# UNITED STATES OF AMERICA

# DEPARTMENT OF COMMERCE

# NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

# NATIONAL MARINE FISHERIES SERVICE

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| **IN THE MATTER OF:** | **DOCKET NUMBER** |
| KLAMATH HYDROELECTRIC PROJECT | 2006-NMFS-0001 |
| (License Applicant Pacific Corp) | |
| | **FERC PROJECT NUMBER:** |
| | 2082 |

**<u>DECISION</u>**

**<u>Dated: September 29, 2006</u>**

**Issued By:**

**Hon. Parlen L. McKenna, Presiding**

## APPEARANCES:

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reservoir thereby impairing their utilization of the full range of life history strategies and spawning productivity; b) unscreened flow through Project turbines result in mortality of juvenile and adult trout migrating down stream; and the inability to effectively migrate adversely affects the genetic health and long term survival of the resident species.

7. USFWS/NMFS ISSUE 4: Entrainment at Project facilities have and continue to adversely affect the resident fishery resources.

8. USFWS/NMFS ISSUE 6: While the exact miles of habitat for use by anadromous fish within the Project reach is unknown, 58 miles is a reasonable estimate based on the evidence contained in the record.

9. USFWS/NMFS ISSUE 7: Access to habitat within the Project would benefit Coho salmon by: a) extending the range and distribution of the species thereby increasing the Coho salmon's reproductive potential; b) increasing genetic diversity in the Coho stocks; c) reducing the species vulnerability to the impacts of degradation; and d) increasing the abundance of the Coho population.

10. USFWS/NMFS ISSUE 8: Although the evidence is inconclusive as to whether Pacific lamprey were historically present above Iron Gate Dam, the record evidence shows that access to habitat would benefit that species of fish by providing it with additional spawning and rearing grounds.

11. BLM ISSUE 10: The seasonal high flows will contribute to improving the quality of riparian habitat in the J.C. Boyle bypass reach by increasing the sediment deposit within the channel and decreasing reed canary grass. However, the extent of any improvement on riparian-focal bird species is indeterminate since an increase of woody riparian vegetation is not expected.

12. BLM ISSUE 11: Project operations have adversely affected riparian resources in both the bypass and peaking reaches by supporting the perpetuation of reed canary grass and by affecting the structure, size, and nature of depositional features. However, the extent of any loss to riparian-focal bird species is indeterminate, based upon evidence that woody riparian vegetation has not decreased noticeably

13. BLM ISSUE 14: The BLM seasonal high flows will assist in the creation of redband trout spawning habitat, decrease fine sediment embedment in spawning gravel, and improve redband trout migration. These benefits provide for a net positive effect to redband trout spawning; overcoming the possible scouring effects high flows will have on spawning trout.

14. BLM ISSUE 16: Current Project operations, particularly sediment blockage at the J.C. Boyle Dam, the flow regime, and peaking operations, negatively affect the redband trout fishery. The proposed River Corridor Management Conditions would improve fishery resources.

15. BLM ISSUE 17: The BLM's proposed upramp rate will improve conditions for fish resources and other aquatic organisms by reducing adverse effects caused by the existing nine inch/hour upramp rate.

16. BLM ISSUE 19: The BLM's proposed flows will substantially reduce the frequency and quality of whitewater boating in the J.C. Boyle peaking reach. The ability to fly-fish in the J.C. Boyle peaking reach will be reduced; the extent of this reduction has not been established.

## SUMMARY OF THE CASE

This expedited trial-type proceeding was brought pursuant to Section 241 of the Energy Policy Act of 2005, Pub. L. 109-58, § 241, 119 Stat. 594, 674-75 ( Aug. 8, 2005 ) ("EPAct") (codified in 16 U.S.C. §§

797(e) and 811), and the underlying procedural regulations codified in 50 C.F.R. Part 221. Section 241 amends sections 4(e) and 18 of the Federal Power Act ("FPA") (amended and codified in 16 U.S.C. §§ 791-823d). Those sections provide certain federal agencies authority to include conditions and/or fishway prescriptions in any hydroelectric license issued/re-issued by the Federal Energy Regulatory Commission ("FERC"). See 16 U.S.C. §§ 797(e) and 811. [1]

More specifically, under section 4(e), the Secretary of Interior ("Interior"), acting through the Bureaus of Land Management ("BLM") and/or Reclamation ("BOR"), may establish conditions deemed necessary for the protection of Indian reservations and public lands to be included in a hydroelectric license. See 16 U.S.C. § 797(e). Likewise, under section 18 of the FPA, the Secretaries of Commerce (acting through the National Marine Fisheries Service ("NMFS")), and Interior (acting through the United States Fish and Wildlife Service ("USFWS")) may prescribe fishways to provide for the safe, timely, and effective passage of fish. Id. at 811. Pursuant to section 241 of EPAct, any party to the FERC license proceeding is entitled to a determination on "disputed issues of material fact" concerning the conditions and fishway prescriptions following an expedited evidentiary hearing on the record before a judge. See Pub. L. 109-58, § 241, 119 Stat. 594, 674-75 (codified in 16 U.S.C. §§ 797(e) and 811).

As the party requesting the hearing, the burden of proof rests with PacifiCorp to establish its version of the facts on each disputed issues of material fact by a preponderance of the evidence. See Order Granting Motion to Confirm Burden of Proof ( July 6, 2006 ); 5 U.S.C. § 556(d) (establishing that the burden of proof rests with the proponent); and 50 C.F.R. § 221.57 (adopting the preponderance of the evidence standard of proof).

The parties framed fourteen disputed issues of material fact for decision. In this case, PacifiCorp partially proved its version of the facts with respect to USFWS/NMFS Issue 8. The utility company also proved its version of the facts with respect to BLM Issue 19 and partially proved its version of the facts with respect to BLM Issues 10 and 11. However, PacifiCorp failed to prove its version of the facts with respect to the remaining disputed issues of material fact.

This decision is made following a two-day prehearing conference; the submission of thousands of pages of written direct and rebuttal testimony, exhibits, and transcripts; the filing of and ruling on numerous pretrial motions; and over forty-five hours of hearing over a five day period. The preliminary statement, a listing of the stipulated disputed issues of material fact to be decided, the findings of fact on each of those disputed issues of material fact, a discussion analyzing the basis for the findings of fact, and rulings on the proposed findings of fact and conclusions of law are set forth below.

## PRELIMINARY STATEMENT

This case concerns disputed issues of material fact with respect to preliminary prescriptions and conditions that the NMFS and Interior agencies seek to include in any FERC issued re-license for the operation of the Klamath Hydroelectric Project No. 2082 ("Project"). The Project is located on the upper Klamath River beginning in Northern California and extending through Southern Oregon . The Project consists of five ("5") main stem dams: 1) Iron Gate Dam; 2) Copco II Dam; 3) Copco I Dam; 4) J.C. Boyle Dam and Diversion; and 5) Keno Dam. PacifiCorp is the current owner, operator, and holder of the FERC license to operate the Project.

On February 26, 2004 , PacifiCorp filed an application with the FERC for a license to continue operations at the Project. In response to this application, FERC issued a Notice of Application Ready for Environmental Analysis, which included a Request for Preliminary Prescriptions and Conditions. By letter to the FERC dated March 24, 2006 , NMFS filed its "Comments, Recommended Terms and Conditions, and Preliminary Prescriptions for the Klamath Hydroelectric Project, FERC Project No. 2082." Included with that letter were NMFS' section 18 preliminary prescriptions for the construction and/or modification of fishways at multiple Project facilities. The preliminary prescriptions were developed jointly with USFWS. A copy of the preliminary prescriptions is contained in Attachment A.

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[1] On November 17, 2005 , the Departments of Agriculture, Interior, and Commerce jointly published procedural regulations governing the expedited trial-type hearings conducted under section 241 of EPAct. See 70 Fed. Reg. 69,804 ( Nov. 17, 2005 ). Agriculture's regulations are codified in 7 C.F.R. Part 1, Interior's regulations are codified in 43 C.F.R. Part 45, and Commerce's regulations are codified in 50 C.F.R. Part 221. The three versions of the regulations are substantively identical with minor variations to account for the different Department's organizational components, and a slight variation on the reference to conditions and prescriptions. Id. at 69,808. Since this case was referred by NMFS to the United States Coast Guard (its designated Administrative Law Judge Office) for adjudication, 50 C.F.R. Part 221 governs this proceeding. See 50 C.F.R. § 221.26 (a).

Separately, in a letter to the FERC dated March 27, 2006, the BLM and the BOR each filed section 4(e) preliminary conditions (together with USFWS section 18 preliminary prescriptions that were jointly developed with NMFS) (collectively referred to as "Interior Agencies"). A copy of the preliminary conditions and prescriptions is contained in Attachment B.[1]

Pursuant to 16 U.S.C §§ 797(e) and 811 (as amended), and 50 C.F.R. Part 221, in letters dated April 28, 2006, PacifiCorp requested an expedited trial-type hearing to challenge the factual bases supporting the preliminary prescriptions and conditions. Since three of the five, Project dams are located in Siskiyou County , California , its County Counsel filed a notice of intervention concerning the preliminary conditions in support of PacifiCorp's hearing request. The California Department of Fish and Game ("CDFG"), the Klamath Tribes, the Hoopa Valley Tribes, and the Conservation Groups all filed notices of intervention concerning the preliminary conditions and prescriptions. Attachment C provides a chart that details each intervenor and their disputed issue(s) of concern.[2]

Pursuant to 50 C.F.R. § 221.23, NMFS consulted with the Interior Agencies. They jointly decided to consolidate the hearing requests, and refer the consolidated

matter to the United States Coast Guard ALJ Docketing Center for assignment of an Administrative Law Judge. On June 22, 2006, Chief Administrative Law Judge Joseph N. Ingolia assigned the Hon. Parlen L. McKenna to preside over the consolidated hearing and issue a decision on the disputed issues of material fact within ninety (90) days from the date of referral in accordance with section 241 of EPAct and 50 C.F.R. Part 221.

In accordance with 50 C.F.R. § 221.12, an initial prehearing conference was held on July 6 and 7, 2006. During the initial prehearing conference, the disputed issues of material fact were narrowed. The next section of this decision contains a list of the disputed issues of material fact.

The hearing commenced in Sacramento , California on August 21, 2006 , and ended on August 25, 2006 . Post-hearing briefs, including proposed findings of fact, were filed on September 5, 2006 . Reply briefs were filed on September 11, 2006 . Rulings on each parties proposed findings of fact are contained in Attachment D. Several Motions to Strike have yet to be ruled upon; the rulings on those Motions will be addressed in this decision. The witnesses and exhibit lists are set forth at the end of this decision.[3]

## DISPUTED ISSUES OF MATERIAL FACT

Fourteen (14) disputed issues of material fact were identified in this proceeding as follows:

1. USFWS/NMFS ISSUE 2(A): Whether stocks of anadromous fish suitable to conditions above Iron Gate are available to use prescribed fishways?

2. USFWS/NMFS ISSUE 2(B): To what extent facilitating the movement of anadromous fish via prescribed fishways presents a risk of introducing pathogens to resident fish inhabiting the basin above Iron Gate ?

3. USFWS/NMFS ISSUE 2(C): To what extent facilitating the movement of steelhead above Iron Gate Dam via prescribed fishways presents a risk of residualizing, and whether and to what extent that [residualization] would pose adverse effects to the resident trout fishery resource?

4. USFWS/NMFS ISSUE 3: Whether and how current Project operations affect the resident trout fishery resource in the absence of passage?

5. USFWS/NMFS ISSUE 4: Whether entrainment at Project facilities is adversely affecting resident fishery resources?

6. USFWS/NMFS ISSUE 6: Whether 58 miles of habitat suitable for use by anadromous fish exists with[in] the Project?

7. USFWS/NMFS ISSUE 7: Whether access to habitat within the Project would benefit coho salmon, and if so, to what extent?

8. USFWS/NMFS ISSUE 8: Whether access to habitat within the Project would benefit Pacific lamprey, and if so, to what extent?

9. BLM ISSUE 10: Whether the seasonally high flows will help to improve riparian conditions in the J. C. Boyle bypass reach; and if so, whether and to what extent such improved riparian conditions will affect native riparian-focal bird species?

10. BLM ISSUE 11: Whether project operations adversely affect riparian resources and native riparian-focal bird species in the J.C. Boyle peaking and bypass reaches?

11. BLM ISSUE 14: Whether the seasonal high flow specified in BLM Conditions 4 A.1(c) will have a net adverse effect on redband trout spawning?

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[1] Since they were jointly developed, the USFWS' section 18 preliminary prescriptions are identical to the NMFS section 18 preliminary prescriptions. The only distinction between the two is the Secretary of Interior is responsible for filing USFWS' preliminary prescription whereas the Secretary of Commerce is responsible for NMFS' preliminary prescription.

[2] The Conservation Groups are comprised of eight separate organizations: 1) American Rivers; 2) Trout Unlimited; 3) Northcoast Environmental Center; 4) Pacific Coast Federation of Fishermen's Associations and the Institute of Fisheries Resources ("PCFFA/IFR"); 5) WaterWatch of Oregon; 6) California Trout; 7) Friends of the River; and 8) Oregon Natural Resources Council.

[3] The parties agreed to file joint post-hearing briefs as follows:

a) PacifiCorp and Siskiyou County filed a joint post-hearing brief;

b) NMFS and FWS filed a joint post-hearing brief (adopted by CDFG);

c) BLM filed a post-hearing brief;

d) The Conservation Groups filed a post-hearing brief; and

e) The Indian Tribes filed a joint post-hearing brief.

1. BLM ISSUE 16: Whether and how current Project operations affect the redband trout fishery resources, insofar, as that resource would be addressed by the River Corridor Management Condition?

2. BLM ISSUE 17: Whether and to what extent BLM's two-inch-per-hour upramp rate for the J.C. Boyle facility will affect fish resources and other aquatic organisms?

3. BLM ISSUE 19: How the flows proposed by BLM may affect the existing whitewater boating and flyfishing in the J.C. Boyle peaking reach?

Pursuant to 50 C.F.R. § 221.60, the undersigned's findings of fact with respect to each disputed issue of material fact will be final and binding on the Secretaries of Interior and Commerce in their final actions under sections 4(e) and 18 of the FPA.

## RULINGS ON PENDING MOTIONS

There are six pending motions to strike that have not yet been ruled upon. The Motions are as follows: (1) Yurok Tribe's Motion To Strike Testimony of PacifiCorp Witnesses Chane and Giorgi dated August 15, 2006; (2) Federal Fisheries Services Motion to Strike Certain Portions of the Written Direct Testimony filed by PacifiCorp dated August 16, 2006; (3) BLM's Motion to Strike Testimony of PacifiCorp Witness Forrest Olson dated August16, 2006; (4) Klamath Tribe's Motion to Strike Certain Testimony of PacifiCorp's Witness dated August 16, 2006; 5) Klamath Tribe's Motion to Strike Alteration of Direct Testimony dated, August 16, 2006; and 6) NMFS/FWS Motion to Strike Certain Portions of the Written Rebuttal Testimony Filed by PacifiCorp dated August 18, 2006. A Motion for Reconsideration of an Order Granting PacifiCorp's Motion to Supplement Rebuttal Exhibits of Ken Carlson filed by the Federal Fisheries Services, dated August 28, 2006 , is also pending. The rulings on said motions are set forth below.

### 1. Motions to Strike and Motion for Reconsideration are DENIED.

The Federal Fishery Services, the BLM, the Yurok Tribe, and the Klamath Tribe all seek to strike certain written direct and/or rebuttal testimony of all five of PacifiCorp witnesses: (1) Mr. Ian Chane addressing USFWS/NMFS Issue 8; (2) Dr. Albert E. Giorgi addressing USFWS/NMFS Issue 8; (3) Mr. Ken Carlson addressing USFWS/NMFS Issue 6; (4) Mr. Kevin Malone addressing USFWS/NMFS Issues 2 and 6; (5) Forrest Olson addressing the Tennant Method. In support of each motion, the Federal Fishery Services, the BLM, the Yurok Tribe, and the Klamath Tribe argue that the aforementioned evidence is irrelevant because it is outside of the scope of the issues agreed upon by the parties for the hearing and, in many instances, seek to introduce subjects that have previously been dismissed/withdrawn from the proceeding. The Agencies also filed a motion on August 28, 2006 , seeking reconsideration of this judge's Order Granting PacifiCorp's Motion to Supplement the Rebuttal Exhibits of Mr. Carlson.[1]

In these proceedings, "relevant, reliable, and probative evidence" is admissible at the hearing so long as the evidence is not privileged, unduly repetitious, or cumulative; and its probative value is not substantially outweighed by the risk of prejudice, confusion of the issues, or delay. See 50 C.F.R. § 221.55. Although the Federal Rules of Evidence do not apply in these proceedings, those rules do serve as guidance. Id. at § 221.55(a) (4). Under those rules, relevant evidence is broadly defined as any evidence [however slight] tending to make the existence of consequential fact more or less probable. See Fed. R. Evid. 401. The Advisory Committee Notes to Federal Rules of Evidence 401 make clear that a fact to which the evidence is directed need not be in dispute to be relevant. See 56 F.R.D. 183, 216 (1972). Those notes provide that "[w]hile situations will arise which call for the exclusion of the evidence to prove a point conceded by the opponent, the ruling should be made on the basis of such consideration as waste of time and undue prejudice (see Rule 403), rather than under any general requirement that evidence is admissible only if directed to matters in dispute." Id.

The undersigned recognizes that issues concerning the effectiveness of volitional passage, the Tennant Method, and the prospective temperature effects from the BLM 4(e) conditions were either withdrawn/dismissed from this proceeding. However, the controversial testimony and evidence contains information that bears on the issues in this case. Thus, it is relevant and admissible. This is especially true given the fact that the parties are not prejudiced by the admission of this evidence. The parties have been aware of the information for sometime now (for instance the United States Geological Survey Report, dated September 20, 2005, entitled "JC Boyle Bypass Segment Temperature Analysis" was received by PacifiCorp from the government in discovery). Further, the parties received the written direct/rebuttal testimony in advance of the hearing, they had an opportunity to cross-examine the witness, and they introduced countervailing evidence at the hearing. Therefore, the motions to strike testimony filed by the Federal Fishery Services, the BLM, the Yurok Tribe, and the Klamath Tribes are **DENIED**.

## 2. Klamath Tribes Motion to Strike Errata of Mr. Malone's Direct Testimony is DENIED.

Klamath Tribes moved to strike PacifiCorp's Errata Regarding the Direct Testimony of Kevin Malone, arguing that the change to the testimony was substantive and impermissible.

With respect to discovery, the regulations place continuing obligations on the parties to promptly amend or supplement any prior response to discovery upon learning that the response is incomplete or incorrect when made. See 50 C.F.R. § 221.42(a). The regulations are silent whether the same rule applies with respect to written direct testimony. Recognizing that a rule requiring a party to go forward with evidence that is known to be incomplete or incorrect would be an exercise in futility, PacifiCorp's Errata is **GRANTED**, and Klamath Tribes' motion to strike is **DENIED.**

## PRELIMINARY FINDINGS OF FACT

The Findings of Fact on the disputed issues of material fact are based upon a complete review of all evidence of record. The facts are as follows:

### A. BACKGROUND

1. Four of the five Project dams are at issue in this trial-type expedited proceeding conducted under section 241 of EPAct and 50 C.F.R. Part 221: a) Iron Gate Dam; b) Copco I Dam; c) Copco II Dam; and d) J.C. Boyle Dam and Diversion or the Klamath Hydroelectric Project. (*Entire Administrative Record*).

Iron Gate development consists of a dam, reservoir, and an 18 megawatt ("MW") powerhouse. It was constructed in 1962, and is the farthest downstream development in the Project area located at river mile ("RM") 190 in Siskiyou County , Ca. The Iron Gate development also includes Iron Gate Fish Hatchery, which was constructed at the same time as the power generation facility. The Iron Gate Fish Hatchery releases fall-run Chinook

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[1] The Federal Fisheries Services also sought to strike portions of Mr. Malone's testimony addressing USFWS/NMFS Issue 9. Since that issue has been withdrawn and removed from this proceeding, the motion to strike is dismissed as moot.

1. salmon, Coho salmon, and winter steelhead trout under the terms of its existing FERC hydroelectric license. (*KTr-CWH-Ex. 1 at 8-9; KTr-CWH-Ex. 5 at 11; KTr-CWH-Ex. 20 at 79*).

2. Copco I development consists of a dam and a 20 MW power plant. It is the first development that was constructed in the Project area in 1917. Copco I is located upstream from Iron Gate Dam at RM 198.6 in Siskiyou County , Ca. (*KTr-CWH-Ex. 1 at 8-9; KTr-CWH-Ex. 5 at 11*).

3. Approximately a quarter-mile downstream from Copco I at RM 198.3 in Siskiyou County , Ca is the Copco II development. Copco II was constructed in 1925, and diverts water to a 5,900 foot

water conveyance system serving a 27 MW power plant. Because it has very minimal active storage capacity, Copco II powerhouse operates as a "slave" to Copco I. (*KTr-CWH-Ex. 1 at 8-9; KTr-CWH-Ex. 5 at 11*).

