Office of Habitat Conservation
National Marine Fisheries Service
United States Department of Commerce
315 East West Highway
Silver Spring, MD 20910

PacifiCorp
Klamath Hydroelectric Project
FERC No. 2082

**PacifiCorp's Alternative to the Joint United States Fish and Wildlife Service and National Marine Fisheries Service Preliminary Fishway Prescriptions**

OHC Docket No.:

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**ATTACHMENTS**



[1] Any material relied upon in this document that is not in the FERC record for the Project relicensing proceedings is supplied herewith as an additional Attachment.

# I. INTRODUCTION

Pursuant to section 33 of the Federal Power Act ("FPA"), 16 U.S.C. § 823d, PacifiCorp hereby submits its alternative ("Alternative") to the joint preliminary fishway prescriptions ("Prescription") submitted in this matter by the United States Fish and Wildlife Service ("USFWS") and the National Marine Fisheries Service ("NMFS") (collectively, the "Services"). PacifiCorp is the current licensee, applicant, and party to the proceeding before the Federal Energy Regulatory Commission ("FERC" of the "Commission") for issuance of a new license for the Klamath Hydroelectric Project ("Project"), FERC No. 2082.

PacifiCorp supports the goal of achieving sustainable populations of both anadromous and resident fish populations in suitable habitat throughout the Klamath River and its tributaries, and is committed to furthering that goal by means of a rational, science-based reintroduction plan. PacifiCorp is submitting this Alternative because it believes that the Services' Prescription does not maximize the potential for successful reintroduction of anadromous fish to habitat in the upper Klamath basin. The Services' stated resource objective for fish passage is to "[p]rovide access to historical spawning, rearing and migration habitats necessary for salmonids to complete their life cycles." DOI at C-4.[2] Simply providing access, however, is not sufficient. As both Services recognize, restoration of passage to the upper Klamath basin is only meaningful if runs are ultimately self-

[2] This document uses Department of the Interior ("DOI") page numbers (e.g., "DOI at C-4") or joint DOI and NMFS prescription section numbers (e.g., § 1.1) when referring to the joint fishway Prescriptions. When referring to DOI's or NMFS's introductory comments, this document refers to each prescribing agency's document (e.g., "DOI at 5" or "NMFS at 2").

sustaining.[3] The outcome of any reintroduction effort, however, is inherently uncertain, and particularly so in the upper Klamath basin, where significant anthropogenic changes have occurred since historical times. Upstream migrating adults and downstream migrating juveniles face long distances, naturally extreme conditions, and predation. Habitat may be so significantly curtailed that it no longer supports the number of fish required to ensure sustainability. Modern runs may be unable to adapt to anthropogenic changes in the river system. And stocks from below Iron Gate Dam may not have genetic characteristics suited to the unique conditions in the upper Klamath basin. For these and similar reasons, the Services have endorsed, for many analogous multi-dam, multi-reservoir projects, flexible collection and transport programs allowing for systematic and adaptive reintroduction.

The ability to be flexible and to adapt over time to meet the challenges in the upper Klamath basin is critical to maximizing a reintroduction program's success, while minimizing the potential for adverse unintended consequences that could result from reintroduction efforts. This Alternative incorporates an adaptive approach to reintroducing anadromous fish to the upper Klamath basin and relies on a fish collection and transport program to implement that objective over time (*see* PaciCorp's "Adaptive Reintroduction Plan" (Attachment A)). Recognizing the significant hazards that adult anadromous fish would face within the Project area (i.e., from Iron Gate Dam to the uppermost point of J.C. Boyle Reservoir) from disease, stress associated with multiple ladders, and delayed migration, the Alternative provides upstream migrating fish immediate access to habitat of known quality above J.C. Boyle Dam as well as access to the upper Klamath basin. As

[3] A "primary goal" of NMFS is to "establish and maintain self-sustaining fish runs in the Upper Klamath Basin...." DOI at C-5. The Services' goals for the Project include restoring passage

juveniles emerge, the Alternative is adaptively managed to collect them at an appropriate upstream location and transport them downstream of the reservoirs to the lower Klamath River, allowing them to out-migrate before normal background temperatures make the river uninhabitable. By using a collection and transport program guided by adaptive management principles, PacifiCorp's Alternative avoids unsuitable habitat within the Project while allowing fish managers to implement a reintroduction program that is responsive to the specific behavior of Klamath River fish.

PacifiCorp's Alternative also fully addresses the needs of resident fish populations and assures that they have access to sufficient habitat to allow them to successfully complete their life cycles. In their Prescription, the Services assert that ladders and screens at all Project dams are necessary to benefit resident fish. The Services state that resident fish – primarily redband trout – will benefit from connectivity, increased genetic diversity, and access to habitat where other redband trout occur. However, there is no evidence that trout or other resident species require additional passage within or outside of the Project area. Redband trout populations are healthy and sustaining and support a premier sport fishery in the J.C. Boyle peaking reach. Nevertheless, as part of the adaptive program for anadromous fish, any modifications or new screening facilities at or above J.C. Boyle Dam will be designed according to salmon and trout criteria.

When compared to the Services' Prescription, PacifiCorp's Alternative provides equal or greater protection for both anadromous and resident fish populations. Because the adaptive program for collecting and transporting fish is the only reintroduction method with

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and providing necessary habitat conditions "for the recovery and long-term sustainability of native fishes," including anadromous fish. DOI at C-6.

the flexibility to respond to the acknowledged uncertainties associated with reintroduction in the upper basin, it maximizes the potential for restoring sustaining anadromous fish runs. Accordingly, the Services should adopt PacifiCorp's Alternative as their final fishway prescription.

PacifiCorp's Alternative is explained in detail below. Sections II through IV provide the legal framework for the Services' analysis of the Alternative. Specifically, Section II sets forth the appropriate standards of review, Section III sets forth PacifiCorp's Reservation of Rights and Objection to the Services' Reservation of Authority, and Section IV objects to certain components of the Services' Prescription as *ultra vires*.

The components of PacifiCorp's Alternative are set forth in Section V. In Section V.A., PacifiCorp presents its proposed adaptive collection and transport program as its Alternative to the Services' Prescriptions for anadromous fish for all facilities within the Project area, from Iron Gate Dam, the lowermost Project facility, to J.C. Boyle Dam, the uppermost Project facility. Section V.B. provides PacifiCorp's Alternative for resident fish within the same Project area. In Section V.C., PacifiCorp provides its Alternative to the Services' Prescriptions at Keno Dam and the Link River East Side and West Side powerhouses and explains that the Services lack authority to prescribe fishways at those sites.

Finally, as stated in Section VI, all studies, reports, analyses, and other documents supporting PacifiCorp's Alternative are provided as attachments to this document.

## II. LEGAL FRAMEWORK

### A. Standards of Review

Section 33(b) of the FPA allows a licensee or other interested party to propose an alternative to agency prescriptions issued under section 18 of the FPA. 16 U.S.C. § 823d; *see* Pub. L. 109-58, title II, § 241(c) (2005). The statute *requires* that the prescribing agency accept the alternative in lieu of its own prescriptions if it finds, "based on substantial evidence provided by the license applicant, any other party to the proceeding, or otherwise available to the Secretary," that the alternative:

> (A) will be no less protective than the fishway initially prescribed by the Secretary; and
> (B) will either, as compared to the fishway initially prescribed by the Secretary–
> (i) cost significantly less to implement; or
> (ii) result in improved operation of the project works for electricity production.

16 U.S.C. § 823d(b)(2). Under this standard, the agency must adopt a proposed alternative, whether or not the alternative constitutes a "fishway" per se,[4] as long as the alternative would result in population-level benefits that are equal to what would be obtained by the Services' fishway prescription.[5]

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[4] Section IV, *infra* discusses the congressional limitation on what may constitute a "fishway" for purposes of FPA section 18. Earlier iterations of section 33 clarified that an alternative to a fishway is not limited by the statutory definition, thus may be comprised of broader conservation measures that result in similar species-level benefits. *See* S. 1005, 108th Cong. § 33 (2003) (providing that a fishway alternative "may include a fishway or an alternative to a fishway").

[5] The "no less protective" language was enacted by Congress after consideration of a number of other standards that would have more narrowly focused on passage success rather than the status of the affected population. For example, earlier versions of section 33(b) required that fishway alternatives "result in equal or greater fish passage," S. 597, 107th Cong. § 701 (2001), or be "no less effective," H.R. 4, 107th Cong. § 401 (2001), than the fishway proposed by the agency. The final "no

Section 33(b) further requires that the prescribing agency justify its final decision by "submit[ting] into the public record . . . a written statement explaining the basis for such [condition or prescription] and reason for not accepting any alternative." 16 U.S.C. § 823d(a)(4), (b)(4). This written statement must:

> demonstrate that the Secretary gave equal consideration to the effects of the prescription adopted and alternatives not accepted on energy supply, distribution, cost, and use; flood control; navigation; water supply; and air quality (in addition to the preservation of other aspects of environmental quality); based on such information as may be available to the Secretary . . . .

16 U.S.C. § 823d(b)(4). The requirement to give "equal consideration" to a variety of competing interests has been interpreted in context of section 4(e) of the FPA as requiring that an agency:

> balance the public interest in all of its stated dimensions, give equal consideration to conflicting interests, and reach a reasoned factual decision.

*State of California ex rel. Water Resources Control Bd. v. FERC*, 966 F.2d 1541, 1550 (9th Cir. 1992); *see also City of Centralia v. FERC*, 213 F.3d 385, 391 (D.C. Cir. 2000) (FERC must balance both power and non-power value in imposing licensing conditions).

Thus, the Services, in evaluating PacifiCorp's Alternative, must "give the same careful and thoughtful consideration" to energy supply, distribution, cost, flood control, navigation, water supply, and air quality as to the environment. *See American Rivers v. FERC*, 201 F.3d 1186, 1204 (9th Cir. 2000) (quoting H.R. Conf. Rep. No. 99-934, at 25); *City of Centralia v. FERC*, 213 F.3d 742, 743 (D.C. Cir. 2000) (vacating condition requiring costly study of tailrace effects on salmon where FERC "failed to accurately weigh the high

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less protective" standard takes a broader view at the population-level benefits to be derived from the agency's passage requirements rather than merely the number of fish passed. *Id.*

cost of the study against the negligible benefits to be derived from the study"). Ultimately, the Services must demonstrate that their final fishway prescriptions are consistent with law, based on a rational conservation objective, reasonably necessary to remedy project impacts, supported by substantial evidence, and not arbitrary or capricious. *See, e.g.*, *Wisconsin Power & Light Co. v. FERC*, 363 F.3d 453, 461-63 (D.C. Cir. 2004); *Bangor Hydro-Electric Company v. FERC*, 78 F.3d 659, 663-64 (D.C. Cir. 1996); *cf. City of Centralia v. FERC*, 213 F.3d 742, 748-49 (D.C. Cir. 2000).

## B. Burden of Proof

Section 33 of the FPA does not expressly allocate the burden of proof for an agency's evaluation of proposed fishway alternatives. However, the language and structure of the statute indicate that the prescribing agency bears the burden of justifying its decision whether to affirm its initial proposal or adopt an alternative.

Under section 33, the Services *must accept* a proposed alternative if they determine, "based on substantial evidence provided the license applicant, *any other party* to the proceeding, or *otherwise available* to the Secretary," that the enumerated statutory standards are met. 16 U.S.C. § 823d(b)(2) (emphasis added). In determining whether the statutory criteria are met, the Secretary must "consider evidence provided for the record by any party to a licensing proceeding, *or otherwise available* to the Secretary, including any evidence provided by the Commission, on the implementation costs or operational impacts for electricity production of a proposed alternative." 16 U.S.C. § 823d(b)(3) (emphasis added). The agency must then support its final decision by "submit[ting] into the public record" "a

written statement explaining the basis for such prescription, and reason for not accepting any alternative." 16 U.S.C. § 823d(b)(4). The written statement must be

> based on *such information as may be available to the Secretary*, including information voluntarily provided in a timely manner by the applicant and others. The Secretary shall also submit, together with the aforementioned written statement, all studies, data, and other factual information available to the Secretary and relevant to the Secretary's decision.

16 U.S.C. § 823d(b)(4) (emphasis added).

This statutory language repeatedly emphasizes that the agency must conduct its alternatives evaluation based upon *all available evidence*. Thus, the agency *must adopt* a proposed alternative if information provided by the parties or "otherwise available" supports the alternative. 16 U.S.C. § 823d(b)(2). Under this scheme, the Services bear the burden of proving that their final decision on an alternative is consistent with the statutory requirements and supported by substantial evidence. *Id.*; *see* H.R. Rep. No. 109-78, at 23 (2005) ("The Committee does not intend section [33] to shift the burden of proof or to change the standard of proof required by section 556(d) of title 5 . . . to support an agency determination."); 5 U.S.C. § 556(d) (placing burden of proof in administrative hearings on "the proponent of a rule or order"); *Comprehensive National Energy Policy Act, Hearings Before the Subcomm. on Energy and Air Quality of the House Comm. on Energy and Commerce*, 108th Cong. 186 (2003) (Congressman Dingell) (noting that under alternatives process "the head of an agency must carry the burden of proof in order to prove a license application does not meet the statutory standard for approval"); *cf. City of Centralia v. FERC*, 213 F.3d 742, 749 (D.C. Cir. 2000) (license applicant has no duty to determine whether project is causing environmental harm; agency must come forward with substantial evidence of harm before imposing mitigation requirements).

## III. RESERVATION OF RIGHTS

### A. PacifiCorp's Reservation of Rights

Section 18 of the FPA grants licensees and other interested parties the right to a trial-type hearing on any disputed issues of material fact underlying an agency's mandatory prescriptions. 16 U.S.C. § 811. Section 33(b) of the FPA grants licensees the right to propose alternatives to any section 18 prescriptions, which the prescribing agency must evaluate and adopt if the statutory criteria are met. 16 U.S.C. § 823d(b). Although these provisions allow the licensee to contest and propose alternatives to the *final* prescriptions prepared for inclusion in a hydropower license, the agencies' regulations implementing these provision allow the licensee to contest only *preliminary* prescriptions proposed by the agencies. 70 Fed. Reg. 69,804, 69,807 (Nov. 17, 2005). This discrepancy has the potential to disadvantage the licensee and controvert the rights conferred by Congress in sections 18 and 33.

For example, the agencies' regulations state that the prescribing agency may ultimately "adopt as a modified condition or prescription its original preliminary condition or prescription, an alternative, or a new condition or prescription." 70 Fed. Reg. at 69,814. This could potentially result in a final prescription premised on facts beyond the scope of the preliminary prescription subject to factual challenge, thereby depriving the licensee of its statutory right to a trial-type hearing. 16 U.S.C. § 18. Similarly, the agencies' regulations require that alternatives be submitted *prior* to resolution of the material fact challenge, and *prior* to the agencies' formulation of final prescriptions. Yet without the ability to analyze

the agency's *final* prescriptions in light of the legally binding facts, the licensee is deprived the opportunity to fashion an effective alternative.

In order to ensure that its rights as conferred by FPA sections 18 and 33 are fully protected, PacifiCorp hereby: (1) states for the record its objection to any final prescription based upon any fact beyond the scope of the preliminary Prescription or otherwise not reasonably subject to challenge by the April 28, 2006 deadline for the filing of material fact challenges in this matter; and (2) reserves its right to submit an amended alternative to the Services' fishway prescriptions in conformance with the facts of record as determined pursuant to the trial-type hearings requested by PacifiCorp and any other party to this proceeding.

## B. Objection to Services' Reservation of Rights

In their prescriptions, the Services claim a broad "Reservation of Authority" to require additional or modified fishways under a number of circumstances, including "as [NMFS/USFWS] may subsequently determine [is] necessary to provide for effective upstream and downstream passage." NMFS A-29; DOI C-23. As legal support for this reservation, the Services cite *Wisconsin Public Service Corporation v. FERC*, 32 F.3d 1165 (7th Cir. 1994). The *Wisconsin Public Service Corporation* opinion, which has not been adopted by other courts, is inapposite for several reasons.

First, in *Wisconsin Public Service Corporation*, FERC reserved *to itself* the right to require construction of future fishways. 32 F.3d at 1166-67. Here, by contrast, the Services purport to reserve to themselves, under authority of FPA section 18, plenary authority to require future fishway prescriptions. Because a "reservation of rights" cannot reasonably be

construed as a fishway – that is – a "physical structure, facility, or device" providing fish passage around an obstacle,[6] this element of the Prescription exceeds the statutory definition of "fishway" and is ultra vires. *See* Pub. L. 102-486, § 1701(b); Section IV, *infra*.

Second, the *Wisconsin* case preceded the 2005 Energy Policy Act amendments to the FPA, which confer upon licensees specific rights to contest and propose alternatives to any fishway prescription. Pub. L. 102-486 (1992); 16 U.S.C. §§ 811, 723d. The Services' broad reservation of authority would vitiate the due process rights conferred by Congress and contravene the plain language of the statute, which gives licensees the right to be heard and to establish the efficacy of less expensive alternatives *prior* to conclusion of the licensing proceeding. By its terms, section 18, as amended, gives licensees the right to a resolution of any disputed factual matters

> in a *single* trial-type hearing to be conducted . . . *within the time frame established by the Commission for each licensing proceeding.*

16 U.S.C. § 811 (emphasis added); 16 U.S.C. § 823d. The Services' reservation of rights to impose new prescriptions after the close of the licensing proceeding is inconsistent with this statutory language and would deny licensees the due process rights conferred by the Act. The Reservation of Right accordingly is not permissible under the FPA.

Finally, the Services' broad reservation of authority to require new or modified fishway prescriptions is arbitrary and capricious, given that the Services are now proposing ladders, screens, and other structural modifications at each Project facility at a cost of approximately $364 million (*see* Attachment E ("Cost Estimates")). That the Services

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[6] *See* Webster's Third New International Dictionary 859 (defining "fishway" as "a contrivance for enabling fish to pass around a fall or dam in a stream).

believe a reservation of rights to alter these burdensome modifications is necessary suggests that these modifications are not justified by the information available at this time. The unaddressed uncertainties associated with the Services' prescriptions and the Services' perceived need to potentially alter these major structural modifications in the future indicate that a more cautious approach is warranted, such as is proposed by PacifiCorp in its adaptive management Alternative described below.

## IV. OBJECTION TO CERTAIN PRESCRIPTION ELEMENTS AS *ULTRA VIRES*

Under the auspices of section 18 of the FPA, the Services have proposed a broad array of structural and nonstructural measures that they assert are necessary in order to further their objective of reintroducing anadromous fish to the upper Klamath basin and to protect and enhance certain resident fish populations. The required measures include preparation of various types of plans; maintenance, operation, and inspection requirements; reporting and monitoring; installation of tailrace barriers; movement over water bodies rather than facilities; and removal of certain alleged barriers to upstream passage.[7] The Services have also generally required passage at each Project facility for resident fish populations, regardless of whether migration is necessary in order for those populations to complete their

[7] *See* Prescription at §§ 1.1.1 (Design and Construction Plans); 1.1.2 (Access to Developments and Records); 1.1.3 (Maintenance Requirements), 1.1.4 (Fishway Operation, Inspection, and Maintenance Plans); 1.1.5 (Post Construction Fishway Evaluation Plans); 1.1.6 (Fishway Evaluation and Modification Plans); 1.1.3, 1.2.3, 1.3.3, 2.1.3, 2.2.3, 2.3.3, 3.1.3, 3.2.3, 4.1.3, 4.2.3, 4.3.3, 4.4.3, 4.5.3, 5.1.3, 5.2.3, 5.3.3, 5.4.3, 6.1.3, 6.2.3, 6.3.3, 6.4.3, 6.5.3, 7.1.3, 7.2.3, 8.1.3 and 8.2.3 (general reporting, monitoring and evaluation plans for each prescription); 4.5 (Copco 2 Bypass Channel Barrier/Impediment Modification); 6.1 (J.C. Boyle Bypass Channel Barrier Removal); 2.3, 4.4, 5.4, 6.5, and 8.2 (tailrace barrier prescriptions); 7.1 (seasonal upstream trap and haul around reservoirs from Keno Dam); and 8.1 (seasonal downstream trap and haul around reservoirs from Link East Side/West Side powerhouses).

life cycles.[8] As explained below, these nonstructural measures and passage requirements for resident fish are inconsistent with express statutory language that strictly limits what may constitute a "fishway" under section 18.

Although the term "fishway" is not defined in the FPA or by agency regulation, Congress has set basic parameters on what may constitute a "fishway" as follows:

> [T]he items which may constitute a "fishway" under section 18 for the safe and timely upstream and downstream passage of fish shall be limited to physical structures, facilities, or devices necessary to maintain all life stages of such fish, and project operations and measures related to such structures, facilities, or devices which are necessary to ensure the effectiveness of such structures, facilities, or devices for such fish.

Energy Policy Act of 1992, P.L. 102-486, 106 Stat. 2776, at 3008 (Oct. 24, 1992). The impetus for this statutory provision was a 1991 FERC rulemaking that narrowly defined "fishway" as including only structures, facilities, and devices providing for *upstream* passage of fish. *See* 56 Fed. Reg. 23,108, 23,109 (May 20, 1991). FERC did not consult with the Services in formulating this definition, which was strongly opposed by those agencies and others. In criticizing FERC's definition, DOI proposed its own definition, which included both upstream and downstream passage and also broadly encompassed, in addition to "structures, facilities, and devices," "other measures" such as temperature regulation, spill, and flows. *See* 56 Fed. Reg. at 23,114.

Much debate ensued, and FERC subsequently amended its definition to include downstream passage. 56 Fed. Reg. 61,137, 61,138 (Dec. 2, 1991). In doing so, however,

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[8] *See* Prescription at §§ 1.1 (upstream fishway at Iron Gate Dam); 1.2 (downstream fishway at Iron Gate Dam); 1.3 (spillway modifications at Iron Gate Dam); 4.1 (upstream fishway at Copco 2 Dam); 4.2 (downstream fishway at Copco 2 Dam); 4.3 (spillway modifications at Copco 2 Dam); 5.1

FERC again rejected DOI's contention that fishways should include non-structural operational measures and also clarified that fishways were only required where "passage of a population is necessary for the life cycle of a fish species."[9] *Id.* at 61,142; *see also id.* at 61,144 (fishways appropriate for "species whose migration is essential for the survival of their population"); *id.* at 61,142 (fishway prescriptions should be limited "to fish that have a bona fide need to migrate past the obstacles"). DOI and others continued to oppose these limitations, arguing that fishways should include broad operational measures and could be prescribed for any migratory or nonmigratory fish. *See* 56 Fed. Reg. at 61,142; 56 Fed. Reg. at 23,114 (DOI definition including all "measures used for safe and timely passage of all life stages of migratory and nonmigratory fish....").

