reach.

The large flow fluctuations associated with the J.C. Boyle Powerhouse can cause high mortality to small fish such as young trout through stranding (City of Klamath Falls 1990). Common habitat types in the JC Boyle peaking reach are shallow rapids, riffles, and runs. Channels with an abundance of shallow habitat are more likely to have larger areas exposed during down ramping where fish could become separated from the main river flow due to declines in river stage (1999). Relicensing should result in establishing new ramp rates in all affected Project reaches that will provide greater potential to meet fish management goals and objectives through restoration of stream habitat.

The DLA does not describe current conditions (other than existing agreements), Project impacts, or propose PM&E's for these ongoing impacts. The DLA is lacking necessary information because of lack of site specific studies in Project-impacted reaches and the two limited studies being conducted are still being reviewed and/or in progress. Study Plan 1.7 Evaluation of Ramping only summarizes literature and has one brief field study of stranding observations in the JC Boyle peaking reach. Study Plan 1.1.6 Ramp Flow Fluctuations was only recently resurrected as a study plan in July 2003 after repeated requests by stakeholders and is an integration of other studies. Therefore, site-specific impacts of flow fluctuation on aquatic habitats of the Klamath River cannot be clearly characterized until studies have been completed.

The Draft Executive Summary (4-5) states study results that have not been shared with ODFW and other stakeholders. It also draws unsubstantiated conclusions regarding Project impacts. It states that down ramp rates in the Link River, Keno, and JC Boyle bypass and peaking reaches occur only 3%, 2%, and 20% of the time, respectively. Then, it concludes that the ramp rate in the Link River does not pose stranding problems and fish salvages adequately mitigate ramp impacts. Similarly, the conclusion in the Keno Reach is that while ramp rates are high, they are infrequent and at the discretion of the USBR, despite information described above that Keno Dam is a hydro Project facility that causes severe oscillations in the Keno Reach that could be better managed with less severe ramp rates by PacifiCorp. PacifiCorp concludes in the JC Boyle bypass and peaking reaches that based on the limited riverine sampling assessment, trout populations "are good in both reaches" (4-5).

PacifiCorp needs to better characterize down ramp data by focusing on the percent of the time the river reaches are ramped during critical egg incubation, and fry and juvenile rearing occur, which is generally from May to August. For example, the lumped data for JC Boyle peaking reach shows that for flows less than 3000 cfs, down ramping is a small effect a low percentage of time. PacifiCorp's use of exceedance curves misrepresents existing conditions. The duration curve for JC Boyle in Exhibit B, Figure B7.5-1 shows that flows exceeding 3000 cfs occur less than approximately 15% of the time. Including data from

other times of year when streamflows are naturally high masks the adverse effects of ramping during lower flow periods. Bovee et al. (1997) reported that "habitat bottlenecks" (such as due to low flow conditions) can cause short-term acute or long-term chronic effects to fish populations. Habitat bottlenecks affect the population dynamics of one or more life stages of a species and can be acute during early life history.

There is a limited and selected literature review of down ramping and peaking affects on aquatic life and misleading conclusions are made regarding species, size of fry and ramp rates. The Fish Resources DTR (4-14) erroneously concludes that winter ramp rates of 6 inches per hour appear not to cause stranding based on this limited literature review.

The Fish Resources DTR (4-4) cited the Smith River as a point of reference for an unregulated stream. Discussions at the Aquatic Work Group concluded that use of the Smith and nearby Klamath tributaries is inappropriate to use for comparisons since the hydrology, climate conditions, geomorphology, and geology are significantly different. The Smith River and lower river tributaries are in a coastal rainforest area with granite geology and porous soils that results in different stream flow characteristics. This point was made at more than one of the work group meetings.

With the lack of site-specific studies and the lack of separating and analyzing the different impacts of peaking versus down ramping, ODFW will use the information acquired from ODFW research and Salt Caves studies to recommend conservative ramp rates or run of river Project operations.

Down ramping occurs daily below JC Boyle powerhouse when average daily flow is less than 3,000 cfs, usually from summer to fall. The present ramp rate agreement is 9 inches per hour compared to most hydroelectric facilities in the Pacific Northwest that ramp at a maximum of 2-3 inches per hour. Information on flow fluctuations was not provided in the FSCD for stakeholders. Ramp fluctuations at JC Boyle from during various time periods was viewed at the USGS gage website for gage #11510700 and demonstrated very wide fluctuations in the past few summers. For example, flow fluctuations from July 1 to September 30, 1998 showed wide fluctuations that typically ranged from 800 to 1,400 cfs. In one case, flow dropped from 1,400 cfs to less than 500 cfs in less than a day, almost a 3-fold reduction in flow. Similarly in 1999, flows from July through September typically ranged on almost a daily basis from 800 to 1,400 cfs. Again, there was a case where river flow dropped dramatically from over 1,700 cfs to less than 400 cfs in 2 days time, again almost a 3-fold reduction in flow.

Rapid flow fluctuations are also documented to contribute to erosion of gravels and fine sediments, particularly to gravel-starved reaches below dams that block sediment movement (Collier et al. 1996). The proposed study should include documented or expected problems from current ramping practices, including public safety issues, and a description of frequency, magnitude, and duration of ramping events. ODFW supports PacifiCorp's proposal to assess current ramping procedures and determine the adverse impacts that result. This information is necessary for ODFW to evaluate the need for ramping and to determine what the rates should be to protect and enhance fish and wildlife and their habitat. ODFW will provide additional comments on future study plans.

The DLA has not evaluated ramping relationships to important water quality parameters using a time sequence analysis. For example in the full flow reach below the JC Boyle powerhouse, temperature varies dramatically during the course of a day in the summer when the river is ramped from high to low flows. As a result of peaking, flow in the "Salt Caves reach" varies almost daily June through October from 400 cfs (18 hours) to approximately 1500-cfs (6 hours) daily. The temperature differential which results from this alternation of flow is approximately 6° C daily (from 14° C to 20° C on a typical summer day) (Fredd 1991).

Project impacts – The DLA fails to describe impacts within each Project reach due to Project flow manipulations and operations. Descriptions of existing flow changes due to operation are extremely limited, precluding a reasonable description of how those flow changes might potentially impact fish, aquatic, riparian and other resources. Lack of site-specific studies other than a brief stranding survey in the summer of 2003 will preclude clear assessment of Project impacts. Observations by ODFW district staff and ODFW research staff as well as previous research indicated that most trout present in the Oregon segment of the peaking reach were identified as 2+ to 4+ age fish. The general absence of age 0+ and 1+ fish was also noted (City of Klamath Falls 1990).

Numerous fish kills have been documented over the past 20 years by ODFW district biologists and letters from concerned anglers. The most recent fish kill was documented by ODFW district biologists in the Keno Reach during the June 2003 outage at JC Boyle when the Keno Reach flow was drawn down to 250 cfs. The rate of flow reduction in the Keno Reach, presumably conducted at the current “self-imposed, non-regulatory ramp rate of 500 cfs or 9 inches per hour,” appears to have been partially responsible for the loss of non-mobile or slow moving aquatic insects and fish resources, and demonstrates the inadequacy of the current ramp rate. It is further evidence of the need for scientific studies to determine appropriate down-ramp rates.

Instream flow studies that may assess impact of the varial zone from peaking have not been completed and significant outstanding data collection and analysis issues remain in the instream flow study plan that has not been approved by the Aquatics Working Group. To date, PacifiCorp has not provided any data or results, beyond habitat surveys, from the instream flow studies to the Aquatics Working Group, precluding any opportunity to describe or evaluate potential impacts. Result of the ongoing instream flow studies may, if conducted according to analyses requested by the Aquatics Work Group, provide some information on extent of the varial zone during drawdown.

The stranding field observations appear to be anecdotal observations of biologists inspecting sites in the JC Boyle peaking reach for 3 trips during the summer of 2002. PacifiCorp does not provide any information on frequency, timing, and duration of observations. No results are presented. However, the absence of stranded fish does not verify that stranding is a problem. Frequent flow fluctuations appear to have fry and juvenile recruitment since 0+ and 1+ age fish have generally been noted absence and flows of less than 300 cfs (which happens daily) provide virtually no fry habitat.

(3) PM&E's – In the DLA, PacifiCorp does not propose PM&E's for instream flows and ramp rates for any Project reach. In lieu of information and analysis provided by PacifiCorp, ODFW proposes that existing information and ramping standards for the Pacific Northwest at other Projects be applied as the basis for preliminary flow release recommendations. In the absence of agreement of these conservative ramp recommendations, ODFW recommends that the Project be operated as a run of the river hydroelectric Project.

ODFW Recommendations –

PacifiCorp needs to consult with ODFW and federal fish and wildlife and land management agencies, tribes, and other interested stakeholders to clearly state Project impacts and propose potential PM&E's for impacts to instream flows via peaking and ramping. The FLA must fully disclose effects of the Project on the environment, contain adequate information for FERC to meet its NEPA, ESA and tribal trust obligations, and propose PM&E's that will fully mitigate for the impacts of the Project.

SS-35

Response to Comment S5-36

As the Project is operating under the current ramp rates directed by the Biological Opinion for Link River dam, field biologists walk the Link River bypass reach after ramping to return any ESA-listed sucker or salmonid that may have been isolated due to the ramping back to the river. This data is submitted annually to USFWS. Therefore, this ramp rate has been tested. PacifiCorp is proposing to decommission the East Side and West Side facilities under the new license.

Response to Comment S5-37

Water fluctuations in the Keno bypass reach are primarily due to the USBR operations and maintaining Keno reservoir elevation constant. A more conservative ramp rate below Keno dam would probably require fluctuating the reservoir elevation. The consequence of the reservoir fluctuations on irrigators, residents that surround the reservoir, and ODFW's wildlife refuge is not fully known. PacifiCorp is proposing to not include the Keno dam within the FERC boundary under the new license.

Response to Comment S5-38

Comment noted. Please see the Fish Resources FTR and Section E4 of Exhibit E for a full analysis of the ramping studies that PacifiCorp has conducted and for the proposed PM&E measures.

Response to Comment S5-39

The BLM's PHABSIM analysis used the transect data that were available for the Salt Caves FERC application. During monthly stakeholder meetings, the Aquatics Work Group agreed that the number of transects used in that study was inadequate to represent the peaking reach. In addition to

- S5-36 [• *Link River:* In the absence of knowledge of site-specific impacts, ODFW recommends that PacifiCorp adopt the conservative ramp rate used below Iron Gate Dam of 50 cfs/2 hour to protect native salmonids. The present adopted ramp rate has not been field tested and likely causes stranding and mortality of salmonids, ESA-listed suckers, and other native fish species.
- S5-37 [• *Keno Reach:* The current ramp rates causes stranding and mortality in the Keno Reach. PacifiCorp conducted no site-specific studies. In the absence of knowledge of site-specific impacts, other than fish kills that have been documented over the past 2 decades, ODFW recommends that PacifiCorp adopt the conservative ramp rate used below Iron Gate Dam of 50 cfs/2 hour. The present adopted ramp rate has not been field tested and likely causes stranding and mortality of salmonids, ESA-listed suckers, and other native fish species.
- S5-38 [• *J.C. Boyle Bypass Reach:* No information is available and limited stranding surveys have yielded little information. Absence of stranding does not preclude that it occurs and the lack of juveniles found during fry and fish sampling surveys indicates that few juvenile fish survive the extreme ramp fluctuations. In the absence of knowledge of site-specific impacts other than brief anecdotal surveys, ODFW recommends that PacifiCorp adopt the conservative ramp rate used below Iron Gate Dam of 50 cfs/2 hour. The present ramp rate of 9 inches/hours not been field tested and likely causes stranding and mortality of salmonids, ESA-listed suckers, and other native fish species.
- S5-39 [• *J.C. Boyle Peaking Reach:* The Bureau of Land Management (BLM) conducted a PHABSIM analysis of transect data previous collected within the Peaking Reach for the proposed Salt Caves Project (BLM 2002). The BLM analysis incorporated key life history strategies, such as the use of stream margin vegetation and shallow water habitats by fry and velocity shelters by adults and juvenile life stages. Fry habitat was absent at about 300 cfs and increased steadily and rapidly to a maximum at 1700 cfs. The BLM analysis further showed that when flows fluctuate between 363 cfs and 1530 cfs, no effective fry habitat is available. Adult and juvenile habitats were lowest at 300 cfs and increased rapidly to peaks at about 1400 cfs for juveniles and 1800 cfs for adults, after which habitat leveled off. The flow data suggests that the best aquatic habitat is supported with no hydro power peaking impacts. Therefore, ODFW recommends that PacifiCorp adopt either no peaking or the conservative ramp rate used below Iron Gate Dam of 50 cfs/2 hour.
- S5-40 [• *Copco 2 Bypass Reach:* No information is available. In the absence of knowledge of site-specific impacts, ODFW recommends that PacifiCorp adopt the conservative ramp rate used below Iron Gate Dam of 50 cfs/2 hour.
- S5-41 [PacifiCorp summarized power outages and start-ups in the DLA in the context of generation (Draft Exhibit H 6-1). We recommend that PacifiCorp summarize this information to evaluate frequency, duration, and magnitude of Project outages and start-ups, and ramp rates applied to these situations.

VI. Water Quality Modeling and Macroinvertebrate Surveys

- S5-42 [The DLA has preliminary information that describes some current conditions, Project impacts, but does not propose any PM&E's. PacifiCorp needs to develop operational, instream flow and facility strategies and PM&E's that alter the impacts of the hydro Project to improve water quality.

expanding the number of transects in the peaking reach, PacifiCorp continues to work with an Instream Flow subgroup to refine the habitat suitability curves for PHABSIM analysis.

Response to Comment S5-40

Comment noted. Please see Section E4 of Exhibit E for a full analysis of the ramping studies that PacifiCorp conducted and its proposed ramp rate for Copco No. 2 Bypass Reach and suite of proposed PM&E measures.

Response to Comment S5-41

In recognition of the rapid stage changes that can occur due to emergency plant shutdowns, PacifiCorp is proposing to install a synchronous bypass valve at the J.C. Boyle powerhouse. Please see the Fish Resources FTR for a detailed discussion of PacifiCorp's ramp rate study.

Response to Comment S5-42

Substantial information has been added to the analysis of water quality in the FLA (Exhibit E, chapter E3) and Water Resources FTR, including water quality modeling of the Klamath River from Link dam to Turwar (near the river's mouth). Measures proposed for enhancement of water quality are described in Exhibit E, section E3.8. PacifiCorp will consult with ODEQ and CSWRCB to prepare a detailed analysis and application for 401 certification, included Project measures as needed, to ensure that the Project complies with the applicable provisions of CWA, including applicable State water quality standards or objectives.

Current conditions -- The ODEQ administers the state water quality control program for the state of Oregon. The Klamath River is listed as water quality limited under Section 303(d) of the Clean Water Act (FSCD 4-23). There are approximately 55 miles of the Klamath River in Oregon affected by the Project, via bypass reaches, minimum flows and flow fluctuations. All 55 miles of the Project reaches are managed by ODFW exclusively for wild fish. All reaches were listed for one or more of the following water quality parameters: dissolved oxygen, temperature, nuisance phytoplankton growth, pH, and toxic substances. Many miles of the Klamath River in California from the Oregon state line to well below Iron Gate Dam are also affected by degraded water quality. Restoration of anadromous and resident fish populations will be dependent on improved water quality in both states.

Many of the water quality and macroinvertebrate studies are ongoing and there is incomplete analysis of Project facilities and operations on flow and water quality. Information is scattered in a variety of the documents including the Draft Executive Summary, Draft Exhibit B, the Draft Water Resources DTR, and the Consultation Record (Appendix E1-A). The DLA provides a limited amount of information and analysis of the water quality data that has been collected. The next step is to answer the "so what" and "now what" questions.

Draft Executive Summary (p. 3-7 to 8) states that the a series of water quality studies have been done to compile existing water quality data, characterize water quality conditions, and assess maintenance effects on water quality. PacifiCorp has also developed a water quality model to assess individual reaches, set of reaches or to simulate conditions throughout the system. While the DLA has a thorough discussion on USBR impacts, results on Project specific effects on water quality are not as well analyzed.

PacifiCorp's DLA does not clearly separate their Project effects on short and long term water quality changes and does not complete a thorough within Project analysis. Primarily boundary conditions of inflow at Upper Klamath Lake (UKL) and outflow at Iron Gate Dam (IGD) are assessed. There is inadequate assessment of Project impacts within the Project area and no proposed PM&E's. This is a fundamental study area that is a major study that is important for understanding the results of many other studies such as fish resource assessments, fish passage, and hydrology. Misleading or the lack of conclusions from this study results in amplifying incorrect conclusions in other studies.

Information in Exhibit E and the Draft Water Resources reports are incomplete and sometimes draw inappropriate conclusions. For example, the turbidity data from multiple sources are averaged and therefore inappropriate conclusions are made. Some of the historic and recently collected data have analyses that lump data inappropriately, and attempt to draw conclusions between seasons that are inappropriate.

There is no clear approach on how PacifiCorp plans to complete this section and fill in data and analyses gaps gap. For example, the without Project scenarios compare boundary conditions only at the top and bottom of the Project with no analysis of within Project impacts at and below each facility. PacifiCorp does not state how or when the water quality analyses will be completed. PacifiCorp has stated that there are only 7 days of active water storage in Project reservoir, but that conclusion is made only under existing conditions. PacifiCorp needs to analyze other scenarios that the Project could be operated.

Incomplete studies include aesthetics below IGD, sediment oxygen demand, bivalve, bioassay, and macroinvertebrates. In addition, there needs to be additional model simulations for certain constituents, calibration of dissolved oxygen due to algal impacts, algal dynamics and consequences to water quality. Many of the models are not ready for simulations since they are still in the calibration and validation phase.

Project impacts – PacifiCorp does not include an analysis of Project impacts section and there is no clear commitment or timeline when this section will be completed. There are many preliminary results, but few completed studies. While most of the studies are underway, the analyses and summaries completed thus far are weak or non-existent. ODFW's principle issues will be analysis of data, interpretation of results, conclusions on Project impacts and development of PM&E's that will clearly commit PacifiCorp to resolution on contribution to degradation of water quality. PacifiCorp, under the obligations of the Clean Water Act, through both hydro relicensing and the TMDL process, will be required to identify Project impacts and implement mitigation measures to protect beneficial uses.

PacifiCorp states that there is limited control over activities that can affect water quality because the reservoirs provide minor storage capacity (Draft Exhibit B (p.2-7)). According to the DLA, Project operations have only localized control of instream flow releases, mainly in the river segments downstream of Link, JC Boyle, and Copco dams. While it is true that Upper Klamath Lake is a hypereutrophic lake with nutrient rich waters, and high temperatures throughout the summer, PacifiCorp has not adequately assessed Project impacts to changes in water quality. Preliminary data suggests the Keno Reach of Klamath River negatively affects water quality parameters by slowing and storing water, although this is not clearly stated in the DLA. Although there is no bypass reach or withdrawal for hydropower, the presence of the dam for regulating flows slows water through the entire reach from Lake Ewauna to below Keno Dam, increasing retention time and solar exposure, thereby contributing to water quality problems.

Some of the model runs have been completed but no conclusions drawn as to impacts, or potential PM&E's. There is an emphasis on other water management in the basin that affects water quality, particularly the USBR Project, such as the Klamath Strait drains and the Klamath hatchery and the increase in nitrates below IGD. The DLA thoroughly describes water quality when the Klamath Straits Drain is in operation with subsequent impacts of water quality for temperature and turbidity. However, there is no analysis of the hydroelectric facility project impacts to water quality impacts. PacifiCorp's FLA will need to focus more on hydroelectric-project specific impacts and less on others.

PacifiCorp inconsistently describes Keno dam and reservoir. Keno Dam is described as a "run-of-the-river" facility (Draft Executive Summary (DES) p.3-3), with a "modest effect on the general shape and trend of the hydrograph". Then, it is later described as a diversion and re-regulating facility "...that helps buffer flows downstream of Keno Dam from inflow and outflow changes originating from USBR's Project" (Draft Exhibit B 1-2). Then, Keno Reservoir is described as a reservoir to maintain lake elevations at minimal drawdown to maintain irrigation pumps (Draft Exhibit B 6-3). Finally, the Keno Reach is further characterized in the Fish Resources DTR (3-16) as flows that mimic instream flow patterns downstream of Iron Gate dam. However, Figure 2.2-3 on page 2-15 of the Fish Resources DTR demonstrates that Keno Dam is more of an oscillating than a reregulating facility and typical flows in one month time can vary dramatically.

Modeling other scenarios besides the "with Project", run-of-river and without Project has not been done. Therefore, there are incomplete modeling scenarios, such as removing individual Projects and examining the restored condition for water quality.

PacifiCorp describes redband trout populations in the JC Boyle bypass reach and concludes they are healthy populations with multiple age classes. Along with the macroinvertebrate data, PacifiCorp concludes that this reach of the Klamath River is "healthy" due to water quality from the springs and the low amount of river water. However, the bypass is much more accurately described as a river reach impacted by diversion. The Oregon Water Quality Commission denied the proposed Salt Caves Hydroelectric Project because further diversion of the water would further impact trout populations.

PacifiCorp needs to provide clear descriptions of the hydrology conditions used to run the water quality model. The analysis in the DLA claims that water quality is improved for such parameters as nitrates coming in at Link River with a lower amount of IGD. However, the comparison is not valid since it does not explain how water quality would have improved without the Project in place. The without Project condition may be much improved over the existing boundary conditions.

The storage and release of water at the Project reservoirs continues to affect water quality in the river by increasing retention time, exposure to sunlight, and thermal stratification. Reservoir stratification also alters other water quality parameters including dissolved oxygen (DO), biological oxygen demand, pH, and production of toxic ammonia. Aquatic plants and algae in the reservoirs and river have a significant effect on fluctuations in DO and pH, which in combination with temperature-induced effects can cause acute and chronic health problems in fish. This was especially observed in the preliminary Keno Reservoir results, which the consultant has been unable to successfully model empirical conditions measured in the reservoir. Reservoirs also modify nutrients by acting as a sink for nutrients and temperature, settling of particulate matter, metabolism of organic compounds, and nutrient uptake by phytoplankton. From the limited data collected thus far, it appears that Project impacts include growth of aquatic plants and algae which create daily and seasonal fluctuations in DO and pH, which in conjunction with temperature can cause chronic and acute stress in fish populations.

Rivers normally process and assimilate nutrients as water flows downstream and attached algae in river systems can filter and clean water. At a recent meeting of the Western Division of American Fisheries Society, a water model consultant indicated that one of the greatest impacts of reservoirs can be the lack of assimilation of nutrients, or that reservoirs can act as nutrient and reservoir sinks. Lack of nutrient assimilation may more likely occur in reservoirs that stratify such as Copco and Iron Gate reservoirs, where thermal barriers can prevent mixing and assimilation of nutrients. Therefore, in the case of the Klamath River, nutrient assimilation from Upper Klamath Lake releases may be delayed many miles downstream of the hydroelectric Project than would normally have occurred upstream in the absence of the Project reservoirs. In support of this concept, all reaches of the Klamath River were listed for 303(d) violations for temperature. However, all hydroelectric Project reservoirs were listed for other water quality violations in addition to temperature. These included but were not limited to dissolved oxygen, toxic ammonia, pH, and chlorophyll a.