4. The J.C. Boyle development was constructed in 1958 and consists of a dam, reservoir, and powerhouse. It is located farthest upstream at RM 224.7 and the 80 MW powerhouse is located several miles downstream at RM 220.4, both in Southern Oregon. (*KTr-CWH-Ex. 1 at 8-9*).

## A. USFWS/NMFS DISPUTED ISSUES OF MATERIAL FACT

### *1. FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 2(A)*

2A-1. The selected anadromous stocks of fish at issue in this proceeding are: a) wild Chinook salmon; b) Coho salmon; c) steelhead trout; and d) Pacific lamprey. (*Entire Administrative Record*).

2A-2. An anadromous fish is a fish that migrates to and from the ocean and spawns in its river of origination in order to complete its life cycle. ( *Aug. 23, 2006 Tr. at 26:7-11*).

#### a. Historically, Anadromous Fish were distributed above Iron Gate Dam

2A-3. While the precise geographic distribution is uncertain, historical records and tribal accounts demonstrate that anadromous fish (Chinook salmon, Coho salmon, and steelhead trout) migrated past the present site of Iron Gate Dam which provided a viable ecosystem and habitat for those stocks of fish. (*Aug 24, 2006 Tr. at 11:1-6, 26:21 - 27:7, and 68:10-14; NMFS/FWS-Issue 2A-Garza-Ex. 7 at 1; NMFS/FWS-Issue 2C-Hooton-Ex. 1 at 2:1-17; NMFS/FWS-Issue 6 Hamilton-Ex. 1 at 3:1-14; NMFS/FWS-Issue 6-Hamilton-Ex. 10 at 5; NMFS/FWS-Issue 16-Hamilton-Ex. 16; NMFS/FWS-Issue 8 Hamilton-Ex. 6 at 6-7;HVT-Franklin-Ex. 1 at 2:3-9; 2:20 to 3:5; HVT-Franklin-Ex. 6;CDFG Pisano Exhibit 1 at 6:10-15; Yurok Tribe's Direct Testimony, Witness: Cleveland R. Steward, Issue: NMFS/FWS 8 ("Yurok-Steward 8 Direct") at 3:18-4:8; KTr-CWH-Ex. 5 at 10; NMFS/FWS PFF 2A.1 and 8.2; NGO PFF 2A.1; Indian Tribes PFF 2A.2*).

2A-4. Chinook salmon (both spring and fall-run) were abundant in the tributaries of Upper Klamath Lake , including Jenny, Fall, and Shovel Creeks, as well as the Wood, Sprague, and Williamson rivers. (*NMFS/FWS-Issue 2A-Garza-Ex. 7. at 5-6; NMFS/FWS-Issue 2C-Hooton-Ex. 17 at 20; NGO Ex. 3 at 6; NGO Ex. 19; KTr-CWH-Ex. 1 at 5-6; KTr-CWH-Ex. 4 at 225; KTr-CWH-Ex. 5 at 13-15; KTr-CWH-Ex. 18 at 5-14*).

2A-5. Steelhead trout utilized habitat in Spencer, Shovel, Fall, Camp, and Scotch Creeks, and they were likely distributed as far upstream as Link River . (*NMFS/FWS-Issue 2A-Garza-Ex. 7 at 6-7; KTr-CWH-Ex. 1 at 5-6; KTr-CWH-Ex. 5 at 15-16; KTr-CWH-Ex. 18 at 5-14; KTr-CWH-Ex. 20 at 79*).

2A-6. Coho salmon spawned in Fall Creek. (*Aug. 24, 2006 Tr. at 273:11-274:8; NMFS/FWS-Issue 2A-Garza-Ex. 7 at 7-8;NMFS/FWS-Issue 8-Hamilton-Ex. 1 at 4:3-13; NMFS/FWS-Issue 8-Hamilton-Exhibit 6 at 6-7;NMFS/FWS-Issue 8-Hamilton-Ex. 11 at 236; Yurok-Steward 8 Direct at 3:20- 4:8; Yurok Tribe- Steward 8 Rebuttal at 4:12 to 5:8; KTr.-CWH-Ex. 4 at 216; KTr-CWH-Ex. 5 at 16; NMFS/FWS-Issue 7-Simondet-Ex. 5 at 117; NMFS/FWS-Issue 7-Simondet-Ex. 1 at 4:7-18; NMFS/FWS-Issue 7-Williams-Ex. 1 at 5:8-6:4; KTr-CWH-Ex. 4 at 216-224; Indian Tribes PFF 7.1*).

2A-7. There is insufficient evidence in the record to determine whether Pacific lamprey historically were distributed above the present site of Iron Gate Dam. (*Aug. 24, 2006 Tr. at 121:2-122:1, 124:2-125:19, 250:23-252:13; 253:13-23; 255:8-13; PAC-Chane-R-1 at 2:23-3:1; CDFG Pisano Ex. 1 at 13:8-9; KTr-CWH-Ex. 5 at 16-17*). However, the evidence does show that Pacific lamprey do occur in the Lower Klamath River , below Iron Gate Dam.[1]

### b. Project Dams Have Changed the Migratory Behavior of Anadromous Fish in the Klamath River

2A-8. The construction of the Project dams has changed the migratory behavior of anadromous fish in the Klamath River System, blocking upstream migration and limiting those fish to habitat below the dam. (*Aug. 24 Tr. at 11:2-12:9; NMFS/FWS-Issue 2C-Hooton-Ex. 1 at 2; NMFS/FWS-Issue 2A-Garza Ex. 1 at 3; NMFS/FWS-Issue 2A-Garza Ex. 7 at 1; KTr-LKD-Ex.-13, at 1; NMFS/FWS-Issue 2C-Hooton- Ex. 17, at 20; KTr-CWH-Ex. 3*).

2A-9. No anadromous fish presently inhabit the waters above Iron Gate Dam. (*Id).*

2A-10. Migration is one of several defining life history characteristics of anadromous fish, especially salmonids. (*NMFS/FWS-Issue 2A-Garza-Ex. 1 at 2:8-3:25; NMFS/FWS-Issue 2A-Garza-Ex. 6 at 6; NMFS/FWS-Issue 2A-Garza-Ex. 8 at 13; NMFS/FWS-Issue 2A-Garza-Ex. 4 at 3; Aug. 24, 2006 Tr. at 11:24 -15:9; NMFS/FWS 2A.7*).

2A-11. Today, wild anadromous fish (Chinook salmon, Coho salmon, and steelhead trout) can only migrate up to the base of Iron Gate Dam, using nearby tributary and main stem habitat to spawn. (*Aug 24, 2006 Tr. at 10:18 to 11:1; 17:15-18; NMFS/FWS-Issue 2A-Garza-Ex. 1 at 4:4 to 5:7; NMFS/FWS-Issue 2A-Garza-Ex. 7 at 1-2; NMFS/FWS-Issue 2A-Curtis Rebuttal Testimony Ex. 1at 2:1-16; CDFG Pisano Exhibit 1 at 4:20 to 5:28; CDFG Pisano Exhibit 4; HVT, Franklin, Ex. 1 at 2, lines 10-17; Yurok-Steward 8 Direct at 3:1-9; Steward Yurok Ex 5; KTr.-LKD-Ex. 13; see also NMFS/FWS PFF 2.A.2 and 8.2; NGO PFF 2A.2; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 2*).

2A-12. If access was provided, anadromous fish would migrate past Iron Gate Dam. (*Aug. 24, 2006 Tr. at 11:12-23; 170:2-17; 273:11-274:8; NMFS/FWS-Issue 2A-Garza-Ex. 1 at 2-3, 5:3-4; NMFS/FWS-Issue 2A-Garza-Ex. 6 at 6; NMFS/FWS-Issue8-Moser-Ex. 1 at 8:4-9:16 and 13:11-17; HVT-Franklin-Ex. 1 at 3:10-20 and 5:3-6; NGO Ex. 3, at 5:22-23, 7:11-9:20 and 13:11-17; CDFG-Pisano-Ex. 1 at 10:12-11:8; NGO PFF 2A.5; see also Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 3*).

### c. The Habitat above Iron Gate Dam is Similar to the Habitat in Some Tributaries below Iron Gate Dam

2A-13. Habitat below Iron Gate Dam, like habitat in the Project-bounded area, has variable suitability across locations, time, and life stages. (*Aug. 24 at 283:25-20*). Anadromous salmonids have used downstream habitat that is no more favorable than that located above Iron Gate Dam. (*CDFG Pisano Ex. 1 at 4:18-51, 7:10-9:7 (Coho in other parts of the Klamath system occupy water with temperatures in excess of 26$^{o}$ C), 9:8-10:12 (spawning in degraded streams); Yurok-Hillemeir Direct Testimony-NMFS/FWS Issue 7 at 4:24-5:3; KTr-CWH-Ex 4 at 219 (juvenile Coho salmon observations in the main stem Klamath River where temperatures exceed 20$^{o}$C)*).

2A-14. Warm water temperatures in the summer and cold water temperatures in the winter will not preclude anadromous fish from successfully utilizing habitat above Iron Gate Dam. (*NMFS/FWS-Issue 2A-Garza-Ex. 1 at 2:8-3:25; NMFS/FWS-Issue 2A-Garza-Exh. 6 at 6; NMFS/FWS-Issue 2A-Garza-Ex. 8 at 13; NMFS/FWS-Issue 2A-Garza-Exh. 4 at 3; Aug. 24, 2006 Tr. at 11:20 -15:9*).

2A-15. The findings of fact in USFWS/NMFS Issue 2B addressing disease is incorporated herein.

2A-16. The findings of fact in USFWS/NMFS Issue 6 addressing the mileage of suitable habitat within the Project-boundaries are incorporated herein.

2A-17. The amount of delay associated with anadromous fish migrating above Iron Gate Dam is uncertain. (*c.f. Aug. 23, 2006 Tr. at 224:18- 227:17, 237:7-20*; *226:20-25; Aug. 24, 2006 Tr. at 42-11:15, 54:10-55:2; NMFS/FWS-Issue 7-Simondet Rebuttal, at 7:7-8; KTr Huntington Rebuttal Ex. 6, at 9:7-20, 11:18-19, 13:16 to 14:16; KTr LKD Rebuttal Ex. 15, at 3:11-4:2, 4:20-5:12; KTr CWH Rebuttal Ex. 6, at 3:22-4:2; NMFS/FWS-Issue 2-Hamilton Rebuttal, Ex. 1 at 2:18 to 3:20; NMFS/FWS-Issue 6-Hamilton Rebuttal at 6:7-24; NMFS/FWS-Issue 2-Hamilton Rebuttal Ex. 8; KTr LKD Rebuttal Ex. 15, at 3:8-5:12; KTr CWH Rebuttal Ex. 6, at 4:2-10; Indian Tribes PFF 2A.8, 2A.10, 2A.11*).

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[1] The issues concerning whether Pacific lamprey stocks suitable to conditions above Iron Gate Dam are available, and whether Pacific lamprey would benefit from access to habitat within the Project area are discussed in great detail below in response to USFWS/NMFS Issue 8.

2A-1.

2A-2. Likely mortality rates of juvenile anadromous salmonids migrating through reservoirs will vary widely among species, and will depend largely on size (larger migrants will do better) of the migrating fish. Thus, small sub-yearling fall Chinook are likely to experience lower passage success than larger Coho, yearling Chinook or steelhead out-migrants. (*KTr-CWH Rebuttal Ex. 6 at 2:6-17, 3:10-14; Aug. 25, 2006 Tr. at 64:7- 65:8, 65:14-22; Indian Tribes PFF 2A.12*).

2A-3. Predation of outmigrating salmonids above Iron Gate Dam is likely to be low. (*NMFS/FWS-Issue 2 Hamilton-Rebuttal Ex. 4 at 224-225*; *Aug. 25, 2006 Tr. at 64:7 to 65:8, 65:17-22*).

2A-4. The fact that anadromous fish currently complete life cycles through eight dams and reservoirs on the Columbia and Snake rivers, and historically completed life cycles through Upper Klamath Lake, provides strong evidence that anadromous salmonids could also migrate through the reservoirs created by Project facilities. (*Aug. 24, 2006 Tr. at 26:21-27:7*; *KTr FAE Rebuttal Ex. 7, at 2:2-17; KTr FAE Ex. 32, at 5:21-25; Indian Tribes PFF 2A.9*).

### a. There are Stocks of Fish Suitable to Conditions above Iron Gate Dam

2A-5. The NMFS and the USFWS (collectively referred to as "Federal Fishery Services") seek to, among other things, restore native anadromous fish species to their historical habitats above Iron Gate Dam. See *NMFS/FWS-Issue 7-White-Ex. 14, Attachment A, at A-9 through A-12.; Yurok-Hillemeir Direct-Issue 7 at 6*).

2A-6. The record shows that those anadromous fish proximate to Iron Gate Dam are genetically most similar to those populations that existed in the Upper Klamath basin prior to the construction of the dams. (*NMFS/FWS Issue 2A-Garza-Ex. 1 at 4:1-5:7 and 6:1-3; NMFS/FWS-Issue 2C-Hooton-Ex. 1 at 2:19-3:11 , 4:12-5:10 , and 6:1-3*). The evidence shows that these stocks of fish have genetic traits suitable for reintroduction into the upper Klamath River basin . ( *Id. ; see also NGO PFF 2A.3*).

2A-7. There are numerous examples from other streams and rivers systems that provide persuasive evidence that anadromous fish possess the capacity and capability to successfully adapt and colonize new habitat or recolonize historic habitat, including streams or river systems with lakes or reservoirs. (*NMFS/FWS-Issue 2A-Garza-Ex. 1 at 2:8-3:25; NMFS/FWS-Issue 2A-Garza-Ex. 6 at 6; NMFS/FWS-Issue 2A-Garza-Ex. 8 at 13; NMFS/FWS-Issue 2A-Garza-Ex. 4 at 3; NGO Ex. 3 at 12:13-13:9; NGO Ex. 20; HVT, Franklin, Ex. 1 at 4:-5:2; CDFG Pisano Ex. 1 at 10:20-22; NMFS/FWS PFF 2A.8*).

2A-8. The record evidence shows that Chinook salmon, Coho salmon, and steelhead have varying life histories and would use differing areas of habitat within the Project at somewhat different times of year as they did prior to construction of the Project. ( *Aug. 24, 2006 Tr. at 212:5-10; HVT-Franklin-Ex. 2 at 2:20 -26; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 3:1-14; NMFS/FWS-Issue 6-Hamilton-Rebuttal-Ex. 1 at 1:22 -25, 4:21-5:11* ).

### i. ***Stocks of fall-run Chinook salmon Suitable to Conditions above Iron Gate Dam are Available to use Prescribed Fishways***

2A-9. Chinook salmon historically were and continue to be the most abundant anadromous fish in the Klamath basin. In the last 25 years, annual runs of Chinook salmon have ranged between 30,000 and 240,000. Historically, the runs were much higher. (*KTr-CWH-Ex. 4 at 225*).

2A-10. In the Klamath River basin , there are at least two distinct Chinook salmon populations: the fall-run and spring-run. The runs are named for the season of entry and migration up the river, which do not necessarily coincide with the spawning time. (*KTr-CWH-Ex. 4 at 225*).[1]

2A-11. The majority of adult fall-run Chinook salmon enters the river to spawn in early September and continues through late October. Although the optimal temperature for adult Chinook salmon is below 14$^{o}$ C, they can withstand temperatures exceeding 20$^{o}$ C for short periods of time. It takes approximately 2 to 4 weeks after entering the river to reach the spawning grounds, where the adult fall-run Chinook salmon spawns and dies. This spawning period coincides with the declining temperatures, which by early November are within the optimal range for the developing embryos (i.e., 4-12$^{o}$ C). (*KTr-CWH-Ex. 4 at 225-26*).[2]

2A-12. The record evidence shows that juvenile fall-run Chinook salmon begin outmigration to the ocean as early as January and migration is complete by the beginning of April. Juvenile Chinook salmon are thermally tolerant and can withstand temperatures exceeding 20$^{o}$ C provided there is abundant food, thermal refugia (i.e., areas of cool water where the fish can seek refuge when the water temperature becomes to warm), and other conditions are not stressful. ( *Aug. 24, 2006 Tr. at 202:9-12, 212:5-10*; *KTr-CWH-Ex. 4 at 226-27; KTr-LKD-Ex. 13 at 6, 7-8*).

2A-13. Historically, the success of fall-run Chinook salmon in the drainage basin above Iron Gate Dam was associated with the thermally moderate spawning and incubation environments (which included spring-fed streams and/or areas of strong groundwater input). In addition, the warming, nutrient-rich waters also provided excellent habitat during the spring for sub-yearling Chinook. (*NGO Ex. 3 at 6; NGO Ex. 19*).

2A-14. The fall-run Chinook salmon in Bogus and Scott Creeks are most suitable to conditions above Iron Gate Dam. (*KTr-CWH-Ex. 13 at 17; NGO Ex. 3 at 7; NGO Ex. 19*).

## 1. *FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 2(C)*

2C-1. Resident rainbow/redband trout are distinct from anadromous steelhead trout. Although the two species are similar (both are designated *O. Mykiss*), the life histories are different. (*Aug. 22, 2006 Tr. at 160:2-15; Aug. 24, 2006 Tr. at 42:16-43:13, 43:5-13; CDFG-Chesney-Ex. 1 at 4:18-20; see also NMFS/FWS PFF 2C.1; NGO PFF 2C.3; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 21-22).* After hatching and early rearing in the riverine habitat, juvenile steelhead trout out migrate to the ocean where they mature into adults before returning to their riverine habitat for spawning. By contrast, resident rainbow/redband trout spend all of their life stages in the Klamath River . (*Aug. 24, 2006 Tr. at 42:16-43:13; PAC-Ols-D-1 at 18:22-23; PAC-Carl-D-3 at 2:18; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 21-22*).

2C-2. Historically, anadromous steelhead trout extended up to and used tributaries of Upper Klamath Lake . (*FOF 2A-3; KTr-CWH-Ex. 5 at 15-16*). The close similarities between anadromous steelhead trout and resident rainbow/redband trout suggest these species historically co-existed. ( *Aug. 23, 2006 Tr. at 268:8 -11; NMFS/FWS-Issue 2C-Hooton-Ex. 1 at 2:3-17; CDFG-Dean-Ex. 1 at 4:8-14; HVT-Franklin—Ex. 1 at 6:1-10; KTr-CWH-Ex. 6 at 8; NMFS/FWS PFF 2C.2, 2C.7-2C.9*). The distribution and resistance of rainbow/redband trout in Upper Klamath Lake to *C. Shasta* lends additional support that the two species co-existed and intermingled prior to the construction of Copco I Dam in 1917. ( *Id*. ).

2C-3. The erection of Iron Gate Dam necessarily changed the migratory behavior of anadromous fish in the Klamath River System, limiting them to habitat below the dam. (*FOF 2A-2*). Today, anadromous steelhead trout only migrate to the base of Iron Gate Dam, using nearby tributaries and main stem habitat to spawn. (*FOF 2A-3*). However, if access was provided, steelhead would migrate past Iron Gate Dam into the upper Klamath River basin . (*FOF 2A-4*).

2C-4. The habitat for the anadromous fish has been significantly reduced subsequent to the construction of the Project dams. ( *Aug. 24, 2006 Tr. at 11:15-19*).

2C-5. Although environmental conditions and habitat above Iron Gate Dam have changed, anadromous fish are resilient and can adapt to most existing environmental conditions and habitat. ( *Aug. 24, 2006 Tr. at 0012:10-13*; 0020:4-6).

2C-6. For instance, steelhead trout have the genetic ability to recolonize and use new habitat. (*Aug. 24 Tr. at 0011:2-0012:13; NMFS/FWS-Issue 2A-Garza-Ex. 1 at 2:8 to 3:25; NMFS/FWS-Issue 2A-Garza-Ex. 6 at 6; NMFS/FWS-Issue 2A-Garza-Ex. 8 at 13; NMFS/FWS-Issue 2A-Garza-Ex. 4 at 3; NMFS/FWS-Issue 2-Curtis Rebuttal at 4:15-17; CDFG-Dean-Ex. 1 at 3:8-17; CDFG-Pisano-Ex. 1 at 5:15-28 and 8:14-9:7; NGO Ex. 3 at 12:3-21; HVT-Franklin-Ex. 8; HVT-Franklin-Ex. 2 at 2:20-26; see also NMFS/FWS PFF 2A.3; Indian Tribes PFF 2A.3; NGO PFF 2A.7).*

2C-7. Resident trout have the genetic capacity to adopt anadromy and some may outmigrate to the ocean if passage exists. ( *Aug. 23, 2006 Tr. at 196:16-24; KTr-CWH-Ex. 8 at 22-25; NGO PFF 2C.4*).

2C-8. While residualization (remain in freshwater) is common in juvenile hatchery steelhead trout, there is an absence of evidence of high levels of residualization in juvenile naturally-spawned steelhead trout. (*Aug. 23, 2006 Tr. at 200:13-14; NGO-Ex. 3, at 11:5-7; HVT-Franklin Ex. 1 at 5:18-22; KTr-FAE Ex. 32 at 7:3-22; NMFS/FWS PFF 2C.4, 6*).