In formulating the Energy Policy Act of 1992, Congress provided a measured response to this debate. In Section 1701(b) of the Energy Policy Act, it vacated FERC's definition yet ultimately left it up to FERC to formulate, jointly with the Services, a definition of "fishway." Section 1701(b) also set forth the definitional parameters quoted above. The Conference Report explains:

> Section 1701(b) vacates the Federal Energy Regulatory Commission's (FERC) current regulatory definition of the term "fishway" without prejudice to any definition or interpretation of the term by rule and requires the Commission to obtain the concurrence of the Secretaries of Commerce and the Interior in issuing any new regulatory rulemaking definition. It also

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(upstream fishway at Copco 1 Dam); 5.2 (downstream fishway at Copco 1 Dam); and 5.3 (spillway modifications at Copco 1 Dam).

[9] FERC's revised definition read: "Fishway means any structure, facility, or device used for the passage of fish through, over, or around the project works of a hydropower project, such as fish ladders, fish locks, fish lifts and elevators, and similar physical contrivances, where passage of a population is necessary for the life cycle of a fish species; and those screens, barriers, and similar devices that operate to guide fish to a fishway; and flows within the fishway necessary for its operation." 56 Fed. Reg. at 61,154.

indicates what may constitute a "fishway" under section 18 when a new rule is developed and promulgated.

H.R. Conf. Rep. No. 102-1018, at 393, *reprinted in* 1992 U.S.C.C.A.N. 1953, 2484.[10]

Although Congress declined to expressly weigh in on the debate between the agencies, the language it adopted in Section 1701(b) supports FERC's interpretation in two respects. First, the statutory language plainly rejects the proposition that operational measures, generally, may be prescribed as a "fishway." *See* Pub. L. 102-486, § 1701(b) (limiting what may constitute a fishway to "physical structures, facilities, or devices . . . and project operations and measures *related to* such structures, facilities, or devices *which are necessary to ensure the effectiveness* of such structures, facilities, or devices.") (emphasis added). This interpretation is consistent with section 18 of the FPA, which describes a "fishway" as something susceptible of "*construction, maintenance, and operation.*" 16 U.S.C. § 811 (emphasis added).

Second, the plain language of the statute adopts the limitation identified by FERC that "fishways" are only appropriate for those fish species that actually *need* passage in order to survive and successfully reproduce. *Compare* Pub. L. 102-486, § 1701(b) (limiting "fishway" to those structures, facilities, and devices "*necessary to maintain all life stages*" of

[10] The legislative history of § 1701(b) is otherwise unhelpful, as it contains highly contradictory statements of what the definitional parameters – which were added as last-minute compromise language – were meant to accomplish. *Compare, e.g.*, 138 Cong. Rec. H11427-01, H11429-30 (Oct. 5, 1992) (suggesting that fishway prescriptions could include stream flows, project shutdown periods, and other non-structural measures) (statement of Senator Dingell, citing Department of Commerce position), *with* 138 Cong. Rec. S17566-01, S17623-24 (Oct. 8, 1992) (statutory language rebuts the "wildly expansive interpretations" of Congressman Dingell and specifically says that fishways are limited to physical structures, facilities, or devices and related operations; "The point was to limit fishways – those items that can be prescribed under section 18 – to physical structures designed principally for the safe passage of fish, and such flows needed to ensure the effectiveness of those structures. There is no fair way to read this language to include stream flows or project shutdown or spillway flows or project operations more broadly.").

fish) (emphasis added), *with* 56 Fed. Reg. 61,142 (FERC rule limiting fishways to situations where "passage of a population is *necessary for the life cycle* of a fish species") (emphasis added).[11] Accordingly, in prescribing fishways for the Project, the Services must limit their prescriptions to "physical structures, facilities, or devices" and related operations that are "necessary" to allow a population to satisfy its life history needs. Pub. L. 102-486, § 1701(b).

Several components of the Services' Prescription do not meet with these requirements. First, the Services' Prescriptions requiring PacifiCorp to undertake various planning, record-keeping, and monitoring activities do not constitute a "structure, facility, or device" that provides for upstream or downstream fish passage. Pub. L. 102-486, § 1701(b). Similarly, as mentioned above, the Services' asserted "Reservation of Authority" does not meet with the statutory definition of "fishway." *Id.*; Section III.B., *supra*.

Second, the Services' Prescription requiring tailrace barriers at various Project facilities does not meet with the definition of "fishway," as it is expressly intended to *prevent* fish from passing into Project turbines and does not provide for passage over or around the Project. Although measures meant generally to protect fish from harm that could result from Project works may be appropriately recommended under section 10(j) of the FPA, Congress has strictly limited what may constitute a "fishway" to structures, facilities, and devices necessary to provide upstream or downstream passage. Pub. L. 102-486, § 1701(b). Likewise, the Services' Prescription requiring that PacifiCorp remove from Project reaches

[11] In formulating this limitation, FERC noted that most fish populations are to some extent migratory, yet only certain species actually need passage in order to survive and reproduce. *See* 56 Fed. Reg. 61,144 (reviewing available legislative history and literature and finding "scant support for

rocks and other material that the Services claim are an impediment to fish passage are not "physical structures, facilities, or devices" that may be prescribed under section 18. *Id.* In addition, as discussed *infra* in Section V.C., the Services' Prescription requiring PacifiCorp to transport fish to avoid bodies of water (upstream at Keno Dam and downstream at Link River East Side and West Side powerhouses) are not appropriate "fishways," as they require transport for the sake of avoiding water quality conditions unrelated to the Project rather than obstacles attributable to the Project.

Finally, the Services have not established by substantial evidence that resident fish populations for which they have prescribed passage in fact need such passage in order to complete their life cycles. *See* NMFS A-18 to A-27 (prescribing passage at Project facilities for redband trout, suckers, and lamprey); DOI C-21 to C-21 (same). As explained above, Congress has expressly limited the Services' prescribing authority to those fish populations that require passage in order to "maintain all life stages." Pub. L. 102-486, § 1701(b). As explained in Section V.B., *infra*, resident fish populations within the Project area are able to meet all of their life history needs under current conditions, therefore fish passage prescriptions are inappropriate for these populations.

In summary, for the reasons explained above, the Services' Prescriptions at sections 1.1.1 (Design and Construction Plans); 1.1.2 (Access to Developments and Records); 1.1.3 (Maintenance Requirements); 1.1.4 (Fishway Operation, Inspection, and Maintenance Plans); 1.1.5 (Post Construction Fishway Evaluation Plans); 1.1.6 (Fishway Evaluation and Modification Plans); 1.1.3, 1.2.3, 1.3.3, 2.1.3, 2.2.3, 2.3.3, 3.1.3, 3.2.3, 4.1.3, 4.2.3, 4.3.3,

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that proposition that [fishways] should be constructed for fish that do not require migration, although they may in fact migrate").

4.4.3, 4.5.3, 5.1.3, 5.2.3, 5.3.3, 5.4.3, 6.1.3, 6.2.3, 6.3.3, 6.4.3, 6.5.3, 7.1.3, 7.2.3, 8.1.3 and 8.2.3 (general reporting, monitoring and evaluation plans for each Prescription); 4.5 (Copco 2 Bypass Channel Barrier/Impediment Modification); 6.1 (J.C. Boyle Bypass Channel Barrier Removal); 2.3, 4.4, 5.4, 6.5, and 8.2 (tailrace barrier prescriptions); 1.1 (upstream fishway at Iron Gate Dam) (as applied to resident fish); 1.2 (downstream fishway at Iron Gate Dam) (as applied to resident fish); 1.3 (spillway modifications at Iron Gate Dam) (as applied to resident fish); 4.1 (upstream fishway at Copco 2 Dam) (as applied to resident fish); 4.2 (downstream fishway at Copco 2 Dam) (as applied to resident fish); 4.3 (spillway modifications at Copco 2 Dam) (as applied to resident fish); 5.1 (upstream fishway at Copco 1 Dam) (as applied to resident fish); 5.2 (downstream fishway at Copco 1 Dam) (as applied to resident fish); 5.3 (spillway modifications at Copco 1 Dam) (as applied to resident fish); 7.1 (seasonal upstream trap and haul around reservoirs from Keno Dam); and 8.1 (seasonal downstream trap and haul around reservoirs from Link East Side/West Side powerhouses) should not be adopted by the Services because the Prescriptions exceed the statutory definition of "fishway."

In this regard, PacifiCorp notes that a licensee's proposed alternative to a fishway is not subject to the strict statutory definition that is binding on the Services, and therefore provides an opportunity to achieve broader and more flexible management measures than are otherwise available under section 18. PacifiCorp's Alternative, for example, contains a proposal for adaptive management and certain other non-structural measures designed to promote the Services' reintroduction objective. The Services thus can achieve the benefits of adaptive management and the greater flexibility that this provides, flexibility that is

particularly important given the uncertainties related to reintroduction here, by adopting PacifiCorp's Alternative, which is described in detail in Section V, below.

## V. ALTERNATIVE FISHWAY PRESCRIPTIONS

### A. Alternative to Services' Prescriptions for Anadromous Fish at and Between Iron Gate, Copco 1, Copco 2, and J.C. Boyle Facilities

#### 1. Description of the Services' Anadromous Fishway Prescription

At and between the Iron Gate, Copco 1, Copco 2 and J.C. Boyle dams and facilities, the Services preliminarily prescribe upstream fishways, downstream fishways, spillway modifications, and tailrace barriers to provide passage for fall and spring Chinook and coho salmon, steelhead trout, and Pacific lamprey. In general, these Prescriptions call for the installation or modification of facilities to provide "volitional" passage (i.e., fish ladders) for upstream migrating anadromous fish. In addition, certain protective measures are preliminarily prescribed for the purpose of downstream juvenile migration and to minimize associated injuries.[12]

[12] This Section A is responsive to the following Prescriptions as they apply to anadromous fish: sections 1.1 (upstream fishway at Iron Gate Dam); 1.2 (downstream fishway at Iron Gate Dam); 1.3 (spillway modifications at Iron Gate Dam); 2.3 (tailrace barrier at Fall Creek Diversion Dam); 4.1 (upstream fishway at Copco 2 Dam); 4.2 (downstream fishway at Copco 2 Dam); 4.3 (spillway modifications at Copco 2 Dam); 4.4 (tailrace barrier at Copco 2 Powerhouse); 5.1 (upstream fishway at Copco 1 Dam); 5.2 (downstream fishway at Copco 1 Dam); 5.4 (spillway modifications at Copco 1 Dam); 5.4 (tailrace barrier at Copco 1 Powerhouse); 6.2 (upstream passage at J.C. Boyle Dam); 6.3 (downstream passage at J.C. Boyle Dam); 6.4 (spillway modification at J.C. Boyle Dam); and 6.5 (tailrace barrier at J.C. Boyle Powerhouse). As stated in Section IV *supra*, Prescriptions 2.3, 4.4, 5.4, and 6.5 exceed the scope of authority conferred by FPA section 18 and are therefore *ultra vires*. Moreover, the remaining Prescriptions are *ultra vires* as applies to resident fish. PacifiCorp does not waive these objections in proposing its Alternative.

### a. Upstream Fishways

The Services are preliminarily prescribing construction of new fish ladders at Iron Gate, Copco 1, Copco 2 and J.C. Boyle dams. The facilities would be designed with a 0.5-foot drop between pools within the fish ladder, and ladders would have no more than a 10 percent slope. The corners of the pool chambers would be rounded to facilitate lamprey passage. In addition to specific ladder conditions, the Services are also preliminarily prescribing that each ladder include features to detect and record data for Passive Integrated Transponder ("PIT") -tagged anadromous fish or other fish species tagged with similar technology.

### b. Downstream Passage

The Services are preliminarily prescribing juvenile fish screens and bypass facilities at Iron Gate, Copco 1, Copco 2 and J.C. Boyle powerhouse intake facilities. In addition to the screening facilities, each of the bypass facilities would be fitted with features to detect and record data for PIT-tagged anadromous fish or other fish species tagged with similar technology.

### c. Tailrace Barriers

The Services are preliminarily prescribing the construction of tailrace barrier and guidance systems for the Fall Creek, Copco 1, Copco 2 and J.C. Boyle powerhouse discharge locations.[13] The purpose of these Prescriptions is to benefit anadromous fish which, under the Services' Prescription, would have access to the Project area.

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[13] The Services have failed to provide any data demonstrating that current Project tailrace configurations are harming migrating fish. This Prescription is thus arbitrary in addition to being

### d. Spillway Modifications

The Services are preliminarily prescribing that PacifiCorp modify all of the spillways on the Klamath River dams to improve downstream fish passage. In addition, the modifications are intended to minimize false attraction flows on the downstream side of each spillway and make fish ladder entrances more accessible.

## 2. Anadromous Fish Reintroduction Efforts are Inherently Uncertain and Require a Flexible, Adaptive Approach

The Services have proposed a method of anadromous fish reintroduction that is incapable of responding to the multitude of uncertainties and unknowns facing a reintroduction effort. As noted above, the Services' goal is not only to provide access to upstream habitat to allow salmonids to complete their life cycles, but to establish "self-sustaining runs" (DOI at C-5) and to "recover" and ensure the "long-term sustainability" of native fish (DOI C-6). Unfortunately, the Services' Prescription is inherently inflexible, and requires that anadromous fish travel through extreme conditions in record times to have even the slimmest chance of survival. In fact, the Services have provided no evidence to support their optimistic conclusion that a series of ladders and juvenile bypass facilities requiring passage through the Project area will result in "substantial" runs of restored anadromous fish (DOI 28) or that anadromous fish will "thrive" in watersheds above Iron Gate Dam if reintroduced as prescribed (NMFS A-5).

While the goal of restoring anadromous fish runs in the upper Klamath basin is a worthy one, it is important to recognize the considerable uncertainty associated with

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*ultra vires. Cf. City of Centralia v. FERC*, 213 F.3d 742, 748-49 (D.C. Cir. 2000) (vacating condition requiring costly study of tailrace effects on salmon where record contained no site-specific evidence that project was causing harm).

reestablishing sustainable fish runs. The decision to attempt a reintroduction effort is not PacifiCorp's; however, PacifiCorp believes that the ultimate decision about whether and how to restore anadromous fish to the upper Klamath basin must be founded upon sound scientific evidence, much of which has yet to be verified. Moreover, any reintroduction program must be sufficiently flexible to allow fish managers to respond to the inherent uncertainties involved in such an effort.

Section (a), below, describes three previous evaluations conducted by or at the request of federal, tribal, and state fisheries managers and other stakeholders, each of which concluded that the risks and uncertainties associated with reintroduction made such an effort unadvisable. Section (b) addresses the two reintroduction prerequisites specifically identified by the Oregon Department of Fish and Wildlife ("ODFW") and concludes that those prerequisites have not yet been met and can only be met in the future through implementation of an adaptive approach that studies the inherent risk, uncertainty and feasibility associated with any reintroduction effort in the upper Klamath basin.

### a. Previous Reviews of Anadromous Fish Reintroduction to the Upper Klamath Basin

The feasibility of reintroducing salmon and steelhead trout to the upper Klamath basin above Iron Gate Dam has been evaluated on three previous occasions. Each time, the federal and state agencies conducting the various evaluations concluded that reintroduction should not be attempted. The Services have not refuted the conclusions of these reports, nor provided any evidence that the information upon which these reports are based has changed.

*Fortune Report - 1966*

"A Study to Determine the Feasibility of Establishing Salmon and Steelhead in the Upper Klamath Basin," completed in 1966, was directed by an inter-agency steering committee consisting of representatives from the United States Bureau of Sport Fisheries and Wildlife, United States Bureau of Commercial Fisheries, California Department of Fish and Game ("CDFG"), Fish Commission of Oregon, Oregon State Game Commission, the City of Klamath Falls, and PacifiCorp's predecessor, Pacific Power and Light Company (Fortune et al., 1966) (hereinafter the "Fortune Report"). The Fortune Report is the most comprehensive of the three evaluations of reintroduction discussed in this Section (a); the two later evaluations relied heavily upon information presented in the Fortune Report. The evaluation included a useful historical account of fish occurrence in the upper Klamath basin based on published accounts, newspaper articles, and interviews with longtime local residents. As part of the evaluation, researchers also surveyed and documented then existing habitat conditions in the Klamath basin upstream of Iron Gate Dam.

After evaluating information contained in the Fortune Report, the steering committee advised against pursuing a program to reestablish anadromous fish runs to the upper Klamath basin. According to ODFW (1997), that conclusion was based on the following findings:

> Problems related to downstream passage of fry and juvenile fish at impoundments and lakes are serious. In the judgment of the Committee, losses due to residualism, predation, diversions and failure of downstream migrants to negotiate the impoundment would prevent the establishment and maintenance of adequate runs.
>
> ...
>
> Losses of upstream-migrating adults at fishways and in forebays or lakes would also be inevitable.
>
> ...

> The re-establishment of anadromous fish would depend on obtaining stocks of fish whose migrating, spawning, and incubation requirements fit within the very narrow limits afforded by conditions in the Upper Klamath Basin. There are insufficient stocks of fish in the Klamath to implement an effective transplant and no assurance that present Klamath stocks would adapt to the narrow requirements of the Upper Basin. Experience elsewhere has demonstrated it is very unlikely that suitable stocks outside the basin could be found.
>
> ...
>
> While perhaps no single factor in itself precludes the possibility of establishing anadromous fish in the Upper Klamath Basin, the interaction of all factors would prevent establishment of self-sustaining runs capable of perpetuating themselves at useful levels.

ODFW (1997) at 66. The Services have not demonstrated that conditions above and within the Project, fish losses at Project facilities, uncertainties associated with fish stock adaptability, or the interaction of these factors are no longer an obstacle to reintroduction.

*Upper Klamath River Basin Amendment to the Long Range Plan - 1992*

Twenty years after the Fortune Report, in 1986, Congress adopted the Klamath River Basin Fishery Resources Restoration Act ("Klamath Act"). The Klamath Act established the Klamath River Basin Fisheries Task Force ("Task Force"), charged with formulating a twenty-year plan for restoring anadromous fish populations in the Klamath River basin, including the Trinity River. The Task Force consisted of fourteen representatives of federal, tribal, state and local government (including the Services, ODFW and CDFG) as well as in-river and ocean fishing interests. In 1991, the Task Force issued a long range plan for restoration of anadromous fish in the lower Klamath River, below the Project (USDI Klamath River Basin Fisheries Task Force 1991). In 1992, the Task Force completed the Upper Klamath River Basin Amendment to the Long Range Plan ("Long Range Plan Amendment"), which evaluated the potential restoration of anadromous fish to the upper

Klamath basin. The Task Force concluded that, "[w]hile the dream of restoring salmon and steelhead remains alluring, consideration of re-introduction of these fish above Iron Gate Dam should be left to the future." Long Range Plan Amendment at 5-A-6. Specifically, the Task Force determined that:

> The Task Force should not support attempts to restore anadromous fish above Iron Gate Dam at this time.
>
> ...
>
> Only native Klamath broodstock should ever be employed in reintroduction efforts.
>
> ...
>
> Continue efforts to conserve gene resources in the lower basin to preserve diverse life history strategies that might someday help to restore upper basin runs.

Long Range Plan Amendment at 5-A-7.

The Task Force's reasons for rejecting reintroduction above Iron Gate Dam included:

*Disease Introduction*. No viral diseases are known to infect native fish of the upper Klamath basin. The Long Range Plan Amendment noted that if salmonids are brought in from other basins, or even allowed to pass upstream from Iron Gate Dam, there is a strong possibility of introducing Infectious Hematopoietic Necrosis ("IHN") to the upper Klamath basin, where native fish populations, including redband trout, have no natural resistance. *See* Long Range Plan Amendment at 5-A-1 through 5-A-6.

*Genetic Risks*. The Long Range Plan Amendment expressed concern that, if out-of-basin stocks are used for reintroduction into the upper Klamath basin, they may stray and spawn with lower river stocks. Such interbreeding could lower the fitness of the locally adapted downriver stocks. *Id.*

*Suitability of Downstream Stocks*. Because any stocks that were genetically adapted to the upper Klamath basin have been extirpated, it is uncertain whether the genotypes present in stocks downstream of Iron Gate Dam would be suited to that habitat. *Id.*

*Habitat Quality*. Water quality in Upper Klamath Lake ("UKL") may have deteriorated since the Fortune Report assessed potential migratory problems for anadromous fish. High water temperatures, pH and low dissolved oxygen would be lethal to salmonids attempting to migrate through the lake after June 1. Water quality problems originating in the lake could continue to pose problems for out-migrating smolts downstream of the lake. *Id.*

*Passage Conditions*. Even with provisions for downstream passage facilities at the dams, the added stress of passing the dams and through the reservoirs, combined with passage problems through UKL, could limit the success of attempts to reintroduce anadromous salmonids to the upper Klamath basin. *Id.*

As recently as 2001, the Task Force reiterated that the feasibility of providing salmonids access to habitat in the upper Klamath basin needed further study. It urged PacifiCorp to evaluate "a broad range of alternatives" for successful passage and to assess habitat available above Iron Gate Dam. Letter from Klamath Fishery Management Council to Todd Olsen, PacifiCorp, at 2 (March 7, 2001). The Services provide no evidence that those studies, evaluations and assessments are no longer required to ensure that reintroduction is feasible and that any reintroduction effort that is undertaken is appropriately designed to ensure successful passage and access to the most well-suited habitat in the upper Klamath basin.

*Klamath River Basin, Oregon Fish Management Plan - 1997*

The most recent evaluation of the potential for salmon and steelhead reintroduction in the upper Klamath basin was conducted by ODFW and resulted in its 1997 Klamath River Basin, Oregon Fish Management Plan ("ODFW Plan"). The ODFW Plan re-emphasized the four problems associated with reintroduction noted by the Fortune Report, and identified two additional factors that counsel against reintroduction:

> Introduction of Klamath River salmon and steelhead from California, the logical choices, would risk importation of viral diseases that could cause harm to existing native trout.
>
> ...
>
> Successful reintroduction of salmon and steelhead would present direct competition for food and habitat with existing native fish fauna.

ODFW Plan at 66.