ODFW's goals and objectives for the Klamath River fish populations are to maintain and restore water quality to support healthy native aquatic species including indigenous trout, sucker, lamprey and anadromous salmonids. Water quality must remain within the range that maintains the biological, physical and chemical integrity and benefits survival, growth, reproduction, and migration of native fish. Fish survival, growth, and egg incubation and emergence are related to water temperature and other water quality parameters, so if the Project impacts water temperature or DO or other water quality parameters, fish populations and their health can be affected. Project emergency shutdowns, maintenance, and reservoir operations have not been adequately documented. Water quality affects other life history characteristics such as fish migration. Temperature change may also affect fish passage, particularly at JC Boyle fish ladder, where fish may be delayed or passage eliminated because they must choose between warm water from JC Boyle Reservoir and primarily spring in the bypass reach. Studies have indicated that adult salmonids avoid temperature changes and prefer to remain in river temperature water, prefer cooler water when given no alternative, and take longer to pass through test facilities in water heated or cooled compared to river water (Weaver et al. 1972).

PM&E's – PacifiCorp proposes no PM&E's in the DLA.

ODFW Recommendations –

PacifiCorp needs to consult with ODEQ, the California State Water Resources Control Board, ODFW, federal fish and wildlife and land management agencies, tribes, and other interested stakeholders to clearly state Project impacts and potential PM&E's for alteration of water quality by Project facilities. This information will be necessary for the FLA to fully disclose effects of the Project on the environment, for FERC to meet its NEPA, ESA and tribal trust obligations, and to propose PM&E's that will mitigate for the impacts of the Project. This information will also be critical to obtain approval by Oregon and California state water quality agencies to approve 401 certificates.

PacifiCorp must identify Project operations and facilities that cause changes in water quality and develop operational strategies or scenarios to minimize impacts, and evaluate the timing and methods of maintenance to minimize impacts to aquatic resources. PM&E' for water quality at all California and Oregon Klamath hydroelectric facilities are needed to improve habitat and instream flow conditions for all native resident and anadromous fish species. PacifiCorp needs to provide sufficient information in the FLA for FERC to analyze the full range of alternatives to mitigate for ongoing impacts of alteration of water quality by each facility. These should include options for dam removal of one, several or all of the facilities. Each individual facility should be evaluated for its relative impact to short-term and long-term water quality and the PM&E's necessary to restore and protect fish and wildlife habitat. PacifiCorp needs to parse out its own Project effects from other basin impacts such as the USBR irrigation Project.

VII. Habitat Surveys for Potential Anadromous Fish Production in the Upper Basin

The DLA does not summarize any habitat survey data of historic and potential future anadromous fish production in or above the Project area, with the exception of that completed for the PHABSIM in the JC Boyle Peaking and Bypass reaches.

Current condition – There are no present or potential habitat conditions described other than habitat survey results from PHABSIM instream flow study. These habitat surveys only encompassed the JCC Boyle peaking and bypass reaches and Fall Creek. Existing habitat data for the Link River was from a previous report completed by the BIA. There is no summary of upper basin habitat. Although some information has been for the EDT process, it was not presented in the DLA.

ODFW requested that PacifiCorp conduct an inventory of existing and potential habitat for each anadromous species within the Project-affected reaches and in the upper basin above Upper Klamath Lake. The requested habitat surveys were to current habitat condition such as location and abundance of spawning gravel, condition of riparian areas, migration corridors, and rearing habitat. There is no summary of potential habitat in Spencer Creek or potential anadromous habitat in upper basin tributaries. Without these studies, there will be insufficient information to evaluate potential restoration strategies for anadromous fish in and above the hydroelectric Project area.

While the EDT and KlamRAS models have been developed to assess potential fish production from Spencer Creek, the DLA does not adequately current conditions, Project impacts, or provide any PM&E's.

The DLA has a brief description of the loss of anadromous fish runs in Draft Exhibit E p. 4-18 to 4-21. A virtually identical description is also in the Fish Resources DTR p. 1-34 to 1-36. Briefly, the summary indicates that Chinook salmon and steelhead historical use in the upper Klamath basin, included the

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ODFW Comments on Klamath DLA

Response to Comment S5-43

PacifiCorp has agreed to run the SLOM scenarios in addition to the three water quality modeling scenarios presented in the DLA as a means to address a range of alternatives. Please see Section 3E of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed PM&E measures.

Response to Comment S5-44

Please see Section 4E of Exhibit E and the Fish Resources FTR for data updates, Project impacts, and proposed PM&E measures. Disagreements as to the scope or relevance of particular studies are documented in Appendix E1-A of the FLA. PacifiCorp is working with the HMG to evaluate stream habitat upstream of Keno dam. The HMG is currently examining possible chinook salmon production but may examine steelhead production in the future. Note, however, that the EDT model is not currently able to model lamprey due to a lack of biological rules for this species.

Response to Comment S5-45

Significant revisions have been made to the fisheries assessment since publishing the DLA. Please see Section 4E of Exhibit E for a detailed discussion on Project impacts to native fish and proposed PM&E measures. PacifiCorp maintains that the methodologies for inventorying fish as described in the Fish Resources FTR, are reasonable for subsequent impact analysis. Data collection to the extent requested by ODFW was somewhat hampered by unreconcilable site conditions. As presented in the FLA, PacifiCorp disagrees with ODFW's conclusion that redband trout are at risk from PacifiCorp's operations.

Sprague, Williamson, and Wood rivers and Spencer and Shovel creeks. Coho salmon likely occurred in the Klamath River through the Project area. Upstream migration was blocked by the completion of Copco 1 dam in 1917 and Iron Gate Dam in 1962.

Summer steelhead, spring and fall Chinook, and Pacific lamprey were extirpated from their historical range in the upper Klamath River basin and its associated tributaries (Fishpro 2000) by construction of Copco 1 and 2 dams and then Iron Gate Dam. A review of historic distribution indicates that anadromous fish once occupied over 300 miles of habitat that is now blocked by the Klamath hydro Project. The Klamath River historically had the third largest salmon runs on the Pacific Coast of North America, after the Columbia and Sacramento rivers.

Project impacts – Klamath hydro Project blocks passage of native fish to 65% of Klamath basin and over 300 miles of historic anadromous fish habitat. ODFW's goal for Klamath River fish populations is to restore native, indigenous species to the fullest extent possible. Information on quantity and quality of habitat conditions of the Upper Klamath River basin is essential to understand how passage efforts and habitat restoration can be integrated to restore anadromous fish to the upper basin. This information will assist also in prioritizing future habitat restoration efforts for resident salmonid and endangered sucker species.

PM&E's – PacifiCorp proposes no PM&E's in the DLA.

ODFW Recommendations –

PacifiCorp needs to assess existing and potential habitat condition and relative contribution of the main river and each tributary above Iron Gate Dam for fish production, run timing, limiting factors and potential mitigation measures. PacifiCorp needs to complete the test run of the EDT and KlamRAS models for Spencer Creek and then evaluate fish production in the upper basin, to assess Project impacts and potential restoration of fish production with fish passage at all facilities. This should include an evaluation of Chinook salmon, summer steelhead, and Pacific lamprey use of the mainstem river and upper basin tributaries if passage were not a concern.

VIII. Native Trout and Wild Fish Surveys; Stock Assessments for Anadromous Fish (Draft Executive Summary 4.0, Draft Exhibit 4.0, Fish Resources DTR 2.0, and Consultation Record)

The fish assessment survey (Study Plan 1.9) does not adequately characterize existing conditions, nor does it provide a clear statement or analysis of Project impacts. No PM&E's are proposed. Without adequate study results provided by PacifiCorp, ODFW will rely on previous studies by other researchers, including the ODFW research study (1988-91) to draw conclusions about existing fish populations, Project impacts, and appropriate PM&E's.

Current condition – ODFW believes PacifiCorp's approach to sampling Project riverine reaches and summarizing data from Project reaches in the DLA and Fish Resources DTR is inappropriate. These data were summarized with an index of relative abundance using catch per unit effort (CPUE) that generates meaningless averages. This kind of analysis does not examine natural variability of populations within seasons, within reaches, and between years. One year of brief sampling does not accurately reflect fish populations. Since the analysis was not standardized to sample size, number of days, length of area sampled, and seasonality in some cases, it is invalid to draw comparisons and conclusions. The results and conclusions from PacifiCorp's fish assessment are inconsistent with fish population evaluations from previous sampling efforts conducted by City of Klamath Falls (1986) from licensing studies for the

proposed Salt Caves Project and ODFW research conducted from 1988-1991 (Buchanan 1991, Hemmingsen et al. 1992).

The fish assessment study is a key area of disagreement between ODFW and PacifiCorp regarding study methodology, analysis, results, and conclusions for the relicensing of the Project. ODFW also views PacifiCorp's analysis of the data as a key dispute, since many of the conclusions PacifiCorp draws are misleading and inaccurate, and based on a technically flawed study.

This study plan was not approved by the Aquatics Working Group stakeholders due to misapplication of standard scientific methodology procedures and the insufficient collection of data over sample reaches, sample periods and number of seasons. PacifiCorp also did not follow the process agreed to by stakeholders to resolve the fish assessment disagreement for approving study plans as stated in the "Collaborative Process".

Since release of the DLA, PacifiCorp has chosen to break apart the study plan into separate studies that are agreed to (i.e. fry sampling, reservoir sampling) and that are not agreed to (i.e. riverine sampling that is considered inadequate by agency and tribal stakeholders).

The goal of the fisheries assessment study was to characterize existing riverine and reservoir fish communities. Specific objectives were to assess relative abundance, growth, length frequency distribution, condition factor, and age structure of fish populations. This is a fundamental study that is important for understanding the results of many other studies such as fish passage, recreation, and water quality. Misleading conclusions from this study amplifies mistakes in other studies. The study indicates that most results are qualitative in nature (Fish Resources DTR p.2-2) and then goes on to draw conclusions based on quantitative results that are questionable and based on inadequate sample design.

PacifiCorp conducted a test of sampling methodologies in fall 2001 and then a general fisheries assessment of the riverine sections in 2002. The fish assessment has a sample size of one in most cases, sampling only one to four days for each reach, and then draws conclusions on the general abundance of fish communities and populations in each reach. While other biological data was gathered on length, scales, and condition factor, this information was not presented in the DLA. Stakeholders have repeatedly asked for additional field sampling with larger sample sizes, sampling representative reaches with representative habitat types, and a more thorough analysis. PacifiCorp declined to conduct more extensive data collection in the 2003 and has stated that there is adequate information to draw conclusions.

ODFW requested a stock assessment in response to the FSCD for each anadromous fish species to evaluate potential reintroduction of salmon, steelhead, and lamprey. No information was presented in the DLA regarding stock assessments or genetics. The steelhead life history morphology was historically present in the Upper Klamath Basin, but is now considered extinct (ODFW 1995). This life history probably was introduced into the Upper Klamath Basin after the Pleistocene Lake Modoc opened to the Pacific Ocean (Behnke 1992). The diverse traits in the Upper Klamath Basin group may have resulted from the interbreeding of the new invading *O. mykiss* with the original resident fish of the basin (ODFW 1995, Behnke 1992). Steelhead were documented as far up as the Link River (Fortune et al. 1966).

Fall Chinook and spring Chinook salmon potentially spawned within the Sprague River (Klamath River Basin Fisheries Task Force 1992). Runs were seen as far up the Sprague River as Beatty, Oregon, and spawning was reported in the North and South Forks of the Sprague. Historically, entry timing for spring Chinook appeared to occur in March to upper Klamath River area. Fall Chinook entry to the Sprague River was noted in September and October. The coho adapted to the Upper Klamath Basin had been lost

sometime prior to the earliest documented fisheries assessment and collections, and prior to fish collections between 1914–1918 at Klamathon Racks (Klamath River Basin Fisheries Task Force 1992). Currently the Southern Oregon Northern California Coastal coho salmon Evolutionary Significant Unit, of which the Klamath River populations downstream of Iron Gate Dam are included, was listed as threatened under the “Endangered Species Act” in 1997 (62 FR 24588). Designated critical habitat for Southern Oregon Northern California Coastal coho salmon occurs downstream of Iron Gate Dam (May 5, 1999; 64 FR 24049).

Rainbow trout, Pacific salmon and many other species exhibit genetic adaptations to local environmental conditions, demonstrating the stock concept. PacifiCorp has only recently introduced a conceptual idea to look at genetics of fish populations. However, PacifiCorp has not proposed a study, nor are there results available to identify Project impacts, and propose PM&E’s.

Preliminary results of the PacifiCorp 2002 sampling effort were presented at the January 2003 Aquatics Work Group meeting in Yreka, California. ODFW and many other stakeholders offered many comments and recommendations such as including sample size, sample dates, time of day, flow (i.e. JC Boyle peaking reach discharge ranges from 350 to over 1500 cfs each day), and other basic scientific collection information. Other comments were to identify outliers of information, for example, most of the chubs and minnows in the Keno Reach were observed near the dam and not found farther downstream. Sample sizes were not stated and conclusions are inappropriately drawn on very small sample sizes (i.e. 4 trout in the Link River in spring 2002 and none in any other season). An incidentally high capture of redband trout in the JC Boyle bypass reach weighted a higher relative abundance and an apparent greater length at age that was not representative of the population. Roger Smith, ODFW District Fish Biologist, indicated at that meeting that sampling effort at low flow periods in the JC Boyle peaking reach just before dark yields high CPUE rates. Therefore, relative abundance is difficult to make conclusions given the variability of sampling conditions and the very limited sampling effort put forth by PacifiCorp.

Some of the sampling results presented at the January 2003 Yreka meeting were questionable due to inappropriate analyses and in comparison to previous studies by other researchers that had spent far more time sampling fish populations using standardized methodology. For example, the PacifiCorp results of sampling in the JC Boyle peaking in California had a relatively high CPUE of redband trout. However, the data is not shown in the DLA that these fish were all 50-75 mm, or age 0+ fish that are young of the year, all caught below Shovel Creek, a known spawning tributary. The trout length at age comparisons showed that in a comparison of age 2+, 3+ and 4+ fish, average length of fish sampled in the summer were sometimes smaller the average length of fish sampled in the spring. Since this is not biologically possible, it is apparent that age/length data was inappropriately analyzed. ODFW suggested that PacifiCorp re-analyze the scale data to produce a back-calculated length at age that would give more meaningful results of trout growth in selected reaches of the Klamath River.

For example, the two reaches of Link River were sampled during different seasons with a sample size of one sample per reach. This is not a defensible estimate of relative abundance. Correctly conducted sampling is to stratify variability is expected and collect multiple samples. In addition, the methods were not adequately described but what is described has serious flaws in data collection. There is no structure to the sampling effort that allows a statistical analysis.

None of the length data that was presented as preliminary results at the Yreka January 2003 were in the DLA. The fish length information discussed at the Yreka meeting showed that Keno fish are larger on average than fish in the JC Boyle peaking and bypass reaches. This has been found in studies by ODFW research as well in the 1988-91 studies. However, in most cases, data were inconclusive due to limited sampling and analysis.

A June 26, 2002 technical memorandum by Forrest Olson (CH2MHill consultant for PacifiCorp) concluded that the use of the fish ladder by trout has declined markedly since the dam was built but not according to his reasoning, due to ladder function or entrance conditions. He states that "the fact that fewer trout fish used the ladder 30 years after the dam was built may merely suggest that movement upstream through JC Boyle Dam has become a less favorable strategy for the local trout population than it was historically without the dam in place". This conclusion is unwarranted and contrary to the evidence that ODFW has assembled on fish populations and fish passage at the JC Boyle ladder. ODFW has implemented very conservative angling regulations below JC Boyle Dam as a consequence of fish passage problems and impacts to the native redband trout populations.

The agency, tribal and NGO stakeholders concluded at the January 2003 Yreka meeting that the objectives of the PacifiCorp fish assessment could not possibly be met with the present level of sampling effort and analysis. Therefore, in the absence of a good administrative record, other studies will be used as the administrative evidence to demonstrate that passage, entrainment and instream flow, all controllable factors by the Project facilities or operations, are responsible for apparent changes in fish populations.

Several conclusions made from the ODFW research Project have shown that the Project has affected redband trout populations via poor passage, entrainment and mortality or altered flows. Studies by the Native Trout Research Project showed that Klamath River rainbow trout from the Keno Reach, Spencer Creek, JC Boyle diversion reach, and the "Salt Caves" reach are a similar, unique stock of fish that adapted to local habitat conditions (Buchanan 1991). This population is unique, as they have adapted to water temperatures up to 27°F in the summer and down to 0°F in the winter, extremely alkaline pH, and high nutrient levels. Prior to the construction of JC Boyle Dam in the late 1950's, the Klamath River wild trout population was noted for its abundance and large fish. Trout migrated freely through all reaches and many spawned in Spencer Creek, a principal tributary of the Klamath River. Following completion of JC Boyle Dam, trout passage estimates dropped from over 5,500 fish in 1959 to less than 600 in the late 1980's. Further, the average size of trout ascending JC Boyle fishway diminished from 12 inches to 5 to 9 inches in length in the same time period.

Some of the conclusions from the ODFW research (January 29, 1997 ODFW memorandum, Al Hemmingsen, Buchanan 1991, Hemmingsen et al. 1992) are:

- Abundance and average size of redband trout that migrated upstream past JC Boyle Dam have declined dramatically since the dam was built. Reasons for that are unclear but likely related to hydroelectric facilities.
- Abundance of redband trout that migrated upstream past Keno or Link River dams was much less than that seen at JC Boyle Dam. Some fish that passed the two former dams returned to spawn downstream in Spencer Creek. That behavior may be influenced by hydroelectric facilities.
- Genetic relationships between redband trout of the Klamath River and certain populations higher in the basin are not likely to be maintained since few fish appear able to successfully pass into and through Upper Klamath Lake. Prevention of migration between populations may enhance genetic divergence between them, and possibly threaten long-term existence of tributary populations upstream.
- Rainbow trout both upstream and downstream of JC Boyle spawn in Spencer Creek. Good access must be maintained for all that intend to get there.

- Safe passage downstream past JC Boyle Dam for migrants of all sizes must be assured.

In summary, the methodology used for the fisheries assessment by PacifiCorp was flawed, with inadequate data collection and analysis that do not reflect current conditions. The method used by PacifiCorp was akin to a "grab sample" with one data point, and therefore cannot be used to assess Project effects on fish populations. PacifiCorp made an independent decision to conduct one sample per reach per season as a baseline assessment for fish populations.

Project impacts – ODFW Research staff provided input to PacifiCorp regarding Study Plan 1.9 Fisheries Assessment (ODFW email January 22, 2003). Their comments were that the objectives could not possibly be met and the proposal had many shortcomings. These included misrepresentation of fish sizes based on capture techniques, lack of specific sampling procedures, and extrapolating findings beyond the capability of the data. The comment on PacifiCorp's third objective of assessing the influence of environmental factors, including Project operations, on fisheries resources, was that it was the most problematic and overextended the limits of the data. Since long term data sets with comprehensive measurements of environmental variables and statistically rigorous abundance of data are not included, it was unlikely that PacifiCorp could explain Project impacts.

The inadequate data collection and analysis leads PacifiCorp to misleading conclusions for both the fish assessment and other studies. PacifiCorp incorrectly concludes that the JC Boyle ladder is no longer needed (June 26, 2002 Technical Memorandum: Review of Adult Trout Passage at J.C. Boyle Dam). In meetings, PacifiCorp staff has suggested that a reintroduction of anadromous fish will fail due to a high abundance of predators in Project reservoirs and poor habitat conditions in the upper basin. This fish assessment is a critical study with a high level of importance in relicensing. However, it has been conducted independently by PacifiCorp utilizing inappropriate methodology and conclusions, despite agency, tribal and NGO stakeholder disagreement on these issues.

Draft Exhibit E p. 4-2 states that the Fish Resources DTR has been prepared to provide the detailed analysis of the fish resource issues...this report contains the information needed to comply with 18CFR4.51(f)(3). Given the inadequate administrative record, misleading conclusions, the lack of Project impact analysis, and no PM&E's, ODFW believes that PacifiCorp is not meeting the intent of the Federal Power Act. Alternative information has been presented from research conducted by ODFW that provides contrary evidence to PacifiCorp's conclusions. Therefore, our conclusions are that the evidence supports that passage, entrainment and instream flow, all caused by the Project facilities or operations, are responsible for apparent changes in fish populations. Given this evidence, ODFW will recommend to FERC that effective, volitional upstream and downstream fish passage be implemented at all hydroelectric facilities and monitoring and evaluation and modifications made at each facility to ensure safe, effective passage for native fish species.

In addition to the ODFW research, other supporting evidence is the FERC 1990 Final EIS for the proposed Salt Caves Project which noted low adult trout densities in the upper end of the peaking reach. The EIS reported that trout in the upper peaking reach, where peaking impacts would be most visible, had relatively low growth rates and that large trout were under represented in the age structure. The EIS cited 5 years of investigation compiled by the City of Klamath Falls. The FERC EIS concluded that flow fluctuations below the JC Boyle powerhouse caused chronic stress on trout and stranding of eggs, fry, and juveniles. Stress occurred from daily flow fluctuations and related changes in water temperature and water quality. These flow fluctuations caused trout to continue to seek new feeding and resting habitat while water temperature changed metabolism and feeding rates.

Response to Comment S5-46

The FLA presents Project impacts to terrestrial resources and proposed PM&E measures. PM&E measures provided in the FLA include proposals to develop a Wildlife Habitat Management Plan and a Vegetation Management Plan. These plans will guide wildlife enhancement measures and land management practices on PacifiCorp ownership within the Project boundary. Practices and enhancement measures implemented under these plans will be enhancements to existing baseline conditions.

PacifiCorp also has not evaluated Project impacts on movement, spawning and survival of shortnose and Lost River suckers. Various studies were conducted by other researchers in other venues to evaluate spawning habitat (Buettner and Scopettone 1990, Desjardins and Markle 1999) and age classes (Roger et al. 2000). However, information on Project impacts such as load following, reservoir fluctuations and upstream and downstream fish passage has not been studied. This is a data gap in the relicensing study that has been requested by stakeholders with no study implemented by PacifiCorp.

PM&E's – PacifiCorp proposes no PM&E's in the DLA.

ODFW Recommendations -

PacifiCorp needs to consult with ODFW, federal fish and wildlife and land management agencies, tribes, and other interested stakeholders to clearly state Project impacts and potential PM&E's for impact of hydroelectric facilities on native fish populations. The FLA needs to fully disclose effects of the Project on the environment, contain adequate information for FERC to meet its NEPA, ESA and tribal trust obligations, and provide PM&E's that will fully mitigate for the impacts of the Project. While ODFW has repeatedly requested additional studies on fish populations in riverine reaches of the river, PacifiCorp has been unwilling to conduct either additional sampling within seasons or for another year. Given the inadequacy of these fish assessments, ODFW will use ODFW research data and results to draw conclusions on Project impacts. From these conclusions, ODFW will recommend conservative PM&E's for fish passage, Project operations, monitoring and evaluation, higher instream flows, modification of ramping rates to moderate levels such as that suggested by WDFW research, and other measures to reduce Project impacts.