2C-9. There are no scientific studies of the Klamath basin demonstrating that reintroduction of anadromous steelhead trout would detrimentally affect the genetic makeup of the resident trout fishery. ( *Aug. 23, 2006 Tr. at 208:18-23; NGO-Ex. 3, at 11:5-7; NGO PFF 2C.7; Indian Tribes PFF 2C.7, 2C.10*). The potential for residualization is largely dependent on environmental conditions in the river and ocean. ( *Aug. 23, 2006 Tr. at 196:12-197:3; NMFS/FWS-Issue 2C-Hooton-Ex. 1 at 4:12 -16; Indian Tribes PFF 2C.5*).

2C-10. There is little information on the nature of any competitive interactions between steelhead and resident trout in the Klamath basin. (*NGO Ex 3, Testimony of Dr. R.. Williams at 11:13 -17; KTR CWH Ex 01 at 30; NMFS/FWS PFF 2C.11*). However, research does suggest that in some circumstances, resident trout may have a competitive edge over steelhead trout. (*Testimony of Dr. R.. Williams at 11:13 -17; KTR CWH Ex 01 at 30; NMFS/FWS PFF 2C.12*).

2C-11. There are many examples from nearby river systems in the Pacific Northwest that show wild anadromous steelhead trout and resident rainbow/redband trout can co-exist and maintain abundant populations without adverse consequences. The Deshutes River in Oregon , the Yakima River in Washington , and the river systems in Idaho are examples. (*NMFS/FWS-Issue 2C-Hooten-Ex. 1 at 4:8-11; KTR-Espinoza-Issue 2 Direct at 7:3-11; NGO Ex. 3 at 11:13 -16; Indian Tribes PFF 2C.4; NGO PFF 2C.8*).

2C-12. The risk of residualization of rainbow/redband trout may be minimized through adaptive management. (*KTr.-Huntington-Ex. 1; NGO Ex. 3 at 11:8-12*).

## *2. FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 3*

3-1. The Project contains various habitat areas for resident trout including: a) the J.C. Boyle bypass reach which extends 4.3 miles from J.C. Boyle Dam to the J.C. Boyle powerhouse; 2) the J.C. Boyle peaking reach extending 17.3 miles and traversing the California/Oregon state line; 3) a 1.4 mile section between Copco II diversion dam and Iron Gate reservoir; and 4) other reservoirs within the Project reach. (*PAC-Ols-D-Ex. 1 at 20:20-22:2; CDFG-Dean-Ex. 1 at 4:19-25; NGO-Ex. 14 at 4; NMFS/FWS-Issue 3-Snedaker-Ex. 1 at 3:24-4:6, 6:15-18; CDFG-Dean-Ex. 1 at 4:19-26, 5:22-6:4; NGO-Ex. 2 at 19:7-9*).

3-2. The 1.4 mile section of river between the Copco II Diversion Dam and Iron Gate Reservoir contains marginal trout habitat. (*PAC-Ols-D-Ex. 1 at 21:21-23; PacifiCorp PFF 200; Appendix to National Marine Fisheries Service and United States Fish and Wildlife Service's Joint Post-Hearing Reply Brief at 20*).

3-3. There are a limited number of trout in the J.C. Boyle, Copco, and Iron Gate Reservoirs. (*PAC-Ols-D-Ex. 1 at 22:4-5; PacifiCorp PFF 201; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 32*).

3-4. Prior to the construction of the dams, redband trout within the Project area belonged to a single, large, intermixing population throughout the Klamath River Basin . (*NGO-Ex. 2 at 13:4-9; NGO-Ex. 14 at 4; NMFS/FWS PFF 3.1; NGO PFF 3.2; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 29 and 34*).

3-5. Although the trout sport fishery is robust in the Upper Klamath Basin , the juvenile trout from above J.C. Boyle Dam in the Oregon portion of the Klamath River are actually decreasing.

(*NMFS/FWS-Issue 3-Hooton-Ex. 0A at 4:7-8, 6:15-17; Hooton-BLM-Ex. 4 at 22*).

3-6. Life history strategies (such as spawning above the J.C. Boyle Dam) are denied to the resident trout population below the dam. (*NMFS/FWS-Issue 3-Hooton-Ex. 0A at 6:17-20; Hooton-BLM-Ex. 4 at 22; NGO-Ex. 2 at 14:10-12, 17:15-18:2, 19:4-18; CDFG Dean Ex. 1 at 5:1-2; Aug. 23, 2006 Tr. at 161:13-162:17; NMFS/FWS PFF 3.5*).

3-7. Migration is one of several defining life history characteristic of trout. ( *Aug. 23, 2006 Tr. at 166:23-168:7; CDFG Dean Ex. 1 at 4:19 -26; NGO-Ex. 14 at 4; NGO PFF 3.3*). Their ability to migrate is one of several evolutionary advantages contributing to survival of trout in the Klamath River for millions of years through dramatic environmental changes. ( *Id. )*.

3-8. The Project restricts migration of resident fish within the main stem and into and out of tributaries. (*NGO Ex. 2 at 19:12-14*). Iron Gate , Copco I, and Copco II Dams do not have fishways and currently block all upstream fish passage. Thus, the stocks above Iron Gate are isolated from counterparts in the lower basin. Further, the stocks between each of Iron Gate , Copco I, and Copco II Dams are similarly isolated. (*NGO PFF 3.5; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at35*).

3-9. J.C. Boyle Dam has a fishway for migration of rainbow/redband trout. (*NGO PFF 3.6*). The current fish screen and ladder at the dam do not meet current state and federal fish passage criteria and impairs upstream migration. (*PAC-MAL-D-Ex. 4 at 7-31; NMFS/FWS PFF 3.8 and 3.9; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 32*).

3-10. The effectiveness of the fishway has declined by 98% since initial operation of the fishway in 1959. (*NGO Ex. 17 at 379; NGO Ex. 2 at 20:19 -20 NMFS/FWS-Issue 3-Snedaker-Ex. 0 at 2:11 -12; NMFS/FWS-Issue 3-Snedaker-Ex. 8 at 8, Hooton-BLM-Ex. 4 at 11; NGO-Ex. 2 at 14:4-10; NGO-Ex. 17 at 3; NMFS/FWS PFF 3.7; NGO PFF 3.6*). A rock cascade that starts at the entry of the fishway and extends downstream may be the cause for such limited use. ( *Aug. 23, 2006 Tr. at 149:22-152:15; NGO PFF 3.6*).

3-11. PacifiCorp has agreed to improve the channel configuration below the fishway so that upstream migration of trout will no longer be impeded. (*PAC-Ols-R- Ex. 1 at 25:14*).

3-12. Improvements in efficiency to the fishway at JC Boyle Dam would result in significant trout population migration above the dam over time. ( *Aug. 23, 2005 Tr. at 176:17-23; NMFS/FWS PFF 3.11*).

3-13. Spencer Creek is a highly productive spawning and rearing habitat for rainbow/redband trout. (*NGO Ex. 16 at 3; NMFS/FWS PFF 3.7*). The stock of rainbow/redband trout in the bypass and peaking reaches below JC Boyle Dam is denied the use of Spencer Creek and other suitable habitat upstream of the J.C. Boyle Dam. (*NMFS/FWS PFF 3.7*).

3-14. Historically, trout in the Copco II area would have moved up and downstream to access needed habitat. To now meet essential life history needs, trout move further downstream over Copco II Dam and utilize either the bypass reach or other tributaries of Iron Gate Reservoir. However, once they exit Copco II they cannot return as there are no upstream passage facilities. Thus, the trout population is not self-sustaining. (*NMFS/FWS-Issue 3-Snedaker-Ex. 1 at 6:15-21; NMFS/FWS- Issue 3-Snedaker-Ex. 16 at 127; NMFS/FWS-Issue 4- Hamilton-Ex. 7 at 1; NMFS/FWS PFF 3.13*).

3-15. Downstream migration of rainbow/redband trout is also adversely impacted because of the Project dams. This is due to the hydraulics at the Project dams and mortality related to unscreened flow resulting in fish passage through Project dam turbines. (*NMFS/FWS-Issue 3-Snedaker Ex. 16 at 126-130; NMFS/FWS-Issue 3-Hooton Ex. 0A at 7:10-9:14; BLM-Hooton-Ex. 3 at 7-8*).

3-16. The Project's limitation on riverine migration may have reduced the genetic diversity of the remaining stocks within the Project reaches. (*NGO Ex. 2 at 3:6-10, 21:1-9; NGO Ex. 14, Figure 3 at 103; NGO PFF 3.8; NMFS/FWS PFF 3.3-3.5*).

## ***3. FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 4***

4-1. J.C. Boyle, Copco, and Iron Gate Dams support populations of resident fish including native and non-native species. Popular sport fisheries occur in each reservoir targeting primarily bass, perch, and catfish. Rainbow trout, resident lamprey, and Lost River/shortnose sucker fish also occur in the reservoirs. (*NMFS/FWS-Issue 4- Hamilton-Ex. 12 at 1*).

4-2. It is estimated that "several tens of thousands of resident fish" are annually entrained at "each of the Projects" facilities. (*NMFS/FWS-Issue 4-Hamilton-Ex. 12, at 28; NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 6:7-9; NMFS/FWS-Issue 4-Hamilton-Ex. 14 at 1; NMFS/FWS-Issue 4-Hamilton-Ex. 10 at 3; NMFS/FWS-Issue 4-Hooton-Ex. 14, at 112; NMFS/FWS-Issue 4-Hooton-Ex. 1, at 5:3-5; HVT-Steward-Ex. 1 at 3:19-20; NMFS/FWS PFF 4.5; Indian Tribes PFF 4.1*).

4-3. Entrainment occurs when fish are drawn into Project facilities, such as power canals, turbines, and tailraces. When drawn into turbine intakes, fish can be subject to injury and mortality. (*NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 4:22-25; NMFS/FWS-Issue 4-Hamilton-Ex. 5, at 1; NMFS/FWS PFF 4.1; Appendix to Reply Brief of PacifiCorp and Siskiyou County , at 37*).

### **ii. *Minimal stocks of spring-run Chinook salmon Suitable to Conditions above Iron Gate Dam are Available to use Prescribed Fishways***

2A-15. Today, wild spring-run Chinook salmon have been significantly reduced. The vast majority of Chinook salmon is fall-run. (*KTr-CWH-Ex. 4 at 225 and 229; NGO Ex. 3 at 8-9; NGO Ex. 19*).

2A-16. Habitat degradation is the primary cause of the decline of spring-run Chinook salmon in the Klamath system. (*KTr-CWH-Ex. 4 at 229-30*).

2A-17. Like Coho salmon, spring-run Chinook salmon has a stream-type life history (meaning that the juveniles remain in the stream for one year or more before outmigrating to the ocean). (*KTr-CWH-Ex. 4 at 229*).

2A-18. Unlike adult fall-run Chinook salmon that spawn soon after reaching their spawning habitat, adult spring-run Chinook salmon enter the river before they are ready to spawn and reside in deep pools for 2-4 months before they spawn. (*KTr-CWH-Ex. 4 at* 229).

2A-19. Adult spring-run Chinook salmon enter the Klamath system to spawn in April through July and aggregate in deep pools where they hold until September. Water temperatures below $16^{O}$ C are generally regarded as optimal for adult spring-run Chinook salmon. However, in Salmon River located below Iron Gate Dam, temperatures of pools holding spring-run Chinook salmon often exceed 20$^{o}$ C. (*KTr-CWH-Ex. 4 at 229*).

2A-20. Spawning peaks in October, juvenile Chinook salmon emerge between March and July, rear through the summer and fall, and migrate to the ocean in the following spring. (*KTr-CWH-Ex. 4 at 229*).

2A-21. The record evidence demonstrates that the Lower Williamson and Wood Rivers provide the best near term potential sites for producing spring-run Chinook salmon above Iron Gate Dam. The North Fork Sprague also has significant potential assuming effective habitat rehabilitation occurs. (*NGO Ex. 3 at 7-8; NGO Ex. 19*).

2A-22. However, finding suitable candidates of wild spring-run Chinook salmon might be problematic. Currently, the spring-run Chinook salmon in the Salmon River provide the only alternative for using wild fish in the reintroduction effort but that stock of Chinook salmon is also not highly abundant. (*KTr-CWH-Ex. 13 at 17-18; NGO Ex. 3 at 8-9; NGO Ex. 19*).

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[1] Some literature indicates that there are three populations of Chinook salmon in the Klamath River Basin : 1) fall-run; 2) late fall-run; and 3) spring run. (*KTr-CWH-Ex. 4 at 225*).

[2] Historically, fall-run Chinook salmon entered the river to spawn in July, peaked in August, and they were largely completed by September. Today, the time the fall-run Chinook salmon enter the river to spawn has shifted by 2 to 4 weeks presumably because the high temperatures in the main stem Klamath River has become unfavorable for the adult salmon or because of excessive harvest of early run fish. (*KTr-CWH-Ex. 4 at 225-26*).

2A-1.

2A-2. Further, deteriorating water temperatures in the summer are likely to block migration of adult spring-run Chinook salmon before they reach suitable holding or natal areas. (*KTr-CWH-Ex. 13 at 11*).

**ii.** ***Stocks of Coho Salmon Suitable to the Conditions above Iron Gate Dam are Available to use Prescribed Fishways***

2A-3. The findings of facts in USFWS/NMFS Issue 7 addressing Coho salmon are incorporated herein.

2A-4. The evidence shows suitable stocks Coho salmon are available to used prescribed fishways above Iron Gated Dam. (*FOF 7-1 through 7-15*).

**iii.** ***Stocks of Steelhead Suitable to the Conditions above Iron Gate Dam are Available to use Prescribed Fishways***

2A-5. Steelhead trout are the most widely distributed anadromous salmonids in North America . They have been able to succeed in a wide variety of habitat because of their keen ability to adapt to changing conditions, higher physiological tolerance than other salmonids, and ability to spawn more than once. This variability ensures that runs of steelhead can continue through periods of adverse conditions. (*KTr-CWH-Ex. 4 at 230*-31).[1]

2A-6. Adult steelhead trout enter the Klamath River to spawn from August to February. Spawning, which takes place any time from January through April, peaks in February and March. (*Kr-CWH-Ex. 4 at 231*).

2A-7. Juvenile steelhead trout emerge in the spring and most spend approximately two years in freshwater before outmigrating to the ocean. Although juvenile steelhead trout demonstrate a preference for cold water temperatures (of 15-19$^{o}$ C), they can withstand incrementally higher temperatures exceeding 22$^{o}$ C provided food is abundant and by finding thermal refuge or by living in areas where nocturnal temperatures drop below the thermal threshold. ( *Aug. 24, 2006 Tr. at 213:20-214:6; KTr-LKD-Ex. 13 at 8-9; KTr-CWH-Ex. 4 at 231*).

2A-8. Historical numbers of steelhead trout in the Klamath are unknown, but total run sizes in the 1960s were estimated at 170,000. In the 1980s, the estimated population numbers dropped to 100,000 and the numbers are still declining to the extent that now the winter steelhead trout is considered to be at risk of extinction. (*KTr-CWH-Ex. 4 at 231-32*).

2A-9. Habitat that is presently suitable for anadromous wild steelhead is more widespread in the upper basin than is habitat suitable for Chinook salmon. (*NGO Ex. 3 at 9; NGO Ex. 19*). This habitat is presently being used in varying degrees by resident rainbow/redband trout. (*NGO Ex. 3 at 9; NGO Ex. 19*).

2A-10. Many streams or segments of streams contain fair to good steelhead habitat above Iron Gate Dam. (*NGO Ex. 3 at 9*). While access to habitat for steelhead trout might be a problem because of gradients, it is critical because the diversity of life history strategies enables the fish to adapt to changing environmental conditions and habitat (*Aug. 23, 2006 Tr. at 24:21-26:19; 63:9-65:9; 68:22-69:10; NGO Ex. 3 at 9*)

## ***2. FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 2(B)***

2B-1. The pathogens present below Iron Gate Dam include: *Ceratomyxa Shasta* (*C. Shasta*); *Ichthyophithirius multifiliis* (*Ich*); *Flavobacterius columnaris* (*F. columnaris*); *Paravicapsula minibicornis* (*P. minibicornis*); and *Trematode metacercaria*. (*Aug. 24, 2006 Tr. at 39:11-40:5, 199:2-200:1; Aug. 25, 2006 Tr. at 42:18-25; NMFS/FWS-Issue 2B-Foott-Ex. 1 at 2:1-3:3;NMFS/FWS-Issue 2B-Foott-Ex 5 at 5; CDFG Cox Ex. 1 at 3:8-23 and 4:20-21; NMFS/FWS PFF 2B.1; NGO PFF2B.2; Indian Tribe PFF 2B.1; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 14*).

2B-2. For the most part, the pathogens existing in the lower basin historically and currently exist in the upper basin of the Klamath River above Iron Gate Dam. ( *Aug. 24, 2006 Tr. at 199:1-8 and 199:22-200:12; NGO PFF 2B.2*).

2B-3. The existence of virus *Infectious Hematopoietic Necrosis* (*IHN*) in the Klamath River system is exceedingly rare. (*Aug. 24, 2006 Tr. at 199:10-11; NMFS/FWS-Issue 2B Foott-Ex. 1 at 2:4-5; CDFG Cox Ex. 1 at 4:2-13; <u>see</u> <u>also</u> NMFS/FWS PFF 2B.11; Indian Tribes PFF 2B.2; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 16; but see Aug. 25, 2006 Tr. at 43:22-44:6; NMFS/FWS FF 2B.12; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 17*).

2B-4. To date, no research or studies have been performed to detect the occurrence of *IHN* in the upper basin of the Klamath River . ( *Aug. 24, 2006 Tr. at 199: 12-15; Aug. 25, 2006 Tr. at 44:7-9*).

2B-5. There is insufficient evidence in the record to make a determination whether *IHN* exists in either the upper or the lower basins of the Klamath River .

2B-6. In addition, multiple surveys on adult and juvenile Chinook salmon in the Klamath River show that *Renibacterium salmoniranrum* (*R. salmoniranrum*), a rare, insignificant bacterial pathogen, is present in the lower basin. (*NMFS/FWS-Issue 2B-Foott-Ex. 1 at 2:15-17 and 3:25-4.4; see also NMFS/FWS PFF 2B.2; Indian Tribes PFF 2B.3, NGO PFF at 2B.3; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 14 and 18*).

2B-7. Like *IHN*, there is a lack of information concerning the presence of *R. salmoniranrum* in the upper basin. (*NMFS/FWS-Issue 2B-Foott-Ex. 1 at 3:13-16, see also NMFS/FWS PFF 2B.2; Indian Tribes PFF 2B.3, NGO PFF at 2B.3; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 14 and 18*).

2B-8. Nevertheless, because of its low levels, *R. salmoniranrum* does not appear to pose a significant risk of disease in the salmonid population in the Klamath River system, and consequently the bacteria will not pose a significant threat to fish in the upper basin. (*NMFS/FWS-Issue 2B-Foott-Ex. 1 at 3:6-11; NMFS/FWS-Issue 2B-Foott-Ex. 4 at 7-8; see also NMFS/FWS PFF 2B.2; Indian Tribes PFF 2B.3, NGO PFF at 2B.3; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 14 and 18*).

2B-9. Similarly, parasitic *Trematode Metacercaria* present in juvenile and adult Chinook salmon do not appear to present a significant health threat to resident fish in the upper Klamath. (*NMFS/FWS-Issue 2B-Foott-Ex. 1 at 3:6-11; NMFS/FWS-Issue 2B-Foott-Ex. 4 at 7-8; see also NMFS/FWS PFF 2B.2; Indian Tribes PFF 2B.5; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 14 and 18*).

2B-10. *F. columnaris* and *Ich* are ubiquitous in freshwater systems, and both are present throughout the Klamath River system above and below Iron Gate Dam. (*NMFS/FWS-Issue 2B Foott-Ex. 1 at 2:12 -18; 3:1-3; CDFG Cox Ex. 1 at 3:11 -15; see also NMFS/FWS PFF 2B.3; NGO PFF 2B.4*). *F. columnaris* causes disease at higher temperatures. ( *Aug. 25, 2006 Tr. at 40:4-5*).

2B-11. Likewise, *C. Shasta* and *P. minibicornis* are myxozoan parasites that are found throughout the Klamath River . (*NMFS/FWS-Issue 2B Foott-Ex. 1 at 2:18-23; see also NMFS/FWS PFF 2B.4; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 15*).

2B-12. It is recognized that disease is the outcome of the interaction of a susceptible host and a pathogen in a poor environment that favors the pathogen and places stress on the fish. The passage of adult fish into a poor upper river environment would have disease, possibly pre-spawning mortality as a likely outcome. ( *Aug. 25, 2006 at 36:15-37:8; PacifiCorp PFF 178; CDFG-Cox-Ex. 1 at4:23-5:25*).

2B-13. The incidence of infection from pathogens is seasonal during summer months when water temperatures and algae blooms are high thereby resulting in poor water quality. ( *Aug. 25, 2006 Tr. at 40:21-41:9; 47:21-48:20; 50:1-18; NMFS/FWS-Issue 2B-Foott-Ex. 1 at 3:17 -20*).

2B-14. In the upper Klamath, the water quality is only poor during the summer, but for much of the year the water system is quite good. ( *Aug. 25, 2006 Tr. at 40:20-41:2*). By the time the water quality deteriorates, many of the adult salmonid most likely would have died because its life cycle was complete whereas others would have died as a result of infection from the pathogen. (

*Aug. 25, 2006 Tr. at 41:8-9*).