The ODFW Plan explained that a decision to reintroduce anadromous fish to the upper Klamath basin must be predicated on meeting two primary biological requisites: the introduced population must be capable of becoming self-sustaining, and the health of the upper basin's native fish community must not be compromised by the presence of reintroduced fish. ODFW Plan at 67. ODFW ultimately concluded that these prerequisites had not been met.

> [B]ecause of existing habitat problems, loss of native stocks, risk of disease introduction and potential competition with remaining native redband trout, *it does not appear feasible, or prudent, to attempt re-establishment of anadromous salmon or steelhead to the upper Klamath Basin in Oregon, now or in the near future.*

ODFW Plan at 67 (emphasis supplied).[14] The Services provide no evidence that the risks identified in the ODFW Plan just nine years ago no longer present obstacles to restoring self-sustaining runs of anadromous fish.

### b. Primary Biological Requisites Not Met

As noted above, the ODFW Plan explained that a decision to reintroduce anadromous fish to the upper Klamath basin must be predicated on meeting two primary biological requisites. First, the introduced population must be capable of becoming self-sustaining. Second, the presence of reintroduced fish must not compromise the health of the upper basin's native fish community. The Services have provided no evidence that these predicates have been met. Below, PacifiCorp examines each of these criteria and demonstrates that (1) there are significant uncertainties regarding whether anadromous fish can be restored to self-sustaining population levels in the upper Klamath basin; and (2) there is a strong possibility that reintroduced fish would bring disease to the upper Klamath basin, resulting in possible catastrophic losses of native fish.

#### i. Criterion 1: Sustainability

The feasibility of successfully restoring anadromous fish populations depends upon a number of factors that, together or singly, can determine the sustainability of a fish

[14] The ODFW Plan also summarized the results of an experimental program conducted from 1970 to 1974 whereby surplus adult steelhead trout from the Iron Gate Hatchery were trapped and released into the Oregon reaches of the Klamath River. An evaluation of the program (Hanel and Stout 1974) concluded that few anglers were attracted to the potential sport fishery, many of the fish moved downstream into California waters, and the steelhead spawned at the same time and in the same areas as resident trout, many of which were larger than the steelhead. Due to poor angler use and, in particular, the potential for interbreeding with the native redband trout, the program was discontinued.

population. These factors are discussed below as a series of questions with corresponding answers for the Klamath River.

***Are there stocks of fall and spring Chinook and steelhead that are genetically adapted well enough to the local environmental conditions in and above Upper Klamath Lake to meet survival levels necessary for sustainability?***

Anadromous fish do not exist in the upper Klamath basin. A reintroduction program would require transfer of lower Klamath River fish or out-of-basin fish stocks to the upper basin. As noted in the reintroduction evaluations described above, these fish stocks would likely not have the genetic or behavioral traits needed to be successful in a stream environment considerably different than their natal stream. While over many cycles the reintroduced stocks may adapt traits needed to complete their life-history successfully, until that occurs all adults and juveniles from lower river populations would need to be continually "mined" or reared in hatcheries to support the reintroduction program. To have any reasonable chance for genetic adaptation to succeed, harvest rates of commingled downriver fish would have to be significantly reduced or totally curtailed for many years.

The concern surrounding use of fish stocks whose migrating, spawning, and incubation requirements may not fit within the narrow limits afforded by conditions in the upper Klamath basin was a major reason why reintroduction was not recommended by the inter-agency steering committee overseeing development of the Fortune Report. Since that time, there has been considerable advancement in our understanding and appreciation of the ecological and genetic diversity of fish stocks as reflective of distinctive adaptations that promote evolutionary processes. The importance of these processes has recently come to the forefront with the listing of several West Coast populations of anadromous fish under the Endangered Species Act ("ESA"). The concept of evolutionarily significant units ("ESUs"),

NMFS's term used to describe "distinct population segments" under the ESA, is based on our current understanding of the importance of ecological and life history differences in defining fish populations that are genetically distinct (Waples 1991). In most cases, ESU distinctions align with ecoregions, which are defined by prevailing landform and climate conditions.

The ESU concept assumes by definition that populations in different ESUs represent different evolutionary lineages. If all populations within the ESU are extirpated, then the species that was adapted to that geographically-defined area becomes extinct. The failure of nearly all attempts to successfully transplant salmonid stocks from one ESU to another attests to the importance of genetic adaptation to the different environmental regimes within each ESU. A good discussion of the relevance of the ecological and genetic basis for specific Chinook salmon life-history traits, including those in the Klamath River basin, is presented in the various NMFS documents supporting the ESA listings of several salmon and steelhead populations. *See, generally*, ,http://www.nwr.noaa.gov/publications/Biological-Status-Reviews/index/cfm>.

The evolutionary significance related to population distinctness is a critical factor that must be considered when determining whether a particular population would be able to survive well enough to be sustainable if introduced into a new environment. Obviously, sustainability is a necessary criterion for successfully maintaining a population. The ESU concept is based on the assumption that subpopulations within the same ESU come from a common evolutionary lineage. It follows then that if a subpopulation is extirpated, another subpopulation within that ESU would have a fair likelihood of recolonizing and adapting to the ecological conditions in the area previously occupied by the extirpated subpopulation. Conversely, however, it follows that a subpopulation from one ESU would have little chance

of being successfully introduced into the ecological region (typically geographic/climatic) associated with another ESU. There have been some notable exceptions to this general observation; however, they have been mostly in situations, such as in the Great Lakes and New Zealand, where the introduced fish species never existed naturally.

The next three subsections discuss the likelihood that lower river stocks of fall Chinook salmon, spring Chinook salmon, steelhead trout would be suited or adaptable over time to conditions in the upper Klamath basin.

*Fall Chinook Salmon*

Chinook salmon are often characterized by their adult run timing. Although winter runs (Sacramento River) and summer runs (Idaho and Upper Columbia River) exist, most runs are categorized as fall-run and spring-run Chinook. All fall Chinook runs, either from coastal or interior streams, have an ocean-type life history, meaning that the juveniles predominantly migrate to sea within the first three months after fry emergence (Meyers et al. 1998). This is true for the two existing Klamath basin fall Chinook stocks and would likely have been the case for any fall Chinook that historically migrated to the upper Klamath basin.

In reviewing genetic and ecological evidence, NMFS has assigned two distinct ESUs to fall Chinook salmon in the Klamath system (Meyers et al. 1998). NMFS found that fall Chinook in the Trinity River and in the Klamath River upstream of the Trinity confluence are genetically and ecologically distinguishable from those in the coastal region, which is defined as waters downstream of the Trinity/Klamath confluence. The lower-river fall Chinook are included in the Southern Oregon/Northern California Coastal ESU, which is a segment of the larger coastal ecoregion. The upriver fall Chinook are included in the Upper Klamath and Trinity River ESU, which includes wild fish as well as those returning to the

Iron Gate and Trinity River hatcheries. The Upper Klamath/Trinity ESU is within the Sierra Nevada ecoregion, although fall Chinook in the Klamath system are quite distinct from those found in the Sacramento River.

No studies exist about the genetics of the fall Chinook salmon stock, which was reported to have been abundant in the upper Klamath basin. However, given the uniqueness of the upper Klamath basin, it is likely that, if a historic stock of fall Chinook used the area, it was distinct from the stock currently found below Iron Gate Dam. This conclusion is consistent with findings elsewhere within the range of Chinook salmon that stocks east of the Cascades are genetically distinct from those west of the Cascades (Meyers et al. 1998). While the upper Klamath basin has not been assigned an ESU designation, the upper basin lies in a different ecoregion (Eastern Cascade Slopes) than the area west of approximately Keno, Oregon (Klamath Mountains).

In addition to the major climate and landform differences between the Klamath Mountains and the region around UKL, any fall Chinook that historically used the upper basin undoubtedly would have been adapted to the unique condition of having to migrate through and perhaps rear in one of the largest natural lakes in the western United States. The lake is very shallow and hypereutrophic. Because water passing through the lake has an average retention time of approximately six months, flow-through currents do not become established in UKL. This condition is of interest because the ability of salmon to successfully navigate through such a large lake with no water current clues to guide them is believed to be based on a genetically adapted behavior (Forester 1968). It is unlikely that juvenile fall Chinook transplanted from below Iron Gate Dam would have the innate ability to navigate successfully out of UKL.

The ability of the fall Chinook stock below Iron Gate Dam to successfully adapt to the unique conditions in UKL is uncertain. However, of the potentially available stocks, the Iron Gate Hatchery fall Chinook, fall Chinook from below Iron Gate Dam, and perhaps those returning to the Shasta River would have the best chance of adapting over time. At a minimum, supplementation using several generations with high productivity would be required to allow the transplanted stock to adapt successful behavior patterns consistent with their new environment.

*Spring Chinook Salmon*

Understanding the life history and stock genetics of the now extinct spring Chinook from the upper basin is critical in determining the biological feasibility of reintroducing spring Chinook to the upper basin. Spring Chinook salmon throughout their range can have either an ocean-type or stream-type life history. Stream-type juveniles usually have a freshwater residency time of one year. Spring Chinook found east of the Cascades are all stream-type. Spring Chinook in most coastal regions, including all of California and the lower Klamath River and tributaries, are ocean-type (Meyers et al. 1998).

According to the Fortune Report, some spring Chinook salmon occurred historically above UKL, but they were apparently extirpated long before construction of the Project (Fortune et al. 1966). The Fortune Report states that adult spring Chinook salmon migrated through UKL in the spring months, consistent with all other spring Chinook migration patterns. Based on what is known about spring Chinook throughout their range, however, any spring Chinook returning to the upper Klamath basin would most likely have been of a stream-type life history and of an interior stock lineage (Meyers et al. 1998). Because stream-type spring Chinook tend to spawn in higher elevation streams where summer water

temperatures are favorable for growth and survival of the juveniles, the likely spawning ground would have been in the upper forks of the Sprague River in the upper Klamath basin.

The Fortune Report and the Long Range Plan Amendment noted that reestablishment of anadromous fish to the upper Klamath basin would depend on obtaining stocks of fish whose life history requirements fit within the very narrow limits afforded by conditions in the upper Klamath basin. While the broad evidence suggests that the historical upper Klamath basin spring Chinook were stream-type, the existing spring Chinook salmon stocks in the lower basin have a predominately ocean-type life history and are of a coastal lineage (Meyers et al. 1998). Therefore, the lower-river stock would not likely be suited to survive in the much different conditions of the upper basin. It would be possible to attempt an introduction of an interior stream-type spring Chinook stock from the Columbia River basin, but transplants of nonindigenous stocks from distant basins often fail, and, more importantly, the practice is contrary to current fish management policy.

*Steelhead Trout*

There is little definitive evidence that anadromous steelhead trout migrated to UKL in large numbers. The Fortune Report provides a comprehensive review of historical presence of steelhead trout upstream from the present location of Iron Gate Dam. Based on this evaluation, it is clear that steelhead were present in the upper Klamath River at least up to, and including, Spencer Creek. However, the authors found no conclusive evidence that steelhead trout ever existed above UKL. Referring to the question of steelhead runs above the lake, the Fortune Report concluded that, "[t]hough it is possible that steelhead trout did migrate to the upper basin, no conclusive evidence of such runs can be derived from the reports examined." There was abundant documentation of large rainbow trout observed in

and above UKL, but at the time there were no clear means to differentiate sea-run steelhead trout from the large adfluvial redband rainbow trout that resided in UKL and Lake Ewauna and spawned in the tributaries to UKL. Lane and Lane (1981) cited the 1940 testimony of nineteen older Klamath tribal members and nine non-tribal members regarding the presence of salmon and steelhead in the upper Klamath basin. All interviewees noted the abundance of Chinook salmon but few mentioned steelhead trout. One tribal member stated that steelhead were numerous whereas two others indicated that they were few in numbers.

The Fortune Report offered no explanation for why steelhead trout should or should not have occurred above UKL except to note that runs were possible because of the available access to the ocean. Similarly, Hamilton, et al. (2005) concluded that the known presence of Chinook salmon in tributaries to UKL provided evidence that steelhead were also present. Although Chinook salmon and steelhead trout overlap in most situations, there are notable exceptions in cases where freshwater rearing conditions favor the resident life history form of rainbow trout over the anadromous life history. Examples include the Willamette and Deschutes rivers in Oregon and the Yakima River in Washington (Cramer et al. 2003). For similar reasons, the Long Range Plan Amendment concluded that steelhead trout may never have gotten a foothold in the tributaries above UKL because growth of resident trout in the lake was so high that natural selection may have favored use of the lake for growth to maturation as opposed to adapting an anadromous life history.

Attempts to establish steelhead in streams with strong populations of resident trout have failed. ODFW attempted to establish steelhead populations in the McKenzie and Middle Fork Willamette basins but recently dropped the program because steelhead failed to naturally produce. Both of these streams continue to support acclaimed resident rainbow

trout fisheries supported by natural production. Similar attempts to establish steelhead in the upper Yakima River also failed, again in an area where there is a highly productive rainbow trout population (Cramer et al. 2003, citing McMichael et al. 1999).

The genetic lineage of the existing steelhead populations in the lower Klamath River (below Iron Gate Dam) differs from the lineage of rainbow trout originating above UKL. Two genetic groups of *Oncorhyncus mykiss* (the scientific name for rainbow trout and steelhead trout) in North America are recognized: the inland and coastal groups. The inland groups are commonly referred to as "redband" trout for both the resident and anadromous forms. The two groups (coastal and interior) are generally separated by the Cascade Mountain crest in Washington and Oregon. All steelhead east of the Columbia River gorge are considered inland steelhead. California, including the Klamath River system, is thought to have only coastal steelhead (Busby et al. 1996, Berg and Gaul 1988). These two genetic groups apply to both anadromous and nonanadromous forms of *O. mykiss*. Resident rainbow trout east of the Cascades (redband) are genetically more similar to steelhead from east of the Cascades than they are to rainbow trout (resident and steelhead) west of the Cascades. Resident redband trout of the UKB are considered a distinct subgroup of the interior group on the basis of unique genetic characteristics associated with the UKL ecosystem (Behnke 1992).

While direct genetic evidence (e.g., electrophoresis) is not available for steelhead that may have historically used the upper Klamath basin (above UKL), some meristic (physical measurements) evidence is available below Keno Dam, as reported in Behnke (1992). Citing observations documented in Snyder (1931) for steelhead in the upper Klamath River below UKL and including museum specimens from Spencer Creek, Behnke notes that these were

coastal rainbow trout which were quite distinct from the lacustrine trout of UKL. He further states that the original genotype of the lake-adapted trout in UKL likely remains intact today, and that the unique natural eutrophic condition of the lake and its high pH are factors favoring the selection of the local redband genotype.

The multiple lines of evidence showing the distinctness of upper Klamath basin redband trout in and above UKL provide a strong basis to conclude that steelhead trout representing a coastal evolutionary lineage did not likely occur in UKL. Had they been present, some evidence of genetic mixing would have been seen in either the electrophoretic or meristic characteristics in the native redband trout of UKL. Thus, if some of the UKL trout migrated to the ocean to explore an anadromous life history, as some probably did, they would have been of the interior redband lineage, not the coastal lineage. This evidence is important in regard to the biological feasibility of introducing steelhead to the area above UKL. The only steelhead stocks existing in the Klamath basin are of the coastal lineage, which includes those arriving at Iron Gate Dam. These lower river stock genetics would not be well suited to survive in the much different conditions in the upper basin as was noted in previous reviews (Fortune Report; Long Range Plan Amendment; Huntington and Dunsmoor 2006 (Klamath Tribes Attachment B). Furthermore, it is unknown how or if a lower river stock could partition available habitat with the resident redband trout, especially the adfluvial fish associated with UKL. Even of greater concern would be the risks associated with coastal stocks reproducing with the unique interior redband trout of UKL. This potential for inbreeding with the native redband trout was a primary reason why an experimental release of Iron Gate Hatchery steelhead to the J.C. Boyle reservoir area of the upper Klamath River in the early 1970s was discontinued (ODFW 1997, citing Hanel and Stout 1974).

***Are water temperature regimes consistent with the life history requirements of stocks being considered for reintroduction?***

With the exception of some spring-water dominated streams (e.g., the Wood and Williamson rivers) and reaches, both upper Klamath River and Project area stream temperatures are of marginal suitability for anadromous fish production. Anadromous salmon prefer stream temperatures that are on average less than 16°C. Natural stream temperatures throughout the Project area and upper basin consistently exceed 22°C during the summer.

High stream temperatures in the Klamath River basin are the product of the natural climate, geology and anthropogenic factors. Furthermore, water temperatures in the basin have been increasing over time due to increases in air temperature. Bartholow (2005) recognized the importance of ambient temperatures in his recent paper examining increasing stream temperatures in the lower Klamath River. Finding little indication that water temperature trends there are related to mainstem water availability, he instead found such trends consistent with measured basinwide air temperature increases possibly related to the cyclical Pacific Decadal Oscillation. Bartholow (2005). Noting that the anadromous salmonid thermal resources are being "squeezed" in both space and time, Bartholow concluded that "[r]ivers as warm as the main-stem Klamath River might … be viewed as thermally adverse [for young salmon], essentially requiring out-migration to avoid early- or oversummer death …." *Id.* at 160. These conditions would have similar effects on upper basin fish passing through the same waters on their way to and from the ocean. Moreover, the warm temperatures in the lower Klamath River have been blamed for the increase in disease among anadromous juvenile out-migrants. Thus, while there may be "temperature windows of opportunity" in some locations and times to meet certain salmon life cycle

requirements, the fact remains that these suitable temperature windows are much smaller today compared to what salmon had available to them historically.

For example, data collected in the lower Klamath River below Iron Gate Dam in 2004 recorded mortality rates ranging from 40 to 100 percent for juvenile Chinook salmon caught in out-migrant traps (Klamath Fish Health Assessment Team ("KFHAT") 2005). As a result of juvenile and adult salmon die-offs that have occurred in the lower Klamath River, the fisheries management agencies established KFHAT. This group of biologists is working to better understand the cause of these die-offs, improve monitoring, and develop strategies to reduce fish losses.

Water quality conditions in the Klamath Basin raise uncertainties for the success of reintroducing anadromous fish to the upper basin. Additionally, if global climate change results in warmer air temperatures, stream temperatures in the lower Klamath River are likely to increase even more over the next fifty years. This would further reduce the probable success of any reintroduction program and possibly even the continued existence of lower river fish stocks.

***Is there sufficient physical habitat to meet spawning, egg incubation, rearing, and migration needs?***

The results of collaborative habitat modeling show that there appears to be a very small amount of stream habitat in and just above the Project area (from Iron Gate Dam to Keno Dam) and a much larger amount in the upper Klamath basin above UKL that would support some anadromous fish production so long as fish are able to migrate successfully through lakes and Project reservoirs (PacifiCorp's Response to FERC AIR AR-2, Nov. 10, 2005). A summary of the amount and type of habitat found in key areas of the Project and the upper Klamath River are shown in Table 1. Of the total stream habitat modeled, only

about 8.6 percent is located in the Project area and immediately above it. The vast majority of the habitat is located in the upper Klamath basin above Keno Dam. It should be noted, however, that although upper basin stream habitat is plentiful, it has been heavily degraded due to logging, agriculture, cattle grazing and other human developments.

**Table 1. Length of riverine, lake, and reservoir habitat within and above the Project area.**

| **Iron Gate Dam to Copco 2 Dam** | **Miles** | **Copco 2 Dam to Copco 1 Dam*** | **Miles** |
|---|---|---|---|
| Riverine | 3 | Riverine | 0.3 |
| Lake | 0 | Lake | 0 |
| Reservoir | 7 | Reservoir | 0 |
| Total | 10 | | 0.3 |
| **Copco 1 Dam to J.C. Boyle Dam** | **Miles** | **J.C. Boyle Dam to upper point of J.C. Boyle Reservoir** | **Miles** |
| Riverine | 26 | Riverine | 0 |
| Lake | 0 | Lake | 0 |
| Reservoir | 5 | Reservoir | 4 |
| Total | 31 | Total | 4 |
| **Above J.C. Boyle Reservoir (Upper Klamath Basin)** | **Miles** | **Total Riverine Habitat** | **Miles** |
| Riverine | 352 | Project Area | 29.3 |
| Lake | 36 | Upper Klamath Basin | 352 |
| Reservoir | 21 | | |
| Total | 409 | Total | 381.3 |

* The 0.3 miles was not modeled in EDT

One of the key uncertainties identified through the modeling process was juvenile migration survival through UKL, Lake Ewauna and Project area reservoirs (Oosterhout 2005). For anadromous fish populations to be sustainable, juveniles must be able to survive at high rates and migrate rapidly through lakes and reservoirs. These are environments to which lower Klamath fish stocks have never been exposed.

Juvenile fish migrating from above UKL through the Project area would have to migrate approximately 280 miles to reach the ocean. On this journey, they would pass through approximately 46 miles of lakes and reservoirs, 6 dams, and 186 miles of mainstem Klamath River below Iron Gate Dam. As adults, these fish would then retrace their journey back to their natal spawning grounds.

The effect that different passage survival assumptions would have on fish populations volitionally migrating from spawning grounds to the estuary and back again are shown in Table 2. This simplified analysis shows that even before juvenile fish arrive at the upper end of the Project, up to 50 percent may have already perished. Additionally, even under the most optimistic assumptions, nearly 50 percent of all juveniles are lost prior to arriving at the estuary. Overall, the modeling effort indicates that only 4 to 38 percent of the population may successfully complete the juvenile and adult migration phase of their life cycle.

One critical uncertainty that requires emphasis is that the survival rates shown in Table 2 for juvenile migrants may be optimistic. A pilot study conducted at Copco and Iron Gate reservoirs in 2004 provided direct evidence that fall Chinook migratory behavior is slow through the reservoirs and survival is lower than survivals used in the models. Radio-tagged subyearling fall Chinook travel times were long, with medians of 11 days through Copco Reservoir and 13 days though Iron Gate Reservoir (Miller et al. 2004). Few fish

migrating through the reservoirs were detected at the dams. Specifically, 65 percent of the fish released at the head of Copco Reservoir were detected at Copco 1 Dam and only 18 percent of the tagged fish released at the head of Iron Gate Reservoir were subsequently detected at Iron Gate Dam. This equates to nearly an 80 percent loss of juvenile fish in the two reservoirs, far exceeding the worst-case scenario provided in Table 2. While these mortality rates may be somewhat overestimated due to tagging effects on the experimental fish, they nevertheless highlight the considerable uncertainty associated with this critical performance factor.