ODFW recommends that any additional studies conducted by PacifiCorp include consultation with ODFW, including our research staff. Any future assessment work should utilize standard methodology and techniques for estimating fish populations so that valid statistical conclusions can be made regarding differences in fish abundance, growth and survival in reaches in, above and below Project diversions and peaking reaches. Furthermore, ODFW requests further documentation of the Trout Comparative Section, Radio Telemetry, Fry Sampling, Snorkeling and Redd Surveys. ODFW requests the opportunity to comment on these conceptual studies before summarized in the FLA. ODFW recommends that PacifiCorp complete the back-calculated length at age recommended back at January 2003 Aquatics Work Group meeting in Yreka, California and share with stakeholders.

ODFW research staff has concluded, after four years of study of native redband trout populations in the basin and around the Project area, that the Project is causing continuous and ongoing impacts to fish populations via blocking fish passage, causing mortality via turbine entrainment, and altering flow regimes and severe ramp rates that limit production of both fish and other aquatic resources.

IX. Terrestrial and Botanical Resources; Noxious Weeds (Draft Executive Summary 5.0, Exhibit E 5.0, Terrestrial Resources DTR).

The DLA does not adequately describe most current conditions, Project impacts, or propose any PM&E's. Most studies are ongoing and have not completed analysis of impact of Project facilities and operations on terrestrial and riparian aquatic resources.

Current conditions - The Klamath Hydroelectric Project is located in ODFW's Keno wildlife unit. Project facilities, operations and maintenance activities affect wildlife species via daily and seasonal reservoir or

riverine drawdowns, facilities or reservoirs that block animal movement and migrations, and upland management activities. These combined impacts reduce habitat quantity and quality available to support wildlife, reduce connectivity, and fragment populations. Potential Project impacts occur to big game, small mammals, eagles, raptors and other avian species, waterfowl, bats, and amphibians and reptiles.

Objectives of the terrestrial studies were to develop baseline information on terrestrial resources and assess how Project facilities and operations affected those resources and identify PM&E's for Project effects on sediment transport. The nine studies included vegetation cover mapping, wetland and riparian plant community characterization, amphibian and reptile surveys, TES surveys, wildlife movement, wildlife habitat association, noxious weed inventory, grazing analysis and a spring-associated mollusk inventory. Some results are presented in the 9 studies on current conditions such as the vegetation survey. Many of the studies are ongoing and expected to be completed in 2003. There is some discussion of potential Project impacts in Exhibit E 5.7 on continuing impacts of the Project, but PacifiCorp acknowledges that much of the information is preliminary and will be more fully analyzed and completed in 2003.

The Terrestrial Resources DTR is a summation of study plans, but fairly general with limited results thus far. Inventory and mapping of plant communities and wildlife habitat features focused on a one-quarter mile bandwidth along the river and around reservoirs, and added additional upland areas requested by stakeholders.

The Riparian and Wetland Characterization study is not yet complete and there is still not a lot of information available to stakeholders. Information in Exhibit E 5.0 primarily is a large scale vegetation mapping and generally describes riparian information, but is not useful to understand impacts. Generally it is a good study plan, but analysis, results, Project impacts and potential PM&E's are not in the DLA. Stakeholders have requested and PacifiCorp has agreed to analyze ongoing impacts of inundated reservoirs to former riparian habitat. PacifiCorp will use pre-Project photos and government land office (GLO) surveys to evaluate reference conditions for lands under the JC Boyle, Copco 1 and Iron Gate reservoirs. Early photos (i.e. JC Boyle, 50 years on the Klamath) illustrate historical conditions that show Copco has a lush fertile valley with an excellent riparian zone. The Riparian and Wetland Characterization study also will evaluate vegetation changes as a result of peaking and flow frequency, duration and magnitude of flow events.

Project impacts Exhibit E 5.7 is a summary of continuing impacts of Project facilities and operations on botanical and wildlife resources.

The small animal and avian connectivity study (Exhibit E5.5.3) documented riparian habitat connectivity along Project reservoirs and riverine sections affected by inundation. This section demonstrated that the average break in riparian patches along reservoirs was significantly different than along riverine reaches. In addition, the 2-mile long JC Boyle canal disconnects upland habitats from riparian habitats.

The assessment of Project effects on big game movement (Exhibit E5.5.1) is based on anecdotal studies of watching a few deer and one report of an elk with radio-telemetry crossing the Project. There is not enough information to make this as a scientifically conclusive statement since information is anecdotal.

The assessment of wildlife entrainment (Exhibit E5.5.2) in canals is confusing. Page 5-99 reports that only a small portion (4%) of the JC Boyle canal is accessible and the entire lengths of East Side, West Side and Fall Creek canals are accessible to wildlife. The section concludes that entrainment data of medium and large animals indicate little mortality. Conversely, page 5-119 in the section on continuing

impacts (E5.7) indicates that 45% of the JC Boyle flow canal (1514 of 11,000 meters) is a potential entry point for wildlife. It also indicates that information from the entrainment study at East Side and West side canals on Link River documented mortality of wildlife including mink, raccoon, muskrat, garter snake, bullfrogs, rough-skinned newt, and various waterfowl. Therefore, it is clear that mortality of wildlife at the JC Boyle canal has not been adequately assessed. An ongoing trapping study of small animals is underway in 2003 to determine if small animals use the vicinity of the canal.

The assessment of transmission lines on avian species (Exhibit E5.5.5.4) suggested that transmission lines are not a problem for avian electrocutions or collisions. However, PacifiCorp only counted 10% of the power lines as transmission lines, while the remaining 90% are "distribution lines". PacifiCorp has a database of bird mortalities associated with Project lines but this has not been shared with stakeholders. ODFW requests that PacifiCorp present information or records on bird mortalities or injuries associated with any Klamath hydroelectric transmission or distribution lines.

The information on effects of reservoirs on wildlife is still preliminary. Results indicate that large gaps in riparian/wetland habitat, particularly along Iron Gate and Copco reservoirs, but also along JC Boyle, limit habitat quality for amphibians, reptiles and some small species and reduce connectivity (E5.7.1.3). One of the focal species, the yellow warbler, had a lower habitat quality at JC Boyle Reservoir, possibly due to daily water level fluctuations that reduce shoreline riparian shrub habitat. Also, most reservoirs, except Keno, provided very little habitat for breeding amphibians due to frequent water level fluctuations. Western pond turtles were affected by shoreline habitats of fluctuating reservoirs with reduced basking habitat and water level fluctuations that reduced juvenile habitat.

Riverine reaches that had flow fluctuations also showed preliminary information that flow fluctuations reduced shoreline habitat and diminished riparian habitat for riparian focal species. Further information on Project effects will be provided when the vegetation/flow fluctuation analysis and pre- and post-Project aerial photography comparisons are completed.

PacifiCorp analyzed other non-hydroelectric impacts and described fairly thoroughly the impact of grazing along river and reservoir reaches, and effects from recreation such as trampling.

Analysis has been incomplete regarding effects of peaking operations on downstream riparian habitat. Information provided by ODFW at the testimony of the proposed Salt Caves hydro Project and in the ODFW response to PacifiCorp's FSCD indicated preliminary impacts of flow fluctuations on the wetted fluctuating zone and non-woody riparian zone

PM&E's - PacifiCorp proposes no PM&E's in the DLA for wildlife and botanical resources. PacifiCorp proposes to continue existing measures of maintenance of two wildlife escapes along the JC Boyle power canal and environmental training programs for maintenance personnel to protect sensitive resources.

ODFW Recommendations –

ODFW recommends that PacifiCorp, through consultation with ODFW and other stakeholders develop a comprehensive wildlife mitigation plan for the Project area and related company-owned lands. The plan should provide routine monitoring and evaluation of wildlife and their habitats associated with the Project, mitigation strategies, and a long-term plan for implementation and monitoring of mitigation coordinated with federal, state, local and tribal wildlife management objectives. The mitigation plan should compensate in-kind to the extent feasible for Project development and ongoing operational and facility impacts. Any new Project development or impacts authorized by Project relicensing should be consistent with ODFW's Fish and Wildlife

Habitat Mitigation Policy and applicable wildlife management policies such as the Wildlife Diversity Plan.

SS-46 ODFW recommends that PacifiCorp develop a vegetation management plan. The plan will guide land management practices on company-owned lands and contain, control, and suppress exotic and invasive weeds so they do not act as a source for infestations downstream or on adjacent property and compromise the integrity of native fish and wildlife habitat.

SS-47 ODFW recommends that crossings are placed at strategic points along the canals and wildlife use and mortality be quantified and documented. For example, PacifiCorp has proposed increasing both the number and the width of crossing structures over similar canals at the North Umpqua Hydroelectric Project (FERC #1927). The design, location, and number of crossings should be evaluated for PM&E's for terrestrial resources of the Klamath Hydroelectric Project.

SS-48 ODFW's Wildlife Diversity Plan requires the protection and enhancement of populations of all native species at self-sustaining levels throughout their natural geographic ranges by supporting the maintenance, improvement, and restoration of habitats and by conducting other conservation actions. ODFW recommends that PacifiCorp consult with ODFW biologists and use appropriate study results to prioritize restoration and mitigation efforts for terrestrial and aquatic wildlife species.

X. Cumulative Impacts (Not addressed in the DLA).

SS-48(B) PacifiCorp has not evaluated the cumulative impacts of the Project on environmental resources. Studies by the Native Trout Research Project showed that Klamath River rainbow trout are a unique stock of fish that adapted to local habitat conditions (Buchanan 1991). They are unique, as they have adapted to water temperatures up to 27°F in the summer and down to 0°F in the winter, extremely alkaline pH, and high nutrient levels. Prior to the construction of JC Boyle Dam in the late 1950's, the Klamath River wild trout population was noted for its abundance and large fish. Trout migrated freely through all reaches to spawn in Spencer Creek, a principal tributary of the Klamath River, and possibly the mainstem river. Endangered shortnose and Lost River suckers, endemic to the Klamath River Basin, are an important indicator of the aquatic health of the basin. However, the combination of alteration of seasonal and daily basin hydrology, ramp rates that cause direct and indirect mortality, the slowing and storing of warm, nutrient-rich waters, and installation of barriers by the hydroelectric facilities, has led to reduced habitat quantity and quality. Native fish are now faced with increased nutrient loading, more extreme and fluctuating habitat conditions and water quality, and limited ability to move to better habitat.

Current conditions - Alteration of seasonal and daily basin hydrology, ramp rates that cause direct and indirect mortality and loss of habitat, the slowing and storing of warm, nutrient-rich waters, and installation of barriers by the hydroelectric facilities, has led to reduced habitat quantity and quality. Native fish are now faced with increased nutrient loading, more extreme and fluctuating habitat conditions and water quality, and limited ability to move to better habitat. In recent years, fish kills from flow fluctuations and violations of water quality standards have documented impacts of the hydroelectric Project on fish populations. The recent June 2003 outage when flows were lowered for maintenance at JC Boyle caused reduced flows of 250 cfs in the Keno Reach. A fish kill was documented by the district biologists due to ramp and high temperature conditions. The fish kill of 30,000 salmon in September 2002 due to low flows and high temperatures also document changes in hydrology and water quality that affect aquatic life. While flow diversion and management in the upper basin directly contributed to the

Response to Comment S5-47

FTR Sections 6.7.2.2 and 6.7.2.3 provide assessment of the risks and restrictions to wildlife movement associated with Project canals and other linear facilities. The results of these assessments were used to develop PM&E measures. PM&E measures include a detailed consideration of the installation and placement of wildlife access and crossing structures as appropriate.

Response to Comment S5-48(B)

Cumulative impacts will be addressed by FERC in the NEPA process. Those familiar with the Klamath Basin understand there are numerous impacts on natural resources that, in when considered cumulatively, render the current environment. The Klamath Hydroelectric Project is just one of many developments that influences the state of the natural environment.

Response to Comment S5-48

PacifiCorp has coordinated with ODFW representatives at all stages of the relicensing process through the TRWG. PacifiCorp expects to work with ODFW to prioritize enhancement efforts for wildlife and associated habitat in the Project boundary.

Response to Comment S5-49(B)

PacifiCorp has acknowledged the desire by some stakeholders that PacifiCorp conduct a detailed analysis of alternatives, including dam decommissioning. This issue is documented in the consultation record (Appendix E1-A) as an area of disagreement.

Response to Comment S5-49

The description of the existing socioeconomic condition includes information related to the importance of recreation, commercial fishing, and agriculture to the communities along the Klamath River as well as coastal communities in the Klamath Management Zone. The baseline condition for evaluating proposed Projects is a continuation of the existing license. PacifiCorp's proposed Project and PM&Es are anticipated to improve rather than degrade resource conditions (measured relative to continued Project operations under the existing license) and the socioeconomic condition of the communities that rely upon those resources. Some modest trade-offs are likely. These changes have been assessed in the Phase 3 socioeconomic study. In this context, the recommendation to conduct a cumulative effects analysis does not appear to be relevant.

Response to Comment S5-50

PacifiCorp maintains the fish passage cost estimates are appropriate at the conceptual level.

fish mortality, Klamath hydroelectric reservoirs may have contributed thermal warming to the river below Iron Gate Dam. PacifiCorp was able to briefly send water downstream from Iron Gate dam to assist in alleviating the situation, and PacifiCorp should look at such strategies for future operations.

Project impacts - Nearly 100 years of hydro power has directly or indirectly led to the extirpation of anadromous fish in the upper basin, the listing of 3 species of native fish under the Endangered Species Act, and the dramatic decline of native resident and anadromous fish throughout the basin. The Project has also contributed to the degradation of water quality, and general loss of productivity and capacity of aquatic, riparian and riverine habitats.

The Draft Executive Summary summarized a large amount of impacts in the basin of flow regulation and management to USBR. However, PacifiCorp is inextricably linked to USBR in a multitude of ways, including flow regulation, power contracts, and dam operation. The PacifiCorp license obligation with USBR is stated in articles 17 and 34 in license as part of the FERC license obligation. Based on this clear connection, PacifiCorp needs to assess and describe its impacts on hydrology, water quality, fish and terrestrial resources, and recreation.

The California Energy Commission (2003) conducted an energy analysis with a perspective of a high level analysis. The CEC concluded that while PacifiCorp will be operating with a deficit of power generation to use in the next decade, the relative contribution of the Klamath hydro Project was considered minimal. The CEC identified decommissioning as a viable alternative that should be examined during the FERC relicensing proceedings.

SS-48(B) PM&E's - There is no recognition of the need for a cumulative impacts analysis in the DLA. Therefore, there is no statement of Project impacts or PM&E's in the DLA for cumulative effects.

SS-49 **ODFW Recommendations** - PacifiCorp needs to conduct a cumulative impacts analysis as part of the socioeconomic studies and should include analyses that recognize the importance of economic development of improved fisheries, restoration of coastal and river communities dependent on fishing, angling, tribal values and recreation. The analysis should evaluation of each facility and its operation, its impacts on aquatic life, and potential protection, mitigation and enhancement measures for future operation and/or possible removal. The study should explore options to manage river flows, reservoir levels, water quality conditions to meet beneficial uses, and expected lifespan of facilities. The study should determine a hydropower alternative that integrates recovery of native resident and anadromous fish with improved water quality, passage, and habitat restoration.

SS-49(B) PacifiCorp has proposed a high level analysis or systems landscape options model (SLOM) to analyze a full range of Project alternatives including dam decommissioning and removal. PacifiCorp needs to develop more detail in the SLOM to provide sufficient information in the FLA for FERC to conduct a complete NEPA analysis. Agency and tribal letters have requested information to support an alternative for dam decommissioning and removal of one or more Project facilities in their FSCD and second stage consultation document (SSCD) comments. This evaluation needs to be applied for all resource groups such as hydrology, sediment and geomorphology, and terrestrial issues and not just for water quality and fish passage for "without Project" scenarios.

SS-50 ODFW believes that the cost estimates of fish passage facilities in the DLA are high and overestimate the cost of fish passage. The range of cost of fish passage improvements as stated in

Response to Comment S5-51

This comment includes several wide-ranging statements about the recreation flow analysis as well as some comments about findings for specific segments (although the links between comments and specific segments are not always clear). Rather than respond point-by-point, we have re-organized the major ideas of this comment in order to respond more systematically.

Overall, this comment appears to focus on two fundamental sets of issues. The first set critiques the *study methods and conclusions* related to flows and fishability. The second set focuses on general assertions by ODFW about how different flow regimes will create *improved fisheries and (presumably) fishing opportunities*. Both are discussed below.

Study methods and conclusions

ODFW appears to be critical of three study issues: 1) the number of anglers involved in the study; 2) the focus on existing fishing opportunities and flow regimes; and 3) separating concerns about the fishery from evaluations of fishability.

Number of anglers in the study

The size of the panel during the J.C. Boyle Bypass and Hell's Corner Reach controlled flow studies was small, but it is comparable to those in other fishability studies. More importantly, the similarity of assessments among panel members and consistency with conclusions from the Phase I interview component tell a compelling story about current angler preferences. As discussed in the Recreation Resources FTR, a larger panel might improve the precision of evaluation

the DLA are from \$570-160 million. These costs should be evaluated in the context of dam removal and decommissioning.

RECREATION RESOURCES (DRAFT EXECUTIVE SUMMARY XX, EXHIBIT E Y, RECREATION RESOURCES DTR Z).

ODFW disagrees with conclusions of the recreation flow analysis, in which the existing condition of low flows in different segments of the Klamath River are considered the optimum flow range for recreational angling. The flow evaluation curves incorrectly conclude that lower flows tend to provide the best quality fishing conditions since it provides better wading access, lower velocities in different habitats, and less turbulence in the rapids. The analysis of flow duration curves is based on average daily flows which lead to misleading conclusions on impacts of flow fluctuations to angling use.

Current conditions – The DLA generally describes optimum fishing in different reaches of the Klamath River from Link River to Copco 2 as low flow conditions with the fundamental assumption that the best condition for angling is when conditions are the most favorable for wading under existing peaking and flow fluctuation conditions. In addition, a very low number of anglers were interviewed for each reach with a total of 17 interviewees for fishing on all upper reaches of the river above Iron Gate Dam so conclusions are misleading with such low sample sizes. These ranged from 4 to 8 total anglers for each flow per reach. The interviewees were not given the choice of angling under a river with restored flow but only the existing river with ongoing peaking and ramping impacts.

Abundance, size, and distribution of fish along with angler success are inextricably tied to quality, quantity and productivity of the habitat. Many of the anglers interviewed expressed valid concerns of separating out the biophysical characteristics of the river caused by Project operations from their ability to successfully fish the river. The historic character of the river was a highly productive river known for its large and abundant trout along with the third largest runs of anadromous fish on the Pacific coast. Therefore, a more natural river hydrograph along with better water quality conditions and fish passage would yield more abundant native fish populations and in turn lead to higher quality of fisheries.

The peaking and ramping operations along with other Project impacts such as reduced passage have reduced the productivity of the river, and in turn angler success and satisfaction over the long term. The study relies on existing hydro Project conditions which have substantially reduced trout abundance, size and distribution. For example, anglers that were interviewed for their preference of fishing conditions in the Keno, bypass and peaking reaches naturally preferred lower flows because fish are more concentrated and easier to catch in low flow conditions. However, lowered productivity has strongly affected anglers' ability to catch fish in what was once a highly productive system known for its large abundant trout populations (Fortune et al. 1966).

The Recreation Resources DTR has contradictory statements about effects of the Project on hydrology. The Recreation Resources DTR p. 2-26 reports that during summer and fall average daily flows released by the USBR and PacifiCorp Projects are generally higher than those that would exist without them. Then, 8 pages later, the DTR (P. 2-34) describes the pre-Project flows as higher. This is also in contrast to the Water Resources DTR information from Balance Hydrologics (1966) and Ayres Associates (1999) reports that both concluded that shifts in seasonal averages of flows had occurred with higher winter flows and lower summer flows (Water Resources DTR 5-18) and with the results and discussion of Water Resources DTR 5.7.1 (p. 5-9) that concludes "upper Klamath Basin operations and diversions have

curves or ranges, but PacifiCorp firmly believes the substance of the findings would not change.

As discussed in the FTR, wading-based anglers generally prefer lower flows on various Klamath segments because they are less turbid, more wadeable, and provide more fishable water (runs and pocket water that can be accessed by wading or from the shore). ODFW appears to agree, and even suggests an additional reason for this preference by noting that lower flows concentrate fish and improve perceived fishing success. PacifiCorp's interpretation is that ODFW agrees that current wading-based anglers prefer to fish lower flows on the river given the current hydrological regime and fishery, which were the focus of the study. If ODFW has evidence that other anglers prefer and use higher flows (in the spring or during peaking periods), we would like to see that evidence.

Focus on current fishing opportunities

ODFW appears more broadly critical of the study because it focuses on assessing flows for current bank- and wading-based trout angling opportunities (which are based on the existing fishery and current flow regimes). ODFW appears to believe alternative flow regimes in Hell's Corner Reach would improve the fishery, which anglers would learn to fish, which would create improved fishing opportunities. The report clearly specifies that current opportunities are better at lower flows (particularly current wading-based fly-angling opportunities). However, it also notes that anglers might learn to fish higher flows by modifying where and how they fish (including changes in tackle, technique, or use of boats). PacifiCorp's findings were qualified because we don't have evidence that anglers would fish those higher flows effectively; ODFW is simply asserting this to be the case. Furthermore, FERC relicensing proceedings focus on the current resource conditions and analysis of how the proposed Project may effect or enhance the current resource conditions.

We stand behind the study's conclusion: lower flows in Hell's Corner Reach resulting from the peaking regime provide high quality wading-based and shore fishing opportunities, even though new opportunities *might* develop if higher sustained flows were to occur.

Separating fishery from fishability evaluations

ODFW asserts that the fishery would improve with higher flows and no fluctuations. ODFW appears concerned that fishability evaluations favoring lower flows are inconsistent with this assertion. The apparent "inconsistency" makes sense precisely because anglers were successful in separating evaluations of fishability from evaluations of the fishery (as we asked them to do in the study). ODFW appears to be confounding evaluations of the fishery with fishability. Anglers appropriately distinguished the two.

The recreation flow analysis focused on how flows affect fishability independent of biological issues. The conclusion that lower flows are preferred fits with the way anglers fish this river, as well as findings from other rivers. The study does not offer information about flow effects on the fishery, and we think everyone anticipates that the results of the biological studies will elucidate those issues.

Assertions about an improved fishery and fishing opportunities

ODFW appears to have broader concerns relating to the fishery, and how its protection or improvement should "trump" fishability. It makes sense that high quality fishing requires a healthy fishery. But it is necessary to specify fishing characteristics in order to assess how they interact with fishability

evaluations of different flow regimes.

ODFW asserts that the fishery on several reaches of the Upper Klamath River used to be better, could be improved with alternative flow regimes, and would necessarily improve angler satisfaction. The current Hell's Corner Reach fishery appears to be among the best in Oregon (USDI, 1994). The debate over the relative quality of historic, current, and possible future fisheries is clearly outside the scope of the recreation flow analysis.