2B-15. Opening up the upper Klamath to anadromous salmonids would not produce adverse results because adult salmonids would be passed late enough in the fall that water conditions in the upper basin would be good. ( *Aug. 25, 2006 Tr. at 41:22-25*).

2B-16. As for outmigration, juvenile salmonids would be out of the system prior to water conditions deteriorating and becoming conducive to disease development. ( *Aug. 25, 2006 Tr. at 42:1-5*).

2B-17. *C. shasta* has been detected in the lower Williamson River , a tributary of Upper Klamath Lake , and in areas below Iron Gate Dam in nearly equal levels. (*Aug.25, 2006 Tr. at 39:13-18; NMFS/FWS PFF 2B.8*).

2B-18. Within the Klamath River system, steelhead trout are resistant to *C. Shasta*, a disease causing pathogen that adversely affects juvenile Chinook salmon. (*Aug. 24, 2006 Tr. at 36:1-21, 68:18-22, 70:7-20, 197:17-20; Aug. 25, 2006 Tr. at 50:13-18; NMFS/FWS-Issue 2B Foott-Ex. 1 at 4:24 to 5:2; NMFS/FWS-Issue 2B-Foott-Ex. 7 at 12-13; NMFS/FWS-Issue 2C-Hooton-Ex. 1 at 5:12-16; KTr-LKD-Ex. 13 at 8; NMFS/FWS PFF 2B.5, 2B.9, and 2B.10; NGO PFF 2B.5; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 16*).

2B-19. Coho salmon are less resistant to *C. Shasta* than steelhead trout, but are more resistant to the virus than Chinook salmon. (*Aug.24, 2006 Tr. at 197:21-22; Aug. 25, 2006 Tr. at 50:13-18; NMFS/FWS PFF 2B.9*).

2B-20. Generally, with the exception of *F. columnaris* and *Ich*, pathogens associated with anadromous fish do not impact non-salmonids. (*NMFS/FWS-Issue 2B Foott-Ex. 1 at 3:25-4:3; NMFS/FWS PFF 2B.6; NGO PFF 2B.4; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 15*). For instance, both *IHN* and *P. minibicornis* are salmonid pathogens for which there exists no data associating them with non-salmonid fish in the upper Klamath. (*NMFS/FWS-Issue 2B Foott-Ex. 1 at 4:1-3*).

2B-21. In the life cycle of *C. Shasta*, the parasite multiplies primarily within the adult fish under low water temperatures of approximately 10-15 C and potentially, under certain circumstances, infects other fish if the parasite is released into the water column and is ingested by the Polykete worm of the species, manucia speciosa. ( *Aug. 24, 2006 Tr. at 192:5-194:18; KTr-LKD-Ex. 13 at 8*).

2B-22. Since a majority of the pathogens currently found in the lower basin also exist in the upper basin of the Klamath River system, a logical conclusion is that migration of anadromous fish would not be a significant factor contributing to disease on resident fish. (*Aug. 25, 2006 at 52:1-20; NMFS/FWS-Issue 2B-Foott-Ex. 1 at 3:24-25, 4:7-8, and 4:16-19; CDFG-Cox-Ex. 1 at 5:6-9 and 6:6-11; NMFS/FWS PFF 2B.7 and 2B.15; NGO PFF 2B.6, Indian Tribes PFF 2B.6 and 2B.7*).

2B-23. To the extent that migrating anadromous fish carry a unique highly virulent pathogen, disease management protocols could be used as is customary. (*KTr-CWH-Ex.17 at 16 and 85-87; KTR-CWH-Ex. 34 at 8:168-74; Indian Tribes PFF 2B.9*).

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[1] The evidence suggests that like Chinook salmon, steelhead trout may be divided into two population: a)

winter steelhead (ocean-maturing); and b) summer steelhead (stream-maturing). (*KTr-CWH-Ex. 4 at 230*). The summer steelhead trout is on the verge of extinction and is not addressed in this proceeding. (*KTr-CWH-Ex. 4 at 233*).

## *1. FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 2(C)*

2C-1. Resident rainbow/redband trout are distinct from anadromous steelhead trout. Although the two species are similar (both are designated *O. Mykiss*), the life histories are different. (*Aug. 22, 2006 Tr. at 160:2-15; Aug. 24, 2006 Tr. at 42:16-43:13, 43:5-13; CDFG-Chesney-Ex. 1 at 4:18-20; see also NMFS/FWS PFF 2C.1; NGO PFF 2C.3; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 21-22).* After hatching and early rearing in the riverine habitat, juvenile steelhead trout out migrate to the ocean where they mature into adults before returning to their riverine habitat for spawning. By contrast, resident rainbow/redband trout spend all of their life stages in the Klamath River . (*Aug. 24, 2006 Tr. at 42:16-43:13; PAC-Ols-D-1 at 18:22-23; PAC-Carl-D-3 at 2:18; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 21-22*).

2C-2. Historically, anadromous steelhead trout extended up to and used tributaries of Upper Klamath Lake . (*FOF 2A-3; KTr-CWH-Ex. 5 at 15-16*). The close similarities between anadromous steelhead trout and resident rainbow/redband trout suggest these species historically co-existed. ( *Aug. 23, 2006 Tr. at 268:8 -11; NMFS/FWS-Issue 2C-Hooton-Ex. 1 at 2:3-17; CDFG-Dean-Ex. 1 at 4:8-14; HVT-Franklin—Ex. 1 at 6:1-10; KTr-CWH-Ex. 6 at 8; NMFS/FWS PFF 2C.2, 2C.7-2C.9*). The distribution and resistance of rainbow/redband trout in Upper Klamath Lake to *C. Shasta* lends additional support that the two species co-existed and intermingled prior to the construction of Copco I Dam in 1917. ( *Id*. ).

2C-3. The erection of Iron Gate Dam necessarily changed the migratory behavior of anadromous fish in the Klamath River System, limiting them to habitat below the dam. (*FOF 2A-2*). Today, anadromous steelhead trout only migrate to the base of Iron Gate Dam, using nearby tributaries and main stem habitat to spawn. (*FOF 2A-3*). However, if access was provided, steelhead would migrate past Iron Gate Dam into the upper Klamath River basin . (*FOF 2A-4*).

2C-4. The habitat for the anadromous fish has been significantly reduced subsequent to the construction of the Project dams. ( *Aug. 24, 2006 Tr. at 11:15-19*).

2C-5. Although environmental conditions and habitat above Iron Gate Dam have changed, anadromous fish are resilient and can adapt to most existing environmental conditions and habitat. ( *Aug. 24, 2006 Tr. at 0012:10-13*; 0020:4-6).

2C-6. For instance, steelhead trout have the genetic ability to recolonize and use new habitat. (*Aug. 24 Tr. at 0011:2-0012:13; NMFS/FWS-Issue 2A-Garza-Ex. 1 at 2:8 to 3:25; NMFS/FWS-Issue 2A-Garza-Ex. 6 at 6; NMFS/FWS-Issue 2A-Garza-Ex. 8 at 13; NMFS/FWS-Issue 2A-Garza-Ex. 4 at 3; NMFS/FWS-Issue 2-Curtis Rebuttal at 4:15-17; CDFG-Dean-Ex. 1 at 3:8-17; CDFG-Pisano-Ex. 1 at 5:15-28 and 8:14-9:7; NGO Ex. 3 at 12:3-21; HVT-Franklin-Ex. 8; HVT-Franklin-Ex. 2 at 2:20-26; see also* NMFS/FWS PFF 2A.3; *Indian Tribes PFF 2A.3; NGO PFF 2A.7).*

2C-7. Resident trout have the genetic capacity to adopt anadromy and some may outmigrate to the ocean if passage exists. ( *Aug. 23, 2006 Tr. at 196:16-24; KTr-CWH-Ex. 8 at 22-25; NGO PFF*

*2C.4*).

2C-8. While residualization (remain in freshwater) is common in juvenile hatchery steelhead trout, there is an absence of evidence of high levels of residualization in juvenile naturally-spawned steelhead trout. (*Aug. 23, 2006 Tr. at 200:13-14; NGO-Ex. 3, at 11:5-7; HVT-Franklin Ex. 1 at 5:18-22; KTr-FAE Ex. 32 at 7:3-22; NMFS/FWS PFF 2C.4, 6*).

2C-9. There are no scientific studies of the Klamath basin demonstrating that reintroduction of anadromous steelhead trout would detrimentally affect the genetic makeup of the resident trout fishery. ( *Aug. 23, 2006 Tr. at 208:18-23; NGO-Ex. 3, at 11:5-7; NGO PFF 2C.7; Indian Tribes PFF 2C.7, 2C.10*). The potential for residualization is largely dependent on environmental conditions in the river and ocean. ( *Aug. 23, 2006 Tr. at 196:12-197:3; NMFS/FWS-Issue 2C-Hooton-Ex. 1 at 4:12 -16; Indian Tribes PFF 2C.5*).

2C-10. There is little information on the nature of any competitive interactions between steelhead and resident trout in the Klamath basin. (*NGO Ex 3, Testimony of Dr. R.. Williams at 11:13 -17; KTR CWH Ex 01 at 30; NMFS/FWS PFF 2C.11*). However, research does suggest that in some circumstances, resident trout may have a competitive edge over steelhead trout. (*Testimony of Dr. R.. Williams at 11:13 -17; KTR CWH Ex 01 at 30; NMFS/FWS PFF 2C.12*).

2C-11. There are many examples from nearby river systems in the Pacific Northwest that show wild anadromous steelhead trout and resident rainbow/redband trout can co-exist and maintain abundant populations without adverse consequences. The Deshutes River in Oregon , the Yakima River in Washington , and the river systems in Idaho are examples. (*NMFS/FWS-Issue 2C-Hooten-Ex. 1 at 4:8-11; KTR-Espinoza-Issue 2 Direct at 7:3-11; NGO Ex. 3 at 11:13 -16; Indian Tribes PFF 2C.4; NGO PFF 2C.8*).

2C-12. The risk of residualization of rainbow/redband trout may be minimized through adaptive management. (*KTr.-Huntington-Ex. 1; NGO Ex. 3 at 11:8-12*).

## *2. <u>FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 3</u>*

3-1. The Project contains various habitat areas for resident trout including: a) the J.C. Boyle bypass reach which extends 4.3 miles from J.C. Boyle Dam to the J.C. Boyle powerhouse; 2) the J.C. Boyle peaking reach extending 17.3 miles and traversing the California/Oregon state line; 3) a 1.4 mile section between Copco II diversion dam and Iron Gate reservoir; and 4) other reservoirs within the Project reach. (*PAC-Ols-D-Ex. 1 at 20:20-22:2; CDFG-Dean-Ex. 1 at 4:19-25; NGO-Ex. 14 at 4; NMFS/FWS-Issue 3-Snedaker-Ex. 1 at 3:24-4:6, 6:15-18; CDFG-Dean-Ex. 1 at 4:19-26, 5:22-6:4; NGO-Ex. 2 at 19:7-9*).

3-2. The 1.4 mile section of river between the Copco II Diversion Dam and Iron Gate Reservoir contains marginal trout habitat. (*PAC-Ols-D-Ex. 1 at 21:21-23; PacifiCorp PFF 200; Appendix to National Marine Fisheries Service and United States Fish and Wildlife Service's Joint Post-Hearing Reply Brief at 20*).

3-3. There are a limited number of trout in the J.C. Boyle, Copco, and Iron Gate Reservoirs. (*PAC-Ols-D-Ex. 1 at 22:4-5; PacifiCorp PFF 201; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 32*).

3-4. Prior to the construction of the dams, redband trout within the Project area belonged to a single, large, intermixing population throughout the Klamath River Basin . (*NGO-Ex. 2 at 13:4-9; NGO-Ex. 14 at 4; NMFS/FWS PFF 3.1; NGO PFF 3.2; Appendix to Reply of PacifiCorp and*

*Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 29 and 34*).

3-5. Although the trout sport fishery is robust in the Upper Klamath Basin , the juvenile trout from above J.C. Boyle Dam in the Oregon portion of the Klamath River are actually decreasing. (*NMFS/FWS-Issue 3-Hooton-Ex. 0A at 4:7-8, 6:15-17; Hooton-BLM-Ex. 4 at 22*).

3-6. Life history strategies (such as spawning above the J.C. Boyle Dam) are denied to the resident trout population below the dam. (*NMFS/FWS-Issue 3-Hooton-Ex. 0A at 6:17-20; Hooton-BLM-Ex. 4 at 22; NGO-Ex. 2 at 14:10-12, 17:15-18:2, 19:4-18; CDFG Dean Ex. 1 at 5:1-2; Aug. 23, 2006 Tr. at 161:13-162:17; NMFS/FWS PFF 3.5*).

3-7. Migration is one of several defining life history characteristic of trout. ( *Aug. 23, 2006 Tr. at 166:23-168:7; CDFG Dean Ex. 1 at 4:19 -26; NGO-Ex. 14 at 4; NGO PFF 3.3*). Their ability to migrate is one of several evolutionary advantages contributing to survival of trout in the Klamath River for millions of years through dramatic environmental changes. ( *Id. )*.

3-8. The Project restricts migration of resident fish within the main stem and into and out of tributaries. (*NGO Ex. 2 at 19:12-14*). Iron Gate , Copco I, and Copco II Dams do not have fishways and currently block all upstream fish passage. Thus, the stocks above Iron Gate are isolated from counterparts in the lower basin. Further, the stocks between each of Iron Gate , Copco I, and Copco II Dams are similarly isolated. (*NGO PFF 3.5; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at35*).

3-9. J.C. Boyle Dam has a fishway for migration of rainbow/redband trout. (*NGO PFF 3.6*). The current fish screen and ladder at the dam do not meet current state and federal fish passage criteria and impairs upstream migration. (*PAC-MAL-D-Ex. 4 at 7-31; NMFS/FWS PFF 3.8 and 3.9; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 32*).

3-10. The effectiveness of the fishway has declined by 98% since initial operation of the fishway in 1959. (*NGO Ex. 17 at 379; NGO Ex. 2 at 20:19 -20 NMFS/FWS-Issue 3-Snedaker-Ex. 0 at 2:11 -12; NMFS/FWS-Issue 3-Snedaker-Ex. 8 at 8, Hooton-BLM-Ex. 4 at 11; NGO-Ex. 2 at 14:4-10; NGO-Ex. 17 at 3; NMFS/FWS PFF 3.7; NGO PFF 3.6*). A rock cascade that starts at the entry of the fishway and extends downstream may be the cause for such limited use. ( *Aug. 23, 2006 Tr. at 149:22-152:15; NGO PFF 3.6*).

3-11. PacifiCorp has agreed to improve the channel configuration below the fishway so that upstream migration of trout will no longer be impeded. (*PAC-Ols-R- Ex. 1 at 25:14*).

3-12. Improvements in efficiency to the fishway at JC Boyle Dam would result in significant trout population migration above the dam over time. ( *Aug. 23, 2005 Tr. at 176:17-23; NMFS/FWS PFF 3.11*).

3-13. Spencer Creek is a highly productive spawning and rearing habitat for rainbow/redband trout. (*NGO Ex. 16 at 3; NMFS/FWS PFF 3.7*). The stock of rainbow/redband trout in the bypass and peaking reaches below JC Boyle Dam is denied the use of Spencer Creek and other suitable habitat upstream of the J.C. Boyle Dam. (*NMFS/FWS PFF 3.7*).

3-14. Historically, trout in the Copco II area would have moved up and downstream to access needed habitat. To now meet essential life history needs, trout move further downstream over Copco II Dam and utilize either the bypass reach or other tributaries of Iron Gate Reservoir. However, once they exit Copco II they cannot return as there are no upstream passage facilities. Thus, the trout population is not self-sustaining. (*NMFS/FWS-Issue 3-Snedaker-Ex. 1 at 6:15-21; NMFS/FWS- Issue 3-Snedaker-Ex. 16 at 127; NMFS/FWS-Issue 4- Hamilton-Ex. 7 at 1; NMFS/FWS PFF 3.13*).

3-15. Downstream migration of rainbow/redband trout is also adversely impacted because of the Project dams. This is due to the hydraulics at the Project dams and mortality related to unscreened flow resulting in fish passage through Project dam turbines. (*NMFS/FWS-Issue 3-Snedaker Ex. 16 at 126-130; NMFS/FWS-Issue 3-Hooton Ex. 0A at 7:10-9:14; BLM-Hooton-Ex. 3 at 7-8*).

3-16. The Project's limitation on riverine migration may have reduced the genetic diversity of the remaining stocks within the Project reaches. (*NGO Ex. 2 at 3:6-10, 21:1-9; NGO Ex. 14, Figure 3 at 103; NGO PFF 3.8; NMFS/FWS PFF 3.3-3.5*).

## *3. FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 4*

4-1. J.C. Boyle, Copco, and Iron Gate Dams support populations of resident fish including native and non-native species. Popular sport fisheries occur in each reservoir targeting primarily bass, perch, and catfish. Rainbow trout, resident lamprey, and Lost River/shortnose sucker fish also occur in the reservoirs. (*NMFS/FWS-Issue 4- Hamilton-Ex. 12 at 1*).

4-2. It is estimated that "several tens of thousands of resident fish" are annually entrained at "each of the Projects" facilities. (*NMFS/FWS-Issue 4-Hamilton-Ex. 12, at 28; NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 6:7-9; NMFS/FWS-Issue 4-Hamilton-Ex. 14 at 1; NMFS/FWS-Issue 4-Hamilton-Ex. 10 at 3; NMFS/FWS-Issue 4-Hooton-Ex. 14, at 112; NMFS/FWS-Issue 4-Hooton-Ex. 1, at 5:3-5; HVT-Steward-Ex. 1 at 3:19-20; NMFS/FWS PFF 4.5; Indian Tribes PFF 4.1*).

4-3. Entrainment occurs when fish are drawn into Project facilities, such as power canals, turbines, and tailraces. When drawn into turbine intakes, fish can be subject to injury and mortality. (*NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 4:22-25; NMFS/FWS-Issue 4-Hamilton-Ex. 5, at 1; NMFS/FWS PFF 4.1; Appendix to Reply Brief of PacifiCorp and Siskiyou County , at 37*).

4-1. Mortality from entrainment can occur at each Project facility, thus fish surviving through one powerhouse could be exposed to potential cumulative mortality. (N*MFS/FWS-Issue 4-Hooton-Ex. 1, at 5:19-21; HVT-Steward-Ex. 39, at 2:3-7; NMFS/FWS-Issue 4-Hooton-Ex. 14, at 113*).

4-2. Once entrained, the fish face a high risk of mortality. For juvenile fish, the risk is between 10-30%. (*PAC-Ols-D-1 at 27*).

4-3. Entrainment mortality removes fish that would otherwise add to the population base downstream of the dam. (*NMFS/FWS-Issue 4-Hamilton-Ex. 12 at 29*).

4-4. Iron Gate , Copco 1, and Copco 2 Dams are not equipped with fish screens or downstream bypass facilities to minimize fish entrainment. (*NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 5:5-6; Appendix to Reply Brief of PacifiCorp and Siskiyou County , at 37*).

4-5. J.C. Boyle Dam has fish screening and bypass systems in place, but they do not conform to current fish screen criteria for resident and anadromous fish. (*NMFS/FWS-Issue 4-Johnson-Ex. 1, at 4:21 to 6:8; NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 5:6-7;*

*NMFS/FWS-Issue 4-Johnson-Ex. 5, at 65-66; Appendix to Reply Brief of PacifiCorp and Siskiyou County , at 37*).

4-6. The seals at J.C. Boyle Dam have rendered the fish screens partially ineffective, allowing fish to be entrained in the power canal and turbines. (*PAC-Ols-R-1, at 26:13-17 and 27:1-3; Aug. 23, 2006 Tr. at 213:13 to 214:13; NMFS/FWS-Issue 4-Hooton-Ex.1, at 4:4-5; NMFS/FWS-Issue 3-Snedaker-Ex. 1, at 3:12-14; Appendix to Reply Brief of PacifiCorp and Siskiyou County, at 38*).

4-7. The J.C. Boyle facility uses Francis turbines, at an operational head of 440 feet. A 1987 report prepared by the Electric Power Research Institute (EPRI) concluded that fish mortality from entrainment at hydroelectric projects using Francis turbines averaged 24 percent. The EPRI report found that entrainment mortality at hydroelectric projects using Francis turbines with operational head greater than 335 feet ranged from 33-48%. (*NMFS/FWS-Issue 4-Hooton-Ex. 1, at 5:23 to 6:2; NMFS/FWS-Issue 4-Hooton-Ex. 7, at 51, Table 4-1; NMFS/FWS-Issue 4-Johnson-Ex. 1, at 2:11-15; Aug. 22, 2006 Tr. at 186:1-17); CDFG Hughes Ex. 1, at 4:12-18; HVT-Steward-Ex. 1, at 2:17-20; NMFS/FWS-Issue 4-Hamilton-Ex. 12, at 28; NMFS/FWS PFF 4.10; Indian Tribes PFF 4.3; Appendix to Reply Brief of PacifiCorp and Siskiyou County, at 39*).