For coho salmon, habitat between Iron Gate and J.C. Boyle dams is poorly suited for rearing; passage of coho salmon to the Project area is likely to result in significant mortality and an overall reduction in the size of the existing population. Tributaries within the Project are often ephemeral, and tributary temperatures generally exceed those optimum for coho survival (*see* "Potential Coho Salmon Production and Survival from Tributaries Entering Iron Gate and Copco Reservoirs" (Attachment C)). Coho reared in these tributaries will be forced by these conditions to move into Project reservoirs, where they will be subject to predation and disease. This is likely to cause significant mortality and result in few juvenile coho arriving below Iron Gate Dam.

Conversely, coho are known to successfully spawn and rear in tributaries to the lower Klamath River. Because coho that move into the Project area are likely to produce few out-migrants due to lack of habitat, allowing them passage will effectively reduce this ESA-listed species' overall numbers. PacifiCorp's proposed adaptive collection and transport program, detailed in Section V, below, could provide coho with immediate access to suitable habitat (Spencer Creek) above J.C. Boyle Dam.

**Table 2. Example of the effects on cumulative fish survival from a range of juvenile and adult survival rates to and from spawning grounds. High, medium, and low rates represent the range of values used in the KlamRAS model. (Source: Oosterhout 2005.)**

| | Juvenile Survival Rate | | |
|---|---|---|---|
| **Area** | **High** | **Medium** | **Low** |
| Upper Klamath Lake | 95% | 90% | 85% |
| Link River Dam | 95% | 90% | 85% |
| Lake Ewauna | 95% | 90% | 85% |
| Keno Dam | 95% | 90% | 85% |
| ***Cumulative Survival to Project Area*** | ***81%*** | ***66%*** | ***52%*** |
| | | | |
| J.C. Boyle Reservoir | 95% | 90% | 85% |
| Copco 1 Reservoir | 95% | 90% | 85% |
| Copco 1 and 2 Dams | 95% | 90% | 85% |
| Iron Gate Reservoir | 95% | 90% | 85% |
| Iron Gate Dam | 95% | 90% | 85% |
| Mainstem Klamath River | 80% | 70% | 60% |
| ***Cumulative Survival to Estuary*** | ***50%*** | ***27%*** | ***14%*** |
| | | | |
| | **Adult Survival Rate** | | |
| **Area** | **High** | **Medium** | **Low** |
| Mainstem Klamath River | 90% | 80% | 70% |
| Iron Gate Dam | 98% | 95% | 90% |
| Iron Gate Reservoir | 98% | 95% | 90% |
| Copco 1 and 2 Dams | 98% | 95% | 90% |
| Copco 1 Reservoir | 98% | 95% | 90% |
| J.C. Boyle Reservoir | 98% | 95% | 90% |
| Keno Dam | 98% | 95% | 90% |
| Lake Ewauna | 98% | 95% | 90% |
| Link River Dam | 98% | 95% | 90% |
| Upper Klamath Lake | 98% | 95% | 90% |
| ***Adult Survival Estuary to Spawning*** | ***75%*** | ***50%*** | ***27%*** |
| | | | |
| ***Total Adult and Juvenile Survival*** | ***38%*** | ***14%*** | ***4%*** |

***Would smolt-to-adult survival rates be sufficient to maintain populations over time?***

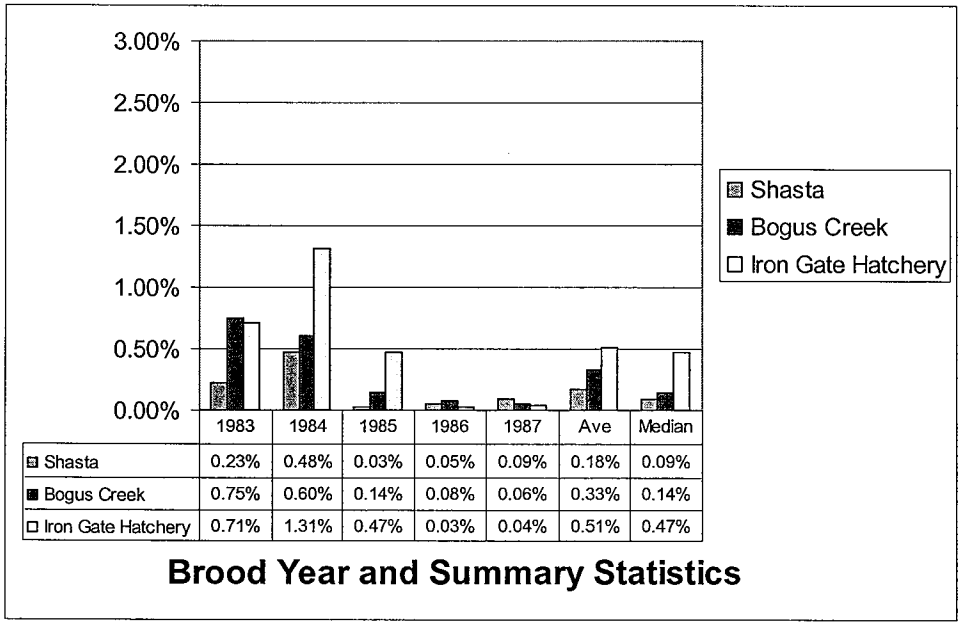
Smolt-to-adult survival rates ("SARs") largely reflect ocean survival, over which there is little control. For fall Chinook salmon, empirical data collected on wild and hatchery fall Chinook from the lower Klamath River show that on average, wild fish SARs are much less than 0.5 percent (Fig. 1). Fish passage modeling using KlamRAS showed that unless SAR was significantly greater than 1 percent (KlamRAS model values averaged 2.8 percent (*see* Fig. 1)), reintroduced fall Chinook production would not sustain itself over time for either the volitional or collection and transport fish passage alternatives.

For spring Chinook, EDT modeling (KlamRAS modeling was not done for spring Chinook) indicated that introduced populations would be sustainable in stream reaches upstream of Link River Dam only if the highest SAR observed on the West coast is assumed (~ 4 percent as reported by Magnusson (2002)) (PacifiCorp's Response to FERC AIR AR-2, Nov. 10, 2005). However, there is little empirical support for such a high SAR for Klamath River spring Chinook. Spring Chinook reared and released at the Iron Gate Hatchery in the 1960s using wild fish that arrived at the dam produced no adult returns. Survival data collected on Trinity River Hatchery spring Chinook indicate survival rates generally less than 0.5 percent (RMIS Coded-Wire-Tag Database Query, 2006). In addition, in reviewing spring Chinook survival data for streams located from Alaska to California, Magnusson (2002) found that wild spring Chinook SAR values were generally less than 1 percent, and only in good survival years might reach 4 percent.

Coho salmon are listed under the ESA as threatened in the Klamath River basin due to human activities including agriculture, logging, mining, water diversions, dams and harvest. Data on coho survival are limited, but given their current ESA status, survival is

assumed to be insufficient to sustain healthy populations in key lower basin tributaries. Survival of coho smolts originating from above Iron Gate Dam, if they were allowed to access that area, obviously would be even lower, given the additional mortality sources that these smolts would encounter in the reservoir(s).

Survival data on wild steelhead trout are also limited, thus EDT modeling relied on data collected in the Columbia River (PacifiCorp's Response to FERC AIR AR-2, Nov. 10, 2005). Given the complex life-history of this species, modeling was used to simply contrast fish passage options. However, the steelhead hatchery program at Iron Gate Dam has had minimal success because steelhead SAR values have generally been low, in the 1 to 2 percent range. The SAR survival data for Iron Gate Hatchery steelhead are complicated by the fact that a large number of fish (all tagged) returning to the Hatchery never actually leave the Klamath River, preferring instead to adopt a resident rather than anadromous life-history (CDFG and NMFS 2001).




| | 1983 | 1984 | 1985 | 1986 | 1987 | Ave | Median |
|---|---|---|---|---|---|---|---|
| Shasta | 0.23% | 0.48% | 0.03% | 0.05% | 0.09% | 0.18% | 0.09% |
| Bogus Creek | 0.75% | 0.60% | 0.14% | 0.08% | 0.06% | 0.33% | 0.14% |
| Iron Gate Hatchery | 0.71% | 1.31% | 0.47% | 0.03% | 0.04% | 0.51% | 0.47% |

**Figure 1. Estimated Smolt-to-Adult Survival Rates (%) for Wild and Hatchery Klamath River Fall Chinook. Includes fish caught in all fisheries, natural spawners, and hatchery returns.**

***Do the stocks have sufficient resistance to pathogen and disease?***

The question of whether stocks in the lower Klamath River have sufficient pathogen or disease resistance appears to be answered by the recent occurrence of reportedly severe disease outbreaks in lower river salmonids. Historically, the native anadromous fish stocks probably had sufficient disease resistance to basin-specific pathogens to maintain population viability over time. However, due to ambient air temperatures and anthropogenic changes in the basin, it appears that lower river pathogen(s) such as *Flavobacterium columnare*, and myxozoan parasites *Ceratomyxa shasta* and *Parvicapsula minibicornis* may be taking an unnatural toll on anadromous fish stocks.

The authors of a disease study conducted in 2004 in the lower Klamath River noted that:

> [d]epending on the [juvenile Klamath River salmon] population size and smolt to adult return ratio, the effective number of adult salmon lost to *C. shasta* as juveniles rivaled the 33,000 + adult salmon lost in the September 2002 Klamath River Fish Die-off.

Nichols and Foott (2005) at 12 (citing Guillen 2003b). As noted in KFHAT (2005), mortality rates of juvenile fall Chinook caught in lower Klamath River traps ranged from approximately 40 to 100 percent in 2004, with 60 to 100 percent of the fish showing signs of sickness.

The results from Nichols and Foott (2005) confirm disease/pathogen assumptions used in EDT modeling of stream habitat conditions in the lower Klamath River. The EDT disease assumption was a point of contention among biologists participating in relicensing studies. Now, however, with the disease data collected since 2002, it appears that EDT assumptions of fish loss (~ 40 percent) due to exposure to disease/pathogens in the lower Klamath River may have been optimistic.

### ii. Criterion 2: Health of Native Fish Community

The above discussion regarding disease indicates that reintroduction of lower river fish into the upper Klamath basin is likely to increase disease load in this portion of the basin. The KFHAT (2005) report noted that 100 percent of juvenile fish collected in smolt traps below Iron Gate Dam were infected with *C. shasta*. If adult anadromous salmonids are allowed access above Iron Gate Dam, disease load – and thus severity – would likely increase as adult salmonids shed the spore life stage.

Currently, no viral diseases are known to infect native fish of the upper Klamath basin. If salmonids were brought in from other basins, or even allowed to pass upstream from Iron Gate Dam, there is a strong possibility of introducing Infectious Hematopoietic Necrosis ("IHN") to the upper Klamath basin. IHN has been detected in both juvenile and adult salmon in the lower Klamath and Trinity rivers. The loss of approximately 20 percent of the spring Chinook juveniles reared at the Trinity River Hatchery has been attributed to IHN infection (PFMC 1994). Because native fish populations in the upper basin, including redband trout, have no natural resistance to IHN, an inadvertent introduction of this disease could result in catastrophic losses of native fish in UKL. This risk of disease introduction was noted in both the ODFW Plan and Long Range Plan Amendment as one reason why reintroduction of anadromous fish to the upper basin should not be supported.

The discussions in sections (i) and (ii), above, demonstrate that anadromous fish reintroduction efforts are inherently uncertain. For that reason, any reintroduction program must be flexible and adaptive to respond to the numerous fish management issues that may arise as we learn more over time. The Services' Prescription is neither flexible nor adaptive. It requires construction of ladders and installation of screens and bypass systems to facilitate passage over each Project dam and through each Project reservoir, without adaptively managing to ensure that reintroduced fish are afforded the best possible opportunity to build self-sustaining populations in the upper basin. Because the Services' Prescription places reintroduced fish in harm's way, has the potential to jeopardize existing native resident fish populations, and offers no tools for addressing new information as it is learned, and because it assumes that volitional passage through the Project area is the best way to accomplish the

goals of reintroduction without first conducting the necessary studies that are a scientific condition precedent, it is critically flawed and should not be imposed.

### 3. The Services' Prescription is Critically Flawed

In addition to the vast uncertainties associated with reintroducing fish to the upper Klamath basin, there are several additional critical flaws in the Services' Prescription.

#### a. Water Temperature Differences Would Cause Stress and Delay

Fall Chinook begin arriving at Iron Gate Dam in early September, and their numbers peak around the first of October (Fish Pro 1992). The daily average surface water temperatures in Iron Gate Reservoir during mid-September are approximately 20°C (Fig. 2). In contrast, water temperatures in the existing Iron Gate fish ladder at this time of year are typically 9°C to 12°C because water is drawn from the Reservoir's cooler hypoliminion (see Fig. 2). Similar conditions would exist in any ladders placed at Copco 1 or Copco 2 dams.

With a volitional system designed to pass fish from below Iron Gate, Copco 1 and Copco 2 dams to the reservoirs above, adult fall Chinook would be required to pass from each ladder into waters approximately 10°C warmer, causing considerable temperature shock. Conceivably, fish could be exited to cooler water at depth; however, the availability of cooler water would disappear rapidly as fish move upstream. Any passage program that requires adult fall Chinook to experience this degree of temperature shock (three times) is likely to cause significant stress and migration delays, thus jeopardizing an already uncertain reintroduction program.

In contrast, surface water temperatures behind J.C. Boyle Dam are approximately 2°C cooler than those in Iron Gate reservoir in September and about 3°C cooler in October (see

Fig. 2). Transporting adult Chinook directly to or above J.C. Boyle reservoir as PacifiCorp proposes would avoid both the stress and delay of fish passing through the reservoirs below.

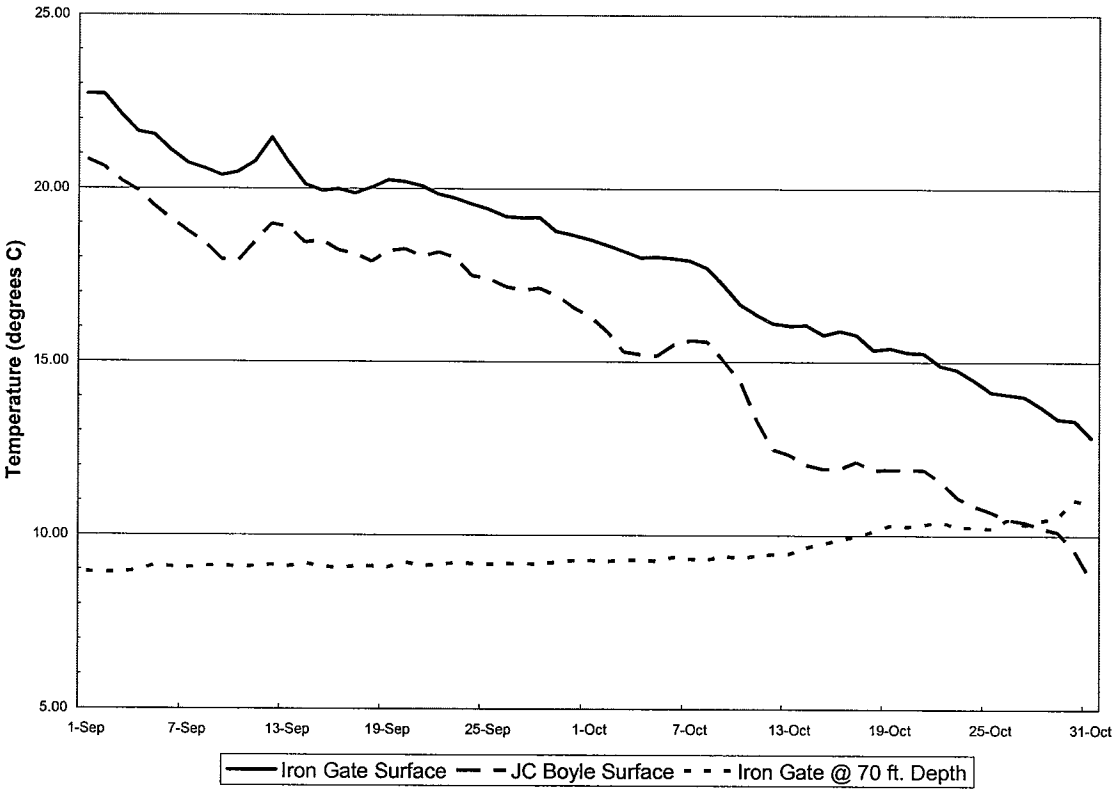



**Figure 2. Water Temperatures During September and October at Iron Gate and J.C. Boyle Reservoirs. Values represent daily averages for years 2000, 2002, and 2003 combined. Iron Gate reservoir water temperatures at a 70 foot depth represents the water used for the existing Iron Gate fish ladder and hatchery.**

### b. Summer Operation of Ladder would Deplete Cool Water and Cause Catastrophic Fish Losses in the Ladder and Hatchery

The Services' Prescription requires year-round operation of a ladder at Iron Gate Dam. Operation of the facility year round would require drawing cool water from below the thermocline, which sets up in the reservoir during the April through October period of temperature stratification. The Iron Gate Hatchery uses this same source for cool water

during the summer and fall for fish rearing at the main hatchery. With a ladder design flow requirement of approximately 20 cubic feet per second ("cfs"), the Services' prescribed summer operation of the ladder would deplete the limited source of cool water in the reservoir in most years by late summer or early fall. Without this source of cool water in late summer and fall, the Services' Prescription would likely result in catastrophic losses of juvenile fall and spring Chinook salmon and steelhead trout at the hatchery, as well as both wild and hatchery adult fall Chinook in the ladder, due to thermal stress.[15]

### c. Requiring Migration through All Project Reservoirs would Delay Arrival at Spawning Grounds

According to Lane & Lane Associates (1981) and the Fortune Report, historically, adult fall Chinook salmon were known to arrive in fishing areas above UKL from late August through October, with their numbers peaking in September. The lower-river fall Chinook stock, which is proposed for reintroduction to the upper basin, currently begins arriving at Iron Gate Dam in early- to mid-September, peaking about October 1 (*see* Fish Pro 1992 (summarizing Iron Gate Hatchery data)). Peak spawning occurs about two weeks after arrival at the Iron Gate Hatchery. Peak arrival of fall Chinook to Bogus Creek, which enters the Klamath River just downstream from Iron Gate Hatchery, occurs in the second or third week of October (Richey and Hampton 2003, Hampton 2004). This information suggests that the current lower river stock of fall Chinook has a later migration time – and perhaps spawning time – compared to fish that may have occurred in the upper Klamath basin. Therefore, to give lower river fall Chinook stocks the best chance of successful

[15] The Iron Gate ladder is currently operated from mid-September to late-March – it uses no cool water during the summer. Even without operating the ladder through the summer, however, existing hatchery operations alone can periodically deplete the cool water source as early as late summer. The resulting warmer water temperatures have caused stress and mortality in adult fall

reintroduction in the upper basin, it reasons that those fish should spend as little time as possible getting through the Project area.

Given the obstacles posed by existing dams and their reservoirs, as well as 25 miles of high-gradient river above Iron Gate Dam, it is clear that an all-ladder fish passage program would expose adult fish to considerable delay (1 to 2 weeks) in reaching spawning areas in the upper basin, possibly leading to high pre-spawning mortality or poor spawning success. It has been suggested that, even historically, adult fall Chinook passage through the Caldera reach (above the California-Oregon border) may have been problematic during certain years (Hamilton et al. 2005). PacifiCorp's collection and transport program, described below, would circumvent such delay by allowing adult fish to reach J.C. Boyle Reservoir within a day or two of their arrival at Iron Gate Dam.

### d. Volitional Upstream Fishways at Iron Gate and Copco 1 Dams May be Biologically Ineffective

The Services' Prescription requires that volitional upstream passage be provided at all developments on the Klamath River, including the high Iron Gate and Copco No. 1 dams. While such facilities are feasible from an engineering perspective, they may not provide the biological effectiveness that the Services desire. The Iron Gate Dam has a gross head of approximately 157 feet and the Copco 1 Dam has a gross head of approximately 124.5 feet. The significant height of these dams, coupled with the 0.5-foot vertical drop pool criteria and the salmon pool size required by the Services, results in fishways of approximately 3,140 feet in length at Iron Gate Dam and 2,490 feet in length at Copco 1 Dam. Long fishways result in long transit times for fish and, in some cases, fish may become discouraged and stop

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Chinook entering fish ladders (Kim Rushton, CDFG, Iron Gate Hatchery Manager, pers. comm.). In addition, these warmer temperatures have caused stress in rearing hatchery fish.

ascending the fishway. For these reasons, there have been few effective fishways of this magnitude constructed in the Pacific Northwest. A fishway rising approximately 200 feet was built at Pelton Dam on the Deschutes River in Oregon, but its operation was eventually discontinued because of the difficulties fish had in completing their ascent. The fishway was converted to a rearing facility after ten years of operation. On the Clackamas River in Oregon, the North Fork dam fishway rises 196 feet. While it generally provided good passage, sometimes it experienced problems attracting fish because of the warming of the transport water. Since Chinook salmon became listed in the Clackamas River, all fish are now trapped at the fishway entrance and selectively transported and released to predetermined locations.

Due to the height of the dams and the length of the required fishways, a fish collection and transportation facility at Iron Gate Dam is a more reasonable alternative with fewer uncertainties regarding effectiveness. In nearly every situation with high dams analogous to those on the Klamath River, upstream fish passage has been accomplished with collection and transport facilities. *See generally*, "Collection and Transport: Fish Passage Strategy for Reintroduction of Anadromous Fish" (Attachment B).

### e. Passage Through the Projects Jeopardizes Establishment of Viable Population above Upper Klamath Lake

Stakeholder comments throughout the collaborative process and in their terms, conditions and recommendations indicated a desire to see reintroduction to the upper Klamath basin succeed. The Services' Prescription aspires to achieve production in both the Project area and in the upper Klamath basin. However, more and better quality habitat for anadromous fish production occurs in the basin above UKL than in the Project area.

Moreover, mortality sources differ greatly between the two areas, with more risks facing those fish migrating through the Project area to and from the upper basin.

A strategy to establish production in the Project area (with passage over all Project dams and through all Project reservoirs) would, in fact, jeopardize the success of the upper basin reintroduction program by forcing upper basin fish, both as adult and juvenile migrants, to encounter significant sources of mortality within the Project area (such as delayed travel time, predators, disease, impaired water quality resulting from nutrient load in UKL, and juvenile screening and bypass systems). Already there is considerable uncertainty associated with the proposal to establish anadromous fish populations in the upper basin. Clearly, forcing these fish to move through areas where they will suffer significant mortalities would further reduce the potential for successful reintroduction. PacifiCorp's proposed adaptive collection and transport program, discussed below, is designed to provide the greatest possible opportunity for successful reintroduction in the upper basin.