It is speculative to simply assume that an unspecified "better fishery" equates with improved success or satisfaction. To wading-based fly anglers for example, higher catch-rates or larger fish might not be good trade-offs if they have to fish from a boat or the bank using bait or spinners. Anglers may also prefer "easier" fishing conditions (e.g., wadeable low flows where fish are concentrated) to those that are "harder," even if the latter increased the density or size of fish.

It is possible to determine anglers' preferences for different types of fishing opportunities, and assess their responses to potential trade-offs of different flow regimes. However, the opportunities must be carefully specified. Preferences shift depending upon 1) the abundance, size, and distribution of the current versus new fishery; 2) whether the new fishery will include new species (e.g., salmon and/or steelhead); 3) how new species might affect existing species; 4) relationships between flow regimes and fishing success; and 5) how flow regimes would affect the way anglers fish (technique and tackle, and whether it was boat, shore, or wading-based).

The recreation flow analysis was not designed to evaluate an unspecified future fishery (with more or different fish). The recreation flow analysis indicates that other fishing opportunities might develop under new flow regimes. But we think it is speculative and simplistic to assert they will be preferred by all anglers. Our analysis shows that substantially higher flows would dramatically change existing opportunities. If changed flow regimes improve the fishery but decrease fishability, analyzing these trade-offs is an important but formidable task.

generally resulted in an increase in winter flows, and a decrease in late-spring and early-summer flows in the river just downstream of Iron Gate dam.

Project impacts – Based on how anglers were asked to characterize optimum angling conditions given existing Project conditions, inappropriate flow evaluation curves were drawn for acceptable and optimum fishing conditions. These curves inappropriately underestimate and recommend minimum flows for fishing well below the natural flows of the river. For example, the Link River flow evaluation curve for fishing with optimum flows is 100 to 1,500 cfs with best flows at the lower end (Recreation Resources DTR p.2-36). The report states that minimum flows in the Link River bypass have been higher than 90 cfs even in the driest period and are often in the 250 cfs to 600 cfs range from May through December, and therefore concludes that the power diversion effects are beneficial because the Project generally prevents higher flows that would be caused by the additional flow of 1,450 from the Eastside canal. The 1,450 cfs diversion is higher than the allocated take of water for the Eastside diversion and may be in violation of the certificated water right for the diversion. Additionally, ODFW biologists have frequently observed flows in the bypass reach of less than 50 cfs.

Similarly, flow duration curves report optimum fishing conditions in the Keno Reach of 200 cfs are optimum while flows of over 1,000 cfs are sub-marginal (Recreation Resources DTR p. 2-47). It then reports that 300 to 600 cfs is optimal although aesthetics above 200 cfs (what is considered a flow to cover the bottom of the channel “might decrease as the river becomes more turbid, inundates vegetation, or loses some definition”. This information is misleading and speculative at best. Anglers may choose to fish a river at lower flows that concentrate fish but given a choice between a river with large abundant fish and a river with reduced population abundance and size, anglers will generally prefer more productive systems.

PM&E's – There are no PM&E's proposed in the DLA.

ODFW Recommendations -

ODFW recommends that the portion of the study associated with flow duration curves be deleted from the administrative record because it is technically flawed. Low sample sizes, misleading questions and false conclusions result in a study that disregards the historical information that showed that the river, in the absence of the JC Boyle facility, was once a highly productive system with abundant trout populations and known for its large-sized trout.

LICENSE LENGTH

The current license length of 50 years is too long, and a new license should be issued for no more than 30 years. The Project has considerable impacts on a multitude of environmental resources and produces a relatively low amount of power.

CORRESPONDENCE RECORD

The correspondence record is a record of all information exchanges between PacifiCorp and stakeholders. Some ODFW letters and emails were not included. For example, two January 2003 emails that documented ODFW concerns on Study Plan 1.9 Fisheries Assessment and Study Plan 1.15 Trout Movement were not included in the record.

Attachment 2
September 16, 2003

Page 54

ODFW Comments on Klamath DLA

Response to Comment S5-51(C)

The correspondence record for this licensing procedure is extensive as evidenced by the size of Appendix E1-A. Both PacifiCorp and FERC welcome notification on any inadvertently omitted correspondence to the record.

Response to Comment S5-51(B)

As presented in the FLA, PacifiCorp has used a term of 30 years to conservatively estimate power production costs and returns on investments.

SPECIFIC COMMENTS

III. Project Operations and Hydrology, and Sediment and Geomorphology in the Klamath Basin

SS-52 [Inconsistencies need to be rectified between Exhibit E, Water Resources DTR, Draft Executive Summary. For example, the Lost River references are incomplete, and Gerber and Clear Lake are not used in the analysis, but are a big part of the Project since water is diverted to and from these systems at various seasons. Keno Reservoir is inconsistently described. Graphs and tables are difficult to understand.

IV. Seasonal Minimum Flows in All Reaches

SS-53 [Draft Executive Summary: ES 4-5. PacifiCorp concludes that the need for PacifiCorp to do an instream flow study is questionable because USBR controls flows. In actuality, PacifiCorp does regulate flow and cause huge fluctuations in the Keno Reach by keeping the Keno Reservoir pool at less than 0.5 feet fluctuations.

V. Ramping Rates for Bypass and Full Flow Reaches

SS-54 [Draft Executive Summary: ES 4-5. PacifiCorp has mischaracterized and minimized the ramping rates for the Link River and Keno reaches as a small percentage of the time. PacifiCorp has not done site-specific studies on either reach and has drawn an erroneous conclusion.

VI. Water Quality Modeling and Macroinvertebrate Surveys

SS-55 [In Exhibit E and Water Resources DTR, many graphs are incomprehensible and/or unreadable. Units, statistics and consistent legends are needed. Statistics are unexplained and inconsistent between graphs. The box and whisker plots are incomprehensible with no explanations. Legends need to be consistent.

VIII. Native Trout and Wild Fish Surveys; Stock Assessments for Anadromous Fish

SS-56 [Draft Executive Summary: ES 4-3. PacifiCorp characterizes lack of passage facilities as: "The inability of some fish populations to gain access to suitable upstream habitat may be resulting in populations levels that are lower than what is desirable for certain management objectives". ODFW and all other agency and tribal stakeholders have stated that the single greatest impact of the population is lack of passage facilities at the California dams and inadequate passage facilities at Oregon dams. PacifiCorp has misrepresented the Project as a "may" effect when it is a significant impact that has denied access for anadromous fish to 300 miles of habitat and reduced abundance of native trout populations.

SS-57 [Draft Executive Summary: ES 4-6. PacifiCorp concludes that no trout fry were observed confirming that spawning does not occur in this reach (lack of gravel). This statement is incorrect since null hypothesis testing is that a scientist does not conclude the absence of something just because it has not been observed. In this case, since PacifiCorp spent minimal time sampling this reach, the conclusion is inappropriate.

SS-58 [Draft Executive Summary: ES 4-6. PacifiCorp concludes that the JC Boyle fish ladder has declining fish use but not due to ladder function. ODFW disagrees with this statement and conclusion, which was based on the June 26, 2002 Technical Memorandum by CH2MHill. ODFW research (1988-91) has demonstrated lack of passage at the JC Boyle Dam has impacted fish populations.

Response to Comment S5-52

Comment noted. Substantial revision has been made to the FLA.

Response to Comment S5-53

The consequence of Keno reservoir fluctuations on irrigators, residents that surround the reservoir, and ODFW's wildlife refuge is not fully known. PacifiCorp is not planning on conducting an instream flow modeling study in the Keno Reach, and has proposed in the FLA to not include this facility in the FERC boundary.

Response to Comment S5-54

Comment noted. PacifiCorp maintains that its characterizations of these reaches are reasonable.

Response to Comment S5-55

These graphics have been revised for added clarity.

Response to Comment S5-56

Comment noted.

Response to Comment S5-57

PacifiCorp has conducted additional fry sampling in the J. C. Boyle bypass and peaking reaches. Please see the Fish Resources FTR for sampling results.

Response to Comment S5-58

Comment noted. The unknown and disagreeable factor here is the reason that fish ladder use has declined. See the Fish Resources FTR for PacifiCorp's viewpoint.

- SS-59 [Fish Resources DTR: Page 4-6 Table E4.1.1-2 states that Arctic grayling occur in the Klamath Basin. They do not occur in the State of Oregon, but perhaps are present in California. The "smallmouth bass" that was discussed at length in the Aquatics Work Group meetings in 2003 does not appear on this list.
- SS-60 [Fish Resources DTR: Page E4-9, E4.1.3.1.1 Description of Area, paragraph two speaks to water quality in upper Klamath Lake and goes on to say that the poor water quality was responsible for several die offs of fish. ODFW questions how this discussion relates to conditions in the Link River. It should be noted that no fish die offs have been recorded in the Link River. Poor water quality and the subsequent secondary infection caused the die offs by *Flexibacter columnaris*. The water quality itself was not determined to be the causative agent. Dr. Rich Holt (OSU) identified *columnaris*. Rich Piaskiosky's work has demonstrated that the endangered shortnose sucker moves out of Lake Ewauna and up into the Link River during times of poor water quality. The endangered sucker survives poor water quality in the Link R, which is a different characterization than what the paragraph leaves the reader with.
- SS-61 [Fish Resources DTR: Page 4-10. The discussion is very vague with regard to trout. The study's objective was sucker entrainment but then the discussion goes on to talk about what a small percentage trout were of the total catch. The study and sample gear were not capable of capturing upstream migrating adult trout. The study did identify trout movements in the late winter and early spring when the juvenile trout would have made up a large proportion of the catch as they were catching few fish at the time. At best there should be a statement that identifies that this study was not set up to give information on trout and the gear and methods probably are not sufficient to discuss trout. Also, there was a very successful fishery on the adult fish at the same time that the report notes few fish were in the nets.
- SS-62 [Exhibit E: References are inconsistent and need to be available and some are not documented (e.g., National Park Service 1994).
- SS-63 [Exhibit E: E4.1.3.2.1 paragraph 2. The discussion is that there is poor water quality in the summer but does not mention excellent water quality in the winter and spring, the time when adult and juvenile fish would migrate.
- SS-64 [Exhibit E: E4.1.3.2.2, Paragraph 3 leaves out that the difference from the three reaches and the subsequent size difference is that there is a hydroelectric Project facility affecting the fish. This section needs to point out the 98% decrease in trout passage at JC Boyle and the extreme concern ODFW has for this hydroelectric Project impact. ODFW has implemented very conservative regulations to conserve fish populations in the peaking reach. Passage data suggests that this subpopulation is on the verge of a complete run failure. In paragraph five, the lack of passage at Keno could be from the long-term selection at JC Boyle dam. With the ladder not functioning for so long low numbers of fish exist from the original population.
- SS-65 [Exhibit E: E4.1.3.3.2 paragraph 4. Regarding fish spawning in the bypass reach, some trout have been observed spawning in bypass reach. Spawning has been observed very infrequently in the bypass reach. However, the success of the spawning of these fish is in doubt due to the history of frequent turbine shut offs and the spilling of water down the emergency by-pass and erodable soils that are present (the large cavern) over the redds. With respect to this same paragraph, Scott Snedaker, BLM biologist, saw fish still spawning in May. Bill Tinniswood, ODFW biologist, observed two fish on a redd in early July and caught one ripe male on the same day. PacifiCorp should also clarify that the peaking process has almost eliminated angler use days. Anglers are forced to fish the last two hours of the day during the longest days of the year. Catch rates and use are low during the high flow (peaking) process.

Response to Comment S5-59

Smallmouth bass has been removed from the task. The sighting of small mouth bass was apparently erroneous.

Response to Comment S5-60

The water quality in the Link River bypass reach is a function of the water quality in Upper Klamath Lake. PacifiCorp agrees that water quality itself is not the causative agent for the fish die-offs in the Upper Basin, but it is certainly one of the triggers. Dead fish may not have been reported in the short Link River bypass reach since it is very likely that fish dying in this reach would float down to Lake Ewauna/Keno Reservoir. PacifiCorp does not assume that since no dead fish have been found in this reach, that the poor water quality does not stress fish beyond their tolerance limits and contributes to fish die-offs.

Response to Comment S5-61

The entrainment study was designed to collect all fish species of catchable size. As such, the trout observations are valid.

Response to Comment S5-62

Comment noted.

Response to Comment S5-63

Comment noted.

Response to Comment S5-64

Although fish use of J.C. Boyle is less than observed historically, fish population data collected in both the Keno

and J.C. Boyle stream reaches show large numbers of resident fish, with a normal age distribution. The data do not support the ODFW's hypothesis about an imminent run failure for this species. We also note that although ODFW has placed some conservative regulations on this species, it still allows sport harvest in both reaches.

PacifiCorp conducted an engineering review and an analysis of several sources of information to assess whether the current ladder was restricting the upstream passage of rainbow trout. In addition, a trout radiotelemetry study was conducted in 2003 to determine if adult trout were tending to move upstream toward the dam and ladder, and, if so, whether they were passing through the ladder without delay. Results of these studies indicated that the ladder is functioning properly, and that few of the downstream fish are inclined to migrate upstream toward the dam. While a decline in use of the ladder has occurred since the dam was constructed, the evidence suggests that the trout population has modified its migratory behavior in response to the dam, reservoir, and changed hydrology and water quality below the dam. The fact that the "runs" of trout moving above the dam have declined, does not necessarily indicate that the population below the dam has declined.

Final results of the ladder assessment and radiotelemetry study will be provided in the FTR.

Response to Comment S5-65

PacifiCorp is unaware of any spawning observations made by others in the J.C. Boyle bypass reach prior to 2003. PacifiCorp disagrees with statement that peaking has eliminated almost all angler use days. Under most water year types low water fishing in the peaking reach is available both in the morning and evening hours.

Response to Comment S5-66

The National Park Service indicated that there was an immense quantity of macroinvertebrates in the peaking reach and did not mention the varial zone. Rick Hafele's comments were specific to the varial zone in the peaking reach and did not describe the general condition of the peaking reach.

Response to Comment S5-67

Comment noted.

Response to Comment S5-68

Typically, fish population estimates have wide confidence intervals around them. Fish managers generally look at length frequency distributions, age and growth patterns and condition factors to assess the "health" of a fishery's and not the numbers. The data that has been collected in the past is presented to give the reader context.

Response to Comment S5-69

See the Fish Resources FTR for the results of PacifiCorp's Fry Distribution and Abundance Study.

Response to Comment S5-70

The Trout telemetry study showed fish can pass through the ladder in a relatively short period. See Fish Resources FTR for study results.

Response to Comment S5-71

Comments noted. Valid changes have been incorporated into the FLA.

S5-66 Exhibit E: E4.1.3.4.1. Paragraph 4 cites a National Park Service (1994) report that describes an "immense quantity of macroinvertebrates in the peaking reach." There is no citation for this report. Rick Hafele, ODEQ macroinvertebrates expert, visited the peaking reach with ODFW and CDFG biologists and described the varial zone as poor for aquatic insect production.

S5-67 Exhibit E: E4.1.3.4.2. Paragraph 4 once again cites the National Park Service 1994 that is not found in the reference section. There is no citation for the Deschutes River fish abundance estimates. The population estimates (fish greater than 7.8 inches) are questionable due to the many different types of habitat sampled as well as the unknown methodology and procedures used.

PacifiCorp does not provide the confidence intervals as noted in the Salt Cave report (page 4-16). The redband trout population estimate cited from the Salt Caves Fisheries Resources for two sections of the peaking reach report are subject to uncertainty (City of Klamath Falls 1986). The upper peaking reach population estimate from JC Boyle Powerhouse to Caldera Rapid was 890 fish/mile, with a 95% confidence of 763/mile to 1069 fish/mile. The lower reach (Caldera Rapid to Salt Caves Powerhouse Site) estimate was 1911 fish/mile with very wide 95% confidence intervals of 475 fish/mile to 7936 fish/mile. PacifiCorp provides no discussion of how this sampling was conducted, the validity of methods use, or the probability that populations have changed or remained the same over the last 17 years.

S5-68 The DLA states that the population estimate of 890 trout per mile in the upper 5 miles is actually a good abundance for a river the size of the Klamath River. However, this estimate is a very low abundance for a river this size, likely due to flow fluctuations. The DLA states that these population estimates are comparable to the Deschutes and Crooked rivers in central Oregon. Population estimates for the Deschutes River range from 642 to 2566 trout per mile, and trout compete for food and habitat with sympatric populations of other salmonid species including steelhead, fall and spring chinook, whitefish and bull trout. The Crooked River, a tributary of the Deschutes, has population estimates ranging from 825 trout per mile (when winter flows averaged 10 cfs) to 8,228 trout per mile (when winter flows were raised to 50 to 75 cfs). The trout abundance data from the Deschutes and Crooked rivers indicates that Klamath River rainbow trout abundance in the peaking reach is relatively low for a large river east of the Cascades.

S5-69 Exhibit E: E4.1.3.4.2 Paragraph 6. The lack of fry sized fish up to 4 to 5 inches is a big concern. It is believed that the peaking process has reduced or eliminated the ability of small trout to survive coupled with the lack of spawning gravel.

S5-70 Exhibit E: E4.1.3.4.2 Paragraph 7 postulates that few fish migrating up the ladder were from the peaking reach and most were from the bypass reach. ODFW research results indicate that the ladder and entrance were so poorly placed and maintained and operated that fish were not able to traverse the ladder.

S5-71 Exhibit E: E4.1.4.1.1 Paragraph 3 states that trout spawning habitat in the Wood River is limited to approximately 2 miles. Actually, brown trout spawn in approximately 10 miles of the Wood River.

Exhibit E: E4.1.4.1.2 Paragraph 3. Spawning in upper basin tributaries does not typically occur in the spring but winter through early summer.

Exhibit E: E4.1.4.1.2 Paragraph 5 should include sturgeon.

Exhibit E: E4.1.4.2. Need to include reference for ODFW 1996 in references. ODFW (1996) and Hummel (1993) did not conclude that water quality was poor for the entire year. Roger Smith (ODFW

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ODFW Comments on Klamath DLA

District biologist) reviewed Hummel's thesis and he stated that the first game fish occurred near Gore Island and it was a Sacramento perch. As he went downstream from there he picked up the sunfishes and bass. The thesis did not support the entire reservoir being poor year-round, as water quality is good in the winter.

SS-71 Exhibit E: E4.1.4.4. Paragraph 2 indicates that summertime sampling was geared towards suckers, and then the discussion talks about trout abundance. Trout are commonly present in the fall and winter.

SS-72 Exhibit E: E4.1.5.2. Paragraphs 2 and 3 should state that trout used to migrate up the river past JC Boyle. In recent history the management of the dam has reduced the number of trout able to migrate upstream from below JC Boyle. This man-made bottleneck has reduced the flow of genetic material above and below the hydroelectric project facility. Conservative angling regulations have been implemented to protect this population due to hydroelectric impacts.

SS-73 Exhibit E: Table E4.2-26. Sacramento perch are missing but small mouth bass are included. This contradicts other fish assessments. It raises a question of why an analysis of smallmouth impacts was not performed.

SS-74 Exhibit E: E4.2.5.1.1 Paragraph 5. In eleven years as ODFW Klamath District Biologist, Roger Smith has never observed the ladder to be function properly. These situations were brought to the attention of PacifiCorp when Roger started in the district in 1992. In the summer time, vandals adjust the ladder to make pools for bathing. The drop between the pools is poorly managed as well as the flow in the ladder.

Response to Comment S5-72

PacifiCorp does not agree that management of J.C. Boyle dam or the design of the ladder has contributed to the reduced trout use of the facilities. While a decline in use of the ladder has occurred since the dam was constructed, the evidence suggests that the trout population has modified its migratory behavior in response to the dam, reservoir, and changed hydrology and water quality below the dam.

Response to Comment S5-73

The reference to smallmouth bass has been removed as it was an obvious error.

Response to Comment S5-74

The isolation of the Link River dam fish ladder from continuous observation and its proximity to Klamath Falls has played a factor in vandalism to the fish ladder. Project staff continuously worked to keep the ladder operating, however, vandals often returned to modify the ladder. USBR is now overseeing the operation of the fish ladder. In addition USBR is constructing a new fish ladder at the dam.

LITERATURE CITED

- Ayers Associates. 1999. Geomorphic and sediment evaluation of the Klamath River, California below Iron Gate Dam. Fort Collins, Co.
- Balance Hydrologics. 1996. Initial assessment of pre- and post-Klamath Project hydrology on the Klamath River and impacts on stream flows and fishery habitat. Report to the Yurok Tribe by Balance Hydrologics, Berkeley, California.
- Behnke, R.J. 1992. Native Trout of Western North America. American Fisheries Society Monograph 6. 275 pp.
- Buettner, M.E. and G. Scoppettone. 1990. Life history and status of catostomids in Upper Klamath Lake, Oregon. The National Fisheries Research Center, Reno, Nevada.
- Bovee, K., B.L. Lamb, J.M. Bartholow, C.B. Stalnaker, J. Taylor, and J. Henricksen. 1997. Stream habitat analysis using the Instream Flow Incremental Methodology. U.S.G.S., Biological Resources Division. Information and Technology Report 1997-0006 (Interim Version).
- Buchanan, D.V. 1991. Direct and rebuttal testimony of David Buchanan. Oregon Department of Fish and Wildlife. Proposed Salt Caves Hydroelectric Project.
- California Energy Commission. 2003. Preliminary assessment of energy issues associated with the Klamath Hydroelectric Project. California Energy Commission Report. Prepared for the California Resources Agency and State Water Resources Control Board.
- Castillo, G., M. Meleason, and E. Phillips. 1994. Annotated bibliography of fishery questions related to the reintroduction of anadromous fish over high head dams. Northrop, Devine and Tarbell, Inc for Portland General Electric, Pelton Round Butte Hydroelectric Project. Madras, Oregon. 197 pp.
- City of Klamath Falls (RMI). 1986. Application for license, Salt Caves Hydroelectric Project, FERC No. 10199. Submitted to the Federal Energy Regulatory Commission by the City of Klamath Falls.
- City of Klamath Falls. 1987. Shortnose and Lost River Sucker Studies CopCo Reservoir and the Klamath River. Prepared by BEAK Consultants Incorporated. Portland, Oregon.
- City of Klamath Falls. 1990. Application for License Salt Caves Hydroelectric Project No. 10199. Submitted to the Federal Energy Regulatory Commission. Response to License Additional Information Request Dated December 27, 1989.
- Collier, M., R.H. Webb, and J.C. Schmidt. 1996. Dams and Rivers: A primer on the downstream effects of dam. USGS. Circular 1126. Tucson, AZ. 94 pp.
- Deas, M.L. and G.T. Orlob. 1999. Assessment of alternatives for flow and water quality control in the Klamath River below Iron Gate Dam. Presented at the Third Klamath Basin Ecosystem Restoration Research and Restoration Coordination Meeting, March 9-11, 1999. Klamath Falls, OR.