4-8. In light of the large percentage of river flow that is diverted into the J.C. Boyle power canal, the operation of Francis turbines, and the high operational head of 440 feet, fish mortality from entrainment at the J.C. Boyle project is likely in the higher end of the mortality ranged as described in the Electric Power Research Institute report. (*NMFS/FWS-Issue 4-Hamilton-Ex. 12, at 28; NMFS/FWS-Issue 4-Hooton-Ex. 1, at 5:23 to 6:5; NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 5:15 -17; NMFS/FWS-Issue 4-Johnson-Ex. 1, at 2:11 -15; NMFS/FWS PFF 4.11; Appendix to Reply Brief of PacifiCorp and Siskiyou County , at 40*).

4-9. PacifiCorp recognizes that entrainment at the J.C. Boyle Dam is a "problem that needs to be addressed." ( *Aug. 23, 2006 Tr. at 214: 4-10; PAC-Ols-R-1 at 26: 21-27:1*).

4-10. PacifiCorp has not conducted site-specific studies on the mortality levels of entrained resident fish at Project facilities, but did conduct a literature review that provides insight into the potential of the fish entrainment at J.C. Boyle, Iron Gate , and Copco Dams. *NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 5:20-23; NMFS/FWS-Issue 4-Hamilton-Ex. 13, at 2; NMFS/FWS-Issue 4-Hamilton-Reb. Ex. 1, at 2:7-10; NMFS/FWS-Issue 4-Hamilton-Reb. Ex. 5, at 21; PAC-Ols-D-1, at 26:2-9; Aug. 22, 2006 Tr. at 178:16-19*).

4-11. Precise estimates of the number of fish entrained at the facility are not available. However, extrapolating from data at other comparable FERC Facilities, PacifiCorp estimates a median annual entrainment of 75,655 fish for reservoirs the size of J.C. Boyle, and 115,979 fish for reservoirs the size of Copco and Iron Gate . (*NMFS/FWS-Issue 4-Hooton-Ex. 14 at 112*).

4-12. In the Project Area, non-native species are entrained to a greater extent than native species. (*NMFS/FWS-Issue 4-Hamilton-Ex. 12 at 17 and 29; PAC-Ols-D-1 at 26:20-21; PAC-Ols-D-15*). This may be the result of the relative abundance of non-native species vis-à-vis native species. (*PAC-Olson-D-1 at 27-28*).

4-13. The J.C. Boyle reservoir contains sucker fish (shortnose and lost River) that are listed under the federal Endangered Species Act and those fish are susceptible to entrainment. (*PAC-Olson-D-15 at 8 and 10*).

4-14. Habitat degradation has been recognized as a common contributor to the decline in the abundance of shortnose and lost river sucker fish in the Klamath basin. (*KTr-CWH-Ex. 1 at 4*).

4-15. Records from canal salvage operations at the J.C. Boyle power canal show that resident fish, in particular resident trout and sucker fish, are entrained and possibly killed in the power canal each year. (*NMFS/FWS-Issue 4-Hooton-Ex. 1, at 5:6-17; NMFS/FWS-Issue 4-Hooton-Ex. 15; NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 5:17-19 and 6:3-5; NMFS/FWS-Issue 4-Hamilton-Ex. 14, at 1; Aug. 23, 2006 Tr. at 212:25-213:21; Appendix to Reply Brief of PacifiCorp and Siskiyou County, at 38*).

4-16. Salvage records show the entrainment of over 690 trout into the J.C. Boyle reach during salvage operations between 1995 and 2002. (*NMFS/FWS-Issue 4-Hamilton-Ex. 14, at 1*). During that same period of time, it appears that only 2 sucker fish were entrained. (*NMFS/FWS-Issue 4- Hooton-Ex. 15, at 3-4 (Fish Salvage Data Table*). In 2003, J.C. Boyle fish salvage totaled 86 trout and 17 suckers. (*NMFS/FWS-Issue 4-Hamilton-Ex. 14, at 1; NMFS/FWS-Issue 4-Hooton-Ex. 15 at 2-3*).

4-17. Canal salvage data provides a snapshot of the number of fish entrained at the time that salvage operations are performed, and thus such data represents only a small fraction of the total number of fish actually entrained each year. (*NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 6:3-5; NMFS/FWS-Issue 4-Hamilton-Ex. 14, at 1; NMFS/FWS-Issue 4-Hooton-Ex. 1, at 5:10 -17; NMFS/FWS PFF 4.8*).

4-18. Since sucker fish are bottom dwellers, they are less prone to entrainment through the shallow intakes at Copco and Iron Gate Dams. (*NMFS/FWS-Issue 4-Hamilton-Ex. 12 at 17*). Moreover, nearly all of the non-larval sucker fish appear to be too large to pass through the existing trash racks at the powerhouse intakes at Copco and Iron Gate . (*PAC-Ols-D-1 at 30:1-6; PAC-Ols-D-15*).

4-19. While the vast majority of fish entrained consists of small juvenile fish, the record shows that adult fish are also susceptible of being entrained and killed. (*PAC-Ols-D-1 at 27; NMFS/FWS-Issue 4-Hooton-Ex. 1 at 3; NMFS/FWS-Issue 4- Hooton-Ex. 18*). ( Id. ).

4-20. In 1959, the year after J.C. Boyle Dam was completed, adult redband trout migrated from what are now known as the peaking and bypass reaches in large numbers to spawn in Spencer Creek and then return to the reaches after spawning. (*NMFS/FWS-Issue 4-Hooton-Ex. 13 at 22*). Currently, the peaking reach life history appears to be gone and the bypass reach life history has been reduced to less than 10% of historical abundance and is composed of significantly smaller trout. ( *Id.* ).

4-21. Resident trout are a migratory species. Because Spencer Creek, located upriver of the J.C. Boyle facility, is a primary spawning and early rearing area for resident trout within the Project area, it is important that adult spawners from the river below the dam and juvenile trout from Spencer Creek both are able to successfully migrate upstream and downstream past J.C. Boyle Dam. (*NMFS/FWS-Issue 4-Hooton-Ex. 1, at 3:6-17; NMFS/FWS-Issue 4-Hooton-Ex. 11, at 2; NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 4:8-12; NMFS/FWS-Issue 4-Hamilton-Ex. 14, at 2; NMFS/FWS-Issue 4-Hamilton-Ex. 17, at 4; NMFS/FWS-Issue 4-Hamilton-Ex. 13, at 4; Aug. 23, 2006 Tr. at 161:5 to 162:18; Aug. 24, 2006 Tr. at 64:20-24; NMFS/FWS PFF 4.12; Appendix to Reply Brief of PacifiCorp and Siskiyou County at 40.).*

4-22. While it is true that the present population of resident trout is robust and supports one of the finest trout fisheries on the West Coast, the losses of juvenile trout through entrainment at the Project could, in the long run, adversely affect trout abundance and distribution. (*NMFS/FWS-Issue-4-Hooton Ex. 1 at 6:9-13; NMFS/FWS-Issue 4-Hamilton-Ex. 1 at 4:16 -16 and 7:3-4; NMFS/FWS-Issue 4-Hamilton-Ex. 17 at 4; HVT-Steward-Ex. 39 at 1:17 -22*).

## *1. FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 6*

6-1. The findings of fact in USFWS/NMFS Issue 2A are incorporated herein.

6-2. Habitat is deemed "suitable" if it can be used successfully at least some of the time by one or more life stages of a Coho salmon. (*NMFS/FWS-Issue 6-Smith-Ex. 1 at 2:18-2:24; PAC-MAL-D-30 at 65; HVT-Franklin-Ex. 2 at 2:20-2:26; KTr.-CWH-Ex. 35 at 2:22-3:6; KTr-CWH-Rebuttal-Ex. 6 at 5:14-6:2; Aug. 22, 2006 Tr. at 197:12-198:23; Aug. 24, 2006 Tr. at 1283:25-285:20; NMFS/FWS PFF 6.1; Indian Tribes PFF 6.1; NGO PFF 6.1*).[1]

6-3. Anadromous fish are highly adaptive to differing conditions typically can readily migrate into and colonize new habitat or recolonize historic habitat. (*Aug. 24, 2006 Tr. at 11:24-15:9; NMFS/FWS-Issue2A-Garza-Ex. 1 at 2:8-3:25; NMFS/FWS-Issue 2A-Garza-Ex. 6 at 6; NMFS/FWS-Issue 2A-Garza-Ex. 8 at 13; NMFS/FWS-Issue 2A-Garza-Ex. 4 at 3; HVT-Franklin-Ex. 8; HVT-Franklin-Ex. 2 at 2:20-2:26; CDFG-Pisano-Ex. 1 at 8:14-9:*7).

6-4. While the exact amount of suitable habitat available for anadromous fish is uncertain, the record evidence shows that steelhead trout, Chinook salmon, Coho salmon, and Pacific lamprey will likely find suitable spawning and rearing habitat in the Project-bound area. (*Aug. 24, Tr. at 28:24-29:1; Aug. 25, 2006 Tr. at 75:2-11; Malone Supplemental Rebuttal Ex., Attachment 2 at 1; NMFS/FWS-Issue 6-Smith-Ex. 1 at 2:1-8; KTr-CWH-Rebuttal-Ex. 6 at 2:16-17 and 3:7-18; KTr-FAE-Rebuttal Ex. 7 at 6:18-20*).

6-5. Spawning and rearing habitat requirements are similar among resident rainbow/redband trout, anadromous steelhead trout, anadromous Coho salmon, and anadromous Chinook salmon. Habitat suitable for redband trout will generally be suitable for steelhead trout, Coho salmon, and Chinook salmon. (*HVT-Franklin-Ex. 12 at 3:4-8 and 3:19 -25; NMFS/FWS-Issue 2-Curtis Rebuttal-Ex. 1 at 2:10-15*).

6-6. Stocks of resident rainbow/redband trout are self-sustaining in habitat above Iron Gate Dam, suggesting that anadromous stocks will probably do the same. (*HVT-Franklin-Ex. 12 at 1:14-4:25 ; PAC-Kirk-D-1 at 2:6-3:7; PAC-Carl-D-7 at 2-68; PAC-Bald-D-2 at 28; KTr-CWH-Ex. 21 at 2*).

6-7. The record evidence shows that Coho and Chinook salmon may use tributary habitat with a gradient of up to 7%. ( *Aug. 22, 2006 Tr. at 208:19-21*). Steelhead trout may use tributary habitat with gradients as high as 15% and could therefore re-colonize areas inaccessible to Coho or Chinook salmon. ( *Aug. 22, 2006 Tr. at 44:1-46:11; KTr-CWH-Ex 7, Tables at 6-8*).

6-8. USFWS/NMFS Issue 2A-47 is incorporated herein.

6-9. Expansive bottomland areas with abundant low-gradient channels, which are preferred salmon habitat, are more common in the Upper Klamath Basin than in the remainder of the Klamath system. Such areas are particularly extensive above Keno Dam and Upper Klamath Lake , where spring-fed streams include the Williamson and Wood Rivers , smaller springbrooks flowing into these two rivers, Sprague River , and various streams. (*KTr-CWH-Ex. 1 at 5*).

6-10. The record, however, shows that there are approximately 28 miles of suitable habitat for anadromous fish to spawn in the main stem provided gravel is placed in those areas. (*NMFS/FWS-Issue 7-White Ex. 14, Table 3 at A-21*). Such habitat includes areas cooled by springs (thermal refugia) in the J.C. Boyle bypass (*Aug. 25, 2006 Tr. at 98:10-14 and 101:20-102:7; NMFS/FWS-Issue 6-Sneadker-Ex. 1 at 5:18-6:2; NMFS/FWS-Issue 4-Hooton-Ex. 1 at 3:6-9; KTr-Dunsmoor Direct-Issue 2 at 3:6-9 and 4:3-4:5; HVT-Franklin-Ex. 2 at 3:9-22; KTr-CWH-Ex. 7 at 6-8; NMFS/FWS-Issue 6-Smith-Ex. 1 at 1:19-3:5; CDFG-Pisano-Ex. 6*).

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[1] The transcript indicates that the Federal Fisheries Services' definition of "suitable habitat" appears on 51 of *PAC-MAL-D-30* (NMFS/FWS Responses to Discovery Requests). The definition of "suitable habitat" actually appears on page 65 of that exhibit. It is a response to Interrogatory 51.

6-11. There are at least 12 miles of perennial stream reaches within the Project area that have gradients at or below 15%. (*NMFS/FWS-Issue 7-White-Ex. 14, Table 3 at A-21*). These include: Jenny, Fall, Shovel, and Spencer Creeks , which presently support spawning by resident salmonids thereby suggesting that those habitat would be suitable for use by anadromous fish. (*Aug. 24, Tr. at 65:10-15; NMFS/FWS-Issue 6-Smith-Ex. 1 at 2:18-24; PAC-Ols-D-1 at 6:18-20, 7:22-8:11, and 22:19-23; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 4:12-5:9; NMFS/FWS-Issue 4-Hooton-Ex. 1 at 3:6-9; KTr-CWH-Ex. 20 at 82; KTr-CWH-Ex. 21 at 2*).

6-12. The only area in Fall Creek that is not suitable habitat for anadromous fish is the portion of the stream below the PacifiCorp diversion to the penstock and the powerhouse. Further, Fall Creek upstream of the Spring Creek diversion experiences low flows in the summer months which would also make it unsuitable habitat for anadromous fish. (*KTr-CWH-Ex. 20 at 82*).

6-13. Fall and Shovel Creeks have the water temperatures most suited for juvenile Coho salmon rearing. Spencer Creek also has a reach extending 2.6 to 9.5 km above its mouth that contains abundant beaver ponds which, if they include pockets of cool groundwater, could provide good summer rearing habitat for Coho salmon. (*KTr-CWH-Ex. 21 at 3*).

6-14. There are also approximately 18 miles of intermittent stream reaches within the Project area that have gradients at or below 15%. (*NMFS/FWS-Issue 7-White-Ex. 14, Table 3 at A-21; NMFS/FWS-Issue 7-Simondet Rebuttal Ex. 1 at 4:6-11; HVT-Franklin-Ex. 2 at 2:20-26; NMFS-FWS-Issue 6-Hamilton-Ex. 1 at 5:11-7:17; NMFS/FWS-Issue 6-Smith-Ex. 1 at 2:13-16 and 3:7-22*).

## 1. ***FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 7***

7-1. The findings of fact under USFWS/NMFS Issue 2A are incorporated herein.

7-2. Today, the runs of Coho salmon have greatly diminished in the Klamath River system, which is now composed largely of hatchery fish. (*NMFS/FWS-Issue 7-Simondet-Ex. 5 at 117; KTr.-CWH-Ex. 4 at 216 and 224*).

7-3. The Coho salmon stock of the Klamath River is a sub-population of the Southern Oregon/Northern California Coast ("SONCC') Evolutionarily Significant Unit ("ESU"), and is listed as a threatened species under the Endangered Species Act. (*NMFS/FWS-Issue 7-Williams-Ex. 7 at 1; NMFS/FWS-Issue 7-Williams-Ex. 6 at 34; NMFS/FWS-Issue 7-Williams-Ex. 1 at 2:17-3:9; NMFS/FWS-Issue 7-Williams-Ex. 14 at 41; NMFS PFF 7.1; NGO PFF 7.2; NMFS/FWS-Issue 7-Simonet Ex. 5 at 117; Appendix to Reply Brief of PacifiCorp and*

*Siskiyou County at 60 and 64; KTr.-CWH-Ex. 4 at 224*).

7-4. The SONCC Coho salmon population has experienced a 70% decline since the 1960s. (*NMFS/FWS-Issue 7-Williams-Ex. 7 at 1; NMFS/FWS-Issue 7-Williams-Ex. 6 at 34; NMFS/FWS-Issue 7-Williams-Ex. 1 at 2:17-3:9; NMFS PFF 7.1; NGO PFF 7.2; NMFS/FWS-Issue 7-Simonet Ex. 5 at 117; Appendix to Reply Brief of PacifiCorp and Siskiyou County at 60*).

7-5. Habitat degradation is a primary cause for the decline of the SONCC Coho salmon. (*NMFS/FWS-Issue 7-White-Ex. 1 at 6:3-5; NMFS/FWS-Issue 7-White-Ex. 18 at 6; NMFS/FWS-White-Ex. 4 at 3; NMFS/FWS-White-Ex. 5 at 363 (page 401 of the report); NMFS/FWS-Issue 7-Simondet-Ex. 1 at 5:22 to 6:1. KTr-CWH-Ex. 1 at 4; NMFS PFF 7.21; Appendix to Reply Brief of PacifiCorp and Siskiyou County at 60*).

7-6. Coho salmon below Iron Gate Dam still utilize the habitat below the dam even though it has suffered degradation commensurate with that above the dam. (*Aug. 25, 2006 Tr. at 118:16-119:2*; *CDFG-Pisano-Ex. 1 at 7:10-11:17; Yurok-Hillemeir at 4:15-5:3; NMFS/FWS-Issue 7-Simondet at 5:22-6:7; Indian Tribes PFF*).

7-7. Although portions of the habitat above Iron Gate Dam have been degraded, much of this habitat remains suitable and restoration projects are currently in progress or planned. (*NMFS/FWS-Issue 7-White-Ex. 1 at 6:7-9; NMFS/FWS-Issue 7-Snedaker-Ex. 1 at 8:7-9:17; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 8:11-13; NMFS/FWS-Issue 7-Snedaker-Ex. 7 at 35-48; NMFS/FWS-Issue 6-Smith-Ex. 1 at 6:1 to 9:18; NMFS/FWS PFF 7.6*).

7-8. Habitat is deemed "suitable" if it can be used successfully at least some of the time by one or more life stages of a Coho salmon. (*FOF 6-1; NGO PFF 7.7*). Such suitability varies across locations, life stages, and time. Faced with such variability in a given tributary, Coho salmon will move to the extent feasible to more suitable habitat within that given tributary so long as access is provided. (*KTr-CWH-Ex. 4 at 216; FOF 2A-14; NGO PFF 7.7*).

7-9. Suitable habitat above Iron Gate Dam includes Spencer, Fall, Beaver, Deer, Shovel, Scotch, and Jenny Creeks . The main stem also has suitable habitat. (*NGO Ex. 27 at 2:3-3:10, 6, 7; NMFS/FWS-Issue 7-Simondet Rebuttal-Ex. 1 at 2:22-5:5; HVT-Franklin-Ex. 1 at 3:9-4:6*; *KTr-CWH-Ex. 12 at 1-20; KTr-CWH-Ex. 21 at 1-4; KTr-CWH-Ex. 36 at 2:18-26; KTr-FAE-ex. 34 at 2; Yurok-Hillemeir Direct Testimony-NMFS/FWS Issue 7 at 3:6; NGO PFF 7.6; Indian Tribes PFF 7.5*).

7-10. Adult Coho salmon enter the river to spawn in late September and reach peak migration strength between late October and mid-November. While it appears that adult Coho salmon migration is keyed to water temperature (below $16^{o}$ C) and river flow, adult Coho salmon migration have been observed where these stimuli are reduced. (*KTr-CWH-Ex. 4 at 217*).

7-11. The record evidence shows that juvenile Coho salmon begin outmigrating to the ocean in late February, and continue migration through early July. While juvenile Coho salmon rear in streams for one year and have a preference for cold water (ranging between 12 and $14^{o}$ C), they can tolerate higher water temperatures (exceeding $20^{o}$ C) where food is abundant, there are areas of thermal refugia, and other conditions are not stressful. (*KTr-CWH-Ex. 4 at 218-19*).

7-12. Although water temperature in the summer above Iron Gate Dam is an issue, the record evidence shows that water temperature will not preclude Coho salmon from successfully utilizing the habitat within the Project area. (*CDFG Pisano Ex. 1 at 4:18-51, 7:10-9:7 (Coho in other parts of the*

*Klamath system occupy water with temperatures in excess of 26 $^{o}$ C), 9:8-10:12 (spawning in degraded streams); Yurok-Hillemeir Direct Testimony-NMFS/FWS Issue 7 at 4:24-5:3; KTr-CWH-Ex 4 at 219 (juvenile Coho salmon observations in the main stem Klamath River where temperatures exceed 20 $^{o}$C)*).

7-13. Predation may also be a slight problem that could be minimized through use of remedial measures. (*NMFS/FWS-Issue 7-White-Ex. 14 at A-10, B-2, and B-40; NGO PFF 7.10*).

7-14. In restoration efforts elsewhere in the Pacific Northwest , Coho salmon and other anadromous juveniles successfully pass through reservoirs under similarly difficult circumstances. (*NGO Ex. 3 at 12:13 -13:9; KTr-FAE-Ex. 1 at 3:4-12; NGO PFF 7.11*).

7-15. Coho salmon below Iron Gate Dam would migrate above the dam if access was provided through fishways. (*FOF 2A-10; NMFS/FWS PFF 7.8; Appendix to Reply Brief of PacifiCorp and Siskiyou County at 62*).

7-16. Over time, access to habitat above Iron Gate Dam would benefit the Coho salmon population by: a) extending the range and distribution of the species thereby increasing the Coho salmon's reproductive potential; b) increase genetic diversity in the Coho stocks; c) reduce the species vulnerability to the impacts of degradation; and d) increase the abundance of the Coho population. (*Aug. 23, 2006 Tr. at 163:1-2; Aug. 25, 2006 Tr. at 107:5-20; NGO Ex. 27 at 3:11-4:7 (allowing access to additional habitat does not decrease the size of the population existing below Iron Gate Dam); Yurok-Hillemeir Direct Testimony-NMFS/FWS Issue 7 at 5:7-8 (access to project area is one of the quickest ways to increase population abundance, 6:4-22; CDFG-Pisano-Ex. 1 at 5, 11:18-12:23; NMFS/FWS-Issue 7-Simondet-Ex. 1 at 5:21-6:15; NMFS/FWS-Issue 7-Williams-Ex. 1 at 6:15-19, 7:15-9:22 (explaining that additional spatial structure reduces species vulnerability to changing environmental conditions); HVT-Franklin-Ex. 1 at 6:16-7:12 (explaining that diverse habitat leads to populations adapted to diverse life history forms and greater viability for the species; NGO ex. 4 at 11:15-28*).