### f. Access to Project-Area Habitat May Further Impede Recovery of ESA-Listed Coho Salmon

The Services hope that allowing ESA-listed coho salmon access to tributary habitat above Iron Gate and Copco 1 and 2 dams will aid the species' recovery. However, while some of these tributaries may have once supported coho, the vast majority of that habitat is no longer suitable for juvenile rearing, and would require juveniles to move into reservoirs where they would face significant hazards, such as predation, disease, impaired water quality resulting from nutrient load in UKL, and juvenile screening and bypass facilities.

The listed population of coho salmon in the Klamath basin includes wild fish that spawn primarily in tributaries as well as hatchery fish returning to the Trinity and Iron Gate

hatcheries. The Iron Gate Hatchery releases approximately 75,000 coho smolts each year. Of the adult coho returning to Iron Gate Dam, about 20 percent are wild fish (Kim Rushton, CDFG, Iron Gate Hatchery Manager, pers. comm., March 2006). In past years these wild fish were artificially spawned and mixed in with hatchery stock. This procedure raised concerns that wild coho were not being given the opportunity to spawn naturally in their stream of origin. In response to this concern, most wild coho adults returning to Iron Gate Dam are now returned to the lower Klamath river. Marking and radio telemetry studies have shown that these fish successfully spawn naturally in tributaries downstream of Iron Gate Dam (Hampton 2004).

The importance of this background information about coho salmon at Iron Gate Dam is the fact that many of the wild coho originating from below Iron Gate Dam tend to overshoot their destination and enter the Iron Gate fish ladders. Therefore, if a volitional fish passage facility were to be installed at Iron Gate, many of the wild listed coho originating from below the dam would ascend the dam and not be able to successfully return downstream to their intended stream of origin. In contrast, PacifiCorp's Alternative would allow managers the ability to sort lower river basin wild fish from upper basin origin supplemented fish, and return these fish unharmed to the lower river.

Because habitat conditions for coho salmon in tributaries to and between Iron Gate and Copco reservoirs are marginal at best (*see* Attachment C), a volitional fish passage facility would afford them access to relatively unproductive habitat, and would expose them to significant sources of mortality in the reservoir primarily due to predation, disease, impaired water quality resulting from nutrient load in UKL and juvenile screening and bypass facilities. Most importantly, however, volitional passage would shift coho

distribution away from more productive streams below Iron Gate Dam where coho currently spawn to the unproductive habitat above Iron Gate Dam. The Klamath River coho salmon population below Iron Gate Dam is barely sustaining itself at this time. To allow any number of these ESA-listed fish to move into areas where their spawning is unlikely to result in any appreciable number of progeny would impede the species' ability to recover – and may further push the species toward extinction.

PacifiCorp's Alternative would facilitate the transport of coho salmon to and from Spencer Creek which, unlike tributaries to and between Iron Gate and Copco reservoirs, contains more suitable spawning and rearing habitat for coho.

### 4. PacifiCorp's Alternative for Anadromous Fish Passage

As an alternative to the Services' Prescription for anadromous fish at Iron Gate, Fall Creek, Copco 1, Copco 2 and J.C. Boyle dams, PacifiCorp proposes to collect upstream migrating adults at Iron Gate Dam and transport them via truck to a release site at or upstream of J.C. Boyle Reservoir. These fish would then be allowed to continue migrating to upstream spawning areas. Through implementation of an adaptive management program (*see* Attachment A), fish managers would obtain, analyze and make decisions regarding the appropriate location to collect and sort downstream migrating juvenile fish for transport to specific locations below Iron Gate Dam.

#### a. Iron Gate Dam Collection Facilities and Upstream Transport

Under this Alternative, PacifiCorp would modify the existing Iron Gate Hatchery fish ladder's collection, sorting, and holding facilities as necessary to facilitate upstream collection and transport of Chinook, coho, steelhead, and Pacific lamprey. PacifiCorp would

construct a hopper system to transfer fish from holding ponds to a transport truck. PacifiCorp would augment the existing sorting facility to enable detection and recording of PIT/tag data and other identifiers. The facility would accommodate all holding, counting, marking and sorting requirements contained in the Services' Prescription for the Iron Gate fishway (section 1.1). The existing ladder includes one entrance and associated entrance pool, which is sufficient. The ladder meets salmon criteria for ladders (1 foot drops and 10 percent slope) and would not be modified to meet a .5 foot drop for redband trout. PacifiCorp would operate the collection and transport facilities year-round. The existing auxiliary water system ("AWS") would continue to be used to augment ladder flow from the forebay. PacifiCorp would not modify the Iron Gate spillway; there is no evidence that the existing spillway causes false attraction to non-passable areas, and downstream migrating anadromous fish would be transported to below the Dam and would not be required to migrate through the spillway. PacifiCorp would develop a design and construction plan for modifications to the existing hatchery facilities for the Services' review and approval, and would complete construction and begin operating within two years of license issuance. An initial design drawing is provided in Attachment D ("Initial Design Drawings").

### b. Juvenile Collection Facilities and Downstream Transport

Under PacifiCorp's Alternative, a juvenile collection and transport facility would be located *at or above* J.C. Boyle Dam to maximize outmigrant survival by avoiding Copco and Iron Gate dams and reservoirs. Consistent with an adaptive management approach, however, the precise timing, location and type of juvenile collection facilities is not known at this time. Under PacifiCorp's proposal, these details would be based on a phased analysis of downstream migrating juvenile behavior early in the program to determine what facilities are

appropriate (*see* Attachment A). At a minimum, however, such facilities would meet agency criteria for screening, collecting, sorting and transporting juvenile fish.

Nothing in PacifiCorp's proposed adaptive management collection and transport program is intended to suggest that the Services have authority to impose fishway prescriptions above J.C. Boyle Dam, the uppermost Project facility as defined by the FERC-determined Project boundary. As discussed elsewhere in PacifiCorp's filings and specifically in Section V.C., *infra*, neither the Services nor the Bureaus of Land Management or Reclamation have jurisdiction to compel conditions relating to Keno and Link dams as these facilities remain outside the Project boundary and are thus outside the agencies' FPA sections 4(e) and 18 authority. By proposing an adaptive management program allowing the Services to decide whether and where to prescribe downstream collection facilities, PacifiCorp in no way waives its jurisdictional arguments.

Should fish managers decide as a result of implementing an adaptive management approach that a juvenile collection and transport facility is appropriate, one location that should be considered when determining the location for a collection facility is J.C. Boyle Dam. J.C. Boyle is the most upstream facility within the jurisdictional boundary of the Project. PacifiCorp has developed a description of a collection, sorting and transport facility that could be placed at J.C. Boyle Dam and that would accommodate the type of downstream juvenile migration that could occur in upper Klamath basin if reintroduction is successful. The ODFW-criteria V-screen and juvenile bypass system would include sorting, collection, and transfer facilities. An initial design drawing is included in Attachment D.

It is expected that any out-migrating juvenile fall and spring Chinook, coho, and steelhead migrants would enter the facilities primarily in March, April and May. During this

period, anadromous migrants would be collected and sorted from other species, such as redband trout, which would need to be bypassed to below the collection location. Collected anadromous fish would be transferred to a tanker truck and transported to a release location downstream from Iron Gate Dam.

The number of juvenile migrant anadromous fish that would be expected to out-migrate is highly uncertain at this time. EDT modeling indicates that perhaps 500,000 fall Chinook juveniles could be expected under ideal conditions. However, this estimate is based on rather optimistic assumptions about spawning success, egg-to-fry survival, and passage success through UKL. Chapman (1981) estimated a fall Chinook salmon smolt yield from the upper basin of 418,000 under pristine predevelopment conditions. It is likely that the numbers of fall Chinook and other anadromous migrants would be lower in early years of the reintroduction program because some time would be needed for the fish to adapt to their new environment. Therefore, PacifiCorp would propose that any initially constructed collection and sorting facilities accommodate up to 15,000 juvenile migrants on a peak day, which could occur if the total runs are between 150,000 to 300,000 fish. If the reintroduction program is successful, additional collection, sorting, and transfer facilities could be added.

Under PacifiCorp's proposal, the marking and/or tagging of downstream migrating juveniles would be included for special studies and program monitoring. As appropriate, any sorting and collection facilities could be constructed to be compatible with juvenile marking and tagging activities. Space and plumbing would be available to accommodate a coded wire tag ("CWT") marking trailer. At J.C. Boyle Dam, water temperatures during March and April, when juvenile salmon would be expected to arrive at the dam, would be suitable (<12°C) for sorting and tagging. Supplemental ground water at 9°C from sources nearby J.C.

Boyle Dam could be used, if needed. Also, the proposed sorting facilities would be configured to allow any marked or tagged fish arriving at the collection facility to be detected and recorded. Any decision to tag upper basin migrants at or upstream of the collection facility would require policy-level decisions from ODFW and CDFG to address potential conflicts with tagging programs in the lower basin.

Juvenile collection efficiency at the proposed V-screen is expected to be very high given the screen's state-of-the-art design criteria. However, the facility would be able to screen only the flow being routed into the location's power canal intake. Flow that occasionally must be passed over the spillway in some years would not be able to be screened. The estimated percentage of migrants that would be spilled (approximately 20 percent), and their survival through the downstream reservoirs and powerhouses (relative to being collected and transported) were included in the EDT and KlamRAS modeling of fish passage options. The primary rationale for selecting a juvenile collection and transport option is that it would route as many migrants as possible around the downstream dams and reservoirs in recognition of the high fish losses that would occur there.

Based on experience elsewhere, PacifiCorp expects a juvenile trucking survival rate of 98 percent (California Department of Water Resources 2004). Juvenile migrants could be released directly into the Klamath River below Iron Gate Dam at one or more locations. It may also be beneficial to first release juveniles into stress release ponds where they would be held for 24 to 48 hours prior to entry into the river. Available raceway space at the Iron Gate Hatchery also could be utilized. PacifiCorp's proposal does not include stress relief ponds at this time, but they easily could be added if determined to be worthwhile.

Collection and sorting facilities would be designed to address non-target species entering the system. Given the timing of the juvenile salmon migration, it is likely that most non-salmonids entering the system would be yearlings; it would be too early in the year to expect young-of-year individuals of any species. The significance of this fact is that most of the non-salmonid fish would be similar to the salmon in size. The non-salmonid species would include chubs, pumpkinseed, fathead minnows, and bullheads, based on fish surveys in the reservoir and downstream trapping data from the ladder and current fish bypass system. Fisheries managers will likely need to decide whether these non-salmonid resident fish should be sorted and bypassed below the collection facilities or transported downstream with salmon juveniles to reduce overall fish handling. Extensive sorting may require facilities to anesthetize fish with carbon dioxide.

The most likely transport route to J.C. Boyle Reservoir from Iron Gate Dam would be south to Grenada, then onto Highway A12 connecting to Highway 97. The route would then turn off of Highway 97 to Keno Dam and ultimately to J.C. Boyle Dam via Highway 66. This same initial route on Highway 97 would be used if some or all of the adult fish are to be transported and released at other areas above J.C. Boyle Reservoir. Water supplied to the transport truck would be the same cool water used at the sorting and holding facilities. Per standard practice, ice or a chiller would be used to maintain water temperatures in the transport vessel until reaching the release site. Once at the site, receiving water would be pumped into the vessel to allow the fish to acclimate to the new water temperature before release. Based on experience elsewhere, we expect an adult trucking survival rate of 98 percent (California Department of Water Resources 2004).

At least initially, it is proposed that adult fish be released in J.C. Boyle Reservoir. From there they would be free to migrate volitionally and ultimately spawn in areas of their liking, possibly including Spencer Creek, which enters J.C. Boyle Reservoir. While the ultimate destination of these fish would be uncertain, it is expected that most would enter UKL and its tributaries. Once the program becomes established, adult fish released into J.C. Boyle Reservoir would be expected to return to their natal stream. However, since the program is adaptive, some adult fish could be released either above Link Dam or directly into the tributaries of UKL to facilitate access to potential spawning habitat.

A scenario like PacifiCorp's proposed collection and transport program was modeled with EDT and KlamRAS with the assumption that adults would be released into J.C. Boyle Reservoir. However, adult fish easily could be released at other locations in the upper basin if, consistent with PacifiCorp's proposed adaptive approach, results of monitoring studies suggest that doing so would be a better strategy (*see* Attachment A). Estimates used in the KlamRAS model, for example, assumed an adult cumulative survival rate of 68 percent for fish volitionally traveling from J.C. Boyle Dam to their spawning grounds in tributaries to UKL. By contrast, adult fish transported directly to the Williamson River were assumed to survive at a rate of 79 percent. Thus, releasing adults above UKL rather than in J.C. Boyle Reservoir could increase the number of adults reaching their spawning grounds by 16 percent.

Specific design and operational aspects of the adult fish collection system would be in accordance with the NMFS guidelines and criteria (NMFS Northwest Region 2004). The existing ladder, holding ponds, and sorting facilities at Iron Gate Dam appear to meet these criteria. The facilities have the capability of handling up to 100,000 adults over the course of

the run. An additional lift/hopper system per NMFS criteria would need to be included to transfer fish from the holding ponds to the transport truck. Fish loading densities for the lift hopper and transport truck would be 0.15 cubic foot per pound of fish in accordance with criteria. Attachment D shows the plan view of the proposed facilities at Iron Gate Dam.

### 5. PacifiCorp's Alternative is No Less Protective than Services' Prescription

The primary goal associated with fish passage facilities for the Klamath Project is to successfully reintroduce anadromous fish to areas upstream of Iron Gate Dam with the hope that self-sustaining populations can ultimately be established. Logically, a "no less protective" criterion in this case must be viewed in the context of the overall reintroduction program for fish populations and not be merely focused on specific sites, facilities, or individual fish or species. The Services must adopt the Alternative if it results in population-level benefits that are equal to or greater than what would be obtained by the Services' Prescription. *See infra* Section II.A.

Section (a), below, describes the many distinct benefits of PacifiCorp's proposed collection and transport program as compared to the Services' preliminarily prescribed fishways. Section (b) describes on a species-specific basis why PacifiCorp's Alternative is no less protective than the Prescriptions for each of the species that the Services name as benefiting from such Prescriptions. Together, these sections support the conclusion that PacifiCorp's Alternative is no less protective than the Service's Prescriptions for anadromous fish at and between Iron Gate, Copco 1, Copco 2 and J.C. Boyle dams.

### a. Benefits of a Collection and Transport Program

#### i. Collection and Transport is the Only Method Used for Reintroduction in the Western United States

PacifiCorp recently commissioned a review of collection and transport programs in the western United States involving anadromous fish reintroduction efforts (*see* Attachment B). All of the collection and transport programs being developed or implemented are relevant to reintroduction in the upper Klamath basin because their passage components span large geographic scales similar to that of the Project, and because most require that fish pass more than one dam and reservoir, as is the case on the Klamath River. All of these large-scale reintroduction programs rely or would rely on collection and transport to pass both juvenile and adult life stages. In fact, to PacifiCorp's knowledge, no other passage option has been approved for any large-scale reintroduction effort. These programs have been recommended, developed or approved by many of the same federal and state fishery agencies involved in the Klamath Project relicensing proceedings, and there is no legitimate reason for those agencies to propose a different passage scheme for the Klamath River. On the contrary, the unique environmental challenges in the upper Klamath basin make collection and transport the only appropriate approach to reintroduction.

Attachment B provides an overview of the several collection and transport programs currently being developed or implemented to reintroduce anadromous fish to above previously impassable hydropower dams.

#### ii. Collection and Transport Focuses on Best Habitat and Least-Risk Areas

One of the clear benefits of a collection and transport operation over volitional passage is the ability to bypass less viable areas in favor of higher-quality upstream habitat.

In this way, habitats that have been altered by developments such as large reservoirs, unscreened diversions, and marginal water quality can be avoided. Results of the EDT modeling clearly demonstrate the lesser amount of suitable habitat between Iron Gate and J.C. Boyle dams compared to what occurs in the upper basin above UKL. In terms of total stream miles, the area above J.C. Boyle Reservoir contains 352 stream miles compared to only 29.3 stream miles in the Project area (*see* Table 1).

Another measure of performance for anadromous fish alternatives that highlights the benefits of bypassing fish around reservoirs and dams is the estimated cumulative survival for adult fish as they make their way upstream to their spawning destination and for juveniles as they make their way downstream to the ocean. Estimates of survival at various river nodes for adult and juvenile fall Chinook were included in the KlamRAS model methods report (Oosterhout, October 10, 2005). Average cumulative survival values for the all-volitional and collection and transport scenarios are summarized in Table 3. These data clearly show that the collection and transport alternative for fall Chinook salmon outperforms the all-volitional alternative. For juvenile Chinook salmon, collection and transport out performs volitional by 24 percent (0.42 versus 0.34 survival). For adult fish destined to the upper basin, the collection and transport alternative (to above UKL) provides a 32 percent improvement in survival over the all-volitional alternative (0.79 versus 0.60 survival). The clear advantage of the collection and transport alternative shown by these survival estimates is evident despite our opinion that some assumptions for the volitional alternative (e.g., reservoir survival) were overly optimistic and that some assumptions for the collection and transport alternative were overly pessimistic (e.g., adult transport survival).

**Table 3. Cumulative Average Survival Estimates for All-Volitional and Collection and Transport Alternatives Used in KlamRAS for Fall Chinook Salmon Originating Above Upper Klamath Lake (Data Source: Oosterhout, October 10, 2005)**

| | | Average Cumulative Survival | |
|---|---|---|---|
| **Life Stage** | **Destination Node** | **All-Volitional** | **Collection and Transport** |
| Juveniles | Above UKL to below Link dam | 0.78 | 0.78 |
| | Below Link dam to below Keno dam | 0.63 | 0.63 |
| | Above JCB to below JCB | 0.54 | 0.54 |
| | Above Copco to below Copco | 0.46 | Transport |
| | Above IGD to below IGD | 0.42 | ↓ |
| | Below IGD to ocean | **0.34** | **0.42** |
| Adults | Ocean to IGD | 0.98 | 0.98 |
| | Below IGD to above IGD | 0.90 | Transport |
| | Below Copco to above Copco | 0.77 | |
| | Below JCB to above JCB | 0.70 | ↓ |
| | Below Keno to below Link | 0.65 | |
| | Below Link to above UKL | **0.60** | **0.68 (0.79)*** |

* For adults transported from IGD to above UKL.

### iii. Collection and Transport is Well Suited for Testing and Monitoring Reintroduction Success

As discussed in Section V.2., above, considerable uncertainty exists as to whether self sustaining runs of anadromous fish to the upper Klamath basin can be achieved with reintroduction. Monitoring of adult returns and smolt production would be critical in determining the program's success. Monitoring of fish numbers would be especially important to test modifications to the reintroduction program that might be needed to enhance the program's probability of success. PacifiCorp's proposed collection and transport facilities, which would include collection, sorting, inspection for tags, and provisions for fish marking, would help meet the monitoring and assessment needs associated with the reintroduction program.

### iv. The Collection and Transport Alternative Compares Favorably to Volitional Passage Options for Enhancing Total Numbers of Fall Chinook in Klamath Basin

One of the primary reasons that the stakeholder Fish Passage Workgroup undertook the EDT and KlamRAS modeling effort for fall Chinook salmon was to assess fish production potential on a basin scale upstream of Iron Gate Dam and examine different passage alternatives. The modeling effort focused on fall Chinook salmon because basin-specific data (e.g., age class structure, fecundity, SAR values) were available. In addition to EDT and KlamRAS model estimates for fall Chinook, EDT modeling was performed for spring Chinook and steelhead at the request of FERC. The EDT and KlamRAS model estimates of total fall Chinook production (depicted as average number of spawners), while being highly uncertain in the absolute sense, were used without controversy in a *relative* sense to rank various alternative combinations of means to achieve fall Chinook access to the

upper basin (Oosterhout 2005). No consideration was given to biological feasibility, economic feasibility, or impacts on other environmental or human resources.

Based on the KlamRAS modeling results, the estimated number of adult fall Chinook salmon spawners under PacifiCorp's Alternative is slightly less (-4 percent) under existing conditions and slightly more (+2 percent) under restored conditions compared to the all-volitional option (Table 4). PacifiCorp notes that the all-volitional option in KlamRAS includes what are likely very unrealistic assumptions for production from the small tributaries (e.g., Jenny, Snackenburg and Beaver creeks) in the Project area. The EDT model ranks a collection and transport alternative higher, with 14 percent more adults and 23 percent more juveniles than the all-volitional alternative under existing conditions. For restored conditions, the collection and transport alternative produces 27 percent more adults and 2 percent more juveniles than the all-volitional alternative.

For existing habitat conditions, EDT estimated that a collection and transport program to and from Iron Gate Dam to J.C. Boyle Dam produced approximately 97 percent and 3 percent more spring Chinook and steelhead adults, respectively, than the volitional system (PacifiCorp's Response FERC AIR AR-2, Nov. 10, 2005).

**Table 4. Comparison of EDT and KlamRAS Adult and Juvenile Fall Chinook Salmon Production for Scenarios Similar to Services' Fishway Prescription and PacifiCorp's Alternative**

| | Adult Abundance (number of adults) | | Juvenile Abundance (number of juveniles) | | Percent in Area from Iron Gate Dam to Keno Dam (%) | |
|---|---|---|---|---|---|---|
| **Alternative/Description** | **EDT** | **KlamRAS** | **EDT** | **KlamRAS** | **EDT** | **KlamRAS** |
| **Existing Conditions** | | | | | | |
| PacifiCorp Collection and Transport from Iron Gate to J.C. Boyle, with screens | 3,619 | 28,539 | 345,091 | 1,331,132 | 11 | 24 |
| Services' All-Volitional Passage, with screens | 3,169 | 29,754 | 280,132 | 1,396,052 | 51 | 46 |

### v. PacifiCorp's Alternative Contains Opportunities to Adaptively Manage Reintroduction Efforts Over Time

PacifiCorp's Alternative would allow adult salmon to be transported for release to a location or locations above J.C. Boyle Dam based on an adaptive approach to reintroduction. Modeling of a collection and transport alternative using KlamRAS and EDT assumed that adult salmon would be released in J.C. Boyle Reservoir. However, the lowering of pre-spawn mortality of adults by transporting them around Keno and Link dams (and thus Lake Ewauna and UKL) could substantially increase the number of adults reaching the spawning grounds. The increased adult spawning escapement would subsequently increase total production over time. Results of KlamRAS and EDT ranked an alternative that transported fish to above UKL higher (by 20 percent) than an all-volitional ladder alternative.