- DE & S (Duke Engineering & Services) 1999. Review Draft, Upstream Fish Passage Survey. Pelton Round Butte Hydroelectric Project, Portland General Electric. Portland, OR. 19 pp.
- DE & S (Duke Engineering & Services) 1999. Pelton Round Butte Hydroelectric Project, Engineering studies in support of fish passage. Portland General Electric. Portland, OR. 67 pp.
- Desjardins, M. and D.F. Markle. 1999. Distribution and biology of suckers in lower Klamath reservoirs. 1999 Final Report. Submitted to PacifiCorp, Portland, Or by Oregon State University, Department of Fish and Wildlife.
- Desjardins, M., and D.F. Markle. 2000. Distribution and Biology of Suckers in Lower Klamath Reservoirs. Submitted to PacifiCorp, Portland, Oregon. Department of Fish and Wildlife, Oregon State University. Corvallis, OR. 37pp.
- Domina, D. 2001. Juvenile spring Chinook salmon downstream route selection under two passage scenarios at Willamette Falls, Oregon. American Fisheries Society presentation, Oregon Chapter meeting. February 15, 2001.
- ENSR. 1999. Preliminary temperature and hydrodynamic temperature modeling of the Lake Billy Chinook - Pelton Round Butte Project. Portland General Electric. Portland, OR.
- Fishpro. 2000. Fish passage conditions on the Upper Klamath River. Submitted to the Karuk Tribe and PacifiCorp. Port Orchard, WA.
- Fortune, J.D., A.R. Gerlach, and C.J. Hanel. 1966. A study to determine the feasibility of establishing salmon and steelhead in the upper Klamath basin. Oregon State Game Commission and Pacific Power and Light Company.
- Fredd, L. 1991. Direct testimony of Louis Fredd. Oregon Department of Fish and Wildlife. Proposed Salt Caves Hydroelectric Project.
- Gutermuth, B., C. Watson, and J. Kelly. 2000. Link River hydroelectric Project (Eastside and Westside powerhouses) final entrainment report, March 1997 – October 1999. Cell Tech Research and Development and PacifiCorp. Portland, OR. 127 pp.
- Hanel, J. and A. Gerlach. 1964. Klamath River flow study at J.C. Boyle Project. Pacific Power and Light Company, Portland, Oregon. (Unpublished Report).
- Hardin-Davis, Inc. 2000. Study Report. Ramping below Iron Gate Dam. Prepared for PacifiCorp Environmental Services. Portland, Or, and U.S. Bureau of Reclamation, Klamath Falls, Or. Prepared by Hardin-Davis, Inc., Corvallis, OR.
- Hemmingsen, A.R., R.A. French, D.V. Buchanan, D.L. Bottom, and K.P. Currens. 1992. Native trout Project. Progress Reports, Oregon Department of Fish and Wildlife, Fish Research Project F-136R. Annual Progress Report. Fish Division. Portland, OR. 22 pp.
- Hicks, B.J., J.D. Hall, P.A. Bisson, and J.R. Sedell. 1991. Responses of Salmonids to Habitat Changes. American Fisheries Society Special Publication 19:483-518.

- Huntington, C., T. Hardin, and R. Raymond. 1999. Water temperatures in the lower Deschutes River, Oregon. Portland General Electric. Portland, OR.
- Keany, J. 1999. Pelton Round Butte Hydroelectric Project noxious weed and non-native plant surveys, Final Report. Prepared for Portland General Electric by EDAW, Inc.
- Kier Associates. 2000. Klamath hydroelectric Project annotated bibliography of aquatics and wildlife. Database and CD prepared for PacifiCorp. Sausalito, CA.
- Kvam, B., E. Connor, E. Greenburg, D. Resier, and C. Eakin. 2001. Lower Deschutes River macroinvertebrate and periphyton monitoring report, fall 1999 and spring 2000 sampling. Draft Report. R2 Resource Consultants. Prepared for Portland General Electric. Portland, OR.
- Lichatowich, J. 1998. A conceptual foundation for the management of native salmonids in the Deschutes River. Report written for Portland General Electric Company. Portland, OR.
- Marcus, M.D., M.K. Young, L.E. Noel, and B.A. Mullan. 1990. Salmonid Habitat Relationships in the Western United States: A Review and Indexed Bibliography. USDA-Forest Service General Technical Report RM-188. Rocky Mountain Forest and Range Experiment Station. 84 pp.
- ODFW (Oregon Department of Fish & Wildlife). 1997. Klamath River Basin, Oregon fish management plan. Fish Division. Portland, OR. 186 pp.
- ODFW. 2001. Letter to Todd Olson, PacifiCorp. Oregon Department of Fish and Wildlife, Comments on First Stage Consultation Document for the Klamath hydroelectric Project, FERC #2082. Prineville, OR.
- PacifiCorp. 1997. Final report of fish trapping activities at the Klamath hydroelectric Project in 1988-91. PacifiCorp Environmental Services, Portland, OR.
- PacifiCorp. 1998. Application for new license for major Project – existing dam. Volume IV. Exhibit E, Appendix 1.2-1, Final Technical Report, pp. 3-34 to 3-40.
- Powers, P. D. and J. F. Orsborn. 1985. Analysis of barriers to upstream fish migration. An investigation of the physical and biological conditions affecting fish passage success at culverts and waterfalls. Bonneville Power Administration. Contract DE-A179-82BP36523 Project No. 82-14. August 1985.
- Ratliff, D.E. and E.E. Schulz. 1999. Annual timing, relative numbers, and age frequency of kokanee passing downstream through Round Butte Dam, 1995-1999. Portland General Electric Company, Portland, OR.
- Rogers, D. D.R. Maria, and J.M. Deinstadt. 2000. Upper Klamath River Wild Trout Management Plan, 2000-2004. California Department of Fish and Game. Sacramento, CA.
- Stillwater Sciences. 1999. Synthesis Report - North Umpqua Cooperative Watershed Analysis.
- Stalnaker, C., B.L. Lamb, J. Henriksen, K. Bovee, and J. Bartholow. 1995. The instream flow incremental methodology: a primer for IFIM. National Biological Service Biological Report 29.

U.S. Bureau of Land Management. 2002. Instream Flow Analysis for the Bureau of Land Management Federal Reserved Water Right, Claim Number 376, For the Klamath Wild and Scenic River in Oregon. May 2002. 92pp.

Weaver, C.R., C.S. Thompson, and E. Slatick. 1972. Fish passage research at the Fisheries-Engineering Research Laboratory, May 1965 to September 1970. Fourth Progress Report on Fisheries Engineering Research (1966-1972). National Marine Fisheries Service.



Oregon

Theodore R. Kulungoski, Governor

Parks and Recreation Department

Central Oregon
Area 5
Empire Corporate Park
20300 Empire Ave. Ste. B-1
Bend, OR 97701
(541) 388-6211
FAX (541) 388-6391



September 16, 2003

Mr. Toby Freeman, Relicensing
Manager
Mr. Todd Olson, Project Relicensing
Manager
PacifiCorp
825 NE Multnomah, Suite 1500
Portland, Oregon 97232

Subject: OPRD Comments on the Draft License Application
Klamath Hydroelectric Project - FERC Project No. 2082

Dear Mr. Freeman and Mr. Olson:

Following are the Oregon Parks and Recreation Department's (OPRD) comments on PacifiCorp's Draft License Application (DLA) for the Klamath Hydroelectric Project. OPRD Statutes, Policies and Rules, the Federal Wild and Scenic River Act, and the Federal Power Act are the basis from which these comments are made. The most relevant sections of OPRD regulations and the Wild and Scenic Rivers Act are quoted below for your reference. Relevant sections of the Federal Power Act are cited within the comments.

OPRD Statutes, Policies and Rules

ORS 390.815 Policy; establishment of Scenic Waterways system. The people of Oregon find that many of the free-flowing rivers of Oregon and Waldo Lake and lands adjacent to such lake and rivers possess outstanding scenic, fish, wildlife, geological, botanical, historic, archaeological, and outdoor recreation values of present and future benefit to the public. The people of Oregon also find that the policy of permitting construction of dams and other impoundment facilities at appropriate sections of the rivers of Oregon and Waldo Lake needs to be complemented by a policy that would preserve Waldo Lake and selected rivers or sections thereof in a free-flowing condition and would protect and preserve the natural setting and water quality of the lake and such rivers and fulfill other conservation purposes. It is therefore the policy of Oregon to preserve for the benefit of the public Waldo Lake and selected parts of the state's free-flowing rivers. For these purposes there is established an Oregon Scenic Waterways System to be composed of areas designated in accordance with ORS 390.805 to 390.925 and any subsequent Acts.

ORS 390.826 Designated scenic waterways. The following lakes and rivers, or segments of rivers, and related adjacent land are designated as scenic waterways:

(2) The Klamath Scenic Waterway which includes the Klamath River from the John Boyle Dam powerhouse downstream to the Oregon-California border.

OAR 736-040-0053 Klamath River Scenic Waterway

- (1) Scenic River Area:
- (a) That segment of scenic waterway beginning at the J.C. Boyle Dam Powerhouse to the California border (11 miles) is classified as a Scenic River Area.
- (b) This Scenic River Area shall be administered consistent with the standards set by Oregon Administrative Rules 736-040-0035 and Oregon Administrative Rules 736-040-0040(1)(b)(B). In addition to these standards, all new development in resource zones (i.e., forest-related dwellings) shall comply with Klamath County land use regulations.
- (c) New structures and associated improvements shall be totally screened from view from the river by topography and/or vegetation, except as provided under Oregon Administrative Rules 736-040-0030(5), and except those minimal facilities needed for public outdoor recreation or resource protection. If inadequate topographic or vegetative screening exists on the site, the structure or improvement may be permitted if native vegetation can be established to provide total screening of the proposed structure or improvement within a reasonable time (4–5 years). The condition of "total screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the improvement.
- (d) Commercial public service facilities, including resorts, motels, lodges, and trailer parks that are visible from the river shall not be permitted.
- (e) New mining operations, except recreational placer mining and recreational prospecting, as those terms are defined and used in Oregon Revised Statutes 390.835, and similar improvements, shall be permitted only when they are totally screened from view from the river by topography and/or vegetation. The condition of "total screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the new mining operation. If inadequate topographic or vegetative screening exists to totally screen the proposed mining site, the mining operation may be permitted if native vegetation can be established to provide total screening of the proposed mining site within a reasonable time (4–5 years).
- (f) New roads may be permitted only when totally screened from view from the river by topography and/or vegetation. The condition of "total screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the new road. If inadequate topographic or vegetative screening exists to totally screen the proposed road, the road may be permitted if acceptable topography can be created, or road design techniques used, to totally (100 percent) screen the road at the time of construction or native vegetation can be established to provide total screening of the proposed road within a reasonable time (4–5 years).
- (g) Where existing roads are visible from the river, major extensions, realignments, or upgrades to existing roads shall be totally screened from view from the river. The condition of "total screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native evergreen and deciduous vegetation to totally (100 percent) obscure the subject improvement. Necessary minor road improvements shall be substantially screened from view from the river. The condition of "substantial screening," as used in this rule, shall consist of adequate topography and/or density and mixture of native, evergreen and deciduous vegetation to substantially obscure (at least 75 percent) the minor road improvement. If inadequate topography or vegetation exists to substantially screen the road improvement, it may be permitted if acceptable topography can be created, or road design techniques used, to substantially screen the road at the time of construction; or native vegetation can be established to provide substantial screening of the road improvement within a reasonable time (4–5 years). When an existing road is regraded, no side cast into or visible from the river shall be permitted.

Response to Comment S6-1

The draft license application (DLA) included a thorough description of the existing Project, its operation, and the Project's effect on the surrounding environment, to the extent it could be described based upon available study results. PacifiCorp and relicensing participants had agreed prior to development of the DLA that it would not be appropriate for PacifiCorp to draw conclusions in the application about the effects of the existing Project on the surrounding environment, unless those conclusions were based upon study results.

Excess material shall be hauled to locations out of view from the river and placed in a manner that the excess material will not reach the waters of the scenic waterway due to wind, water or other means of erosion or transport.

(h) Visible tree harvest or other vegetation management may be permitted provided that:

(A) The operation complies with relevant Forest Practices Act rules;

(B) Harvest and management methods with low visual impact are used; and,

(C) Harvest or vegetation management is designed to enhance the scenic view within a reasonable time (5–10 years). Within this paragraph, "enhance" means to benefit forest ecosystem function and vegetative health by optimizing forest stand densities and vegetative composition, fostering forest landscape diversity and promoting sustainable forest values.

(i) Improvements needed for public recreation use or resource protection may be visible from the river, but shall be primitive in character and designed to blend with the natural character of the landscape.

(j) Proposed utility facilities shall share existing utility corridors, minimize any ground and vegetation disturbance, and employ non-visible alternatives when reasonably possible.

(k) Whenever standards of Oregon Administrative Rules 736-040-0035 and 736-040-0053 section (1), subsections (b) through (j) are more restrictive than Klamath County's land use and development ordinances, scenic waterway regulations shall apply.

16 U.S.C. 28 Wild and Scenic Rivers Act

Section 2 (a) The national wild and scenic rivers system shall comprise rivers... (ii) that are designated as wild, scenic or recreational rivers by or pursuant to an act of the legislature of the State or States through which they flow, that are to be permanently administered as wild, scenic or recreational rivers by an agency or political subdivision of the State or States concerned, that are found by the Secretary of the Interior, upon application of the Governor of the State or the Governors of the States concerned, or a criteria supplementary thereto as he may prescribe, and that are approved by him for inclusion in the system... Each river designated under clause (ii) shall be administered by the State or political subdivision thereof without expense to the United States other than for administration and management of federally owned lands... Nothing in this subsection shall be construed to provide for the transfer to, or administration by, a State or local authority of any federally owned lands which are within the boundaries of any river included within the system under clause (ii).

SECTION 10. (a) Each component of the national wild and scenic rivers system shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting its aesthetic, scenic, historic, archaeologic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area.

General Comments

Overall Assessment of the Draft License Application

The OPRD is not surprised by the content of the DLA as PacifiCorp has been very clear that the DLA would not contain elements required by FERC (18 CFR 16.8 (c) (4)). OPRD is very disappointed that PacifiCorp chose not to provide examples of each of its projects critical elements (i.e. project impacts, mitigation measures) so that interested parties and agencies with mandatory authorities could discern what the proposed project might look like and evaluate the available information accordingly. PacifiCorp's decision to provide a DLA lacking such details

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S6-1

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requires that commenting parties provide conservative recommendations that meet their individual needs and regulations. Had the DLA met FERC requirements and presented a detailed description of what the proposed project might look like, including proposed protection, mitigation and enhancement measures (PM&Es), agencies and interested parties would be able to make constructive, evaluative recommendations.

State scenic waterway and federal wild and scenic river designation of the Klamath River from the J.C. Boyle Powerhouse to the Oregon-California state line was based on the significance of particular values of the river specifically, these are Recreation, Wildlife, Fish, Prehistoric, Historic and Scenic values (USDI, 1990).

S6-2

Recommendation: Protection and enhancement of the river values is paramount to the development of PacifiCorp's proposed project. The FLA must detail the purpose, content and methodology of the studies used to determine project-related impacts, the scientific analysis used to evaluate those studies and the PM&Es that will balance all of the resource needs. The required two-year study season should be employed to obtain a thorough base of data. This data then would be available to all interested parties to deliberate and develop the best beneficial project.

Overall Assessment of the Consultation Process

OPRD thanks PacifiCorp, Kearns and West, EDAW, Bo Shelby and Doug Whitaker for providing an open and collaborative process in the Recreation, Land Use, Visual and Aesthetic Technical Working Group. This environment enabled us to develop and amend study plans, evaluate study results as they became available and foster a positive work atmosphere. However, we found that this process was not afforded other work groups.

S6-3

In offering a collaborative approach to develop study plans, PacifiCorp consistently listed stakeholder recommendations as "ongoing issues," seemed to come to work group meetings with narrowly defined and inadequate study plan objectives and showed true reluctance to expand evaluations beyond those predetermined objectives. This posture resulted in studies beginning without collaborative approval, a lack of trust that the studies would be objective and thorough, or would include pertinent and necessary information for that particular work group. Trust was further undermined when, in the DLA, PacifiCorp repeatedly stated that study results would be available in the FLA. Not sharing interim data leaves stakeholders believing that the proposed project and corresponding PM&E's are being developed under a Traditional Process and not the "robust collaborative effort" as described by the applicant.

S6-4

Recommendation: PacifiCorp should conduct studies in a true collaborative process, including stakeholder approval of study plans, prior to study initiation. Share information gathered in the studies as it becomes available so stakeholders can begin their evaluations as early as possible. Use results to collaboratively evaluate a host of proposed projects so that when the FLA is filed, FERC has sufficient information to do its work and is not inundated with Additional Study Requests (ASR's).

Specific Comments

OPRD is most concerned with protecting the values for which the Klamath River was designated a state scenic waterway and a federal 2(a)(ii) wild and scenic river. Therefore, our comments are limited to the section of river designated a state scenic waterway and federal wild and scenic river (Hell's Corner Reach).

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OPRD Comments on Klamath DLA

Response to Comment S6-2

The License Application was prepared according to FERC guidelines to describe the Project impacts and enhancement measures to balance social and environmental resources including hydropower generation.

Response to Comment S6-3

Study results were shared with stakeholders as soon as, and sometimes before, draft technical reports were prepared.

Response to Comment S6-4

The goal of the Collaborative process was to work towards gaining study plan approval on all Klamath relicensing studies. However, due to timing issues and disagreement on the scope of the studies, some did not receive working group or Plenary approval.

Land Use, Visual, and Aesthetic:

Inventory of Applicable Plans: The Klamath River from the J.C. Boyle Powerhouse to the Oregon-California state line was designated a state scenic waterway in 1988. In 2002 the state of Oregon adopted specific land management rules for this 11-mile section of state scenic waterway. Table 2.4-1 (Inventory of Applicable Federal, State, and Local Plans) of the Draft Technical Report does not include the Oregon Parks and Recreation Department. This information is also missing from Table E8.3-2 (Summary of relevant land use and resource management plans).

Recommendation: The FLA must acknowledge the state scenic waterway portion of the Klamath River and the state regulations (ORS 390.805 through 390.940 and OAR 736-040-0005 through 736-040-0095) As a landowner within this designation, PacifiCorp is bound by state regulation (18 CFR 16.8 (c) (4)).

**DTR 4.7.3.1 Inventory of Applicable Plans and Programs:
Oregon:**

3. Oregon Parks and Recreation Department. Klamath River Scenic Waterway Rules (OAR 736-040-0053(1)).

Summary: These rules were filed as final on October 3, 2002. The final rules classify the river as Scenic.

Recommendation: The FLA should reflect the correct classification of the Klamath River Scenic Waterway as Scenic.

Visual Resource Management Element: This section, in discussing the state scenic waterway regulations, states, "The following provisions of the rule may apply to the Project." (DTR page 4-55). State scenic waterway regulations do apply to the Project where it falls within one-quarter of one mile on either side of the river between the J.C. Boyle Powerhouse and the Oregon-California state line.

Recommendation: The FLA must acknowledge the state scenic waterway portion of the Klamath River and the state regulations ORS 390.805 through 390.940 and OAR 736-040-0005 through 736-040-0095. PacifiCorp is bound by these regulations as a landowner within the boundaries of a state scenic waterway (18 CFR 16.8 (c) (4)).

Documentation and analysis of medium and high flow conditions for various Key Observation Points (KOP's):

As stated in the various sections this information is lacking because the data was not gathered until May of 2003.

Recommendation: The required two-year study season should be employed to obtain a thorough base of data. This data then would be available to all interested parties to deliberate and develop the most beneficial project.

E8.6 Existing and Proposed PM&Es: This section does not list PM&Es, rather it suggests what might be included in the FLA. Scenery is one of the values for which the river was designated a state scenic waterway and federal wild and scenic river (USDI, 1990).

Response to Comment S6-5

Comment noted. This information is included in the FLA.

Response to Comment S6-6

Comment noted. This information has been corrected in the FLA.

Response to Comment S6-7

Comment noted. This information is included in the FLA.

Response to Comment S6-8

An additional observation was made after the DLA. This information is included in Section 4.7 of the Land Use, Visual, and Aesthetic Resources FTR.

Response to Comment S6-9

PM&E's for visual/aesthetic impacts are included in the final license application.

S6-9

Recommendation: The PM&Es in the FLA should reflect state scenic waterway regulations in the preservation and enhancement of visual and aesthetic resources (18 CFR 16.8 (f) (3) (ii) .

Recreation:

S6-10

Project Boundary – Figures E7-1-1 (7, 8 & 9 of 15) show the study area to follow the state scenic waterway boundary of ¼ mile on either side of the river and from above the powerhouse to the state line. DTR Figure 1.1-2 (7 of 15) shows the proposed FERC boundary measuring approximately 100 feet on either side of the river and ending downstream of the powerhouse approximately 500 feet. This proposed boundary appears designed to preclude inclusion of the access road to the Upper Klamath River boater access. Phase I interview results (Appendix 2C, page 1) show the interest in the maintenance and improvement of this access road. These results confirm that this area is essential to recreational access and should be included in the FERC boundary for future recreational access objectives.

Recommendation: PacifiCorp should include the Upper Klamath River boater access road in the FERC boundary and continue to maintain and operate this access road below the J.C. Boyle Powerhouse for recreation access purposes. PacifiCorp should convert the old housing site into a raft staging area and perhaps an overflow parking area (day-use only). Road improvements and site development should be accomplished in accordance with state scenic waterway regulations.

S6-11

Trails: PacifiCorp did not evaluate trails as to avoid duplicating the work of the Bureau of Land Management (DTR 5-89).

Recommendation: PacifiCorp should incorporate the findings of BLM and work with them to develop a trails plan that will connect private and public lands. Within the scope of this plan, PacifiCorp should design a pedestrian bridge installation at an historic crossing to allow for a loop connection for hikers. Unnecessary roads should be evaluated for complete obliteration or conversion to non-motorized trails.

S6-12

Recreational Facilities: PacifiCorp lists many "considerations" for the removal, expansion, upgrade, and other changes for existing and possible additional facilities (DTR 5.7.4 Recreational Needs Analysis).

Recommendation: All development and rehabilitation activities within this section of river must comply with state scenic waterway regulations. PacifiCorp should move campsites and motorized access locations out of riparian areas, wetlands and meadows and restore these areas with native vegetation.

S6-13

Whitewater Boating: While PacifiCorp defers to the BLM and State of Oregon to determine whitewater boating needs (DTR page 5-108), the release of water from the J.C. Boyle Powerhouse has a direct affect on the ability to whitewater boat. PacifiCorp acknowledges that the timing of water release has changed in recent years (DTR page 2-28). This timing issue is acknowledged on DTR pages 2-72 through 2-74. Whitewater boating is one of the values for which the river was designated a state scenic waterway and a federal wild and scenic river (USDl, 1990).

Response to Comment S6-10

In response to the recommendation, PacifiCorp has included the access road below the J.C. Boyle Powerhouse within the FERC boundary. The boundary was extended past the access road to Spring Creek Island boat launch site to the turn-around on the existing road. This provides room for safe vehicle turn-around, which is required to access the boat launch site. PacifiCorp has also included the old J.C. Boyle housing site within the FERC boundary so that it can be used for a raft staging area and overflow parking. However, PacifiCorp must retain rights for using the site for critical hydro operational requirements and material storage. There are no other level areas near the powerhouse that would be suitable for emergency construction and operational requirements.