***2. FINDINGS OF FACT CONCERNING USFWS/NMFS ISSUE 8***

8-1. The Findings of Fact in 2A are incorporated herein.

8-2. Today, Pacific lamprey is found throughout the Klamath River main stem and tributaries downstream of the Project area and some have also been found in tributaries near Iron Gate Dam. (*NMFS/FWS-Issue 8-Hamilton-Rebuttal Exhibit 4; Yurok-Steward 8 Rebuttal at 2:9 to 3:2; FOF 2A-8; NMFS/FWS PFF 8.3; Indian Tribes PFF 8.2*). The Pacific lamprey fishery resources in the lower Klamath River are in decline. (*PAC-Chan-D-1 at 4:7-9; NMFS/FWS PFF 8.1*).

8-3. Although the historical upstream distribution of Pacific lamprey is unknown, suitable habitat for spawning and juvenile rearing is available within tributaries and stream reaches in the Project area. (Y*urok-Hillemeier 2and 8 Direct at 6:4 to 7:15 ; Yurok-Steward 8 Direct at 5:1-8; NMFS/FWS PFF 8.4*).

8-4. Resident lamprey ammocoetes (juveniles) already rear within tributaries within the Project. (*Yurok-Steward 8 Rebuttal at 4:2-11; CDFG Pisano Ex. 16; NMFS/FWS PFF 8.5*).

8-5. Ammocoetes of resident and Pacific lamprey have similar habitat requirements. (*PAC-Chan-D-1 at 8:8-9; Yurok- Steward 8 Rebuttal at 4:4-6; NMFS/FWS PFF 8.5*).

8-6. There is no measurable genetic difference between Pacific lamprey inhabiting different river basins along the Pacific coast. (*Yurok-Hillemeier 8 Direct at 4:14 to 5:25 . NMFS/FWS-Issue 8-Hamilton-Rebuttal Ex. 3 at 15; Aug. 24, 2006 Tr. at 105:9-24; NMFS/FWS PFF 8.6*).

8-7. Pacific Lamprey below Iron Gate Dam would migrate above the dam if access was provided through fishways. (*FOF 2A-10; NMFS/FWS PFF 8.9; Indian Tribes PFF 8.5*).

8-8. Volitional passage for Pacific lamprey has been designed and is in place in other river systems. (*NMFS/FWS-Issue 8-Johnso-Rebuttal Ex. 1 at 2:3-19, 3:5-7; Aug. 24, 2006 Tr. at 178:8-179:1, 184:1-185:15; NMFS/FWS-Issue 8-Moser-Ex. 1 at 9:12-16; Yurok-Steward 8 Direct at 5:12-26; NMFS PFF 8.8; Indian Tribes PFF 8.6*).

8-9. Access to habitat would benefit Pacific lamprey by increasing their viability through: a) extending the range and distribution of the species; b) providing additional spawning and rearing habitat; c) increasing the generic diversity of the species; and d) increasing the abundance of the Pacific lamprey population. (*NMFS/FWS-Issue 8-Hamilton-Ex. 1 at 8:1-11; Yurok-Steward 8 Direct at 4:27 and 5:17; NMFS/FWS-Issue 8-Mesa-Ex. 1 at 5:16-6:6; CDFG-Pisano-Ex. 1 at 11:19* ).

## B. BLM DISPUTED ISSUES OF MATERIAL FACT

### ***1. FINDINGS OF FACT CONCERNING BLM ISSUE 10***

10-1 About eighty ("80") percent of the J.C. Boyle bypass reach (an area of 4.3 miles in length) is confined by steep canyon walls. Thus, only twenty ("20") percent of the bypass reach (less than one mile in length) has potential for "riparian restoration." (*PAC-Dwer-D-1 at 5:12 -14, 5:20 -23; Aug. 21, 2006 Tr. at 71:13-22; BLM Reply Brief at 4-5*).

10-2 Relatively coarse bed sediment (*i.e.*, gravel and cobble) can be mobilized in the bypass reach with flows of 1,700 cubic feet per second (cfs) and greater. (*PAC-Tomp-R-1 at 4:8-10*).

10-3 The seasonal high flows proposed by BLM for the bypass reach will create more frequent and larger magnitude high flow events. (*BLM-Turaski-Ex. 4 at 59, 89-91; BLM-Gard-Ex. 0 at 2:4-9*).

10-4 BLM high flows, as compared to current conditions, will mobilize and transport sediment more frequently within the Project. (*PAC-Tomp-D-1 at 12:20-23*).

10-5 Seasonal high flows, in combination with the BLM's proposed gravel augmentation program, will likely create a more dynamic channel with a wider range of sediment deposits. This sediment will be deposited higher on the channel margin which will serve as an ecological benefit. (*BLM-Cluer-Ex. 0 15:5-7, 24-16:4; Aug. 22, 2006 Tr. at 54:4-23; BLM-Cluer-Ex. 0 at 15:5-7*).

10-6 With the construction of dams and their operation, changes have occurred to the riparian community of the bypass reach. Specifically, reed canary grass has encroached into the channel in places that have been exposed by Project-diverted flows. (*PAC-Dwer-D-5 at 6-66; NGO-Ex. 1 at 13:7-9, 16:7-10; Aug. 21, 2006 Tr. at 102:24-103:3*).

10-1 ).

10-2 Reed canary grass can adversely affect downstream channel formation by effectively trapping sand, gravel, and small cobble in its dense root mass. Such material would otherwise have been transported downstream where it would replenish similar sized bed material scoured by floods. (*NGO-Ex. 1 at 16:11 -17:3*). This may adversely affect abundance and quality of fish and terrestrial habitat. (*NGO-Ex. 1 at 10:13-22*).

10-3 Approximately two-thirds of the riparian habitat in the J.C. Boyle bypass reach is riparian grass land, which is predominately reed canary grass. ( *Aug. 21, 2006 Tr. at 97:24 to 98:9*).

10-4 Riparian-focal bird species are birds that use riparian habitats. (*BLM-Alexander-Ex. 0 at 5:19-24; BLM-Alexander-Ex. 6 at 35; BLM-Turaski-Ex. 4 at 74*). These species often have a special management or conservation status. ( *Id.* )

10-5 Avian riparian focal species consistently use riparian habitat in the J.C. Boyle bypass and peaking reaches during breeding season. (*PAC-Tres-D-1 at 7:6-9:12*).

10-6 The eight species of riparian-focal bird species in the Project area do not nest in reed canary grass. Nesting is such grasses make the birds accessible to predators. (*PAC-Tres-D-1 at 4:17 -23, 11:14 -20); Aug. 21, 2006 Tr. at 124:14–125:23).*

10-7 Avian riparian focal species prefer structurally diverse habitat. ( *Aug. 21, 2006 Tr. at 124:20-22; PAC-Tres-D-1 at 13:7-11*).

10-8 In the J.C. Boyle bypass and peaking reaches, riparian-focal bird species are associated with and primarily nest in woody riparian vegetation. (*BLM-Alexander-Ex. 0 at 6:22 to 7:2; Aug 21, 2006 Tr. at 124:14–125:23*).

10-9 Numerous factors determine how useful riparian patches are to avian riparian focal bird species. An increase in the amount of riparian habitat does not necessarily correspond to a similar increase in birds that would use that habitat. ( *Aug. 21, 2006 Tr. at 128:21 to 129:10; Aug. 22, 2006 Tr. at 18:3-14*).

10-10 A relative increase in early woody riparian vegetation and a relative decrease in reed canary grass will likely increase abundance of riparian-focal bird species in the J.C. Boyle bypass reach. (*BLM-Alexander-Ex. 0 at 9:10-14; Aug. 21, 2006 Tr. at 120:21-25*).

10-11 BLM proposed flows would not increase woody riparian habitat. (*PAC-Tres-R-1 at 1:16 -17; NGO-Ex. 1 at 7:11 -18, 10:5-22 (which suggests that high flows, such as that associated with the proposed flows, scour woody riparian vegetation*)).

## *1. <u>FINDINGS OF FACT CONCERNING BLM ISSUE 11</u>*

11-1. J.C. Boyle Dam has captured an average of 6,124 tons/year of channel bedload and thus blocked its transport into the bypass and peaking reaches. (*PAC-Tomp-D-1 at 14:9-15; Aug. 21, 2006 Tr. at 74:22-75:2).*

11-2. Channel bedload is the totality of cobble, gravel, and other sediment that form the channel bed. Bedload mobilization is the natural geomorphic process whereby flow moves gravel for deposit on alluvial features and cleanses gravel of sediment. ( *Aug. 21, 2006 Tr. at 64:12-23*). Diversion has reduced the capacity of flow to mobilize the bedload by an estimated eighty-three (“83”) percent to ninety-six (“96”) percent in the bypass reach. (*PAC-Tomp-D-3 at 6-139; Aug. 21, 2006 Tr. at 64:3-70:1*).

11-3. The bed material in the J.C. Boyle bypass and peaking reaches has coarsened due to the J.C. Boyle Dam limiting the sediment supply. (*BLM-Cluer-Ex. 5 at 111, 129; BLM-Cluer-Ex. 0 at 6:14 -16; BLM-Turaski-Ex. 4 at 70*). In addition, the sediment that is delivered to the channel or was in the channel at the time of Project construction is transported downstream during Project spill events in the bypass reach and during peaking flows in the peaking reach. (*BLM-Cluer-Ex. 0 at 8:5-7, 14:10-12*).

11-4. In the J.C. Boyle bypass reach, the average annual flow released from the J.C. Boyle Dam has been reduced by eighty-one ("81") percent—from approximately 1,560 cfs to 296 cfs—with the 100 cfs minimum flow occurring eighty-nine ("89") percent of the time. (*BLM-Turaski-Ex. 4 at 68, 83*).

11-5. Low base flows combined with sediment being blocked by the J.C. Boyle Dam result in smaller alluvial features. (*NGO-Ex. 1 at 10:13 -16, 11:1-2; BLM-Cluer-Ex. 0 at 8:1-4*).

11-6. High flows can scour (uproot and dislodge) reed canary grass. Moderate flows are likely to scour plants with less well-established root mats. (*NGO-Ex. 1 at 15:14-16*). Larger flow events are likely to scour older plants with more well-established root mats. (*NGO-Ex. 1 at 16:1-7; PAC-Dwer-D-1 at 13:21 -23*).

11-7. Project diversions decrease high flow events in the bypass reach by approximately fifty ("50") percent. (*PAC-Dwer-D-5 at page 5-46, Table 5.7-16 (as explained at page 5-45*).

11-8. By decreasing the frequency of larger flows, the Project operations have reduced the number of flow events that can scour established reed canary grass. (*NGO-Ex. 1 at 16:4-10*).

11-9. If Project related coarsening of the bed had not occurred, it is likely that active features (e.g., point bars, islands) would have been characterized by finer sediment. ( *Aug. 21, 2006 at 68:8 to 69:6; PAC-Tomp-D-3 at 6-129*).

11-10. Willow is a desirable riparian plant that germinates and establishes itself on freshly deposited alluvium (material transported and deposited by river flows). (*BLM- Turaski-Ex. 4 at 74*).

11-11. Current operations continue to maintain, to a certain degree, woody riparian vegetation in the bypass reach. (*PAC-Dwer-R-1 at 8:24 -26; PAC-Dwer-R-1 at 3:14-20; NGO-Ex. 1 at 12:14 -18*).

11-12. Reed canary grass is adapted to survive in frequently inundated coarse substrate and is capable of out-competing woody riparian vegetation. (*BLM-Turaski-Ex. 4 at 73; PAC-Dwer-D-4 at 3-28*).

11-13. In the bypass reach, there is more riparian vegetation as a result of Project operations. This increase of vegetation is attributed mainly to the encroachment of reed canary grass. ( *Aug. 21, 2006 Tr. at 107:112-108:8*).

## *2. FINDINGS OF FACT CONCERNING BLM ISSUE 14*

14-1. In the J.C. Boyle bypass reach, the channel bed is dominated by sixty-four ("64") percent boulders and twenty-eight ("28") percent cobble. A reduction in find grain deposits diminishes the quantity and quality of fish habitat. (*BLM-Cluer-Ex. 11 at 2; BLM-Cluer-Ex. 0 at 1-5*).

14-2. Sediment trapping by J.C. Boyle Dam is the primary cause of low sediment availability in the bypass reach. (*FOF 11.1, 11.3; BLM-Cluer-Ex. 0 at 6:14-20; BLM-Cluer-Ex. 5 at 111*).

14-3. BLM has proposed a gravel management plan in which 1,226 to 6,134 tons of sediment per year would be added to the Klamath River below J.C. Boyle Dam. (*BLM-Turaski-Ex. 4 at 60-61*).

14-4. Implementation of coordinated sediment delivery with seasonal high flows can result in deposition of gravel in velocity pockets on the bed and fine sands on the banks. These deposits have ecological benefits including creating spawning pockets around boulders and in pools. (*BLM-Cluer-Ex. 0 at 13:10-14;* Aug*. 21, 2006 Tr. at 201: 10-15*; *BLM-Gard-Ex. R0 at 2:6-9*).

14-5. Fine sediment can infiltrate salmonid spawning gravel and reduce incubation success or affect the ability of fry to emerge from the gravel. (*PAC-Carl-D-1 at 7:4-6; BLM-Snedaker-Ex. 0 at 3:20 -26*).

14-6. Gravel embedded with greater than ten ("10") percent fine sediment results in a substantial reduction in suitability of steelhead spawning habitat. (*BLM-Gard-Ex. R0 at 1:20-21*).

14-7. Trout spawning gravel in the bypass reach is embedded with fine silt. (*BLM-Gard-Ex. 0 at 4:1-6; BLM-Snedaker-Ex. 0 at 3:20 -25*). In July 2006, the spawning gravel in the bypass reach below the emergency spillway was fifty ("50") percent embedded with silt and sand. (*BLM-Gard-Ex. 0 at 4:1-14*).

14-8. An annual flushing flow can clean and redeposit gravel to provide quality spawning habitat. (*PAC-Carl-D-8 at 116-121*). To be effective, flushing flows need adequate duration and frequency to mobilize and redistribute fine sediments in the spawning beds. (*BLM-Turaski-Ex. 4 at A-41*).

14-9. The BLM River Corridor Management Condition calls for a one week seasonal high flow between February 1st and April 15th in years when inflow to J.C. Boyle Reservoir exceeds 3,300 cfs. (*BLM-Gard-Ex. 0 at 2: 4-13; BLM-Turaski-Ex. 4 at 59*). Based on an analysis of the historical flow record, the seasonal high flow would be implemented approximately every other year. ( *Id.* ; *PAC-Carl-R-1 at 1:10 to 2:*3). The seasonal high flow would occur in February twenty-four ("24") percent of the years, in March twenty-four ("24") percent of the years, and in April three ("3") percent of the years. (*Id).* The median start date for the seasonal high flow would be February 18. (*Id).*

14-10. BLM's proposed seasonal flushing flow would commence at 3,300 cfs and the medium flow would exceed 4,200. (*BLM-Turaski-Ex. 4 at A-16; PAC-Carl-D-1 at 4:15-19; BLM-Gard-Ex. 0 at 2:11 -13*).

14-11. The spawning period for redband trout between Copco 1 Reservoir and J.C. Boyle Dam is from February through May. (*BLM-Gard-Ex. 0 at 2:19-23*). Most of the spawning takes place between March 15 and April 15. (*Id).*

14-12. Based on an analysis of the historical flow record, the seasonal high flow would be implemented between March 15 and April 15 in fourteen ("14") percent of the years. (*BLM-Gard-Ex. 0 at 2:23-25*).

14-13. Salmonids will hold during high flows and resume spawning once the flows have dropped. (*BLM-Gard-Ex. 0 at 3:6-10*). The one week seasonal high flow will still leave 21 weeks for rainbow trout to spawn. (*Id).*

14-14. BLM's proposed flushing flow would always occur during spawning season. ( Aug*. 22, 2006 Tr. at 59:23-25*).

14-15. Flushing flows scheduled during or immediately after fish spawning could dislodge eggs and result in reduced recruitment. (*PAC-Carl-D-8 at 116*). Flushing flows released just prior to spawning would produce more beneficial effects. ( *Id.* ).

14-16. In the bypass reach, PacifiCorp provides flows limited to 100 cfs eight-nine ("89") percent of the time. (*BLM-Turaski-Ex. At 68*). When flows greater than 100 cfs do occur in the bypass reach, they are abrupt, are short in duration, and do not reflect a flow regime with seasonal variability. (*Id).*

14-17. The timing of the BLM seasonal high flow condition reflects the natural hydrologic flood regime under which redband trout evolved. (*BLM-Gard-Ex. 0 at 3:11-17*). The BLM seasonal high flow condition will be implemented during the normal peak flow period. (*BLM-Gard-Ex. 0 at 3:11-17; Aug. 21, 2006 Tr. at 175:20-22*).

14-18. Historically, redband trout rearing in the Oregon portion of the Klamath River downstream of the J.C. Boyle Dam migrated upstream to spawn in Spencer Creek . (*BLM-Hooton-Ex. 0A at 2:5-6*). Redband trout rearing below J.C. Boyle Dam moved upstream in two peak spawning migrations, one in the spring and one in the fall. ( *Id. at 2:12-13*). Both spring and fall spawning migrations were associated with increases in the river flow. (*Id).*

14-19. Spring and fall freshets attract spawning rainbow trout upstream past J.C. Boyle Dam and juvenile trout migrant downstream to rearing areas below J.C. Boyle Dam. (*BLM-Hooton-Ex. 0B at 4:1-3; BLM-Hooton-Ex. 18 at 1; BLM-Hooton-Ex. 19 at 1*).

14-20. Soon after the installation of J.C. Boyle Dam, upstream spawning migrations of redband trout were reduced and recent data shows little successful migratory movement occurs from downstream to upstream of J.C. Boyle Dam. (*BLM-Hooton-Ex. 0B at 4:10-16*).

14-21. The only observed trout spawning activities, including the presence of redds, currently occur in the main stem bypass reach just downstream of the existing J.C. Boyle emergency canal spillway. (*PAC-Carl-D-1 at 8:11-21; PAC-Carl-R-1 at 5:22 -6:1*).

14-22. Erosion from PacifiCorp's use of the emergency spillway has significantly increased the rate of fine and coarse sediment delivery to the area below the emergency spillway. (*BLM-Cluer-Ex. 0 at 8:14-16; PAC-Carl-D-1 at 8:15 -17*). Since J.C. Boyle Dam operations began in 1958, approximately 69,000 cubic yards of hillside sediment has been delivered to the stream from the erosional washout. (*BLM-Cluer-Ex. 0 at 8:14-16*).

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14-23. The location of the redds, near the erosional feature, is relatively unstable for two reasons. First the spillway can be used at any time and its use probably destroys or buries redds and spawning gravel patches. (*BLM-Cluer-Ex. 0, 10:1-8*). Second, the slope of the channel in this location is very steep ( *Aug. 21, 2006 Tr. at 56:10 to 57:7*), making this location inherently unstable during flood flows in the bypass channel. (*BLM-Cluer-Ex. 0, 10:1-8; BLM-Gard-Ex. 0 at 4:9-14*).

14-24. Seasonal high flows can mobilize sediment accumulated at the emergency spillway deposit and distribute that sediment downstream where it can be deposited in more stable locations. (*BLM-Cluer-Ex. 0 at 15:17-25*).

14-25. If the gravel at the emergency spillway were transported downstream by seasonal high flows, they would be more valuable fish habitat because the gravel would be transported to more stable locations and better sorted into spawning sizes. ( *Id.* ; *Ex. PAC-Carl-D-8 at 120-121).*

14-26. If PacifiCorp installs bypass valves at the J.C. Boyle powerhouse, the emergency spillway will no longer be used and the unnatural sediment loads in the area will not be replenished. (*PAC-Carl-D-1 at 8:21 -9:3*).

## *1. FINDINGS OF FACT CONCERNING BLM ISSUE 16*

### a. Low Flows Reduce Fish Habitat

16-1. Trout presently do not spawn in the peaking reach. (*PAC-Ols-D-1 at 7:20* ).

16-2. Before the J.C. Boyle Dam was built, rainbow trout would use the Frain Ranch area of the J.C. Boyle peaking reach to spawn. (*BLM-Denman-Ex. 0 at 3:6-15; BLM-Snedaker-Ex. 0 at 3:9-13*).

16-3. There are locations in the peaking reach with suitable spawning gravel, but these areas were on the margins of the stream channels and were exposed during lower flows. (*BLM-Snedaker-Ex. 0 at 3:13-19; BLM-Gard-Ex. 6 at 21-24*).