One example of where the flexibility of PacifiCorp's adult transport Alternative would benefit fish survival is during those documented times when water quality conditions

in Lake Ewauna are stressful or even lethal to migrating fish. If water quality monitoring (temperature and dissolved oxygen) indicate a potential problem in this reach, adult fish can easily be directed to sites upstream of the problem area. Consistent with the adaptive management approach attached as Attachment A, PacifiCorp recommends that the location of adult releases be subject to specific future studies to determine the best long term approach.

#### vi. Collection and Transport Provides the Best Chance of Successful Reintroduction to the Upper Klamath Basin

More and better quality habitat for fall Chinook production occurs in the basin above UKL than in the Project area. Stakeholder comments throughout the collaborative process indicated a desire to see reintroduction to the upper basin succeed. The Services' Prescription aspires to achieve production in both the Project area and in the upper basin. However, mortality sources differ greatly between the two areas. The Services' proposal of providing access to marginal habitat within the Project area would, in fact, jeopardize the success of the upper basin reintroduction program by forcing these fish, both as adult and juvenile migrants, to encounter many more mortality sources such as delayed travel time, marginal seasonal water quality, predators, and juvenile screening/bypass systems (*see infra,* Section V.A.5.ii). Already there is considerable doubt as to the feasibility of restoring anadromous runs in the upper basin. Clearly, forcing these fish to encounter additional mortality sources would likely result in the program's failure. PacifiCorp's Alternative, on the other hand, would allow fish to avoid these high risk areas so as to provide the greatest possible opportunity for the reintroduction effort in the upper basin to succeed.

### vii. PacifiCorp's Alternative Would Avoid Jeopardizing ESA-Listed Coho Salmon

As described earlier in Section V.A.3.f., PacifiCorp believes that an all-volitional passage facility at Iron Gate Dam would cause harm to the listed coho salmon population in the Klamath basin. Specifically, by allowing these fish to access poorer habitat than they now have available to them below the Dam, in combination with exposing them to additional mortality sources above the dam(s), the Services' Prescription would have a net negative effect on the population. PacifiCorp's Alternative would allow adult coho salmon to be sorted and distributed to desired locations (e.g., Spencer Creek above J.C. Boyle Dam or habitat below Iron Gate Dam, as appropriate). Recent experience at the existing Iron Gate Dam ladder indicates that wild coho that enter the ladder and then are returned to the river below the Dam do, in fact, spawn successfully in tributaries downstream of the Dam, probably in their natal stream.

### viii. Upstream Migration Timing for Fall Chinook is Better Served With Collection and Transport

As noted previously, the peak arrival of fall Chinook at Iron Gate Dam is approximately October 1 and peak spawning occurs about two weeks later. According to the Fortune Report, peak fall Chinook arrival to the upper basin probably occurred in September. Given these circumstances, it is clear that adult fall Chinook would need to pass quickly through the Project area to reach their spawning destinations above UKL. Volitional passage through a series of ladders, reservoirs, and high-gradient stream reaches would delay migration and cause late arrival at spawning grounds, which in turn could result in high rates of pre-spawn mortality or latent egg mortality. PacifiCorp's Alternative would allow adult fish to move to above the Project area within a day of their arrival at Iron Gate Dam.

### b. Species-Specific Analysis

This section describes the anticipated effects of PacifiCorp's Alternative on fall and spring Chinook, coho, steelhead and Pacific lamprey on a species-by-species basis.

#### i. Fall Chinook Salmon

Although the collection and transport facilities will be designed to pass fall and spring Chinook and coho salmon, steelhead trout, and Pacific lamprey, it is apparent from years of discussion and joint stakeholder modeling that fall Chinook is the primary target species for any reintroduction program.

The stocks of fall Chinook salmon possibly acceptable for use in an upper basin reintroduction effort would be those fish arriving at the ladders at Iron Gate Dam and Hatchery or possibly those returning to the Shasta River (Huntington and Dunsmoor 2006a). It is estimated that up to half of the fall Chinook salmon collected in the Iron Gate ladders are actually non-hatchery fish (Kim Rushton CDFG, Iron Gate Hatchery Manager, pers. comm.). Because the hatchery and wild fish returning to the ladder are spawned together, all fall Chinook at the hatchery and spawning naturally just below the hatchery (and possibly including Bogus Creek) should be of the same genetic stock. This coastal stock differs from the interior stock that would have spawned in the upper basin. Concerns about the adaptability of this lower-river stock to the much different conditions in the upper basin have been expressed in previous reviews (ODFW Plan, Long Range Plan Amendment, and Fortune Report). However, because of the common river basin origin, the Iron Gate or Shasta stocks are the most likely available stocks to become adapted to the upper basin over time.

It has yet to be determined by the fisheries managers whether a fall Chinook reintroduction program would be initiated by simply moving fish arriving at Iron Gate Dam to the upper basin and allowing them to volitionally find spawning areas to which they would have no homing tendency, or whether eggs and/or fry would be introduced into suitable rearing areas. If the first option is selected, sufficient surplus fish should be available at Iron Gate Dam in most years. The number of fall Chinook returning to the Iron Gate ladders averages about 15,000 fish, of which 8,000 are needed for the hatchery broodstock. In only four of the last twenty years has the broodstock requirement not been met. For those years when hatchery broodstock needs are not likely to be met, a management protocol would need to be developed to determine how many adults (or percent of total) should be made available for upstream transport. Collection of adults would be timed to mimic the natural run timing to the extent possible. No attempt should be made to select fish by size or sex. Obviously diseased, stressed, or injured fish would not be transported. Fish would be held for no more than two days at Iron Gate Dam prior to their transport upstream with most fish during the peak of the run being transported daily. Facilities would be available to hold and mark adult fish for experimental and monitoring studies, if necessary.

The fish ladder and sorting facilities at Iron Gate Dam currently use the same water source as the hatchery. This source is the deep hypolimnetic water withdrawn from a depth of about 70 feet in Iron Gate Reservoir. The water first passes through an aeration tower to bring oxygen concentrations to near saturation. During the peak fall Chinook salmon handling period of September and October, the water temperature at the facilities typically ranges between 9°C and 12°C. Handling mortalities are reported to be very minimal (Kim Rushton, CDFG Hatchery Manager, pers. comm.). Based on experience elsewhere, we

expect an adult holding and sorting survival rate of 98 percent (California Department of Water Resources 2004).

### ii. Spring Chinook Salmon

As noted in Section V.A.2.b.i, above, and consistent with concerns expressed by the Klamath Tribes (2006) at Attachment B, PacifiCorp believes that there are significant uncertainties associated with reintroducing spring Chinook salmon to the upper Klamath basin and that fish managers should carefully consider whether and how to attempt such an effort. The lack of a suitable donor stock from within the basin that would posses the life history traits and ability to adapt to the unique environmental conditions in the upper basin is a significant hurdle. In addition, the available spring Chinook stock in the lower river is known to have been exposed to IHN disease, which could seriously affect the native trout population in UKL.

Notwithstanding these concerns, PacifiCorp performed an EDT analysis for spring Chinook at the request of FERC (PacifiCorp's Response to FERC AIR, AR-2, Nov. 10, 2005). Results of that analysis indicate that a collection and transport alternative would be nearly *twice* as effective as an all-volitional alternative in producing adult spring Chinook (Table 5). These results reflect the fact that there is little production potential for spring Chinook in the Project area, at least for the 1+ yearling life history pattern modeled. EDT modeling indicates that 93 to 100 percent of production potential for spring Chinook comes from habitat in UKL and its tributaries.

**Table 5. EDT Estimates of Spring Chinook Production for Scenarios Similar to the Services' Fishway Prescription and PacifiCorp's Collection and Transport Alternative. Assumes No Harvest.**

| Option/Description | Adult Capacity (number of adults) | Adult Abundance (number of adults) | Juvenile Capacity (number of juveniles) | Juvenile Abundance (number of juveniles) | Percent of Adult Production (Project Area) |
|---|---|---|---|---|---|
| PacifiCorp Collection and Transport to J.C. Boyle Dam, with screen | 3,359 | 2,674 | 103,804 | 67,491 | 2 |
| NOAA Fisheries All-Volitional, with screens | 1,838 | 1,354 | 70,240 | 38,702 | 4 |

### iii. Coho Salmon

PacifiCorp's Alternative would accommodate an introduction program for coho salmon to Spencer Creek, which enters J.C. Boyle Reservoir. Unlike tributaries to Iron Gate and Copco reservoirs, Spencer Creek contains abundant spawning habitat and excellent rearing conditions for coho salmon. Spencer Creek contains more than three times the amount of rearing habitat (based on low-flow rearing area) than Jenny, Fall, and Shovel creeks combined (Huntington and Dunsmoor 2006b). Summer water temperatures remain cool enough that juveniles would not be forced to move downstream to J.C. Boyle Reservoir. Most importantly, migrant coho smolts could be collected just downstream, at J.C. Boyle Dam (should that location be chosen for a collection and transport facility pursuant to an adaptive reintroduction program (*see* Attachment A)) for transport to below Iron Gate Dam. This would allow coho smolts to avoid potential sources of mortality that they would otherwise encounter between J.C. Boyle and Iron Gate dams.

The alternative to collecting adults at Iron Gate Dam in the early years of the reintroduction program would be to transfer only eyed eggs or fry to the upper basin for release in areas expected to support juvenile rearing. In this way the eggs and/or fry could be certified as disease-free (a concern of ODFW regarding impacts on redband trout (ODFW 1997)).

### iv. Steelhead Trout

As noted in Section V.A.2.b.i, above, PacifiCorp believes that there are significant uncertainties associated with reintroducing steelhead trout to the upper Klamath basin and that fish managers should carefully consider whether and how to attempt such an effort. The lack of a suitable donor stock from within the basin that would posses the life history traits and ability to adapt to the unique environmental conditions in the upper basin is a significant hurdle.

Notwithstanding these concerns, PacifiCorp did perform an EDT analysis for steelhead trout at the request of FERC (PacifiCorp's Response to FERC AIR A-2, Nov. 10, 2005). Results of that analysis indicate that PacifiCorp's Alternative would be nearly identical to the Services' Prescription in producing adult steelhead (Table 6).

**Table 6. EDT Estimates of Steelhead Trout Production for Scenarios Similar to Services' Fishway Prescription and PacifiCorp's Collection and Transport Alternative. Assumes No Harvest.**

| Option/Description | Adult Capacity (number of adults) | Adult Abundance (number of adults) | Juvenile Capacity (number of juveniles) | Juvenile Abundance (number of juveniles) |
|---|---|---|---|---|
| PacifiCorp Collection and Transport Alternative to J.C. Boyle Dam, with screen | 485 | 363 | 11,876 | 8,846 |
| Service's All-Volitional, with screens | 500 | 358 | 12,358 | 8,663 |

### v. Lamprey

Three species of lamprey are known to potentially exist in the Project area: Klamath lamprey (*Lampeta similes*), Pit-Klamath lamprey (*Lampetra lethophaga*), and Pacific lamprey (*Lampetra tridentate*). The Klamath lamprey occurs in waters above and below Iron Gate dam. It is parasitic and non-anadromous. The Pit-Klamath lamprey occurs only upstream from Iron Gate dam and probably only above Klamath Falls. It is non-parasitic and non-anadromous. Little is known about the life history of these two lamprey species.

Pacific lamprey, which are the focus of the Services' fishway prescriptions for lamprey, occur in the Klamath River downstream from Iron Gate Dam. They are an anadromous species that is widely distributed in all major river systems along the west coast. Pacific lamprey are important to tribal cultures in the Klamath basin. At the request of stakeholders during the relicensing study process, PacifiCorp conducted an information exchange workshop on lamprey and subsequently prepared a literature review summarizing

what is known about lamprey in the Klamath basin (PacifiCorp, Final License Application, Fish Resources Final Technical Report (Feb. 23, 2004). Because Pacific lamprey are an anadromous fish that could have migrated to the upper Klamath River, the literature review included information on lamprey use of fishways.

Fish ladders at dams are not highly efficient for upstream passage of lamprey. Passage difficulty appears to be related to biological characteristics of lamprey that include their weak swimming ability, the need to attach to surfaces, and a strong avoidance of light. Recent studies of upstream fish passage efficiency of radio-tagged lamprey have been conducted at several hydroelectric dams on the Columbia River including Bonneville dam (Moser et al. 2002), Priest Rapids and Wanapum dams (Nass et al. 2003), and Rocky Reach dam (Stevenson et al. 2005). Results of these studies (reviewed in Stevenson et al. 2005) indicate that net upstream passage efficiency is typically about 50 percent for Pacific lamprey through contemporary fishways designed for anadromous salmonids. Although certain physical conditions are known to hinder lamprey movements at ladders (floor gratings, concrete lips, high velocities), no specific criteria or guidelines have yet been developed by fisheries management agencies for lamprey passage facilities.

Juvenile lamprey passage at conventional screen systems also has been problematic (Kostow 2002). Because juvenile lamprey and ammocoetes are slender and weak swimmers, they tend to become impinged and/or partially entrained on fish screens at higher velocities and die, or they can attach to fish screen surfaces at lower velocities and be crushed by screen cleaners.

Adult Pacific lamprey have not been observed in the fishways at Iron Gate Dam or at the Iron Gate Hatchery (Kim Rushton, Iron Gate Hatchery Manager, pers. comm., Jan. 31,

2003). However, juvenile lamprey, less than about 12 inches long, are occasionally observed attached to adult salmon returning to the Hatchery. A review of available fish passage data for the ladders at J.C. Boyle, Keno, and Link dams also found no evidence of lamprey using these facilities (Ian Chane, PacifiCorp, pers. comm., Mar. 10, 2006). Field notes indicated that a few trout using these ladders contained what appeared to be lamprey scars.

The available evidence suggests that few, if any, adult lamprey would use conventional fishways at Project dams. PacifiCorp's proposed collection and transport facilities at Iron Gate would incorporate the existing partial ladder to the collection facility. That ladder length is much less than that of an all-volitional ladder to the top of Iron Gate Dam. Therefore, while we would expect few lamprey to use any fishway at the Dam, PacifiCorp's Alternative would likely provide a greater probability of success compared to the Services' all-volitional Prescription. For lamprey attached to adult salmon, PacifiCorp's Alternative would assure that more lamprey reach the upper basin because the passage and survival rate of the host adult salmon would be greater with the collection and transport program as compared to the Services' all-volitional Prescription. If lamprey entered the collection facilities, they too could be transported upstream.

### 6. PacifiCorp's Alternative is Significantly Less Costly to Implement or Will Result in Improved Operation for Electricity Production

At and between the Iron Gate, Copco 1, Copco 2 and J.C. Boyle dams and facilities, the Services prescribe upstream fishways, downstream fishways, spillway modifications, and tailrace barriers to benefit fall and spring Chinook and coho salmon, steelhead trout, and Pacific lamprey. In general, these prescriptions call for the installation or modification of facilities to provide fish ladders for upstream migrating anadromous fish. In addition, certain

protective measures are preliminarily prescribed to facilitate downstream juvenile migration and minimize injuries.

As an alternative to the Services' Prescription for anadromous fish at Iron Gate, Fall Creek, Copco 1, Copco 2 and J.C. Boyle dams, PacifiCorp proposes to modify the existing ladder at Iron Gate Dam to include a collection and transport facility for upstream migrating adults; no new infrastructure at Copco 1 or 2, and no downstream passage would be required at Iron Gate Dam. Through implementation of an adaptive management program (*see* Attachment A), fisheries managers would obtain, analyze and make decisions regarding the appropriate location to collect and sort downstream migrating juvenile fish for transport to specific locations below Iron Gate Dam. For purposes of the following cost analysis, however, PacifiCorp assumes that a downstream collection and transport facility would be constructed at J.C. Boyle Dam. Constructing a similar facility elsewhere above J.C. Boyle Dam would likely result in equivalent or increased costs, but in any case would still be significantly less expensive than the Services' Prescription.

The following costs estimates include capital, project, operation and maintenance ("O&M") and annual lost energy costs.

### a. The Services' Prescription

The Services' Prescription for anadromous fish at and between Iron Gate, Copco 1, Copco 2, and J.C. Boyle (including a tailrace barrier at Fall Creek) would cost approximately $300,792,000.

In general, the Services' preliminarily prescribed facilities are typical in nature and reflect published criteria and guidelines. However, some requirements are very unusual and

have never been implemented on any known project. As such, the cost estimates provided herein consider facilities that generally meet the Klamath prescriptions while observing normal design criteria. For example, the auxiliary water supply ("AWS") flow plus fishway flow is assumed to be approximately 120 cfs, which is typical of these structures, not the "5 to 10 percent of the fish passage high design flow," or 5 percent point on the flow-duration curve as described in the Prescription. If PacifiCorp were to interpret the Services' AWS Prescription literally, its cost would increase by $76,709,000 to account for larger piping, diffusers and energy dissipation and/or recovery systems.

It was assumed that the Services' fishway design guidance of 0.5 foot vertical drop per pool and slopes no steeper than 10 percent (1:10) could be provided with construction costs approximately 10 percent greater than the standard salmon fishway. This assumes only additional weirs would be installed within the standard fishway configuration. However, while the turbulence factor for this configuration would be within the normal design criteria, the additional weirs would reduce the pool size, resulting in approximately 5-foot long by 8-foot wide pools. Pools of this length do not meet the recommended standard salmon guideline of at least 8 feet long. Provision of both the 0.5 foot vertical drop and 8-foot-long pools would result in a fishway slope of 5 percent (1:20) and total fishway lengths of approximately twice those proposed previously. If PacifiCorp were to assume that the Services' intend for pool lengths to be in accordance with the Services' guidelines for salmon, ladder costs would be considerably greater than those provided in Table 7, adding an additional $68,295,000 to the total cost of the Services' Prescription.

The Prescriptions require a screen approach velocity of 0.33 feet per second ("fps") which is the criteria used by NMFS Southwest Region and the State of California. All

previous work on the Klamath River assumed an approach velocity of 0.4 fps, which is typical for facilities in the Pacific Northwest. The downstream fishway screen areas were increased by 21 percent to meet the 0.33 fps criteria. It was assumed that all powerhouse flows would be screened, meeting the Services' requirement to screen "the full range of river flows for which the Project maintains operational control." The AWS intake screen costs were also increased to reflect the prescribed juvenile rather than typical adult criteria assumed previously.

The lost energy costs[16] consider only headlosses and bypassed fishway flows that exceed proposed instream flow requirements. Lost energy costs due to instream flow requirements are not included.

In summary, the cost estimates are consistent with the previous estimates for this project and have been escalated to 2006 dollars. Although the cost estimates do not account for every detail in the Services' Prescription, and therefore likely underestimate the total cost of the Prescriptions, the estimates are appropriate for use in this comparison. A summary of specific assumptions by development and prescribed facility as well as further cost details are included as Attachment E. Table 7 below provides a summary of total project costs for the Services' Prescription.

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[16] Lost energy costs throughout this document are based on an assumed 30-year license period, average water flows, assumed energy prices of $0.05/KWh, and an assumed annual discount rate of 6.6 percent (6.6%). Actual lost energy costs will vary due to, among other factors, actual market prices, variations in water years, changes in interest rates and any change in the duration of the license.

**Table 7. Summary of Project Costs for Services' Prescription for Anadromous Fish at and Between Iron Gate, Copco 1, Copco 2 and J.C. Boyle Dams, Including a Tailrace Barrier at Fall Creek Diversion Dam.**

| No. | Development | Proposed Facility | Capital Construction Cost | Project Capital Cost | Present Worth O&M Costs | Present Worth Lost Energy Costs | Total Project Cost |
|---|---|---|---|---|---|---|---|
| 1.1 | Iron Gate | Upstream Fishway | $ 27,082,000 | $ 38,608,000 | $ 2,035,000 | $ 6,115,000 | $ 46,758,000 |
| 1.2 | | Downstream Fishway | $ 17,834,000 | $ 25,424,000 | $ 727,000 | $ 1,434,000 | $ 27,585,000 |
| 1.3 | | Spillway | $ 731,000 | $ 1,042,000 | $ 145,000 | $ - | $ 1,187,000 |
| 2.3 | Fall Creek | Tailrace Barrier | $ 124,000 | $ 177,000 | $ 218,000 | $ - | $ 395,000 |
| 4.1 | Copco 2 | Upstream Fishway | $ 4,416,000 | $ 6,295,000 | $ 582,000 | $ - | $ 6,877,000 |
| 4.2 | | Downstream Fishway | $ 25,431,000 | $ 36,254,000 | $ 727,000 | $ 181,000 | $ 37,162,000 |
| 4.3 | | Spillway | $ 292,000 | $ 416,000 | $ 73,000 | $ - | $ 489,000 |
| 4.4 | | Tailrace Barrier | $ 7,991,000 | $ 11,392,000 | $ 363,000 | $ 60,000 | $ 11,815,000 |
| 4.5 | | Bypass Channel Barrier / Impediment Modification | $ 146,000 | $ 208,000 | $ 73,000 | $ - | $ 281,000 |
| 5.1 | Copco 1 | Upstream Fishway | $ 20,984,000 | $ 29,915,000 | $ 582,000 | $ 6,013,000 | $ 36,510,000 |
| 5.2 | | Downstream Fishway | $ 27,639,000 | $ 39,402,000 | $ 727,000 | $ 1,177,000 | $ 41,306,000 |
| 5.3 | | Spillway | $ 2,925,000 | $ 4,170,000 | $ 145,000 | $ - | $ 4,315,000 |
| 5.4 | | Tailrace Barrier | $ 8,595,000 | $ 12,253,000 | $ 363,000 | $ 58,000 | $ 12,674,000 |
| 6.1 | J.C. Boyle | Bypass Channel Barrier Modification | $ 1,462,000 | $ 2,084,000 | $ 73,000 | $ - | $ 2,157,000 |
| 6.2 | | Upstream Fishway | $ 10,529,000 | $ 15,010,000 | $ 582,000 | $ - | $ 15,592,000 |
| 6.3 | | Downstream Fishway | $ 27,639,000 | $ 39,402,000 | $ 727,000 | $ 147,000 | $ 40,276,000 |
| 6.4 | | Spillway | $ 2,925,000 | $ 4,170,000 | $ 145,000 | $ - | $ 4,315,000 |
| 6.5 | | Tailrace Barrier | $ 7,496,000 | $ 10,686,000 | $ 363,000 | $ 49,000 | $ 11,098,000 |

**Grand Total: $ 300,792,000**

### b. PacifiCorp's Alternative

PacifiCorp's Alternative for anadromous fish would require (1) minor modifications to the existing ladder and holding facility at the Iron Gate Dam to facilitate the upstream adult collection and transport program; and (2) a single intake screen at J.C. Boyle Dam or another location in the upper Klamath basin based on adaptive management (Attachment A). The Alternative, including initial studies pursuant to the adaptive reintroduction program, would cost approximately $49,440,000. The cost estimates below assume construction of a screen and a sorting, holding and loading facility like that described in Section V.A.4.b., above, at J.C. Boyle Dam to provide for a downstream collection and transport program for juveniles. If, pursuant to an adaptive management approach, a similar juvenile collection and transport facility is located elsewhere above J.C. Boyle Dam, the costs would likely be equivalent or greater. Four fish transport trucks would serve both programs. Table 8 provides a summary of the costs of PacifiCorp's proposed Alternative.