Response to Comment S6-11

A trail study was included as a component of the Recreation Capacity Analysis (Section 5.4.3 of the FTR for Recreation Resources). The trail study was completed in the interim between the DTR/DLA and the FTR/FLA. Results of the trail study, as well as a general discussion of BLM proposed trails (per the Draft Upper Klamath River Management Plan), are included in the FTR and FLA for Recreation Resources. Additionally, trail needs and potential actions to meet those needs are included in the Draft RRMP.

Response to Comment S6-12

Comment noted. Minimizing potential recreation-related impacts to terrestrial and cultural resources is a goal of the Draft RRMP. Specific actions to meet this goal are described

in the Draft RRMP for areas within the proposed FERC Project boundary.

Response to Comment S6-13

Comment noted. Whitewater boating-related flows are discussed in the FTR and Section 7.0 of the Exhibit E, as well as in the Draft RRMP. The Recreation Flow Analysis in the DTR presented preliminary findings only, as the study was still in process. The complete Recreation Flow Analysis can be found in Section 2.0 of the FTR for Recreation Resources. Revisions and additional recreation flow information was also added to the FLA and the Draft RRMP.

Response to Comment S6-14

The results of the fisheries studies are provided in the Fish Resources FTR. PacifiCorp has considered the fisheries, recreation, and other resource study results in developing the proposed J.C. Boyle powerhouse operations, including instream flows and ramp rates. PacifiCorp believes the proposed operation of J.C. Boyle powerhouse protects state scenic waterway and federal wild and scenic rivers values.

Response to Comment S6-15

See response to comment S2-10.

Response to Comment S6-16

Comment noted. The complete description of PM&Es to be included in the Draft RRMP, are discussed in Section E7.5 of the FLA.

S6-13

Recommendation: PacifiCorp should schedule flow releases suitable for whitewater boating, with releases occurring by mid-morning to facilitate boating during the warmest portion of the day (DTR page 2-73).

S6-14

Recreational Fishing: Fishing is identified as one of the values for which the river was designated a state scenic waterway and federal wild and scenic river (USDI, 1990). The timing of peaking flows affects this value (DTR page 2-64). As acknowledged in the Phase I interview, the release of peak flows is preferred at different times of the day depending upon when the angler wants to fish (DTR page 2-64).

Recommendation: PacifiCorp should complete the fisheries study to determine the necessary flows for fish survivability. The collaborative process should be used to determine the best flow regime that protects the state scenic waterway and the federal wild and scenic river values.

S6-15

General Recreation: The water in the Klamath River provides for boating and fishing activity. To date, studies concerning water quality have not been completed and assessments have not been made to determine what can be done to assure high water quality.

Recommendation: PacifiCorp needs to address those elements specifically attributed to the existing and proposed project that affect water quality. Dissolved oxygen, temperature, toxic substance, turbidity levels, etc. must be evaluated and addressed to sufficiently satisfy the 401 Certification application requirements.

S6-16

E7.5.2 Proposed Measures: This section states that PM&Es will be developed between the DLA and FLA and incorporated into the Recreation Resource Management Plan.

Recommendation: The Recreation Resource Management Plan (PM&Es) must take into account the results of all resource studies so as to protect and enhance the values for which the river was designated a state scenic waterway and a federal wild and scenic river.

Closing Comments:

Thank you for the opportunity to comment on the Draft License Application. If you have any questions or would like to discuss these comments, please do not hesitate to contact me. The OPRD looks forward to working collaboratively in the development of the protection, mitigation and enhancement measures that will protect the Klamath River Scenic Waterway.

Sincerely,



Jan E. Houck
Program Coordinator

/jeh

C: Oregon HART
Dave Wright, OPRD Resource Management & Planning Division Manager
Michelle Michaud, OPRD Natural Resources Manager

**North Coast Regional Water Quality Control Board Comments on the
Klamath Hydroelectric Project Draft License Application for New
License, FERC # 2082**

September 18, 2003

**Draft Technical Report (DTR) for Water Resources and Exhibit E 3
Water Use and Quality**

Water Resources DTR Review – Chapter 1.0 Introduction

General Comments:

- needs editing to reduce redundancy and improve on readability—first paragraph is a good example.

**Water Resources DTR Review – Chapter 2.0 Compilation and Assessment of
Existing Water Quality Data**

**This was reviewed with the understanding that it is support material for the Water
Use and Quality section of the Application, Exhibit E, and that comparison of
findings to water quality standards are presented in Exhibit E.**

General Comments:

- The existing data represent a significant body of information—over 4,000 observations at 20 sites for the 248 miles of river were selected for assessment. While the sources of the data are mentioned, it is not clear if certain sources were not use, e.g., Regional Water Board data from the CWA Section 104(b) grant, Dept. of Water Resources reservoir data, etc.
- The data should be discussed in the context of what was happening on the river through this period, such as known discharges, log rafting upstream of Keno, etc.
- The data should not be treated as individual parameters, rather in relation to one another and the dynamics of primary productivity, decomposition, and basic water chemistry.
- pH should be presented and discussed.
- Add a data gaps section per Objective 3, “Identify data gaps to be filled by further study.”
- A discussion subsection should be added at the end of this section that provides a cogent treatment of the results of the analysis with respect to the stated objectives for the assessment.
- Many statements are unsupported, and should be better explained with more analysis of the data, or caveated as speculative and the reasoning behind the speculation presented more clearly.

S7-1

Response to Comment S7-1

Comments noted. Many of these suggestions have been incorporated into the extensively revised DTR.

S7-1	• Enlarge the site map or change the scale, as it currently hampers the reader's understanding of the data in a spatial context • Use site acronyms instead of station IDs to avoid sending the reader back and forth from the charts to the table of sites. • Bar charts are not adequate to evaluate the data; box plots would be more useful—give the reader a sense of the distribution of the data • Plots from upstream to downstream should have the x-axis on a river mile scale, with sites identified. That is, the x-axis scale as presented gives the impression that all sites are equidistant. • The analysis of temporal trends is inadequate.
S7-2	<u>2.4.2 Database Development</u> page 2-2, item 6—no explanation is offered as to why WQ-related data for other media were not included in the data set. Those data may assist in explaining some of the relationships borne out by the analysis.
S7-3	<u>2.7.1 Review of Historical Data</u> No mention is made of the NCRWQCB data, nor 1960s DWR data on the lakes and river. A table of data sources should be provided, identifying what data were evaluated and which were not analyzed according to which criteria. Table 2.7-1, page 2-5 • site “KR24898,” Klamath River at Hwy 97 Bridge, is listed as site “KR24890” in Table 2.7.2 and so referenced in the text. • Site “KR23503,” Klamath River Below JC Boyle Powerhouse” is listed as “KR22127” in Table 2.7-3. Are they the same site?
S7-4	<u>2.7.2 Spatial Trends in the Historical Data</u> A better map would facilitate the reader's understanding of the text The use of averages provides the reader with no information on the distribution of the data—at a minimum, scatter plots as used in Section 3 should be used; box plots are better. The use of means for lognormal data, such as nutrient data, is not appropriate. Box plots are a graphical expression of non-parametric statistics that provide the reader with central tendency as well as the distribution of the data. A statement is made at the end of this paragraph that “...detailed interpretation of the differences between the sites is probably not warranted.” That statement is contradictory to the purpose of the section—to look at spatial trends. That sentence should be removed or revised to indicate that the data are coarse, but useful when evaluated on a large scale.
S7-5	<u>2.7.2.1 Specific Conductance and Alkalinity</u> The statement that “Alkalinity... is also a function of dissolved material...” is misleading and conveys to the reader that conductance and alkalinity are synonymous.

Response to Comment S7-2

The database was developed according to the study plan approved by the Plenary.

Response to Comment S7-3

The Water Resources DTR was significantly revised to address stakeholder comments and to update studies. This section has been modified to address this comment.

Response to Comment S7-4

This section has been modified to address this comment.

Response to Comment S7-5

This section has been modified to address this comment.

- S7-5 While alkalinity is controlled by some dissolved material, the whole story should be told—alkalinity is much more than that.
- S7-6 [The patterns of conductance and alkalinity may be similar, however, alkalinity is more appropriately evaluated in context with pH and primary productivity.
- S7-7 [Treatment of the data is inconsistent. Conductance is addressed by a bar chart, then alkalinity is compared to it with a statistical test.
- S7-8 [2.7.2.2 Dissolved Oxygen
page 2-11, sentence 4—states that “Dissolved oxygen concentration in the outflow of Iron Gate dam was probably influenced by conditions within the reservoir.” Most certainly! Were reservoir data included in the analysis? This important water quality parameter should not be separated from discussion of primary productivity and reservoir dynamics.

The use of average dissolved oxygen is not sensitive to the dynamics of primary production, water temperature, and reaeration. At the very least, some representation of the distribution of the data should be available—box plots would help.
- S7-9 [2.7.2.3 Nutrients
The data should be expressed as box plots. The use of an average for lognormal data is inappropriate.
- S7-10 [Paragraph 1, page 2-11—Klamath River “immediately below Iron Gate dam” is identified as a possible area where nitrate sources may occur. Are there Iron Gate Hatchery discharge data that could be used in the analysis? Were the dynamics of the nitrogen cycle from Iron Gate release to the lower site considered?

Again, the map is not of scale for the reader to even see where the sites are and if inflows occur between the sites.
- S7-11 [Paragraph 2, page 2-11—orthophosphate is discussed briefly, but no data are presented, nor are the dynamics of the phosphate cycle and relevance of orthophosphate.

Paragraph 2, page 2-11—the speculation that “...high productivity probably contributed substantial dissolved and particulate organic matter...” is unsubstantiated and should be evaluated with the conductance, nutrient, chlorophyll *a*, and turbidity data.
- S7-12 [2.7.2.4 Organic Matter
Organic matter should be discussed along with primary productivity and known sources in the river at the time. Speculation that “...high productivity probably contributed substantial dissolved and particulate organic matter...” should be evaluated along with the conductance, nutrient, and turbidity data.
- S7-13 [2.7.2.6 Chlorophyll *a*

Response to Comment S7-6

Comment noted.

Response to Comment S7-7

This section has been modified to avoid inconsistent comparisons.

Response to Comment S7-8

Comment noted. Most parameters are displayed as box plots in the FTR. Please see Section E3 of Exhibit E for an updated and detailed discussion on the Project's impact on water quality and PacifiCorp's proposed PM&Es.

Response to Comment S7-9

Box plots are used in the Water Resources FTR.

Response to Comment S7-10

No data from the fish hatchery were available to PacifiCorp for this analysis. The map has been modified to address this comment.

Response to Comment S7-11

This section has been modified to address this comment.

Response to Comment S7-12

This section has been modified to address this comment.

Response to Comment S7-13

ODEQ water quality action levels are included in Section E3 of Exhibit E.

S7-13	That the concentrations of chlorophyll <i>a</i> observed below JC Boyle as lower than above should be explored in the context of the influence of the springs in the bypass reach, as well as changes in the primary productivity that may occur in the diversion channel and subsequently released through the turbines. Reference to the ODEQ water quality action level for chlorophyll—please provide that level for the reader.
S7-14	<u>2.7.2.7 Interpretation of Spatial Trends</u> The section opens with “It is unwise to attempt a detailed interpretation of spatial trends in these historical data for several reasons. The data were collected over many years during which important changes occurred in the basin.” Is this meant to say that temporal changes were so dramatic and variable that any spatial analysis is meaningless? If so, that negates all the discussion that occurred in the pages preceding. Also, I don’t believe it—presentation of the data as simple plots over time and compared on a site-by-site basis may indeed serve the interpretation of spatial differences, and support the observations already brought forth in Section 2.7.2. Evaluation of spatial differences and how they change over time, especially with changes in the river hydrology (like dam construction), are valuable as hindsight in evaluating current conditions and proposed changes. An understanding of the changes that <u>have occurred</u> is essential to an understanding of the current situation and what <u>may occur</u> as a result of any proposed changes.
S7-15	Page 2-15, paragraph 3—mention is made here of possible nitrogen sources between the Iron Gate outflow and the site below Iron Gate. • A better scale map is needed • Discharge from the Iron Gate hatchery should be evaluated along with the data for these two sites. Page 2-16, paragraph 2—a statement is made that “The Trinity River enters the Klamath between Orleans (KR05912) and the site near Klamath, suggesting that the Trinity River may have been introducing a load of suspended material and phosphorus to the Klamath River.” • That statement is unsupported by any presentation of data from the Trinity River and without any temporal analysis of data for those three sites (upstream at Orleans, Trinity River, and downstream at Klamath). • No consideration of the 30 or so miles between the confluence of the Trinity and the site at Klamath, nor the 51 miles between Orleans and Klamath, is expressed. A lot can happen in that 51-mile stretch of river.
S7-16	<u>2.7.3 Temporal Trends in the Historical Data</u> Three paragraphs and simple linear regressions at two sites are not adequate to explain temporal trends for over 4,000 sampling events at 20 sites over 248 miles of river. At a minimum the data for each site should be plotted on a time scale and evaluated in the context of changes in conditions upstream of the site and at other sites over time.

Response to Comment S7-14

Comment noted.

Response to Comment S7-15

This section has been significantly modified to address these comments.

Response to Comment S7-16

This section has been modified to address these comments.

S7-17 [The data should be evaluated in the context of the physical and biological dynamics of the system—e.g., dissolved oxygen, pH, alkalinity evaluated in the context of primary productivity, along with nutrients and organic matter.

S7-18 **Water Resources DTR Review – Chapter 3.0 Monitoring of Water Temperature and Water Quality Conditions in the Project Area**

General Comments:

- A substantial amount of data were collected in this effort. Better displays are provided than for the historical data set, but the same problems with readability and clarity exist as in the previous chapter:
 - Maps should be larger or cover smaller areas so the reader can refer to them in discussions of spatial differences.
 - Acronyms should be used on the maps and figures instead of site IDs to avoid going back and forth from table to map. The use of site IDs makes evaluation of the data difficult and frustrating.
 - Plots from upstream to downstream should have the x-axis on a river mile scale, with sites identified. That is, the x-axis scale as presented gives the impression that all sites are equidistant.
 - All plots should be checked to ensure that the sites are in order.
- Parametric and nonparametric statistics are intermixed in the discussions. For instance, averages are discussed in the text, while some of the data are presented as box plots.
- The data are presented as distributions for the most part, an improvement over the previous section. However, averages are still used in many of the discussions, insensitive to the diel and seasonal nature of the system dynamics.
- Nutrient data are discussed as means, which is inappropriate for lognormal data unless transformed into a normal distribution.
- Scatter plots should use the date on the x-axis as with other plots, instead of day of year, e.g., Figure 3.7-8.
- Redox potential is mentioned as a measurement parameter, but is not discussed nor used in discussions of nutrient cycling.

3.2 Objectives

paragraph 1, page 3-1—The primary objective includes combining current and historic data: "...to collect current water quality data (since 2000) that, combined with the historic data..." Please explain how this is done. It is not apparent in reading the section that it was done.

Paragraph 1, page 3-2—warm water and nutrient enrichment are not "...the primary cause of water quality problems..." rather they are the water quality problems.

Response to Comment S7-17

Comment noted. Please see the revised Water Resources Technical Report for a methodology discussion. Please also see Section E3 of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed mitigation measures.

Response to Comment S7-18

General Comments This chapter has been modified to address these comments. Site IDs were developed to provide useful information about the site location while also being amenable to sorting and meaningful manipulation by statistical analysis software. Site IDs had to be amenable to adding new sites without upsetting the organization. Acronyms are not suitable for these purposes. The text has been modified to provide easier site identification.

Objectives The text of this chapter has been modified to address this comment.

Figure 3.4-1 and Table 3.4-2 PacifiCorp has incorporated these comments in the FTR.

Figure 3.4-1, page 3-3—site “KR20642” is displayed twice on the map in two different locations. That should be resolved, as well as improving the scale so the reader can see if the site is above or below Shovel Creek.

Table 3.4-2, page 3-8—provide a map of temperature sites in addition to the table.

3.4.4 Water Quality Monitoring During 2002
page 3-7—In the bulleted section

- It states “There were three main sampling components,” however four are listed. The last one is missing a bullet.
- First bullet says “monthly or biweekly collection...” Which is it? If both, state why.
- List the four water quality parameters in parentheses

3.4.4.1 Monthly Sampling
No mention of bi-weekly here.

3.4.4.4 Laboratory Methods
There is a lot of detail here an in section 3.4.4.5 that probably isn’t necessary, since the SOPs are referenced.

3.4.4.5 Quality Control and Quality Assurance
paragraph 2, page 3-15—this paragraph presents some information on samples that did not meet QC requirements, but leaves the reader wondering what was the outcome. Were those data discarded?

3.7 Results

3.7.1 Temperature
paragraph 2, page 3-16—“Water temperature measured in the project ranged from...” can mislead the reader into thinking the following applies to all water temperature measurements, including data logger data.

Paragraph 3, page 3-16—“Water temperatures measured in the reservoirs...” These were spot measurements taken during water sample collection. Explain if the measurements were taken from the shore, at the surface, etc.

Paragraph 2, page 3-18—last sentence is speculative and the data for Jenny Creek are not presented.

3.7.2 Dissolved Oxygen
paragraph 1, page 3-27

- “At the reservoir sites the summertime range in oxygen concentration is a function of depth...” is misleading and incorrect. First, it is not the range in concentrations, rather the trends, and second, the oxygen concentration is a function of decomposition and lack of aeration with increasing depth.

Response to Comment S7-19

3.7.1 Temperature The FTR clarifies temperature ranges between grab samples and logged data, and where data were collected in reservoirs. The sentence referring to Jenny Creek has been removed.

Response to Comment S7-20

This chapter has been modified to address these comments.

- “At the river sites, the range in oxygen concentration is largely the result of low summertime values experienced at sites in Lake Ewauna....” This says that low DOs result in low DOs. Isn’t it more likely that higher oxygen demand, lower primary productivity, and lower aeration contributed?
- Last sentence references a median, when the section begins by using averages, neither of which mean much in light of the diel and seasonal variability.

3.3.3 pH

No discussion of seasonality is offered.

3.7.4 Conductivity

Rename to Specific Conductance to be consistent.

3.7.5.2 Nitrogen

Mean and median are both used in this section.

Paragraph 2, page 3-35—The following sentence is unnecessary. “This pattern appears to be a consequence of the spatial distribution of nitrate concentration in the river samples.”

Paragraph 2, page 3-40—“ the pattern of ammonia concentration for the rest of the river sites is very nearly the opposite of that seen for nitrate.” Considering the chemistry of nitrogen in water, this is expected. Statements like this serve to highlight the need to discuss the nutrients in the context of primary productivity and redox.

3.7.6.1 Chlorophyll *a*

These data are presented with mean and median in a bar chart, and skew is mentioned. Box plots would provide the reader with the distribution and avoid mixing parametric (mean) and nonparametric (median) statistics.

Figure 3.7-23, page 3-46—scaling the plots the same would facilitate the statements regarding river sites having higher chlorophyll concentrations.

The spatial relationships of the data should be discussed.

3.8 Discussion

This section opens by dividing the project area into four functional divisions based on the water quality data. This was not discussed, nor made evident in the presentation of the data preceding this section.

3.8.1 Lake Ewauna and Keno Reservoir

This section includes discussion on the interrelationships of nutrient chemistry, primary production, decomposition, and nutrient cycling. It is a good summary of the river section water quality, but a bit abbreviated if it is to support Exhibit E. It could benefit from some enhancements:

Response to Comment S7-21

- Figures 3.8-1 and 2—include major features on the plots along with river mile, such as Lake Ewauna, Link River, Klamath Straits Drain, Keno, etc.
- The chlorophyll discussion relates high nutrients to high chlorophyll concentrations, however the supporting information is not presented, rather, the previous section 3.7.6.1, discusses chlorophyll seasonality, not spatial relationships.
- Elucidate on the release of nitrogen from sediments, bringing in the redox data that were mentioned as a parameter, but never discussed.
- The discussion of N:P ratio could benefit from explanation of the range of ratios and importance of the Redfield ratio.

3.8.2 River Reaches

The discussion appears reasonable, however the data are not presented to support the discussion. Reference the sections preceding this one and provide displays to support the discussion.

Figure 3.8-3, page 3-52—would be more useful if the x-axis was plotted as river miles and major features were provided as reference points.

3.8.3 Reservoirs

These discussions may benefit from evaluation of the redox potential measurements.

The reservoirs are considered productive. Presentation of the chlorophyll data may enhance and provide support for the discussion.

3.8.4 Klamath River below Iron Gate Dam

Temporal relationships beyond temperature should be discussed and provided for this section.

Provide temporal data plots for the Iron Gate outflow and Klamath River below Iron Gate sites to support the statement of an increase in nitrate in that section, and discuss seasonality and magnitude of differences.

Water Resources DTR Review – Chapter 4.0 Water Quality Analysis and Modeling Process

General Comments:

- It would be useful to state early in this section the model input data use philosophy. For example, in several cases, temperature input data is developed from field data collected in several different years. As another example, in several cases, reach accretions/depletions are assigned to a single tributary input node, when it is likely that accretions may occur as distributed inputs from springs or other similar sources. What is the modeler's basis for concluding that these simplifications and approximations are suitable and appropriate? Is there a data hierarchy that is used when constructing input files? How are the effects of data simplifications and approximations on model results evaluated?

The Klamath basin is, in general, data limited. Efforts made to provide a representative description of the system required examining, in some cases, up to ten years of data to estimate inflow conditions. This was particularly challenging because the models were simulating continuous time series (at an hourly time step) for complete calendar years.

With respect to the temperature comment, in an attempt to represent as many tributaries and inputs as practicable, "composite" records are created where data is not readily available. These records, although not replicates of exact field conditions, provide a means of representing seasonal variations in tributary inputs. Whenever composite records are applied, it is noted.

With respect to accretions and depletions, examination of the accretions and depletions in non-winter periods indicate that overall such inflow are small. For both the Keno dam to J.C. Boyle reach and from J.C. Boyle powerhouse to Copco dam, the average accretion/depletion from May through October is less than 5 cfs. It is true that in winter months these accretions and depletions can be considerably larger, but impacts are small because during those periods the transit time in the system is typically short, water temperatures are low, reservoirs are isothermal with short residence times, and biological and chemical rate reactions are at the annual minimum. Sensitivity of simulated model results to the placement of the accretion and depletion was completed, but because the value is typically small compared to main stem flows, the location was insensitive.

Below Iron Gate dam the accretions/depletion were assigned

to streams as per previous completed work and ongoing work by USGS (1995)¹. The methods presented, although simple, are common practice in water flow and quality modeling. Further, model results indicate that the approach was effective in representing system inflows during the critical periods of the year. It is given that during winter storms water is entering at many small tributaries in the Klamath River below Iron Gate dam that are not included in the framework. As noted above, these periods are not typically of concern with water quality.

Overall, because accretions and depletions are small, particularly in the upper basin, during the mid-spring through early fall months (the period of critical concern) the impacts on location and quality are minor. The effects on location and quality of accretions/depletions were assessed by moving them to different locations, with little effect because of the small inflows.

A final point on accretions and depletions: accretions and depletions are calculated based on a mass balance between gages and represent accretions and depletions between the known gaging points as well as any gage error. Where known inputs and outputs existed and were sufficiently quantified or readily estimated, they were included in the mass balance. Because the accretions/depletions term is an aggregate value, it is difficult to assign any meaningful quality to the inflow (no quality is assigned to the outflow, a depletion). Thus, for example, in the J.C. Boyle peaking reach the accretion/depletion enters the river system at the same quality as the river at that point (Stateline). A contrasting example is downstream of Iron Gate dam where each tributary input is assigned temperature and quality attributes (except where noted) because, although often minor, in accumulation these inflows are an important consideration.