16-4. Low flows contribute to the lack of spawning in the peaking reach. (*BLM-Simons-Ex. 0 at 7:12-20; BLM-Simons-Ex. 16 at 69, section 4.10*; *"[M]uch of the gravel at this location [in the peaking reach] was exposed during low flow conditions. Since peaking operations often begin in mid-May, trout embryos would still be in the gravel when daily desiccation begins. Therefore, much of the available gravel would not be suitable for incubation of trout embryos during most years." BLM-Gard-Ex. 6 at 24*.").

16-5. Depositional features, such as gravel bars and side channels, are suitable spawning and rearing habitat for redband trout and serve as an oasis from the higher-velocity flows that occur during springtime snowmelt. (*NGO-Ex. 1 at 21:9-16, 21:1-2).*

16-6. The Project reduces the frequency and extent of inundation of depositional features in the bypass and peaking reach. (*NGO-Ex. 1 at 21:3-16, 32:4-7.*). This hydrologic impact reduces the availability of suitable rearing habitat for juveniles. ( *Id. at 21:3-16).*

### b. Stranding

16-7. Peaking is the most widely documented source of fish stranding. (*BLM-Snedaker-Ex. 6 at 25*). Peaking fluctuations can result in severe cumulative impacts to fish populations. (*Id*). Stranding is the separation of fish from flowing surface water as a result of declining river state. ( *Id. at 5*).

16-8. PacifiCorp's peaking operations cause high mortality to fish and other aquatic organisms through stranding. (*BLM-Snedaker-Ex. 0 at 4:25 to 5:11 ; KTR-LKD-DT-BLM 16 at 4:3-22; KTR-FAE-DT-BLM 16 at 7:13 -17*).

16-9. On July 5, 2006 , a severe stranding along 225 feet of the peaking reach was documented near Frain Ranch. (*KTR-LKD-DT-BLM 16 at 4:3-10*). "[A]bout 5,000 fish, more crayfish, and an order of magnitude more aquatic insects perished in a single peaking cycle . . . ." (*KTR-LKD-Ex. 3 at 5*). No redband trout mortalities were documented, however few trout fry exist in the peaking reach. ( *Id.* ).

16-10. The severe loss of fish and other aquatic life on July 2006 is directly attributable to PacifiCorp's peaking operations. ( *Aug. 21, 2006 Tr. at 153:18-21*).

16-11. July 5, 2006 , was the first major downramp event of the season. No stranded fish were found on

July 6, during the second major peaking cycle, or on July 7-8, 2006 , during the third major peaking cycle. (*KTR-LKD-DT-BLM 16 at 4:8-13; PAC-Ols-R-1 at 16:7-11*).

16-12. Peaking operations that cause high mortality likely only happen a few times a year, following the first peaking event after several months of steady flow. (*PAC-Ols-R-1 at 16:16 -17:7*)

16-13. Reduced ramp rates can resolve the problem of fish stranding. (*PAC-Ols-R-1 at 17:1-9*).

16-14. The downramp rate at the site where the severe mortality of aquatic organisms occurred was about 4.0 inches/hour. (*KTR-LKD-DT-BLM 16 at 4:14-22*). At a site further downstream where no mortalities of fish were observed, the ramp rate was 2.4 inches/hour, similar to BLM's proposed condition of a 2 inch/hour maximum downramp rate. ( *Id.* ).

16-15. Project peaking operations kill, through stranding, large numbers of young fish and aquatic invertebrates that are the primary prey food for trout. (*KTR-LKD-Ex. 17 at 4:3-133 (enormous prey losses from stranding); KTR-LKD-Ex. 3 at 4-5 (field study finds enormous prey loss from stranding); KTR-FAE-Ex. 31 at 8:19-20 (redbands feed primarily on invertebrates; invertebrate "drift" 5 to 6 times higher in Keno reach than in peaking reach); Aug. 21, 2006 Tr. at 153:18-21 (significant loss of fish prey is a Project effect); BLM-Denman-Ex. 0 at 2:19-22 (crayfish were food source for trout before peaking); BLM-Denman-Ex. 0 at 3:6-8 (numerous dead crayfish were seen in the peaking reach after peaking events)).*

### c. Downstream Displacement

16-16. Flushing of juvenile salmonids downstream is likely in the peaking reach. (*BLM-Snedaker-Ex. 0 at 9:16-17; BLM-Hooton-Ex. 0B at 7:12-15; BLM-Snedaker-Ex. 8 at 19 (FERC Salt Caves Project EIS concludes that flows of 1500 cfs in the peaking reach "lead to fry and fingerling trout being flushed downstream"*)).

16-17. Few fry have been captured in the Oregon section of the peaking reach; the section of the peaking reach with the highest ramp rates. (*BLM-Snedaker-Ex. 5 at 52; PAC-Ols-D-20 at App. 3A at 20; KTR-LKD-Ex. 6 at 6-46*).

16-18. PacifiCorp's mark-recapture studies did not mark or recapture any fry in the Oregon peaking reach; the area of peaking reach where peaking effects would be most pronounced. (*PAC-Ols-D-1 App. 3A at 36-37*).

16-19. In the California peaking reach, nine ("9") of seventy-three ("73") fry were recaptured, indicating some ability to maintain their location during peaking events. (*PAC-Ols-D-1 App. 3A at 36-37*).

16-20. Very few salmonid fry or other fish species are observed in the margins of the peaking reach. (*BLM-Hooton-Ex. 0A at 11:7-10; BLM-Snedaker-Ex. 0 9:16 -23; KTR-LKD-DT-BLM 16 at 3:16 to 4:8*).

### d. Energetic Costs/Size

16-21. Flow fluctuations from peaking operations increase energetic demands on salmonids, decreasing energy available for overall health, growth, and reproduction. (*BLM-Simons-Ex. 19 at 16, 165*).

16-22. Peaking operations induce trout movement that would not be expected in a stable-flow regime. Holding territory, while flows increase, force trout to swim faster to stay in place. (*BLM-Simons-Ex. 0 at 5:8-6:7*). Fish move laterally with changes in flow. (*KTR-LKD-DT-BLM*

*16 at 7:13-17; KTR-LKD-Ex. 10 at 26*). During low flows fish will move towards the center of the channel and during high flows fish will move toward the edges of the channel. ( *Id.* ).

16-23. Larger fish operate closer to the energetic margin, so energetic costs of peaking would be expected to reveal themselves in larger fish. (*KTR-LKD-R-BLM 16 at 7:12-17*).

#### e. Macroinvertebrate

16-24. Peaking operations reduce the production of sessile organisms, like macroinvertebrates, by ten ("10") percent to twenty-five ("25") percent. (*BLM-Simons-Ex. 13 at 26*).

16-25. Macroinvertebrate drift rates, a measure of food availability for trout, in the non-peaking Keno reach were five to six times greater than in the peaking reach. (*BLM-Simons-Ex. 13 at 70*). Fluctuations in the peaking reach are undoubtedly a contributing factor to the lower macroinvertebrate drift rates. ( *Id.* ).

#### **f. Keno vs. Peaking Reach**

16-26. When comparing growth of trout in the non-peaking Keno reach to growth in the J.C. Boyle peaking reach, the following is observed: growth is greater for trout in the peaking reach through age two ("2"), similar growths are recorded between ages two ("2") and three ("3"), and growth is greater in the Keno reach after age three ("3"). (*BLM-Simons-Ex. 13 at 64*).

16-27. Average trout size has decrease since Project operations began. (*BLM-Hooton-Ex. 28*). For trout residing below J.C. Boyle Dam, the average length has decreased from about twelve inches (30 cm) in 1961, shortly after the J.C. Boyle facility was completed, to about seven inches (18 cm) in 1990. ( *Id.* )).

16-28. The average condition factor for trout in the peaking reach is similar to that in the Keno Reach. (*PAC-Ols-D-1 at 12:12-14; PAC-Ols-R-1 at 13:4-7; PAC-Ols-R-5*).

16-29. While the average condition factor for trout may be similar, condition factors vary in the peaking reach and Keno Reach from season to season. (*PAC-Ols-D-6 at 4*).

16-30. Trout in the Keno reach are older than those in the peaking reach. (*PAC-Ols-D-12 at 3-4; PAC-Ols-D-5*).

16-31. Forage fish will provide a higher energy source than invertebrate drift for mature fish and allow for increased growth rates. (*BLM-Snedaker-Ex. 0 at 10:19 -23, BLM-Simons-Ex.14 at 17, 53).*

16-32. The Project-caused impacts to forage fish in the peaking reach help explain the lower growth rates and absence of larger and older fish in the peaking reach, as compared to the Keno reach. (*BLM-Snedaker-Ex. 0 at 10:15 -17, 11:8-13; KTR-LKD-DT-BLM 16 at 9:7-11*).

### ***2. FINDINGS OF FACT CONCERNING BLM ISSUE 17***

17-1. The existing upramp rate for the J.C. Boyle facility is nine inches per hour. (*BLM-Turaski-Ex. 4 at 67*).

17-2. The BLM has proposed an upramp rate of two inches per hour. (*BLM-Turaski-Ex. 4 at 59*).

17-3. Most rivers in the Pacific Northwest do not naturally experience a ramp rate in excess of two inches per hour, except during or immediately after events such as an intense storm or flood event. (*BLM-Snedaker-Ex. 0 at 7:13-15; BLM-Snedaker-Ex. 6 at 12-13; HVT-Steward Ex. 4 at 2:18-22; HVT-Steward Ex. 37 at 14-15 (showing that the "upramp" rate for the naturally flowing Williamson River in the Upper Klamath Basin rarely, if ever, exceeded two inches per hour over the three years of flow data reviewed*)).

17-4. Limiting ramp rates to no more than two inches per hour have been widely accepted as being protective of fish resources. (*BLM-Snedaker-Ex.10 at 48-49; BLM-Snedaker-Ex. 0 at 7:15-16*).

17-5. Daily peaking causes chronic increases in macroinvertebrate drift events. This in turn reduces the quality and abundance of drift forage for trout. (*BLM-Snedaker-Ex. 6:8-11; BLM-Simons-Ex. 13 at 26*).

17-6. Such drift events may increase fish feeding activity in the short term. Over the long term, however, this can result in a depletion of macroinvertebrates, resulting in lower fish productivity. (*BLM-Snedaker-Ex. 7 a t4-5*).

17-7. Macroinvertebrate sampling showed that upramping caused an increase in macroinvertebrate drift. (*BLM-Snedaker-Ex. 0 at 10:9-17; PAC-Ols-D-1 at 9:12 -13*).

17-8. Species of dace, chubs, and suckers native to the Klamath River broadcast their eggs over the substrates where they remain until hatching. (*BLM-Snedaker-Ex. 0 at 11:1-5*). Eggs deposited in this fashion and weak swimming fry of these species are especially vulnerable to entrainment and transport by peaking flows. ( *Id.* ).

17-9. Impacts to native forage fish species (species on which trout prey) can impair growth and feeding of trout in the peaking reach. (*BLM-Snedaker-Ex. 0 at 11:8-13; KTR-LKD-DT-BLM 16 at 7:8-12 (the evidence indicates that forage fish production is impaired by the peaking operations, and this affects trout growth in the peaking reach)*)

## *1. FINDINGS OF FACT CONCERNING BLM ISSUE 19*

### a. Current Flow Regime

19-1. The current flow regime at the J.C. Boyle powerhouse has two components. (*PAC-Whit-D-1 at 4:23* ).

19-2. First, there is a minimum base flow of 100 cfs from J.C. Boyle Reservoir into the J.C. Boyle bypass reach at all times, which combines with springs in the bypass reach to provide approximately 330 cfs where the J.C. Boyle powerhouse discharges water into the river at the start of the peaking reach. (*PAC-Whit-D-1 at 4:23 -5:4; PAC-Carl-D-1 at 15:1-6)*. [1]

19-3. Second, remaining inflows to J.C. Boyle reservoir are stored and diverted to the J.C. Boyle powerhouse for electric generation unless they exceed Project capacity, in which case the excess is spilled over J.C. Boyle dam into the bypass reach. (*PAC-Whit-D-1 at 5:5-7; PAC-Carl-D-1 at 14:21 -22*).

19-4. In wetter periods with higher reservoir inflows (usually from late winter through early summer), J.C. Boyle powerhouse is operated continuously, up to a two-turbine capacity of about 2,600 cfs. (*PAC-Whit-D-1 at 5:7-9; PAC-Carl-D-1 at 14:19 -21*).

19-5. During drier times of the year, the powerhouse is operated in a daily "peaking" mode with alternate periods of storage and generation through a twenty-four-hour cycle. (*PAC-Whit-D-1 at*

*5:10-11*).

19-6. In typical peaking operations, peaking reach flows are about 330 cfs (all from the bypass) during the storage periods from early evening through early morning, and then ramp up to about 1,600 cfs (one turbine operating plus bypass flows) or 2,800 cfs (two turbines operating plus bypass flows) during the middle of the day. (*PAC-Whit-D-1 at 5:14-17*).

19-7. As active storage is used up, the project ramps back down to 330 cfs in the evening. (*PAC-Whit-D-1 at 5:17-18*).

### b. BLM's Proposed Flows

19-8. The BLM condition is intended to provide an overall increased base flow and flows that are more reflective of seasonal events, including high and low flows. (*BLM-Turaski-Ex. 4 at 89*).

19-9. The BLM flow proposal would substantially alter the established flow regime. (*PAC-Whit-D-1 at 5:19 ).*

19-10. Under BLM's proposal, there would be a higher base flow in the bypass reach of either forty ("40") percent of the inflow to the J.C. Boyle reservoir, or a minimum of 470 cfs, whichever is greater. (*PAC-Whit-D-1 at 5:19-22; BLM-Turaski-Ex. 4 at A-16*).

19-11. Most of the time, the proposed base flows would provide a minimum flow of approximately 700 cfs in the peaking reach, about twice the current baseflow. (*PAC-Whit-D-1 at 5:22 -6:1*).

19-12. The BLM proposal would provide a seasonal high flow event, for seven full days, between February 1 and April 15, when inflows first exceed 3,300 cfs, during which time power generation would be suspended to allow all inflows down the bypass reach (and on through the peaking reach) for one week. (*PAC-Whit-D-1 at 6:3-6; BLM-Turaski-Ex. 4 at A-16*).

19-13. During the period between May 1 and October 31, BLM Condition 4 would provide a single peaking event per week of 1,500 cfs to 3,000 cfs, with a priority set for Saturday, Sunday, and then Friday. (*PAC-Whit-D-1 at 6:7-8; BLM-Turaski-Ex. 4 at A-16*).

### c. Whitewater Boating

19-14. Boating is a common recreation activity in the peaking reach. (*PAC-Whit-D-1 at 6:21 to 7:1*).

19-15. Whitewater boating takes place at the section of water between J.C. Boyle powerhouse and the California-Oregon border known as the peaking reach, which has been rafted commercially since 1979. (*PAC-Bald-D-1 at 3:1-3; PAC-Whit-D-1 at 7:7-10*).

19-16. Siskiyou County strongly opposes the proposed flow regime and believes it will induce severe and adverse affects on the county's commercial whitewater rafting business, which produces needed revenue for the county. ( *Aug. 21, 2006 Tr. at 33:12–36:19*)[2]

19-17. Boaters in kayaks may be able to use the river with flows as low as 400 to 500 cfs, but acceptable "technical" trips begin about 700 cfs and transition into higher quality "standard trips" about 1,300 cfs to 1,500 cfs. (*PAC-Whit-D-1 at 11:14-18).*

19-18. Standard rafting opportunities are acceptable about 1,300 to 1,400 cfs, but they become optimal for commercial trips about 1,500 cfs. (*PAC-Whit-D-1 at 12:3-4; PAC-Bald-D-1 at 2:14 -15*).

19-19. Big water boating is optimal from about 2,400 to 3,000 cfs. (*PAC-Whit-D-1 at 12:6-8*).

19-20. At flow levels above 3,500 cfs, the river starts to "flush" and it is up to the comfort of the individual outfitter or boater to take this on. (*PAC-Bald-D-1 at 2:18-19*).

19-21. Predictable daily flows during current peaking operations support a substantial commercial whitewater boating industry on the Upper Klamath River . (*PAC-Carl-D-1 at 15:22 to 16:1*).

19-22. About 4,000 to 5,000 (of an estimated 12,000) recreation days per year are specifically associated with commercial rafting. "Recreation day" is defined as "one person visiting for any portion of a day." (*PAC-Whit-D-1 at 7:3-4*).

19-23. In 2004, there were 4,141 commercial rafting visits on the Upper Klamath between May and October with 2,712 visits, or sixty-six ("66") percent of the total visits, occurring in the months of July and August. (*PAC-Bald-D-1 at 4:5-8; BLM-Turaski-Ex. 4 at A-36; BLM-Turaski-Ex. 4 at 80, 89; BLM-Weidenbach-Ex. 0 at 5:6*).

19-24. The highest use days for whitewater boating are weekends (Friday-Sunday), with approximately sixty-five ("65") percent of commercial rafting visits occurring on the weekends (statistics are from rafting visits made between May and October 2004 on the Upper Klamath). (*BLM-Turaski-Ex. 4 at 80, 85*).

19-25. Even though the BLM conditions emphasize protecting the weekend boating opportunities, the conditions would substantially reduce the number of days when optimal whitewater boating (flows over 1,500 cfs) is available compared to existing conditions. (*BLM-Turaski-Ex. 4 at 59; BLM-Weidenbach-Ex. R0 at 3:23 to 4:2; Aug. 22, 2006 Tr. at 93:17-23; PAC-Whit-D-1 at 16:17 -19*).

19-26. Given BLM's proposed flow regime, there will only be enough water through the system in very wet years to allow for boating during the week (excluding weekends), without peaking under the BLM flows. ( *Aug. 22, 2006 Tr. at 84:25-85:15*).

19-27. Under the flows proposed by BLM, in an average year (such as 2000), the approximate decreases in raftable days would be as follow: total number of days would decrease forty-four ("44") percent (from 183 days to 102 days); the total number of weekend days would decrease eighteen ("18") percent (from 78 to 64); the total number of days in the July-August period would decrease seventy-one ("71") percent (from sixty-two ("62") to eighteen ("18")); and the total number of weekend days in July-August would decrease thirty-five ("35") (from twenty-six ("26") to eighteen ("18")). (*BLM Proposed Ultimate Finding of Fact - Issue 19*)

19-28. There may be a shift of some percentage of existing midweek use to weekend days. (*BLM-Turaski-Ex. 4 at 100; BLM-Weidenbach-Ex. 0 at 6:14-17*).

19-29. Under BLM's proposed flows, there would be limited opportunity for boating parties to spread out trips to avoid or mitigate potential crowding or congestion. (*BLM-Weidenbach-Ex. R0 at 2:2-5; Aug. 22, 2006 Tr. at 103:2-10*).

19-30. The BLM Flow Management Scenario (FMS) model provides estimates of available whitewater boating opportunities that would result from the BLM flow condition. (*BLM-Turaski-Ex. 0 at 2:15 -18, 4:1-8*).

19-31. Model results-for both the FMS model and PacifiCorp's spreadsheet model-are approximations of what impacts might actually occur to whitewater boating opportunities. (*BLM-Turaski-Ex. 0 at*

*10:12-15; PAC-Carl-R-1 at 13:4-6; Aug. 21, 2006 Tr. at 181:5 to 182:4*).

19-32. BLM provided FMS model outputs for decreases in whitewater boating opportunities (raftable days) in an average, dry, and wet year for the 10-year period; the decreases were greater in a dry year and less in a wet year. (*PAC-Whit-R-3 (average year) (these are the values presented in the proposed ultimate finding of fact for Issue 19); BLM-Turaski-Ex. 5, Table 2 (presents values for average, dry, and wet years*)).

19-33. In the ten-year period used by the BLM for its FMS model, there were three average years, four wet years, and three dry years. (*BLM-Turaski-Ex. 11 (listing the entire 1960-2000 period of record, including the ten-year period of 1991 to 2000 used in the BLM FMS model); BLM-Turaski-Ex. 0 at 7:18-8:11 (explaining how the ten-year period is representative of the 1960-2000 period of record*)).

19-34. The FMS model does not explicitly consider mechanical or efficiency considerations when estimating rafting impacts. (*PAC-Smit-R-1 at 5:8 to 6:2; Aug. 22, 2006 Tr. at 88:12-16*).

19-35. The FMS model does not consider variables that affect the demand and need for generation at the Project, the value available at the J.C. Boyle project, or the variability inherent in electricity markets. ( *Aug. 22, 2006 Tr. at 87:17 to 87:20*).

19-36. The FMS model does not consider whether transmission generation is available or the mechanical or physical limitations that can be imposed on generating facilities, and does not attempt to maintain reservoirs within current summer operating levels. ( *Aug. 22, 2006 Tr. at 87:21-88:4*).

19-37. As a result of these limitations of the FMS model, the model likely overstates the number of days and hours rafting will be available. (*PAC-Smit-R-1 at 2:14-20; PAC-Carl-R-1 at 13:4-16*).

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[1] PacifiCorp Proposed Finding of Fact 95 states that the total cfs from the bypass reach which discharges into the peaking reach is *approximately 330* cfs (100 cfs from J.C. Boyle Reservoir and 230 from springs in the bypass reach). BLM wholly disputes this proposed finding and states that the total discharge is *generally 320* (100 cfs from J.C. Boyle Reservoir and 220 from springs in the bypass reach). (*BLM Reply Brief at 15*). Inconsequential and/or picayune objections do not aid in moving this expedited process forward.