**Table 8. Total Project Costs for PacifiCorp's Alternative for Anadromous Fish at and Between Iron Gate, Copco 1, Copco 2 and J.C. Boyle Dams.**

| Development | Proposed Facility | Capital Construction Cost | Project Capital Cost | Present Worth O&M Costs | Present Worth Lost Energy Costs | Total Estimated Project Cost |
|---|---|---|---|---|---|---|
| Iron Gate | Adult trap and haul - Iron Gate to J.C. Boyle. Includes holding and loading facility | $ 1,974,000 | $ 2,814,000 | $ 2,145,000 | $ - | $ 4,959,000 |
| J.C. Boyle [a] | Juvenile trap and haul - J.C. Boyle to Iron Gate. Includes conventional V-screen with sorting, holding and loading facility | $ 25,506,000 | $ 36,361,000 | $ 5,015,000 | $ 147,000 | $ 41,523,000 |
| N/A | Anadromous Fish Reintroduction Studies | - | - | - | - | $ 2,958,000 |

**Grand Total: $ 49,440,000**

[a] PacifiCorp is providing cost estimates for downstream fishways located at J.C. Boyle Dam. However, pursuant to PacifiCorp's proposed adaptive collection and transport program (Attachment A), those facilities could be located elsewhere above J.C. Boyle Dam. Locating a downstream collection and transport facility at a site above J.C. Boyle Dam would likely result in similar or increased costs to those presented here.

## 7. Description of Effects

### a. Energy Supply, Distribution, Cost and Use

PacifiCorp's Alternative for anadromous fish would result in a present worth loss energy cost of $147,000[17] (see Table 8 for a breakdown by site/facility). This lost energy cost is associated with the screen system head losses at J.C. Boyle Dam.

PacifiCorp's Alternative also includes a sizable financial commitment for 5 to 10 years to contribute funds to evaluate key performance criteria associated with the anadromous fish reintroduction effort (*see* Attachment A). PacifiCorp's total cost share associated with implementing initial studies over the first five years of the program is estimated to be $2,958,000.

By comparison, the Services' Prescription for anadromous fish at and between Iron Gate, Copco 1, Copco 2 and J.C. Boyle dams, and including a tailrace barrier at Fall Creek Diversion Dam, would result in a present worth lost energy cost of $15,234,000 (see Table 7 for breakdown by site/facility). Most of this cost is associated with fish ladder flow (including AWS) and screen bypass flow at Iron Gate and Copco No. 1 dams. It was assumed that the source of these water requirements would be the dam forebays, thus making the water unavailable for power generation. At the other sites the ladder flow and screen bypass flow was assumed to come from the agency-recommended minimum flows, and thus did not add additional energy cost. Tailrace barriers also would create head loss at each powerhouse resulting in energy loss.

[17] See note 16, *supra*.

### b. Flood Control

The Project is not operated for flood control. Therefore, there would be no difference in flood control between the Services' Prescription and PacifiCorp's Alternative for anadromous fish.

### c. Navigation

There would be no difference in navigation between the Services' Prescription and PacifiCorp's Alternative for anadromous fish.

### d. Water Supply

The Services' anadromous fish Prescription includes the construction of a tailrace barrier at the discharge point of the Fall Creek Powerhouse. This location lies immediately upstream of the City of Yreka, California, municipal water supply intake. Water quality issues during construction would require the temporary shutdown of the City's diversion. It is unknown how long the Yreka water system can operate without diversion from Fall Creek.

Water from Fall Creek below the Powerhouse also is diverted for use at the CDFG Fall Creek salmon rearing facility. PacifiCorp's Alternative, which would not require construction of a tailrace barrier at the Fall Creek Powerhouse, would not result in the types of construction-related water turbidity associated with the Services' Prescription, which would require such construction and thus adversely affect fish in rearing ponds.

### e. Air Quality

There would be no difference in air quality between the Services' Prescription and PacifiCorp's Alternative for anadromous fish.

### f. Other Aspects of Environmental Quality

PacifiCorp's Alternative for anadromous fish would be compatible with operation of the Iron Gate Hatchery. The Services' Prescription for a volitional adult fishway at Iron Gate Dam, on the other hand, would jeopardize the entire operation of the Hatchery by depleting the limited supply of cool water by late summer. This cool water is critical to the continued operation of the Iron Gate Hatchery for fall Chinook salmon, coho salmon, and steelhead trout.

PacifiCorp's Alternative, which includes an adaptive program for reintroducing anadromous fish (Attachment A), would be able to address concerns about the introduction of fish diseases to upper Klamath basin. The Services' volitional fishway Prescription would potentially allow disease organisms found in lower river fish to be introduced into the upper basin, thereby potentially causing significant losses of native fish, such as redband trout, as well as added losses of anadromous fish for which the facilities are intended.

PacifiCorp's Alternative would not allow coastal-lineage steelhead trout to ascend above Iron Gate Dam without assurances that inbreeding with the upper basin interior-lineage redband trout could be prevented. The Services' Prescription has no provision for the major concern of genetic introgression between coastal and redband trout.

## B. Alternative to Services' Prescriptions for Resident Fish at and between Iron Gate, Copco 1, Copco 2, and J.C. Boyle Dams

PacifiCorp's proposed collection and transport program would obviate the need for the Services' Prescription at and between Iron Gate, Copco 1, Copco 2 and J.C. Boyle dams for anadromous fish. However, in addition to prescribing fishways at and between the dams to support anadromous fish passage, the Services claim these same fishways will benefit resident fish. Therefore, this section presents PacifiCorp's Alternative for resident fish at and between Iron Gate, Copco 1, Copco 2 and J.C. Boyle dams.

### 1. Description of the Services' Resident Fishway Prescription

At and between the Iron Gate, Copco 1, Copco 2 and J.C. Boyle dams and facilities, the Services preliminarily prescribe various upstream fishways, downstream fishways, and spillway modifications, in part to benefit resident redband trout. In general, these prescriptions call for the installation or modification of facilities to provide "volitional" passage (i.e., fish ladders) for upstream migrating anadromous and resident fish. In addition, certain protective measures are preliminarily prescribed to facilitate downstream juvenile migration and to minimize injuries.[18] The upstream and downstream fishways and spillway modifications are described in Section V.A.1., above.

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[18] This Section B is responsive to the following preliminary prescriptions as they apply to various resident fish: sections 1.1 (upstream fishway at Iron Gate Dam); 1.2 (downstream fishway at Iron Gate Dam); 1.3 (spillway modifications at Iron Gate Dam); 4.1 (upstream fishway at Copco 2 Dam); 4.2 (downstream fishway at Copco 2 Dam); 4.3 (spillway modifications at Copco 2 Dam); 5.1 (upstream fishway at Copco 1 Dam); 5.2 (downstream fishway at Copco 1 Dam); 5.3 (spillway modifications at Copco 1 Dam); 6.2 (upstream passage at J.C. Boyle Dam); 6.3 (downstream passage at J.C. Boyle Dam); and 6.4 (spillway modification at J.C. Boyle Dam). As previously stated, PacifiCorp does not waive its objection to any Prescription as beyond the scope of FPA section 18 by voluntarily including these measures in its Alternative.

In addition, at the Fall Creek and Spring Creek diversion dams, USFWS prescribes upstream and downstream passage for redband trout (Prescription at §§ 2.1, 2.2, 3.1 and 3.2). PacifiCorp is not proposing an alternative to USFWS' upstream and downstream fishway Prescriptions at those sites.

### 2. PacifiCorp's Alternative Resident Fishway Prescription

No resident fish species have been observed entering the Iron Gate ladder (Bob Wakefield, CDFG, pers. comm.). Nevertheless, consistent with its proposed adaptive collection and transport program for anadromous fish, PacifiCorp would transport any resident fish that do arrive in the Iron Gate Dam collection facility to above or below the Dam at the request of fish managers.[19] PacifiCorp proposes no downstream fishway at Iron Gate Dam, and no upstream or downstream fishways or spillway modifications at Copco 1 or Copco 2 dams.

Resident fish do not require passage at J.C. Boyle Dam (*see infra,* Section V.B.3.a.). Nevertheless, because there is an existing ladder at J.C. Boyle Dam, PacifiCorp proposes to modify the ladder to minimize stress to and delay of any resident fish that use the ladder. The existing bar spacing on the fishway exit pool trashrack will be increased to allow fish already using the ladder to pass more easily and without delay. An additional weir will also be added to the fishway entrance pool to decrease the height of the existing step and allow fish already attempting to use the ladder to more easily do so.

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[19] All trout now arriving at the Iron Gate ladder are considered to be of a coastal-lineage stock (steelhead). Fisheries managers would need to decide whether to allow these fish to be released above Iron Gate Dam, where they would likely interbreed with resident redband trout.

As described in Section V.A.4., above, PacifiCorp is proposing to construct a collection and transport facility for downstream migrating salmonids at a time and location and of a type to be determined in accordance with the adaptive approach described in Attachment A. Until a decision is made regarding these details, PacifiCorp will continue to use existing downstream screening facilities to bypass resident fish. These facilities consist of traveling screens that cover the entire flow to the power canal. The system also includes a fish bypass system that discharges to a pool just downstream of the spillway. The screen approach velocities under maximum flows do not meet current criteria for fry; however, if a juvenile anadromous collection and transport facility is ultimately constructed at J.C. Boyle Dam, it will be constructed to meet criteria for juvenile salmon and trout.

Finally, PacifiCorp is proposing to implement minor fixes to fill gaps among boulders and bedrock in the spillway within four years of license issuance; however, PacifiCorp is not proposing to implement hydraulically-engineered spillway modifications of the type described in the Services' Prescription (Prescription at § 6.4). There is no evidence that significant modifications are necessary to protect redband trout.

PacifiCorp's Alternative does not include fishways at Iron Gate Dam (other than the upstream passage proposed as part of the anadromous fish collection and transport program) or at the Copco 1 and 2 dams for resident fish.

### 3. PacifiCorp's Alternative is No Less Protective than Services' Prescription

#### a. Resident Trout

As discussed in Section IV, *supra*, Congress has limited the populations of fish for which fishways can be prescribed, providing that fishways may only include those "physical structures, facilities, or devices *necessary to maintain all life stages of such fish* ...." Energy Policy Act of 1992, P.L. 102-486, 106 Stat. 2776, at 3008 (Oct. 24, 1992) (emphasis supplied). As set forth below, neither the resident trout populations in and above Copco 1 Dam nor the populations below Copco 1 Dam require passage in order to maintain all life stages.

##### i. Population In and Above Copco 1 Dam

The upper Klamath River between Copco Reservoir and Keno Dam maintains a highly productive, self sustaining redband trout population, which supports an excellent trout fishery (National Park Service 1994). Both Oregon and California manage their respective river reaches as wild trout waters (ODFW 1997, CDFG 2000). In 1994, the Secretary of the Interior designated the 11 miles of the Klamath River below the J.C. Boyle Powerhouse down to the Oregon/California border pursuant to the Wild and Scenic Rivers Act based in part on a finding that the river supported an outstanding redband trout fishery. The National Park Service, acting in cooperation with the Bureau of Land Management, found that this stretch of the Klamath River

> provides an exceptional trout fishery and is reputed to be one of the better fly fishing rivers in Oregon ... [and] offers an excellent fishery for wild rainbow

> trout with a size and catch rate among the highest in the state [with] nearly unlimited shoreline access [and a] year-round fishing season.

National Park Service (1994) at 12, 18.

A fish ladder designed primarily for redband trout was built as part of the J.C. Boyle development in 1958. To verify that the fish ladder performed as intended, ODFW monitored fish use of the ladder in 1959 starting in mid-May. At the end of 1959, it was estimated that 5,529 trout had moved upstream through the fish ladder. Estimates for 1961 and 1962 were 3,882 and 2,295, respectively. In general, the large number of fish using the fish ladder in these first few years indicated that the ladder performed well.

The number of fish using the fish ladder was monitored again in 1988-1991. By then the annual fish passage estimates ranged from 588 in 1989 to 70 in 1991. In an attempt to determine potential reasons for the decline, 453 adult rainbow trout from the Klamath River downstream of the J.C. Boyle Powerhouse were tagged in 1988, and fish passage was monitored at the J.C. Boyle fish ladder from late 1988 through 1989. None of the tagged fish were observed in the fish ladder, indicating that trout from below J.C. Boyle Dam were no longer making the migration to above the Dam. In 2003, PacifiCorp evaluated the same issue using radio-tagged trout to assess whether trout were being deterred by the fishway or approach conditions at the Dam or whether fish were simply not inclined to even migrate to the Dam. Only one of 42 radio-tagged fish even approached the fish ladder. In 2003 and 2004, ODFW radio-tagged 72 adult redband trout in the Klamath River below J.C. Boyle Dam, and none of these fish moved up the ladder (Bill Tenniswood, ODFW, pers. comm.). The lack of upstream movement toward the Dam for 41 of the 42 tagged fish is consistent with the results of the 1988 tagging study and the recent ODFW study, thus providing three

sources of concurring evidence that only a small fraction of the trout originating from downstream of the Dam actually use the upstream fish passage facilities at J.C. Boyle Dam, and that most trout from below the Dam presumably spawn successfully below the Dam.

There is no evidence indicating that the current fish passage facilities or Project operations have contributed to the declining use of the ladder. A more plausible explanation for the reduced trout use of the ladder is that the trout population has modified its movement behavior over the years in an adaptive response to new conditions with the Dam in place. The construction of J.C. Boyle Dam inundated nearly four miles of riverine habitat. The fish observed moving upstream over the dam in the first few years after Dam construction would have been following their homing behavior to natal spawning or over-wintering areas, much of which may have been inundated by construction of the Dam. It is known that Spencer Creek, which enters J.C. Boyle Reservoir, is a good spawning stream and still supports spawners from the upstream Keno reach. However, it is also likely that there was good spawning habitat at the mouth of Spencer Creek in the 4-mile section of the Klamath River that is now inundated. This reach of the Klamath River was relatively low gradient (15 ft/mi), and thus likely was a depositional area for spawning gravel originating from Spencer Creek and the upstream Keno reach.

It is unknown whether reconstructing the fish ladder in accordance with contemporary design criteria would noticeably improve fish passage efficiency. It is conceivable that a new facility would allow the fish to move through the ladder more quickly after they enter the ladder. However, it is doubtful that the non-contemporary design of the existing ladder could explain the decline in its use over the years. To argue such would

require the unlikely assumption that the ladder efficiency became progressively worse through the years, yet the ladder has remained unchanged.

PacifiCorp acknowledges that maintaining a healthy trout population near J.C. Boyle Dam is an important priority for resources agencies. Based on relicensing studies and angler surveys conducted in the J.C. Boyle bypass and peaking reaches, the resident trout population is self-sustaining and supports a viable fishery (PacifiCorp's Final License Application, Feb. 23, 2004; ODFW 1997). Although the trout population has modified its migratory and spawning behavior in response to the construction of J.C. Boyle Dam, there still are trout that occasionally use the ladder. PacifiCorp's proposed ladder modifications will benefit fish that may use the ladder. PacifiCorp believes these modifications are appropriate given the limited use of the existing ladder and the fact that resident fish do not need passage at this site.

As discussed above, PacifiCorp's Alternative for downstream passage of resident fish at J.C. Boyle Dam is tied to the eventual need for screening and collection facilities for anadromous fish migrants. The existing screens at J.C. Boyle Dam are not designed per current criteria; however, PacifiCorp believes that decisions regarding when and how to screen J.C. Boyle Dam for anadromous fish should take priority over trout. The numbers of juvenile trout that currently pass downstream at J.C. Boyle Dam is believed to be small considering the small number of spawning adults that ascend the ladder.

### ii. Population Below Copco 1 Dam

The Services' Prescription includes upstream and downstream fish passage facilities at the two Copco dams and Iron Gate Dam. While the potential benefit of these facilities for trout passage is noted in their Prescription, it is clear from the Services' filings that their primary goal is the reintroduction of anadromous fish.

While PacifiCorp acknowledges the fact that the river upstream of Copco reservoir supports an abundant trout population, the same cannot be said for Copco and Iron Gate reservoirs. These reservoirs are warm water habitats and thus support primarily a warm water fishery (e.g., largemouth bass and perch). Extensive fish sampling in both reservoirs in 1998 and 1999 (PacifiCorp 2004, Fish Resources Technical Report (summarizing data from Desjardins, M. and D.F. Markle 2000)) found relatively few trout. In Copco Reservoir, for example, only 3 trout were captured out of a total all-species catch of 35,816. In Iron Gate Reservoir, 17 trout were captured out of a total of 4,113 fish. The few trout able to survive in Copco and Iron Gate reservoirs can have their spawning and perhaps early rearing needs met in Fall and Jenny creeks (above Iron Gate Dam) and Shovel Creek (above Copco Dam). There is no evidence that trout in those areas require access to additional habitat, or that trout outside those areas would benefit from access to habitat within them.

According to Iron Gate Hatchery staff, resident fish have never been observed using the existing ladder at Iron Gate Dam. All rainbow trout entering the ladder are considered steelhead trout, although some have clearly residualized in the river. Furthermore, it is important to note that rainbow trout in the Klamath River below Iron Gate Dam are of a coastal lineage stock, much different from the interior redband stock genetics found above

Iron Gate. ODFW (1997), among others, have previously expressed concerns regarding allowing introgression between coastal lineage trout and native redband trout in the Klamath Basin.

PacifiCorp's Alternative places priority on achieving the maximum possible success for anadromous fish reintroduction in the upper Klamath basin, consistent with agency and tribal goals. For the reasons discussed above (*see supra*, Section V.A.3.), volitional fishways for upstream and downstream passage at Iron Gate and Copco dams would jeopardize the success of the anadromous fish reintroduction program. PacifiCorp's Alternative better meets the Services' priority fish goals. Furthermore, because resident fish do not require passage within or outside of the Project area to meet their life stage requirements, PacifiCorp's Alternative is no less protective than the Services' Prescriptions.

**b. Suckers**

Federally-listed shortnose and Lost River sucker are found in small numbers in Project reservoirs. It is well established that the reservoirs are inherently unsuitable for these suckers to complete their life cycles. For this reason the Services did not prescribe measures specific to the protection of these species. They noted, however, that the downstream protection facilities designed for salmonids will provide some protection for suckers as well.

PacifiCorp's Alternative, which focuses on the best means to achieve successful reintroduction of anadromous fish to the upper basin, does not call for downstream screens or bypass facilities at Copco 1 or 2 or Iron Gate dams. Therefore, PacifiCorp evaluated the potential for sucker entrainment mortality at these sites. An attached technical memorandum addresses this topic (*see* "Entrainment Mortality for Shortnose and Lost River Suckers at the

Klamath Hydroelectric Project (FERC Project No. 2082)" (Attachment F)). The assessment concludes that all non-larval shortnose or Lost river suckers occurring at Copco and Iron Gate dams are too large to pass through the existing trash racks at the powerhouse intakes. In two years of extensive surveys, the smallest identified shortnose sucker in both reservoirs was 410 mm.

Larval shortnose suckers are known to be recruited into the upper end of Copco Reservoir. However, all the larvae appear to die, presumably from predation, before they reach a size of 40 mm. If some larvae were able to reach the dams and pass through the powerhouses, few, if any, would be expected to suffer turbine-induced mortality because of the fish's small size and flexible body. Larval-sized fish cannot be effectively screened at large intakes because of their small size and poor swimming ability. In fact, conventional screens designed for salmonid fry, with screen approach velocities of 0.33 to 0.4 fps, would be expected to cause high rates of impingement mortality for larval suckers, much exceeding that which would likely occur due to passage through turbines.

Based on the fact that listed sucker species in Iron Gate and Copco reservoirs are either too large to enter the powerhouses or too small to be effectively and safely screened with the Services' Prescribed facilities, it is clear that PacifiCorp's Alternative of not including downstream fish facilities at Copco 1, Copco 2 and Iron Gate dams is no less protective for suckers.

### 4. PacifiCorp's Alternative is Significantly Less Costly to Implement or Will Result in Improved Operation for Electricity Production

#### a. Estimated Cost of the Services' Prescription for Resident Fish

The total cost of the Services' prescriptions for resident fish in the Project area (from Iron Gate Dam to J.C. Boyle Dam) is estimated at $267,484,000. The cost of all fishways that were prescribed in whole or in part for resident fish is included in that estimate; some of those same costs are included in Table 7, which details the cost estimates for preliminary anadromous fish prescriptions. See, *infra*, n. 18.