1. United States Geological Survey (USGS). (1995) "Klamath River Basin Characterization of Hydrology Data from U.S.G.S. Records," in *Compilation of Phase I reports for the Klamath River Basin*. Prepared for the Technical Work Group of the Klamath Basin Fisheries Task Force. Fort Collins, CO. May.

- S7-22
- The maps should be revised to show the node locations referenced in the text. For example, in Section 4.7.1.6, Node 448 is referenced, but is not shown on Figure 4.7-9.
 - It would be helpful to have a list of the locations of the various USGS gages referenced by number in this section, or a reference to a table elsewhere in the document that presents this information
 - The second objective of the study is to assess water quality compliance in the Project area. There is no information presented in this section on water quality standards or objectives, and there is no assessment of compliance. This constitutes a serious deficiency of the chapter in its current form.
 - The water quality data presentation is confined to temperature. The text at the end of the chapter states that additional graphical outputs are available though none are presented. This is also a serious deficiency of the current version of the chapter.
 - There is no discussion of how the Project contributes to or controls water quality conditions in and downstream of the Project area.
 - There is no information presented regarding possible measures to protect, enhance or mitigate water quality problems.
 - In summary, the current version of the chapter addresses only one of the five objectives laid out at the beginning of the chapter. Consequently, it is not possible to determine water quality conditions or compliance on the basis of the information presented.

S7-23 4.7.1.1 Link River

- p. 4-9. Please clarify the cross sections used for this reach. The text in the River Width section and the summary in table 4.7-3 do not appear to agree.
- p. 4-9. Please explain why elevations estimated from land surface contours is an adequate and reasonable approximation for characterizing bed elevations and slope.
- p. 4-10, Table 4.7-2. Please explain what BC means.
- p. 4-10. Please explain how the junctions work. How is it that the reach has 29 nodes, yet the junctions are associated with nodes 30-37
- p. 4-10. Shouldn't the A Canal be noted as a diversion from Upper Klamath Lake at Link Dam

4.7.1.2 Lake Ewauna to Keno Dam

- p. 4-16. Please provide additional detail on the number of rainfall events from 1992 used to determine total stormwater runoff flows. For equation (1) please explain how the r2 value can be 1.

4.7.1.3 Keno Reach

Response to Comment S7-22

Please see the Water Resources FTR, which has been updated with additional information. Also see Section E3 of Exhibit E for a detailed discussion on the Project's impact on water quality and PacifiCorp's proposed mitigation measures.

Response to Comment S7-23

4.7.1.1 p 4.9: There were six cross sections used to create the model grid for this reach. Table 4.7-3 is correct. The "River Width" section should read that trapezoidal sections were 1:1 for the junctions and 20:1 at all other locations.

4.7.1.1 p 4.9: Clarification - topographic contours where they cross the river represent the approximate water surface elevation. The assumption that is made is that the bed slope is approximately equal to the water surface slope. This does not pick up micro-topography issues, but is sufficient for the one-dimensional approximation.

4.7.1.1 p 4.10: BC refers to boundary condition

4.7.1.1 p 4.10: Junctions are required in the model to create a branching network. As seen in Figure 4.7-2, the powerhouse returns are represented as small "branches" (one element in length and each element has three nodes) flowing into Link River. Where the branches join Link River in the model, a special "junction" element is necessary. Junctions are used because the flows entering the Link River from East and West Side Powerhouses can make up an appreciable portion of the flow in the river and junctions assist in properly accounting for conservation of mass and momentum to simulate flow and water surface. The two additional elements and the special junction element result in an additional eight nodes in the

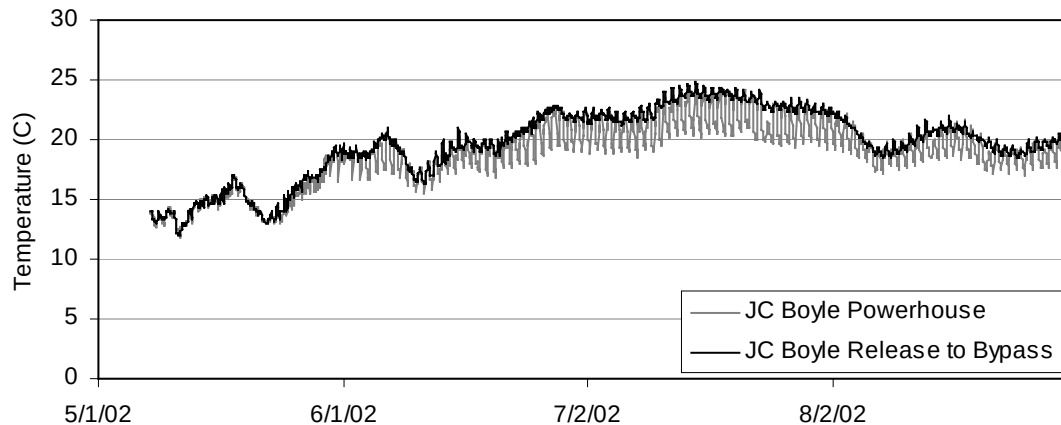
geometric representation.

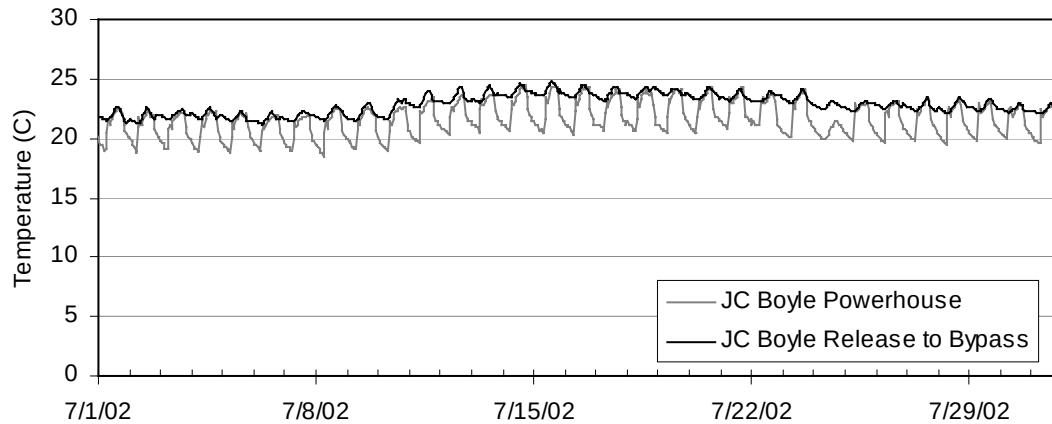
4.7.1.1 p 4-10: A-Canal actually leaves Upper Klamath Lake upstream of Link dam and not directly from Link dam.

4.7.1.2 p 4-16: Concerning the rainfall events from 1992: "[C]ontributing drainage basins were delineated on USGS quad maps. Storm water runoff was estimated using Q=CIA" (CH2MHill and Wells, 1995)².

4.7.1.2 p. 4-30: For model implementation, there were no water quality data available at Keno dam, so upstream values were used to set up the input files and test the model to ensure proper function. Subsequently, the model was calibrated and applied with data from Keno dam.

4.7.15 p 4-36: Water temperatures were compared between the water released from J.C. Boyle to the Klamath River below J.C. Boyle dam, and water released from the J.C. Boyle powerhouse. The figures below illustrate that there is no appreciable heating. During the evening and early morning hours, the powerhouse temperature drops because the flows through the powerhouse are turned off. The temperature reflects leakage through the system. When the power plant is online the temperature trace matches that at J.C. Boyle dam, generally within the resolution of the temperature datalogger ($\pm 0.2^{\circ}\text{C}$)





Water temperatures released from J.C. Boyle Dam and the J.C. Boyle Powerhouse (2002)

4.7.15 p 4-36: Certain high volume springs can produce waters that are at or near saturation because source waters are well oxygenated with little organic input and little oxygen demand in the geologic matrix. This was assumed for the springs in the bypass reach because both the water quality monitoring, as well as the modeling indicated that the springs were at or near saturation.

4.7.1.6 p4-37: Correct layer thickness is 2 meters.

4.7.1.7 p 4-44: Branch 2 inflow was set to 0.003 cfs (essentially no flow). Thus the inflow quality did not matter. However, this has been updated to reflect more appropriate conditions. The model documentation in section 4 of the Water Resources FTR includes a description of the tributary inputs to Iron Gate reservoir.

4.7.1.7 p 4-40 and 4-44: Equation is the same on both pages, but the description of h is incorrect. $E_{\text{Copco/Iron Gate}}$ should be defined as E_{Lower} in equation 3 on page 4-40.

4.7.1.8 Figure 4.7-13 Comment noted.

4.7.1.8 Page 4-49: Comment noted.

4.7.1.8 Table 4.7-25: Based on water quality monitoring results from 2000 (Watercourse, 2003), seasonal variations in water quality, possibly due to agricultural activities in the Shasta River, were observed in the sampling data. To accommodate these variations the input data streams were compiled to reflect these observations.

4.7.2 p 4-59: The calibration objective was to minimize differences between observed and simulated values. Visual observation (graphics) were used in combination with summary statistics including bias, mean absolute error, and root mean squared error on an hourly and daily basis. Because the

Klamath Basin overall is not a data rich system, general guidelines were presented to the stakeholder group on target criteria. The goal was to generally have the calibration of mean absolute error less than or equal to: temperature $\pm 1^{\circ}\text{C}$, and dissolved oxygen ± 2.0 mg/l. The nutrient data was so sparse that these values were not formally calibrated (with the exception of the reach from Iron Gate dam to Turwar), but instead were graphically compared to ensure they were within the expected range given the available field data. Model performance was within these ranges for much of the system, and where deviations occurred they were documented. Simulated nutrients concentrations in most cases corresponded closely with field observations.

4.7.2 Figures 4.7-41 and 4.7-43: Comment noted.

4.7.2 4-98: Results of water quality modeling are provided in the FLA (Exhibit E, chapter E3) and section 4 of the Water Resources FTR. As the modeling framework was being developed and implemented, methods and results were presented and discussed on several occasions with the Water Quality Work Group.

2. CH2MHill and Wells, S. 1995. *Water Quality Model of the Klamath River between Link River and Keno Dam*. Prepared for the Oregon Department of Environmental Quality. December.

p. 4-30. Water Quality Data. The text states that Lake Ewauna temperature and constituent values were used in the Keno reach. Does this mean the lake Ewauna values were used as input boundary conditions to the reach, or that the values were fixed at the Lake Ewauna values throughout the reach

4.7.1.5 J.C. Boyle Bypass and Full Flow (or Peaking) Reach

p. 4-36. Water Quality Data. Please explain the basis for the assumption that there is insignificant change in temperature of water passed through the diversion and powerhouse.

p. 4-36, Constituent Concentration. Please explain the basis for assuming that spring inflow is saturated with respect to dissolved oxygen, and for using nitrate and orthophosphate concentrations of 0.15 mg/L.

4.7.1.6 Copco Reservoir

p. 4-37 Section 4.7.1.6, Reservoir Bathymetry. The text states layer thickness as both 1m and 2m. Please clarify.

4.7.1.7 Iron Gate Reservoir

p. 4-44. Please explain why Lake Ewauna concentrations were used for the Branch 2 inflow. What other options were considered and rejected?

Equations 3 (page 4-40) and 4 (page 4-44) appear to be the same formula though the details differ. Please review and reconcile or explain the differences.

4.7.1.8 Iron Gate Dam to Turwar

Figure 4.7-13. The labels are not very clear on this map.

p. 4-49. Numbering on this page is not clear.

Table 4.7-25. Please provide some explanation for the selection of Shasta River NH4 and PO4 concentrations notably different and broken in mid-summer.

4.7.2 Model Calibration and Validation

p. 4-59 The statement regarding successful calibration is not substantiated. At a minimum, the report must include a complete discussion of calibration procedures, results, and an evaluation of the results.

Figures 4.7-41 (page 4-87) to 4.7-43 (page 4-89). The graphs appear to be missing at least one trace of the three listed in the legend. The Lake Ewauna/Keno results appear to be missing from Figure 4.7-41.

S7-23

p. 4-98. The text states that graphical output is available for a variety of parameters and comparisons, though only temperature plots are presented. What is the plan for presenting the additional information identified?

Water Resources DTR Review – Chapter 5.0 Analysis of Project Effects on Hydrology

General Comments

S7-24

- Need actual analysis and presentation of existing data in the application. Discuss and analysis of past studies, Hardy phase I and II flows, and analysis of existing data on annual flow hydrology of stream must be in this chapter and in the application. Section is incomplete as it stands currently due to lack of data analysis.

S7-25

Water Resources DTR Review – Chapter 6.0 Analysis of Project Effects on Sediment Transport and River Geomorphology

6.4.2 Reservoir Sedimentation Study

This section is well done. The studies do show that only Copco has any appreciable amount of sediment (14.6%)

6.4.2.2 Classification of Sediments in Project Reservoirs

S7-26

p 6-4, Step 2. Sediment Sampling
The samples from the upper and lower 5 cm is a poor sample procedure that loses much of the information gained from the cores, this could hardly be called “Rigorous” as stated in the document.
“The core was then photographed in the field and was extruded on-site to yield two samples – one from the upper 5 cm and one from the lower 5 cm of the core. Approximately 20 sediment samples were collected from each reservoir to develop a rigorous classification.”

S7-27

6.4.6 Selection of Representative Study Reaches

The study has limited use as only 14 reaches were surveyed from 125 miles of stream length (subtracting reservoir length). Due to the limited length of each reach (10 x channel width) and only two to four cross sections per reach, very little can be expected to be gained from this exercise. The plan offers little justification other than “to capture examples of channel and habitat features such as pools, riffles, rapids, bars, and to capture both highly constrained and wider alluvial reaches.”

The reaches were as follows: one in Link River, one in the Keno reach, two in the J.C. Boyle bypass. Four in 20.7 miles at the J.C. Boyle full-flow section, one in the 1.5 mile

Response to Comment S7-24

Substantial information has been added to the analysis of hydrology in section 5 of Water Resources FTR to describe relevant past studies (including Hardy) and existing data.

Response to Comment S7-25

Comment noted.

Response to Comment S7-26

Response to Comment S7-27

Geomorphic reaches were identified from aerial photographs and site visits. At least one study site was selected in each geomorphic reach. One or two study sites per geomorphic reach is adequate to collect basic geomorphic information for each reach. Pebble counts were taken at a great frequency to add to the data collected at each study site.

S7-27	reach below Copco 2 dam, and five downstream Iron Gate dam a length of 61.5 miles. It is difficult to understand how this limited number of widely spaced reaches can provide a statistically significant sample of the project reaches.
S7-28	<u>6.4.7.5 Surficial Bed Material Size Sampling and Channel Reconnaissance Throughout the Study Area</u> This section is the most flawed in this chapter as it starts out with an assumption about high flows that is not justified, and then drops any further study of high flows. The quote is “Because of the small size of Project reservoirs relative to the river’s annual runoff, the Project’s reservoirs are unlikely to significantly affect high flows, because the Project’s reservoirs are relatively small compared with the river’s annual runoff (e.g., Iron Gate reservoir impounds only 4 percent, and Copco reservoir 5 percent, of annual runoff), and because the project reservoirs are <i>not</i> operated for flood control, it is unlikely that the Project’s reservoirs significantly affect high flows, except in bypassed reaches”. This is not justified as no mention is made of the full impact of all five dams and 9 percent of the annual flow does not take into account the effect that all the dams may have during individual storms especially in drought years when many storms may be picked off before any overflow is possible. Additionally the report states in the results section, “In late winter and spring, particularly for average or wetter years, the PacifiCorp Project reservoirs are typically full”. This indicates that the fall and early to late winter that the reservoirs are filling and do not provide high flows and in under average years to dry years the reservoirs are also not typically full. Both these scenarios indicate there must be a responding impact to high flow most of the time. Dismissing the significance of the Project on high flows is a serious limitation of this study but is further compounded by not considering the cumulative effects of the Upper and Lower Klamath Lakes flood control and rerouting in combination with the 5 dams in the Project area. The “Analysis of Project Effects on Sediment Transport and River Geomorphology” is seriously flawed by not considering the Klamath River system above the Project and dismissing the impact of high flows of the 5 dams within the Project.
S7-29	<u>6.4.9 Bedload and Suspended Sediment Sampling</u> This section yields little useful information due to a lack of sufficient flows to conduct the study, except at the J.C. Boyle bypass reach. Most of the sections were given a light touch and put off because the study sites “<i>will be revisited in June 2003 and this analysis will be completed at that point.</i>” The report also states that “it was not feasible in this study to make direct measurements of most sediment sources in the basin, the field team conducted reconnaissance-level surveys and took advantage of opportunities to measure erosion, sediment transport, and deposition”. No justification was offered within the report for why it was not feasible to study sediment sources of why “most sediment sources were not of the sort detailed in Reid and Dunne (1996).” This severely limits the usefulness of this section. <u>6.7.10 Bedload and Suspended Sediment Sampling</u>

Response to Comment S7-28

See revised section 6.7.15.2 of the Water Resources FTR. The FTR examines both flow and sediment conditions that could potentially occur without the Project. The quoted text in this comment was presented as justification for the study design and did not prevent the geomorphology study from assessing the potential impacts noted in this comment.

Response to Comment S7-29

The measured sediment sources were rare and localized, and were included in the sediment budget presented in the Water Resources FTR. (see section 6.7.14). Beyond these measured sediment inputs, direct sediment contribution to the active channel from slopes was extremely small when compared to inputs from tributaries. See section 6.7.12 of the FTR for revised tracer gravel results.

Response to Comment S7-30

See the Water Resources FTR for a more thorough analysis of the fall and spring macroinvertebrate sampling.

This section states that few obvious sediment sources could be found and then proceeds to list and measure some very significant sediment sources. "Reconnaissance-level examination of aerial photographs and field observations has yielded relatively few obviously active, measurable sources of sediment." This is followed by a list of significant "obvious and measurable sources of sediment." The J.C. Boyle canal emergency spillway "blowout" approximately 1,856,000 cubic ft., a left bank is undercut that produced an estimated 276,000 cubic ft. and four gullies that yielded 40,880 cubic ft. of sediment. The lack of analysis of these significant sediment sources puts the entire chapter into question. These sources contribute substantial amounts of sediment to the system and must be addressed and discussed in detail in the application.

6.7.11 Tracer Gravel Study

Typical of this chapter we have a study which "As of March 2003, tracer gravels have not moved at any of the established tracer gravel sites. Therefore, there are no results to present from this study. However, high flows in late March and April could have mobilized tracers. *Tracer sites will be revisited in June 2003 and this analysis will be completed at that point.*" The number of studies that are put off to the summer of 2003 and are not included in this report make review a moot point.

Water Resources DTR Review – Chapter 8.0 Fall 2002 Macroinvertebrate Monitoring

(Also see comments in Exhibit E...E3.7.3 Fall 2002 Macroinvertebrate Study and E3.3.2.7 Macroinvertebrates)

General Comments

- The analysis of Macroinvertebrate data is incomplete and does not attempt to relate macro. findings to project features. There is no discussion in the text of whether conditions are better, the same, or worse upstream or downstream of project features.
- What are the criteria for good vs. bad conditions in relation to macroinvertebrates? What constitutes a healthy and diverse population? Literature source, Index of Biological Integrity, Reference Stream, etc for determination?
- (Relating to the above bullet) There is no discussion of whether conditions are good or bad at monitoring locations. The discussions are generally vague and don't give detail of areas where good conditions exist, or where conditions may be degraded.
- Macroinvertebrate data is not discussed in context with water quality conditions, nor in relation to substrate conditions. There is mention of water quality and substrate, but no discussion on how macro. assemblages change with changes in these parameters.
- Many statements are unfounded/unsupported, and need be better explained and supported. Conclusions are made without providing the reader the data, standards, or criteria by which they are reached.

Response to Comment S7-31

See the Water Resources FTR for an updated and more detailed analysis of the fall and spring macroinvertebrate sampling.

- Where is the statistical analysis that is mentioned so many places in the text? Need to show these analyses and results rather than just stating they were done.
- There is no in-depth discussion of how the study met the “Objectives”. A few objectives are discussed briefly but two to three sentences is not sufficient detail. Some objectives are not discussed at all.
- Enlarge the site map or change the scale, as it currently hampers the reader’s understanding of the data in a spatial context.
- Be consistent with the use site acronyms instead of station IDs (or no ID). Station ID’s should be more descriptive of the station location.
- It is necessary to have a table which relates site acronyms to the name and location of the actual site.
- Both site name and river mile axis should be used on all Figures, not just river mile.

S7-30

S7-31

8.4 Methods and Geographic Scope

Table 8.4-1, page 8-6

Explanation for the lack of samples at “Copco 2 Reservoir” is necessary. Footnote “4” is not suitable explanation. It is stated that monitoring was done in Lake Ewauna/Keno Reservoir, J.C. Boyle Reservoir, and Iron Gate Reservoir, but the sampling locations are not shown on the maps.

8.4.5 Data development and Analysis

page 8-7 “The final choice of metrics and procedures used to compare sites was developed following consultation with appropriate agencies (e.g., SWRCB, ODEQ).” Discuss what the chosen metrics were and why they are important in determine a healthy macroinvertebrate population.

8.7 Results and Discussion

Refer to general comments for additional detail on this section.

8.7.1.1 Physical Habitats

page 8-8, “Substrate character is an important physical habitat parameter in determining macroinvertebrate community structure.” Explanation necessary, what kinds of substrate make good habitat for macros, etc.

Figure 8.7-1 page 8-19

A line graph is not appropriate for this information. It would be best and most clearly presented as a bar chart where the relative percentage of each substrate type were shown for each site (see Figure 8.7-12). It is very confusing as it is presented now. The scale of the y-axis needs to be smaller so the relative values of the parameters can be easily determined. Site names need to be added to this figure (see figure 8.7-10 for good example)...or the River miles have no reference points and the meaning of the data by sample site is lost.

Figure 8.7-2, page 8-19

The scale of the y-axis needs to be smaller so the relative values of the parameters can be easily determined. Site names need to be added to this figure (see figure 8.7-10 for good example)...or the River miles have no reference points and the meaning of the data by sample site is lost.

Figure 8.7-3, page 8-20

The intention of this figure is very unclear, even with the explanation. There should be another way to present this information, as cluster diagrams are difficult for many people to interpret and understand. A table should be placed along with the graph listing the statistical analysis to display how the figure was created.

Figure 8.7-4, page 8-21

There is no reference to this figure in the text. See previous comment about cluster diagrams.

Page 8-21, "It is apparent that in-channel substrate conditions demonstrate a longitudinal series of changes with elevation." It isn't apparent to the reader. An explanation of substrate condition and how they change with elevation should be placed here to support this statement. Add a table which lists the elevation vs. substrate conditions from site to site so it is clearer to the reader.

Page 8-21, "In contrast, measures of channel erosion, bank stability, and riparian condition do not demonstrate the same geographic clusters (Figure 8.7-3). These factors are more variable by geographic location than substrate characteristics (Figure 8.7-3)." Again, this statement is unsupported in the text. Clarify, discuss, add a table, etc. Figure 8.7-3 does nothing to support the statement for the reader.

Page 8-21, "Water quality conditions did not change appreciably through the study reach during Fall 2002 sampling." This statement is untrue. Temperature and dissolved oxygen vary greatly. What caused these variations? Need to discuss the features in between points of large changes.

Temperature (just two examples here, but there are more...see Figure 8.7-2):

RM 230-220 (19C-12C)

RM 200-180 (16C-22C)

ETC.

Dissolved Oxygen

RM 225-212 (8-12mg/L)

RM 190-180 (9-14 mg/L)

Page 8-21, "Some factors, like pH and DO, are expected to be dynamic on a daily basis and the individual, one-time measurements shown in Figure 8.7-2 are not particularly indicative of the station." Where is support for this statement? Need to describe what IS indicative of the station to support statement.

8.7.1.1 Physical Habitats

page 8-22, "The data appear to show effects of the reservoirs on downstream water quality..." How? There should be a discussion to support this statement. Does other water quality data show this too?

Page 8-22, "Nevertheless, despite possible reservoir influences, neither pH nor DO appeared to exceed limits of concern for aquatic invertebrates or fish (Figure 8.7-2)." What are the limits of concern used to make this statement? How do these numbers compare with govt. standards/requirements. Needs discussion/support.

Page 8-22, "For this study, stream water temperatures ranged from 8.5 to 22 degrees C. These single values can not capture the important range of daily, monthly, or seasonal variation." The values do not enable calculation of MWATs etc, however some of the temperatures at the sampling locations are extremely high (for example 22C). This needs to be addressed. Find literature on suitable/unsuitable temperatures and discuss why elevated temperatures were found at certain locations. What affect did these temperatures have on Macros and therefore food supply for fish?

Page 8-22, "Several important pair-wise comparisons of stations were tested for statistical similarities related to physical habitat as a means of relating patterns to those of macroinvertebrate community structure." This statement and the paragraph following it, do not contain a discussion of the results of the above tests as they pertain to the macroinvertebrate community structure. Need discussion of results in more than one sentence.

Page 8-22, "The major changes in physical habitat are longitudinal and elevation related (for example, substrate percentages at sites are depicted in Figure 8.7-1." As was previously requested, an explanation of substrate condition and how they change with elevation should be placed here to support this statement. How does this affect macros.?

Table 8.7-1, page 8-22

What standard is used to determine which station has a "higher habitat quality value". What does this mean for macroinvertebrates? What were macro. results at these stations (to support statement of higher habitat value).

8.7.1.2 Macroinvertebrate Communities

Page 8-23, "When examining the percentages in various functional feeding groups, Fall Creek was the most distinct outlier (Figure 8.7-5)." An outlier in what sense? Show statistically how it was an outlier and how it is different.

Page 8-23, "When comparing sites on the basis of diversity and tolerance indices, the Fall Creek and J.C. Boyle varital zones appeared as distinct groups (Figure 8.7-6)." Again, talk about why and how they are distinct groups. What makes them different from others and the same as each other? Details.

Page 8-26, "The analysis of statistically different metrics by station helps to confirm the cluster analysis results." Show statistical analysis.

Page 8-26, "Table 8.7-3 shows selected comparisons among reaches and, of those, which reach ranks as "less impaired"(better average condition) as a result of the comparison." Why were these parameters/sites chosen for comparison/presentation? Glad to see an analysis of which reach is "less impaired" for selected parameters, but this doesn't tell the reader whether overall conditions were good or bad at these locations and how project features affect (improve/degrade) conditions for macroinvertebrates. Further discussion necessary.

Page 8-27, "When compared among river reaches on the basis of density by major molluscan taxonomic groups, Fall creek had statistically higher numbers of both Pelecypod (snail) and gastropod (clam) species than all other riverine sites ($P < 0.05$, ANOVA)." Is this good/bad? How does this relate to impairment or positive effects of the project on this species welfare, habitat, etc?

Page 8-29, There is no Figure 8.7-9 in the text.

Page 8-29, The second paragraph on this page summarizes "trends" in macroinvertebrates moving downstream, but doesn't interpret whether conditions are good or bad. What does it all mean? The fact that "EPT index peaks in the J.C. Boyle full flow (or peaking) reaches and gradually declines downriver...." means what? Further analysis of results necessary.

Page 8-29, Are the changes discussed from upstream to downstream statistically significant?

Page 8-29, Where applicable, trend lines should be added to the figures on this and subsequent pages.

8.7.2 Lentic Stations (Reservoirs)

Page 8-32, "Some limited patterns are evident in the reservoir results." "Nevertheless, when grouped by reservoir, limited patterns were observable." What were these patterns? They are not discussed here.

Page 8-32, "The invertebrate fauna of Lake Ewauna showed evidence of impairment as compared to the communities of the other lakes. Results are summarized in Table 8.7-4." Why? What was different that may have led to these results and a less diverse community? What standards are being used to determine what is a good vs. a bad community?

Page 8-33, "In general, the fauna from all lakes was dominated by "tolerant" taxa, those taxa judged most tolerant of impaired conditions. The tolerant taxa group was dominated by Chironomid midges in all reservoirs (Appendix 8A, Table 8A-8)." What does this mean...is this good or bad? Further interpretation/support necessary. The prevalence of tolerant taxa would indicate degraded conditions...is this true?

Response to Comment S7-32

8.8 Discussion

Overall the discussion of results in this section is incomplete and needs to include information on locations where conditions are good, where they are poor or degraded, what affects the project components have on macroinvertebrate communities, and how substrate and water quality conditions affect macros. Refer to general comments for this section.

Page 8-33, "The macroinvertebrate communities of the study riverine reaches and reservoirs revealed some basic differences among sites, most of which are attributable to expected differences associated with geographic variation and the longitudinal or elevation changes in riverine communities." This statement has been made several times, however no analysis has ever been presented attributing differences among sites to "geographic variation". Specific support these statements is necessary. Also what are the differences among sites...where is this discussion of the affects of the project?

Page 8-33, "The stream macroinvertebrate communities do not strongly reflect these longitudinal changes in physical habitat (e.g., Figures 8.7-9 to 8.7-15). However, some differences were observed between full flow and bypass reaches and between geographically-separate locations." What were assemblages like up stream to downstream? What differences were observed between full flow and bypass reaches? This is a discussion of results, but no values are discussed.

Page 8-34, "Full flow and bypass comparisons were not distinctive. For both the J.C. Boyle full flow/bypass and the Fall Creek full flow/bypass reach comparisons, most metrics did not vary significantly." This sentence contradicts the sentence above which states that there were observed differences.

Page 8-34, "The reservoirs were dominated by tolerant fauna (as compared to the streams) and were basically similar to each other in terms of community structure, with the exception of Lake Ewauna." (Underline added by NCRWQCB reviewer) Where is the stream discussion of this?

Page 8-34, "In addition to developing baseline data on macroinvertebrates of the study area, it is possible to address some of the key questions raised in the original objectives of this study:..." Not all objectives are discussed here. All objectives should be addressed. Discussion of objectives listed is generally insufficient and lacks detail.

S7-31

S7-32

Water Resources DTR Review – Chapter 9.0 Determination of Sediment Oxygen Demand In Selected Project Reservoirs

General Comments:

- These results should be integrated with the modeling effort. The model should assess the sensitivity of results to SOD rates. The adequacy of the SOD data collection

General Comments: The SOD study was done specifically to address the needs of the model, as stated in the Study Plan. The results are being used for modeling.

9.4 Methods and Geographic Scope:

The methods and scope balanced geographic coverage and cost. Replicate cores were obtained from each reservoir based on the sediment characterization from the recent bathymetric survey.

9.4.2 Methods: Recent *in situ* work by the USGS, posted on their web site, are in close agreement with results obtained by PacifiCorp.

9.7 Results and Discussion: Three different measurement techniques were used. Methods are outlined in section 9 of the Water Resources FTR. Text has been modified to address this comment.

program should be evaluated based on the sensitivity of the model to variations in SOD rates.

9.4 Methods and Geographic Scope

What criteria were used to select locations and numbers of SOD measurements?

9.4.2 Methods

Please provide an assessment, with references for supporting research, describing the comparative accuracy of measurements made on cores vs. measurements made in situ.

9.7 Results and Discussion

page 9-9 third paragraph. Please discuss how the independent verification of anaerobic conditions was done.

S7-32

Water Resources DTR Review-Chapter 12.0 Spring 2003 Macroinvertebrate Monitoring

General Comments

- When writing the results and discussion sections of this DTR please refer to the comments made about the Fall 2002 study and use them as guidance when presenting the results of this Spring 2003 study.
- We will look forward to reviewing the findings of this Spring 2003 study, and the additional analysis of seasonal variation in macroinvertebrate composition that will be included as a result of the comparison of the two studies.

S7-33

APPENDIX E REVIEW

E 3.3 Water Quality Conditions

E3.3.2.7 Macroinvertebrates

General Comments

- The bulk of this section is taken directly from the DTR which needs further analysis and discussion of the data. Therefore see comments above on the DTR to create an application which contains adequate information on the Macroinvertebrate analysis.
- Where is the discussion of PM&E's?

S7-34

E 3.4 Applicable Regulations and Standards

E3.4.1 Applicable Water Quality Standards

Citation for California is for the 1994 WQCP. Even if the applicable standards are unchanged since then, at least two amendment cycles have been completed. Should cite the most recent WQCP (June 28, 2001), and mention triennial review requirement under federal law.

S7-35

Response to Comment S7-33

Comment noted. Please see Sections 8 and 12 in the Water Quality FTR for a detailed discussion on the fall and spring macroinvertebrate sampling.

Response to Comment S7-34

Please see Section E3 of Exhibit E for an updated and detailed discussion on macroinvertebrate studies. The FLA addresses the Project's impact on water quality and PacifiCorp's proposed PM&Es.

Response to Comment S7-35

Comments noted. Section E3.4 has been revised as appropriate. Regarding fish passage at Iron Gate and Copco facilities, PacifiCorp's fish resources studies (as described in chapter E4 of Exhibit E and the Fish Resources FTR) includes information on fish passage options, and use of EDT and PasRAS models to assess potential anadromous fish reintroduction.

E3.4.1, table E3.4-1 does not mention barriers to migration as relates to Oregon and California beneficial uses.

E3.4.2 303d Listed Water Bodies and TMDL Processes

“Pollutant” versus “Pollution”: E3.4.2, third sentence, states: “The Clean Water Act and U.S. EPA’s implementing regulations require that a TMDL and associated wasteload and load allocations be developed for pollutant loading sources to achieve the applicable water quality standards in water bodies on the 303(d) list.” The Regional Water Board must address both pollutants and pollution in achieving water quality protection.

E3.4.7 California Department of Fish and Game Management Goals

Does not mention requirement for fish passage, not met on Iron Gate or Copco facilities.

E3.4.8 Klamath River Basin Compact

Klamath River Basin Compact: Power generation is next to lowest priority under 1957 agreement. Fish and wildlife are given a higher priority under the Compact.

S7-35

3.5 Compliance With Applicable Water Quality Standards

First paragraph, third sentence states: “Historical data do not indicate any significant trend in water quality attributable to the project.” This statement seems too broad. What data? Do fish migration, spawning and survival data indicate significant impacts? Should the statement be more qualified as to what data are being referenced?

S7-36

Second paragraph begins: “The Project has no effect on many of the constituents for which standards have been developed, and most constituents are well within the appropriate criteria. Again, this seems quite broadly worded. (Effect is taken to mean discharge in a general reading.)The next sentence continues: “For some constituents, no data are available to determine if criteria are being met, but there is no reason to suspect that the effects of the Project would result in exceedance of the standards (Table E3.5-1). For this section, only those standards for which exceedances have been documented or for which the Project could potentially cause or contribute to an exceedance will be discussed in detail (Table E3.5-2).” Barriers to migration are not mentioned.

S7-37

Table E3.5-1. Water quality standards that should not be affected. Considering the list offered, is it possible that: Impoundment for hydroelectric generation creates a pool with greater surface area, greater shoreline, and greater bed surface? Does this not create circumstances that can increase bacteria and bacterial pollution, dissolution of materials, contributing to taste and odors, as well as some facets of total dissolved solids? Impoundment changes area of contact, duration. “Floating material”: Foam is observed floating below the dams for several miles. In cold weather frozen foam persists even further. In addition, for suspended, settleable sediment, reservoirs do capture sediment in stripping the river of its load. Erosive forces are increased downstream of dams. Channel structure is influenced by base flow.

Response to Comment S7-36

The text of this section has been modified to provide more clarifying language and thus address this comment. This section dealt specifically with water quality data. Fish migration, spawning, and survival data are dealt with in the Fish Resources FTR and chapter E4 of Exhibit E (Report on Fish Resources).

Response to Comment S7-37

Section E3.5 of Exhibit E has been revised to provide an assessment of how current water quality conditions in the proposed Project area compared to relevant water quality standards or objectives. Barriers to migration are not discussed in this section. PacifiCorp’s fish resources studies (as described in chapter E4 of Exhibit E and the Fish Resources FTR) includes information on fish movement and migration, and fish passage options, and use of EDT and PasRAS models to assess potential anadromous fish reintroduction.

	<u>E3.5.1 Water Temperature</u> second paragraph identifies different reach for temperature impairment than in Table 3.5.2. (Text in second paragraph indicates Oregon Border to the Scott River for temperature impairment. Table indicates River Mile 0 through River Mile 190 for temperature impairment.)
S7-38	Paragraph 3 begins “Temperatures greater than 17.8 C were recorded in the Klamath River between Link River dam and the California border in every month except November during 2000 through 2002 (measurements were limited to March through November).” Why aren’t these data shown here? The first part of this is untrue. December through February did not have such values recorded. E3.5.1, fourth paragraph doesn’t mention effect of springs below J.C.Boyle on water temperature.
S7-39	<u>E3.5.2 Dissolved Oxygen</u> paragraph six: seems to describe that the impoundment creates conditions for an oxygen sink where it wouldn’t otherwise occur.
S7-40	<u>E3.5.3 Hydrogen Ion Activity (pH)</u> second paragraph: “Elevated pH occurs in productive lakes and rivers as a result of photosynthetic activity. Chlorophyll a concentrations in the Klamath River are high – average values for all sites exceed 15 µg/L in all months except April, May, and November (no measurements were made in December – February).” This syntax is misleading. “all months” is really just five months out of twelve. Paragraph four ends: “It is likely that the photosynthetic production in the river has changed from one dominated by planktonic organisms to one dominated by attached organisms which were not sampled by the chlorophyll a protocol.” What evidence supports this?
S7-41	<u>E3.5.4 Nuisance Phytoplankton Growth (Oregon) and Biostimulatory Substances (California)</u> third paragraph, fifth sentence, reads: “It appears that the portion of the Klamath River within the Project is a net sink for nutrients.” Nice suggestion. Where does it go?
S7-42	<u>E3.5.6 Toxic Substances (Oregon) and Pesticides (California)</u> Ammonia toxicity is not separate from biostimulatory substance. This link could be mentioned here.
S7-43	<u>E3.5.8 Aesthetic Conditions (Oregon)</u> third paragraph: flow and eutrophication are not unrelated.
S7-44	<u>E3.5.9 Naturally Occurring Conditions</u> first paragraph seems to suggest that, absent impoundment and release, the springs below J.C. Boyle are not cool. The second and third paragraphs seem to describe the difference between a lake and a river as if the impounded areas were not river reaches.

Response to Comment S7-38

This section of the FLA has been modified to address the questions and concerns expressed in this comment.

Response to Comment S7-39

Comment noted. This section of the FLA has been modified to address the questions and concerns expressed in this comment.

Response to Comment S7-40

This section of the report has been modified to address this comment.

Response to Comment S7-41

Nutrients are retained in the project reservoirs.

Response to Comment S7-42

Comment noted.

Response to Comment S7-43

Comment noted.

Response to Comment S7-44

This section of the report has been modified in the FLA.

E 3.7 Water Quality Studies

E3.7.3 Fall 2002 Macroinvertebrate Study

General Comments

- There are more objectives listed in the DTR than are mentioned or discussed in this section of the application. All objectives should be addressed in the application.

E3.7.4 Determination of Sediment Oxygen Demand in Selected Project Reservoirs

p. 3-140, The water and sediment samples were not analyzed for potential toxic substances, such as pesticides or wood preservatives. The potential release of toxic substances from the sediments may be detrimental to fisheries and should be investigated.

E3.7.5.1 Water Quality Analysis and Modeling Process

Page 3-142, The one-dimensional river models RMA-2 and RMA-11 may not adequately model biological and nutrient components. Please explain whether these models characterize sediment oxygen demand and sediment nutrient fluxes within the river. If not, what effect will this have on model results?

Page 3-143, first bullet., Please explain how flow and water quality measurements were coordinated. Do coincide? Were flow measurements and water quality measurements taken at the same times and locations? Also, the text could be clarified to state that the model requires input values, though those values are not necessarily based on measured water quality data.

Page 3-144, In certain cases during the Klamath River modeling, temperature and water quality boundary conditions were derived from field observations and in other cases “no observations were available and temperature and water quality conditions were estimated.” Please describe the effects of these estimates on model results. What sensitivity analyses or additional field data collection is planned or needed to address uncertainty associated with sensitive parameters?

Page 3-144-145, Please explain why only meteorological data from Klamath Falls was used and corrected for each river reach. There should be available data from each river reach that would indicate changes in air temperature, humidity, and other meteorological data.

Page 3-145, The model runs for “existing conditions”, “steady flow”, and especially “without project” have not indicated what role riparian vegetation has on temperatures and water quality. Have the cooling effects and nutrient assimilative capacities of riparian vegetation been considered in this model?

Page 3-145, The final results of the modeling need to be presented, explained, discussed, and evaluated when they are completed. These results and analysis should be made available in a timely fashion and prior to the final license application submission.

Response to Comment S7-45

Comment noted. This section has been corrected as suggested.

Response to Comment S7-46

An analysis for toxics was beyond the scope of the study plan approved by the Water Quality Working Group and the Plenary. Toxics in fish tissue are the subject of a separate study described in section 10 of the Water Resources FTR.

Response to Comment S7-47

Page 3-142: The models represent sediment oxygen demand through a BOD compartment in the bed model. Similarly, nutrient fluxes are represented in the bed model. These processes could be implemented in the model, but they would act strictly as calibration parameters because there is little or no data to support the models in this respect. Model results (calibration) from Iron Gate dam to Turwar indicate that the existing modeled processes (phytoplankton washout from the reservoirs, benthic algae, BOD, inorganic and organic nutrients, and temperature) capture temporal and spatial characteristics of the system well, both diurnally, longitudinally, and seasonally.

Page 3-143: With the exception of the flow in the J.C. Boyle peaking reach and releases from J.C. Boyle dam and Copco dam, all flow is daily average flow from USGS, USBR, and PacifiCorp. A grab sample on any particular day or water quality probe deployment were assigned the corresponding flow from the USGS, USBR, and PacifiCorp data. Tributaries and other inflows, return flows, diversions, and accretions and depletions are explicitly modeled in the hydrodynamic phase so that at any sampling point an estimate of the sub-daily flow could be made. Flow measurements at main stem sampling

locations (e.g., Stateline, above Copco reservoir, above Salmon River to name a few) was infeasible. One exception to this approach was sampling in the J.C. Boyle peaking reach where morning and afternoon sampling was intended to coincide with off-line conditions and peaking conditions. Attempts were made to coordinate with PacifiCorp operators to capture water quality differences. By and large the sampling efforts were successful (see calibration data).

Page 3-144: All instances of estimated data are documented. In many cases estimated data were for small inputs, such as municipal and industrial inputs in the Klamath Falls area. No formal sensitivity analysis was completed because these discharges - on the order of a few cfs - are small. The system was initially modeled without them, and when added the results were virtually identical. Similar tests were completed on all reaches where "generic" water quality was applied during implementation, and when "actual" data were applied in calibration and application the results did not significantly change. Certain parameters that were essentially absent from the historic data sets include total inorganic carbon (TIC), and the partitioning of organic matter among the dissolved and particulate, and labile and refractory forms. The TIC is currently estimated using an atmospheric equilibrium model. The organic matter partitioning assumptions were, to some degree addressed in parameter sensitivity testing of decay rates because this affects partitioning in the system. The models showed moderate sensitivity to these parameters .

Page 3-144-145: For 2000 and 2001 there are complete data sets only for Klamath Falls and Yreka (partial). There are some air temperature data for the lower river (near river locations), but no complete data sets are available. Although there are new stations at Iron Gate reservoir, Copco reservoir, and a station at Weitchpec, these stations were not placed in service until after 2001. To maintain the ability to create a comparable set of scenarios, the decision was made to adopt the long-term station at Klamath Falls and modify the data on a reach-by-reach basis.

Page 3-145: Analysis of similar river systems have shown that the Klamath River is sufficiently wide that the impacts of riparian shading are minimal in most reaches. For riparian shade to be effective, persistence in shade-providing capability is important. Further, especially in the Klamath River below the Scott River, the hydrology and geomorphology create an adverse environment for woody riparian vegetation to persist and dominate near-shore areas, and thus shading opportunities are restricted.

With respect to nutrient assimilative capacities of vegetation, there was no attempt to model hyporheic flow or near-shore shallow groundwater exchange that would be necessary to address nutrient uptake by riparian vegetation (either herbaceous or woody).

Page 3-145: Results of water quality modeling are provided in the FLA (Exhibit E, chapter E3) and section 4 of the Water Resources FTR. As the modeling framework was being developed and implemented, methods and results were presented and discussed on several occasions with the Water Quality Work Group.

Response to Comment S7-48

Gerber Reservoir and Clear Lake have little impact on monthly or annual flow quantities; i.e., monthly or annual flow quantities in the Klamath River would be similar with or without Gerber Reservoir and Clear Lake. KPOPSIM results are discussed in section 5 of Water Resources FTR. Substantial information has been added to the analysis of hydrology in the FLA (Exhibit E, chapter E3) and section 5 of Water Resources FTR, including analysis based on hourly data. Water years for this data has been clarified.

Response to Comment S7-49

Comment noted.

- S7-48 [E3.7.5.2 Analysis of Project Effects on Hydrology
Page 3-146, It is stated that, "Gerber Reservoir and Clear Lake have very little if any impact on the Klamath River". Please provide the basis for this assumption. The transport of nutrients and enrichment of downstream aquatic habitat may affect Lost River water quality and ultimately Klamath River water quality (when Lost River water is diverted to the Klamath River).
- Page 3-148, The KPOPSIM results and analysis should be made available in a timely fashion and prior to the final license application submission.
- Page 3-148, The effect of PacifiCorp operation on the Hydrologic regime was examined using several years of hourly flow data. The water years used, the nature of the water years, an assessment of the representative of the water years, and any other information that could help in placing the years selected in context should be presented.
- S7-49 [3.7.5.7 Spring 2003 Macroinvertebrate Study
General Comments
 - See "General Comments" under Water Resources DTR Review-Chapter 12.0 Spring 2003 Macroinvertebrate Monitoring