**Table 9. Summary of Project Costs for Services' Prescription for Resident Fish at and Between Iron Gate, Copco 1, Copco 2 and J.C. Boyle Dams, Including Upstream and Downstream Fishways at Fall Creek and Spring Creek Diversion Dams.**

| No. | Development | Proposed Facility | Capital Construction Cost | Project Capital Cost | Present Worth O&M Costs | Present Worth Lost Energy Costs | Total Project Cost |
|---|---|---|---|---|---|---|---|
| 1.1 | Iron Gate | Upstream Fishway* | $ 27,082,000 | $ 38,608,000 | $ 2,035,000 | $ 6,115,000 | $ 46,758,000 |
| 1.2 | | Downstream Fishway* | $ 17,834,000 | $ 25,424,000 | $ 727,000 | $ 1,434,000 | $ 27,585,000 |
| 1.3 | | Spillway* | $ 731,000 | $ 1,042,000 | $ 145,000 | $ - | $ 1,187,000 |
| 2.1 | Fall Creek | Upstream Fishway | $ 73,000 | $ 104,000 | $ 218,000 | $ - | $ 322,000 |
| 2.2 | | Downstream Fishway | $ 522,000 | $ 744,000 | $ 363,000 | $ 3,000 | $ 1,110,000 |
| 3.1 | Spring Creek | Upstream Fishway | $ 219,000 | $ 312,000 | $ 218,000 | $ - | $ 530,000 |
| 3.2 | | Downstream Fishway | $ 245,000 | $ 349,000 | $ 363,000 | $ - | $ 712,000 |
| 4.1 | Copco 2 | Upstream Fishway* | $ 4,416,000 | $ 6,295,000 | $ 582,000 | $ - | $ 6,877,000 |
| 4.2 | | Downstream Fishway* | $ 25,431,000 | $ 36,254,000 | $ 727,000 | $ 181,000 | $ 37,162,000 |
| 4.3 | | Spillway* | $ 292,000 | $ 416,000 | $ 73,000 | $ - | $ 489,000 |
| 4.5 | | Bypass Channel Barrier / Impediment Modification* | $ 146,000 | $ 208,000 | $ 73,000 | $ - | $ 281,000 |
| 5.1 | Copco 1 | Upstream Fishway* | $ 20,984,000 | $ 29,915,000 | $ 582,000 | $ 6,013,000 | $ 36,510,000 |
| 5.2 | | Downstream Fishway* | $ 27,639,000 | $ 39,402,000 | $ 727,000 | $ 1,177,000 | $ 41,306,000 |
| 5.3 | | Spillway* | $ 2,925,000 | $ 4,170,000 | $ 145,000 | $ - | $ 4,315,000 |
| 6.1 | J.C. Boyle | Bypass Channel* | $ 1,462,000 | $ 2,084,000 | $ 73,000 | $ - | $ 2,157,000 |
| 6.2 | | Upstream Fishway* | $ 10,529,000 | $ 15,010,000 | $ 582,000 | $ - | $ 15,592,000 |
| 6.3 | | Downstream Fishway* | $ 27,639,000 | $ 39,402,000 | $ 727,000 | $ 147,000 | $ 40,276,000 |
| 6.4 | | Spillway* | $ 2,925,000 | $ 4,170,000 | $ 145,000 | $ - | $ 4,315,000 |

**Grand Total: $ 267,484,000**

* Denotes prescriptions for resident fish that are also included in the anadromous fish prescription cost estimates (Table 7); cost estimates are included in both places to represent the total costs should the Services impose this condition for resident fish only.

### b. Estimated Cost of PacifiCorp's Alternative Fishway Prescriptions for Resident Fish

The total cost of PacifiCorp's Alternative for resident fish within the Project area, which includes upstream and downstream passage at Fall Creek and Spring Creek diversion dams and modifications to the J.C. Boyle fish ladder, is estimated at $4,758,000. This is significantly less than the cost of the Services' Prescription for resident fish, estimated in Table 9, above, at $267,484,000.

**Table 10. Summary of Project Costs for PacifiCorp's Alternative for Resident Fish at and Between Iron Gate, Copco 1, Copco 2 and J.C. Boyle Dams, Including Upstream and Downstream Fishways at Fall Creek and Spring Creek Diversion Dams.**

| Development | Proposed Facility | Capital Construction Cost | Project Capital Cost | Present Worth O&M Costs | Present Worth Lost Energy Costs | Total Estimated Project Cost |
|---|---|---|---|---|---|---|
| Fall Creek | Upstream Fishway | $ 73,000 | $ 104,000 | $ 218,000 | $ - | $ 322,000 |
| | Downstream Fishway | $ 522,000 | $ 744,000 | $ 363,000 | $ 3,000 | $ 1,110,000 |
| Spring Creek | Upstream Fishway | $ 219,000 | $ 312,000 | $ 218,000 | $ - | $ 530,000 |
| | Downstream Fishway | $ 245,000 | $ 349,000 | $ 363,000 | $ - | $ 712,000 |
| J.C. Boyle [a] | Modify existing fish ladder | $ 1,462,000 | $ 2,084,000 | $ - | $ - | $ 2,084,000 |
| | | | | | **Grand Total:** | **$ 4,758,000** |

[a] PacifiCorp is providing cost estimates for downstream fishways located at J.C. Boyle Dam. However, pursuant to PacifiCorp's proposed adaptive collection and transport program, those facilities could be located elsewhere above J.C. Boyle Dam. Locating a downstream collection and transport facility at a site above J.C. Boyle Dam would likely result in similar or increased costs to those presented here.

## 5. Description of Effects

### a. Energy Supply, Distribution, Cost and Use

PacifiCorp's Alternative for resident fish would result in a present worth loss energy cost of $3,000[20] (*see* Table 10). Most of the cost is associated with energy lost due to head loss associated with a potential screening system at J.C. Boyle Dam.

By comparison, the Services' Prescription for resident fish at and between Iron Gate, Copco 1, Copco 2 and J.C. Boyle dams and including upstream and downstream fishways at Fall Creek and Spring Creek diversion dams would result in a present worth lost energy cost of $15,070,000 (*see* Table 9). Most of this cost is associated with fish ladder flow (including AWS) and screen bypass flow at Iron Gate and Copco 1 dams. It was assumed that the source of these water requirements would be the dam forebays, thus making the water unavailable for power generation. At the other sites the ladder flow and screen bypass flow was assumed to come from the agency-recommended minimum flows, and thus did not add additional energy cost. Tailrace barriers also would create head loss at each powerhouse resulting in energy loss. Note that many of the Services' prescribed facilities for resident fish were prescribed for anadromous fish as well.

### b. Flood Control

The Project is not operated for flood control. Therefore, there would be no difference in flood control between the Services' Prescription and PacifiCorp's Alternative for resident fish.

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[20] See note 16, *supra*.

### c. Navigation

There would be no difference in navigation between the Services' Prescription and PacifiCorp's Alternative for resident fish.

### d. Water Supply

There would be no effects on water supply from either the Services' Prescription or PacifiCorp's Alternative for resident fish.

### e. Air Quality

There would be no difference in effects to air quality between the Services' Prescription and PacifiCorp's Alternative for resident fish.

### f. Other Aspects of Environmental Quality

PacifiCorp's Alternative for resident fish would be compatible with operation of the Iron Gate Hatchery. The Services' Prescription for a volitional fishway at Iron Gate Dam, on the other hand, would jeopardize the entire operation of the Hatchery by depleting the limited supply of cool water by late summer. This cool water is critical to the continued operation of the Iron Gate Hatchery for fall Chinook salmon, coho salmon, and steelhead trout.

## C. Alternative to Services' Prescriptions for Anadromous and Resident Fish at Keno Dam and Link River East Side/West Side Powerhouses

### 1. Description of the Services' Fishway Prescription[21]

#### a. Keno Dam

The Services preliminarily prescribe modifications to Keno Dam's existing ladder for the upstream passage of Chinook, steelhead, Pacific lamprey, and redband trout. The Services would require that PacifiCorp maintain uninterrupted passage over a full range of flows for which the Project maintains operational control. PacifiCorp would be required to include a screened and bypassed AWS to augment ladder flow from the forebay. The ladder would be modified to meet current criteria for Pacific lamprey. The Services would also require that PacifiCorp construct, operate and maintain holding and sorting facilities to accommodate upstream interim, seasonal trap and haul for anadromous salmonids, including modifications to allow trapping, holding, sorting by age and species, and to accomplish the transfer of anadromous salmonids to above Link River Dam from June 15 to November 15.

In addition to the upstream fishway modifications, the Services' Prescription would require that PacifiCorp modify, maintain and evaluate the radial gates to provide a spillway for downstream anadromous and resident fish passage.

The Services would require PacifiCorp to operate the ladder year-round regardless of trap and haul activities there. Finally, the Services would require that PacifiCorp subsample fish on a daily basis for size, species identification, age determination, and condition.

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[21] This Section C applies to the following Prescriptions: sections 7.1 (Keno Dam upstream passage); 7.2 (Keno spillway modifications); 8.1 (downstream passage at Link River East Side and West Side powerhouses); 8.2 (tailrace barrier at Link River East Side and West Side powerhouses).

### b. Link River East Side/West Side Powerhouses

The Services preliminarily prescribe that PacifiCorp construct a fish screen and bypass facility for downstream passage of anadromous and resident fish at the Link River East Side and West Side powerhouses. These facilities would be designed in accordance with NMFS juvenile criteria or an alternative criteria approved by the Services. The facilities would provide for uninterrupted passage over the full range of flows for which the Project maintains operational control. In addition, the Services preliminarily prescribe that PacifiCorp transport fish to holding, sorting, counting and tagging facilities where fish are passed into a fishway or, from June 15 to November 15, a seasonal trap and haul facility for downstream transport. The Services' Prescription includes construction of a tailrace barrier and guidance system.

## 2. Keno Dam and Link River East Side/West Side Powerhouses Are Non-Jurisdictional

The Services' Prescriptions for Keno Dam and the East Side and West Side powerhouses are arbitrary, capricious, and contrary to law. 5 U.S.C. § 706. The Services have no section 18 prescriptive authority at Keno or Link River dams because neither Link River East Side or West Side powerhouses nor Keno Dam and its reservoir will be included in the new license or the Project boundary.

PacifiCorp's application for a new license does not include the Link River East Side and West Side powerhouses because PacifiCorp intends to cease generation there and remove or mothball associated works and facilities. FERC does not require licensees to continue to operate generating facilities if they wish to cease such operation at the end of a license term. *See Niagara Mohawk Power Corp.*, 89 FERC ¶ 61,194 at 61,596 (1999), *reh'g denied*, 90

FERC ¶ 61,250 at 61,839 (2000). Thus, the powerhouses will not be in the new Project license or boundary.

Nor must the new license "include" an extension of the 1956 Link River Dam contract between PacifiCorp and the Bureau of Reclamation ("Reclamation"), whereby PacifiCorp operated the federal dam primarily for Reclamation purposes, and had the use of any water surplus thereto. The 1956 contract expired by its terms on April 16, 2006, and FERC has ruled that the current Klamath Project license does not require PacifiCorp to continue to perform under that contract after its expiration. *See* PacifiCorp, 114 FERC ¶ 61,051 (2006); *reh'g denied*, 115 FERC ¶ 61,075 (2006). Indeed, FERC has stated that PacifiCorp need not, for purposes of any new license for the Klamath Project, hold the rights it held under the 1956 contract. 114 FERC ¶ 61,051 at ¶ 27.

PacifiCorp's application for a new license does not include Keno Dam and Reservoir ("Keno"), because the Commission lacks authority to relicense Keno. Although Keno re-regulates the irrigation-dominated releases from Link River Dam, and although PacifiCorp's contract with Reclamation governing Keno operations gives PacifiCorp limited flexibility to shape releases on behalf of downstream generation, in fact, Keno's contribution to generation is insubstantial at best. In fact, modeling conducted by PacifiCorp demonstrates that the median expectation of the maximum theoretical benefit that Keno contributes downstream is -20 percent. At one end of the modeling extreme, Keno contributes at most 3.8 percent to downstream generation in only the wettest 5 percent of the inflow record. At the other end of the modeling extreme, there is an equal probability that Keno results in a 24.7 percent loss of generation in the driest 5 percent of the inflow record.

In short, there is at most a 25 percent probability that the existence of Keno provides any benefit at all (and that benefit ranges between 0 and 3.8 percent) while there is a corresponding 75 percent probability that the existence of Keno results in a loss of generation (ranging from 0 to 24.7 percent). This means that Keno does not qualify as a part of the Klamath Hydroelectric Project unit of development, a concept that defines the works the Commission has jurisdiction to license. *See* FPA Section 3(11), 16 U.S.C. § 796(11) (definition of "project"), and Section 4(e), 16 U.S.C. § 797(e) (Commission is authorized to issue licenses "for the purpose of constructing, operating, and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project works necessary or convenient for . . . the development, transmission, and utilization of *power* . . .") (emphasis added); *Chippewa and Flambeau Improvement Co. v. FERC,* 325 F.3d 353 (D.C. Cir. 2003) (affirming FERC's "unit of development" test); *Bear Lake Watch v. FERC,* 324 F.3d 1071, 1075 (9th Cir. 2003). In *Bear Lake Watch*, the court affirmed FERC's ruling that "when a reservoir. . . does not have a significant beneficial impact on power generation but, rather, has the opposite effect it is not a necessary or appropriate part of the generation project." *Bear Lake Watch*, 324 F.3d at 1075. The court noted that its ruling applied even if at times the reservoir in question was actually beneficial to downstream generation, so long as its overall operation was detrimental to power generation, as is the case with Keno. *Id.*

The Department of the Interior attempts to argue that the mere existence of the Keno contract makes Keno Dam a necessary part of the licensed project, asserting:

> Even if PacifiCorp "excludes" Keno Dam from its Project, PacifiCorp is still required to operate Keno Dam under its contract with Reclamation. Thus, PacifiCorp is contractually required to operate and maintain Keno Dam as

> long as PacifiCorp operates the Project. Thus, Keno Dam must remain a part of the project.

DOI at 17 n.3. However, it is Keno Dam's value to hydroelectric generation – not the contract – that defines Keno Dam for FERC jurisdictional purposes. DOI's bootstrap argument cannot create FERC jurisdiction where there is none, or require FERC to keep a non-jurisdictional work in the license. Because Keno Dam provides insubstantial benefits to generation and therefore will not be in the new license, neither PacifiCorp nor FERC has a stake in the continuation of the Keno Dam contract.

Contrary to Reclamation's implication, the test of whether a facility is part of a unit of development depends only on whether the facility contributes to hydroelectric generation. The facility's impacts, adverse or beneficial, on other public interest considerations (including Reclamation projects) are irrelevant. *See Bear Lake Watch*, 324 F.3d 1071. Other public interest considerations come into play only after FERC's licensing jurisdiction has been established. If the facility becomes part of a licensed project, protection of the facility's beneficial impacts or mitigation of its adverse impacts can be among the project's purposes. Conversely, if FERC does not have jurisdiction over the facility, it is irrelevant that the facility or parts thereof may occupy or affect federal land.

DOI misapprehends the Commission's regulatory authority when it asserts (DOI at 18) that if FERC concludes it lacks jurisdiction over Keno, PacifiCorp must apply for permission to "decommission" the project. Because PacifiCorp is not required to relicense Keno, it can exit the project at the end of the license term and is not subject to any further FERC proceedings or requirements. *Cf. Pennsylvania Electric Co.*, 56 FERC ¶ 61,435

(1991) (project not required to be licensed; at end of license term, no further actions by FERC).

In the event the Commission were to rule that Keno Dam is part of the Klamath Hydroelectric Project unit of development, such that it must be under license, PacifiCorp would likely apply to the Commission for authorization to remove or mothball Keno Dam. This would only further leave the Services with no section 18 prescriptive authority over Keno Dam.

### 3. The Services' Prescription for Transferring Anadromous Fish to Around Upper Klamath Basin Reservoirs is Not a Fishway

The Services' Prescription requires that PacifiCorp seasonally transport adult fish from Keno Dam, which is not part of the Project, further into the upper Klamath basin, and juvenile fish from Link River Eastside and Westside powerhouses, which are also not part of the Project, to below Keno Dam. The purpose of these seasonal trap and haul Prescriptions are to avoid poor water quality conditions between the dams. These Prescriptions are beyond the scope of permissible "fishways" under section 18 of the FPA, both because they are not necessary to mitigate for Project-caused impacts and because they do not provide for passage around a Project-related obstacle. *See* Pub. L. 102-486, § 1701(b); Section IV, *supra*; *see also* Webster's Third New International Dictionary 859 (defining "fishway" as "a contrivance for enabling fish to pass *around a fall or dam* in a stream") (emphasis added); OAR 635-412-0005(20) (defining "fishway" as "the set of human-built and/or operated facilities, structures, devices, and measures that together constitute, are critical to the success of, and were created for the sole purpose of providing upstream fish passage *at artificial or natural obstructions which create a discontinuity between upstream and downstream water*

*or bed surface elevations*") (emphasis added). This prescription should therefore be withdrawn.

### 4. PacifiCorp's Alternative

In addition to lacking the requisite legal authority over Keno Dam and Link River East Side and West Side powerhouses to prescribe fishways generally and, more specifically, to prescribe passage over the reservoirs, the Services have provided no evidence that their remaining prescriptions for modifying Keno Dam's ladder and spillway are warranted. Indeed, there is nothing to suggest that passing resident fish – and in the future, anadromous fish – require any additional protections at the Dam. Moreover, PacifiCorp does not propose to subsample fish on a daily basis for size, species identification, age determination, and condition, as described in the Services' Prescription. Such fish handling would merely add to the already stressful conditions that these fish would encounter in their upstream migration thereby further jeopardizing the success of the anadromous fish reintroduction effort. Finally, PacifiCorp proposed in its license application to decommission the East Side and West Side powerhouses at Link Dam, and PacifiCorp is also prepared to apply to FERC to decommission Keno Dam. For these reasons, PacifiCorp proposes as its Alternative to the Services' Prescriptions that such actions not be implemented.

The Services also propose that PacifiCorp design, construct and operate trap and haul facilities at Keno Dam to allow upstream migrant fish to be collected and transported to the upper Klamath basin during those occasions when water quality conditions (temperature and dissolved oxygen) in portions of Lake Ewauna would be potentially fatal to fish. As discussed in Section 3, above, moving fish over a water body – as opposed to over a dam or

other facilities – is not a "fishway" and therefore not a legally permissible prescription. In any case, the conditions in Lake Ewauna provide a clear example of why PacifiCorp's proposed collection and transport program, described previously, is better suited for the potentially adverse conditions that anadromous fish would face between Iron Gate Dam and their spawning destination due to predation, disease and migration delays. If upstream migratory conditions are determined to be hazardous in Lake Ewauna or any other location, PacifiCorp's collection and transport program for anadromous fish would allow fish managers to direct that adult fish collected at Iron Gate Dam be released above problem areas. In the case of Lake Ewauna, hazardous conditions for adult anadromous fish would most likely occur in September when water temperatures are still warm.

### 5. PacifiCorp's Alternative is No Less Protective than Services' Prescription

As stated above, the Services provide no evidence that modifications to the Keno Dam ladder and spillway are warranted. In addition, subsampling fish on a daily basis for size, species identification, age determination, and condition, as described in the Services' Prescription, would merely add to the already stressful conditions fish encounter in their upstream migration and would not provide any measurable benefit for fish management. Therefore, PacifiCorp's Alternative of not implementing these actions at Keno Dam is no less protective than the Services' Prescription. In addition, PacifiCorp's collection and transport program for anadromous fish can provide fish direct access to habitat above Keno reservoir when appropriate to avoid hazardous conditions there, thus accomplishing the same goals as the Services' seasonal trap and haul prescription is designed to achieve.

PacifiCorp's Alternative of implementing none of the Services' prescriptions at the East Side and West Side powerhouses is no less protective of the anadromous and resident fish in the upper Klamath basin. PacifiCorp intends to cease generating and decommission the powerhouses, which will eliminate any adverse effects to fish passage.

### 6. PacifiCorp's Alternative is Significantly Less Costly to Implement or Will Result in Improved Operation for Electricity Production

As detailed in Table 11, below, the Services' prescriptions for Keno Dam and Link River East Side and West Side powerhouses would cost approximately $60,312,000. PacifiCorp's Alternative would incorporate, as seasonally appropriate, use of the collection and transport program for upstream migrating adult fish, the cost of which is also detailed in Table 11. No other costs would be associated with PacifiCorp's Alternative.

**Table 11. Comparison Summary of Total Project Costs for the Services' Prescription and PacifiCorp's Alternative.**

| No. | Development | Proposed Facility | PacifiCorp's Total Project Cost | Services' Total Project Cost |
|---|---|---|---|---|
| 7.1 | Keno | Upstream Fishway | - | $ 11,758,000 |
| 7.2 | | Spillway | - | $ 935,000 |
| 8.1 | East and West Side | Downstream Fishways | - | $ 40,267,000 |
| 8.2 | | Tailrace Barriers | - | $ 7,352,000 |
| | | **Grand Total:** | **$ -** | **$ 60,312,000** |

### 7. Description of Effects

#### a. Energy Supply, Distribution, Cost and Use

The Services' Prescriptions for Keno Dam would have no lost energy cost. However, the Prescriptions for Link River East Side and West Side powerhouses would have a total

lost energy cost[22] of $109,000 due to head losses associated with downstream fishways ($82,000) and tailrace barriers ($27,000).

**b. Flood Control**

The Project is not operated for flood control. Therefore, there would be no difference in flood control between the Services' Prescription and PacifiCorp's Alternative at Keno Dam and the Link River East Side/West Side powerhouses.

**c. Navigation**

There would be no difference in navigation between the Services' Prescription and PacifiCorp's PacifiCorp's Alternative at Keno Dam and the Link River East Side/West Side powerhouses.

**d. Water Supply**

There would be no effects on water supply from either the Services' Prescription or PacifiCorp's PacifiCorp's Alternative at Keno Dam and the Link River East Side/West Side powerhouses.

**e. Air Quality**

There would be no difference in effects to air quality between the Services' Prescription and PacifiCorp's PacifiCorp's Alternative at Keno Dam and the Link River East Side/West Side powerhouses.

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[22] See note 16, *supra*.

### f. Other Aspects of Environmental Quality

There would be no difference in effects to other aspects of environmental quality between the Services' Prescription and PacifiCorp's PacifiCorp's Alternative at Keno Dam and the Link River East Side/West Side powerhouses.

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Any material relied upon in this document that is not in the FERC record for the Project relicensing proceedings is supplied herewith as an Attachment. PacifiCorp reserves the right to supplement this filing with additional supporting information, including, but not

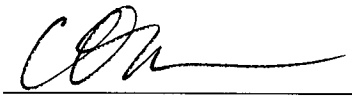
limited to, any modeling conducted or other information developed to support any material issue of fact challenge raised by PacifiCorp.

## VII. CONCLUSION

For the reasons stated above, PacifiCorp respectfully asserts that it has fully satisfied the requirements set forth at 43 C.F.R. § 45.70-74 and 50 C.F.R. § 221.70-74 and requests that the Services adopt PacifiCorp's Alternative as proposed herein and in attachments hereto, and expeditiously file the Alternative with FERC as their "modified prescriptions" pursuant to 43 C.F.R. § 45.72 and 50 C.F.R. § 221.72.

**Respectfully submitted this** 25th day of April, 2006.

**STOEL RIVES LLP**



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