[2] Siskiyou County also objects to the potential loss of peak power from Project facilities, should the proposed flows be allowed. ( *Aug. 21, 2006 Tr. at 33:12–36:19*).

## a. Fly-fishing

19-1. Trout fishing occurs in the J.C. Boyle bypass reach. (*PAC-Whit-D-1 at 8:1*).

19-2. Siskiyou County strongly opposes the proposed flow regime and believes it will induce severe and adverse affects on the county's fly-fishing tourism industry, which produces needed revenue for the county. ( *Aug. 21, 2006 Tr. at 33:12–36:19*).

19-3. In the peaking reach, many fly-fishing anglers describe the experience as good or excellent. (*PAC-Carl-D-7 at 2-68; NGO-Ex. 5 at 10:11-19*).

19-4. The ability to wade is an integral component to fly-fishing. This includes not only the aesthetic experience of wading, but also the practical advantage of being able to better access places where fish my reside. ( *Aug. 22, 2006 Tr. at 113:3-117:10*).

19-5. Optimal fly-fishing conditions, particularly for those who wade, generally occur at 330 cfs base flows. (*PAC-Whit-D-1 at 12:11-13*).

19-6. Lower flows are preferred by anglers because lower flows provide: (1) improved access to fishable water because of improved wadeability that allows river crossings, access to the middle of the channel, and more casting space for fly anglers; (2) more fishable water, with current velocities and depths appropriate to preferred tackle and techniques; (3) the ability to use lighter tackle, which decreases the possibility of snagging rocks or vegetation in the channel; (4) more concentrated fish in specific locations; and (5) better aesthetics and possibly improved fishing success due to a larger proportion of "clear water" from Boyle bypass springs rather than more turbid water from Upper Klamath Lake . (*PAC-Whit-D-1 at 12:18 to 13:3*).

19-7. Higher flows diminish the quality of this opportunity, which becomes sub-optimal at about 700 cfs and unacceptable at about 1,400 to 1,500 cfs. (*PAC-Whit-D-1 at 12:13-15; BLM-Denman-Ex. 0 at 4:9-10; PAC-Whit-R-1 at 2:1-4*).

19-8. Measured flows at a gage are not indicative of velocity conditions at all spots within the river. (*Aug. 22, 2006 Tr. at 114:23 to 115:8 (higher flows do not mean that wading is more difficult in all areas—some areas may be faster, some slower); Aug 22, 2006 Tr. at 133:15-23 (Knight cross) (noting fisherman's ability to find back water area to fish when measured flows were 1,500 cfs*)).

19-9. In an average year (2000), the existing regime provides at least three daylight hours of "preferred" fishing flows (330 to 699 cfs) for 109 days or about fifty-nine ("59") percent of the season from May through October, and fifty-two ("52") days or eighty-four ("84") percent of the season from June through August. (*PAC-Whit-R-1 at 3:7-13*).

19-10. In an average year (2000), the existing regime provides at least three hours of "preferred" fishing flows for forty-five ("45") of seventy-eight ("78") (about fifty-eight ("58") percent) of the "weekend" days (Friday, Saturday, or Sunday) from May to October. (*PAC-Whit-R-2*).

19-11. Under current operations, all day "high flow fishing" only occurs on twenty-six days or twenty ("20") percent of the May-October season. (*PAC-Whit-R-2*).

19-12. The BLM condition will make wading more difficult in the peaking reach. (*Aug. 22, 2006 2 at 120:3-20; BLM-Weidenbach-Ex. 2 at 93 (each higher flow increment may provide less wadeable area); PAC-Carl-D-7 at 2-93; NGO-Ex. 5 at 7:12-13*).

19-13. Under BLM's proposal, wading access (or fishability) at dawn and dusk will be more difficult at those locations where the flow velocity and depth will increase relative to current minimum flows. However, pools and other locations with good access will continue to exist under the proposed schedule. (*PAC-Carl-D-7 at 2-94; NGO Ex. 5 at 7:10 -15; Aug. 22, 2006 Tr. at 121:1-122-16, 132:22-134:1*).

19-14. Based on experience with changed flow regulation on other rivers, it is reasonable to expect that anglers in the peaking reach will attempt to adjust their tackle and techniques to accommodate the proposed flows if implemented. (*PAC-Carl-D-7 at 2-97; id. at 2-63-64, 2-95; Aug. 22, 2006 Tr. at 130:19-21).* Thus success of any such mitigation attempts is no contained in the record.

19-15. Wading access, as set out in the "fishability" study conducted by PacifiCorp, is only one component of assessing flow needs for fishing opportunities. (*PAC-Whit-D-8 at 17, 30 (other components include fishing success or effects on the fishery); Aug. 21, 2006 Tr. at 230:18 to*

*231:14*).

19-16. Many anglers believe that geological concerns of the fish stock out weight their concern about maintaining water levels which are optimal for wading. (*BLM-Weidenbach-Ex. 2 at 98; PAC-Carl-D-7 at 2-98 (same); Aug. 21, 2006 Tr. at 231:18 to 233:4; Aug. 22, 2006 Tr. at 131:1-4*).

19-17. The proposed flows will increase the population of the redband trout fishery. (*See BLM Issue 16 Proposed Findings*).

# DISCUSSION

## A. USFWS/NMFS DISPUTED ISSUES OF MATERIAL FACT DISCUSSIONS

### *1. USFWS/NMFS ISSUE 2(A)*

USFWS/NMFS Disputed Issues of Material Fact 2A asks whether stocks of anadromous fish suitable to conditions above Iron Gate Dam. PacifiCorp answers this question in the negative. According to PacifiCorp, the stocks of anadromous fish at issue in this proceeding do not possess the biological and behavioral traits suitable to the conditions above Iron Gate Dam. To support its position, PacifiCorp heavily relies on the KlamRas and EDT models to show that juvenile and adult fish survival rates associated with volitional passage would be minimal. While the information contained in the studies was informative, PacifiCorp's reliance on the Miller Radio-Telemetry study is misplaced.

The issue concerning suitability of stock for reintroduction above Iron Gate Dam is separate and distinct from the issue concerning survival rates associated with volitional passage. See *NMFS/FWS-Issue 2-Curtis Rebuttal at 2:18-23; Aug. 24, 2006 at 16:24-17:18* ). The latter is not an issue before the judge.

#### a. The Miller Radio-Telemetry Study is Scientifically Unreliable.

While the Miller Radio-Telemetry study (*PAC-Mal-D-15*) was admitted into evidence, I find that it is not scientifically reliable. Accordingly, it will be accorded little, if any, weight. This study was based on a small sample of juvenile salmonids, it used hatchery fish which lack the predator avoidance skills of wild fish, and the authors themselves admitted that fish passage success and travel time may be underestimated. (*Aug. 23, 2006 Tr. at 220:25-233:5; Aug. 24, 2006 Tr. at 53:2-55:2; PAC-Mal-D-15 at 15, 19, 27 and 31; NMFS/FWS-Issue 7-Simondet Rebuttal-Ex. 1 at 7:3-11; NMFS/FWS-Issue 2-Hamilton Rebuttal Ex. 1 at 2:18-3:7; NMFS/FWS-Issue 2-Hamilton Rebuttal Ex. 8*). Further the study: 1) lacked a control group; 2) was conducted during one-water year type and so it does not represent the normal range of flow conditions; 3) was conducted with highly variable peaking flows; and 4) produced widely varying results between 18 and 100 percent survival for different groups of salmonids in one reservoir. ( *Id.* ).

As the presiding judge in this case, I have an affirmative duty of ensuring that this decision is based on "relevant, reliable, and probative evidence." See 50 C.F.R. § 221.55(a) (1). The reliability requirement of 50 C.F.R. § 221.55(a) (1) adopts the "spirit" of Daubert v. Merrell Dow, 509 U.S. 579 (1993), as the standard to be used for determining the reliability of expert testimony in this administrative proceeding.

In Daubert, the Supreme Court held that Rule 702 of the Federal Rules of Evidence imposes upon the trial court a gatekeeper obligation in order to "ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable." Daubert, 509 U.S. 579. The judge's gate keeping function was later extended to apply to all expert testimony. Kumho Tire Co., Ltd. v. Carmichael , 526 U.S. 137 (1999). Daubert and its progeny interpret the Federal Rules of Evidence. Although the Federal Rules of Evidence do not apply in these proceeding, they do serve as guidance. 50 C.F.R. at § 221.55(a) (4). As the 7th Circuit noted in Niam v. Ashcroft, "'Junk science' has no more place in administrative proceedings than in judicial ones." 354 F.3d 652, 660 (7th Cir. 2004). Although the Daubert factors could be used in this case to excluded Mr. Malone's testimony and the related exhibits concerning the Miller Radio-Telemetry study because it is unreliable, Lobster v. Evans, 346 F. Supp. 2d. 340, 344-45 (D. Mass. 2004), my practice has been to err on the side of admissibility. United States Steel Mining Co., Inc. v. United States Department of Labor, 187 F.3d 384, 388-389 (4th Cir. 1999).; Consolidation Coal Co. v. Office of Workers' Comp. Programs, 294 F.3d 885, 893-94 (7th Cir. 2002).

Because the Miller Radio-Telemetry study is not scientifically reliable, it does not offer viable support for PacifiCorp's position.

### b. The Evidence Shows that There are Stocks of Anadromous Fish Suitable to the Conditions above Iron Gate Dam.

PacifiCorp failed to prove that there are no stocks of anadromous fish suitable to the conditions above Iron Gate Dam. The record shows that historically, anadromous fish, including wild Chinook salmon, Coho salmon, and steelhead trout migrated above the present site of Iron Gate Dam. (*FOF 2A-3, - 2A-6*). The record shows that construction of dams has necessarily changed the migratory behavior of anadromous fish in the Klamath River System, permanently blocking upstream migration and limiting those fish to habitat below the dam. (*FOF 2A-8*). It is undisputed that, today, wild Chinook salmon, Coho salmon, and steelhead trout only migrate to the base of Iron Gate Dam, using nearby tributary and main stem habitat to spawn. (*FOF 2A-11*). If access was provided through a properly designed, operated, and maintained fishways, anadromous fish would migrate past Iron Gate Dam into the upper Klamath River basin . (*FOF 2A-12*). The evidence further shows that because of its genetic similarity to those populations that existed in the upper Klamath basin prior to the construction of the dams, the stocks of anadromous fish (especially fall-run Chinook salmon and steelhead trout) at the base of Iron Gate Dam are suitable candidates to the conditions above that dam. (*FOF 2A-22, 2A-25 through 2A-30, 2A-42 through 2A-47*).

PacifiCorp argues that to be suitable for reintroduction and for anadromous fish to persist and thrive, the selected anadromous fish stocks' spawning, rearing and life cycle window must fit the spatial, temporal and environmental conditions present in the Project above Iron Gate Dam. PacifiCorp's argument fails to give any weight to the fact that anadromous salmonids are highly adaptable to changing conditions and will migrate to and colonize unused habitat. (*FOF 2A-23, 2A-24, 2A-28 and 2A-29, 2A-44, 6-3*). The ability to adapt to a wide array of environmental conditions and colonize unused habitat or recolonize historical habitat are just a few life history strategies that have allowed the species to survive for millions of years in sub-optimal conditions. (*FOF 2A-15, 2A-35, 2A-36, 2A-37*). The fact that the anadromous fish adapted to life below the dams following construction of the dams is strong evidence of their capabilities. (*Id*). The fact that anadromous fish in other streams and river systems have successfully colonized new habitat or recolonize historic habitat lends further support that the wild anadromous fish in the Klamath River could and would do the same. (*FOF 2A-8 and 2A-11*).

Pacific lamprey is the only stock for which there is no clear evidence regarding its historical presence above Iron Gate Dam. (*FOF 2A-7*). PacifiCorp has proven, by a preponderance of the evidence, that historical observance of Pacific lamprey above Iron Gate Dam was most likely a misidentification because of the lack of genetic analysis at the time and the similarities between Pacific lamprey and resident lamprey. (*Aug. 24, 2006 Tr. at 121:17-122:2, 124:2-8; 125:13-19, 252:2-255:19; NMFS/FWS-Issue 3–Snedaker-Ex. 14 at 21-23; NMFS/FWS-Issue 8-Hamilton Ex. 6 at 17 (recognizing that it is difficult to distinguish anadromous Pacific lamprey from resident taxa*). Therefore, the evidence concerning the historical presence of Pacific lamprey above Iron Gate Dam is inconclusive.

## 1. ***USFWS/NMFS ISSUE 2(B) Discussion***

In response to USFWS/NMFS Issue 2(B), PacifiCorp argues that facilitating movements of anadromous fish via prescribed fishways will provide increase risk of disease exposure of resident fish inhabiting the basin above Iron Gate Dam to pathogens, such as *C. Shasta* and *IHN*. This argument is rejected. The weight of the evidence shows that many pathogens are already present in the upper and lower Klamath Basin . Thus, establishing fish passage will not increase the risk of disease. (*FOF 2B-2, 2B-10, 2B-11, 2B-17, and 2B-22*). *C. Shasta and P. minibicornis* exist throughout the Klamath River System in both the upper and lower basins, so migration of wild anadromous fish upstream from below Iron Gate Dam would not increase the risk of introducing pathogens to resident trout residing above Iron Gate Dam (*FOF 2B-11, 2B-17 and 2B-22*). This is especially true given the fact that trout are resistant to *C. Shasta* and with respect to the remaining known pathogens, except *F. columnaris* and *Ich*, they do not impact non-salmonids. (*FOF 2B-20*).

As for *IHN*, there is insufficient evidence to determine whether that virus exists in either the lower or upper basin of the Klamath River . (*FOF 2B-4*). The record evidence shows that there has only been a single detection of *IHN* documented in the lower basin in 1997, and since then there has been no further detection. (*FOF 2B-3*). The virus was detected in one adult Chinook salmon returning to Iron Gate Hatchery. (*Id*). Based on the Chinook salmon population size existing in the lower basin, I do not find a single detection nearly ten years ago in a fish suspected to be a "hatchery fish" to be significant or cause for alarm. Moreover, to date, there has been no work or surveys completed concerning the actual occurrence of *IHN* in the upper basin. (*FOF 2B-6).* Therefore, any suggestion that *IHN* exists in either the lower or upper Klamath Basin would be mere speculation.

Furthermore, there is insufficient evidence to determine whether *R. salmoniranrum* exists in the upper Klamath Basin . Like *IHN*, no research or studies have been performed to detect the occurrence of *R. salmoniranrum*. (*FOF 2B-7*). Consequently, PacifiCorp failed to prove that facilitating the movement of anadromous fish would present a high risk of introducing pathogens to resident fish inhabiting the basin above Iron Gate Dam.

## 2. ***USFWS/NMFS ISSUE 2(C) Discussion***

USFWS/NMFS Issue 2(C) asks to what extent facilitating the movement of steelhead above Iron Gate

Dam via prescribed fishways presents a risk of residualizing, and whether residualization would adversely effects to the resident trout fishery resource. The experts are in agreement that residualization is characteristic of hatchery fish, and is quite rare in wild anadromous steelhead trout. (*FOF 2C-8*). During the hearing, PacifiCorp's sole witness on USFWS/FWS Issue 2(c) conceded that the residualization of steelhead is not really an issue of concern. (*PAC-Ols-R-1*). The issue of concern to PacifiCorp and Siskiyou County is the genetic effects on the resident trout. (*Id*). It is undisputed that resident trout have the genetic capacity to adopt anadromy and outmigrate to the ocean, where passage exists. (*FOF 2C-7*). However, there exist no scientific studies demonstrating that reintroduction of anadromous steelhead trout would detrimentally affect the genetic make up of the resident trout fishery. (*FOF 2C-10*). The undisputed evidence shows that residualization is largely dependent on environmental conditions. (*Id*).

Historically, anadromous steelhead trout extended up to and used tributaries of upper Klamath Lake. (*FOF 2A-3, 2A-5, and 2C-2*). The close similarities between anadromous steelhead trout and resident trout, together with the distribution and resistance of the resident trout to *C. Shasta* provides strong evidence that the two species likely co-existed prior to the construction of the dams. (*FOF 2C-2*). While the competitive interactions between the steelhead and resident trout in the Klamath basin is unknown, there are many examples from nearby river systems in the Pacific Northwest that show wild anadromous steelhead and resident rainbow/redband trout can co-exist and maintain abundant populations without adverse consequences. (*FOF 2C-10 and 2C-11*). To minimize the risk of residualization by resident trout adaptive management may be utilized. (*FOF 2C-12*).

### 3. *USFWS/NMFS ISSUE 3 Discussion*

In response to USFWS/NMFS Issue 3, PacifiCorp argues that current project operations do not adversely affect the resident trout fishery resource in the absence of passage. Indeed, PacifiCorp has proved that the redband fishery is excellent and robust, as indicated by angling success in the J.C. Boyle bypass and peaking reaches. While this is true, the evidence also shows that the Project confines the population between the Project's dams and associated reservoirs. (*FOF 3-8*). Resident trout are not able to utilize their full range of life history strategies and spawning productivity and genetic diversity of the stock is impaired. (*FOF 3-13. through 3-16*). Further, unscreened flows through Project turbines result in mortality of juvenile and adult trout migrating downstream. Therefore, the record evidence demonstrates that the resident trout fishery is adversely affected by current Project operations.

### 4. ***USFWS/NMFS ISSUE 4 Discussion***

USFWS/NMFS Issue 4 asks whether entrainment at Project facilities is adversely affecting resident fishery resources. There is no dispute that entrainment is occurring at J.C. Boyle, Copco, and Iron Gate Dams. (FOF 4-2). In its literature based review, PacifiCorp admits that tens of thousands of resident fish are being entrained on an annual basis at each Project. (FOF 4-2). The facts show that non-native species are entrained to a greater extent than non-native species. (*FOF 4-13*). This is primarily because of the relative abundance of non-native versus native species. Id. The Federal Agencies appear to be most concerned with the impact entrainment is having on two species of fish, sucker fish and resident rainbow trout.

Precise estimates on the number of fish entrained are unavailable. However, records from canal salvage operations at the J.C. Boyle power canal show that some resident fish, in particular resident trout and sucker fish, are entrained and possibly killed in the power canal each year. (*NMFS/FWS-Issue 4-Hooton-Ex. 1, at 5:6-17; NMFS/FWS-Issue 4-Hooton-Ex. 15; NMFS/FWS-Issue 4-Hamilton-Ex. 1, at 5:17-19 and 6:3-5; NMFS/FWS-Issue 4-Hamilton-Ex. 14, at 1; Aug. 23, 2006 Tr. at 212:25-213:21; Appendix to Reply Brief of PacifiCorp and Siskiyou County, at 38*). Salvage records show the entrainment of over 690 trout into the J.C. Boyle reach during salvage operations between 1995 and 2002, whereas only 2 sucker fish were entrained during the same period of time. (*FOF 4-17*). In 2003, J.C. Boyle fish salvage totaled 86 trout and 17 suckers. (*NMFS/FWS-Issue 4-Hamilton-Ex. 14, at 1; NMFS/FWS-Issue 4-Hooton-Ex. 15 at 2-3*). Of the two species, sucker fish are less prone to entrainment because they are bottom dwellers making it less likely for them to pass through the shallow intakes at Copco and Iron Gate Dams. (*FOF 4-19*). Therefore, it is reasonable to conclude that the adverse effect of entrainment for sucker fish would be minimal.

The Federal Fisheries Services rely on the “Link River Hydroelectric Project, Final Entrainment Study Report” (*NMFS/FWS-Issue 4-Hamilton-10*) to rebut PacifiCorp’s evidence that entrainment is not adversely affecting sucker fish. The Link River Dam and Westside/Eastside are not in the proposed Project area. They are currently proposed for decommissioning. Therefore, reliance on this study is misplaced since they are not necessarily comparable.

Moreover, a review of the canal salvage data demonstrates that there is a significantly higher rate of sucker fish entrainment at the Link River and Eastside/Westside facilities than at the J.C. Boyle facility. (*NMFS/FWS-Issue 4- Hooton-Ex. 15, at 2-4 (Fish Salvage Data Table*)). Of the 785 sucker fish recovered during entrainment salvage operations in 1995 through 2002, it appears that only 2 were entrained at the J.C. Boyle facility. ( *Id.* ). The number of entrained sucker fish recovered during salvage operations at the J.C. Boyle in 2003 increased to 17. This increase might be a result of the ineffectiveness of the fish screens. But given the low numbers, it is difficult to conclude that entrainment is adversely affecting sucker fish. This is especially true given the fact that the record shows that sucker fish are bottom dwellers that are less prone to entrainment through shallow intakes, such as those found at Copco and Iron Gate Dams. The non-larval sucker fish residing in those two reservoirs appear to be too large to pass through the existing trash racks at the powerhouse intakes. (*FOF 4-20*). If there is an adverse affect from the low number of sucker fish being entrained, it is minimal.

The same is not true for resident trout. The record shows that Spencer Creek located upriver of the J.C. Boyle facility has historically been a primary spawning and early rearing habitat for trout. (*FOF 4-22 and 4-23*). The construction of J.C. Boyle has adversely affected the migratory behavior of the resident trout. Currently, the peaking reach life history appears to be gone and the bypass reach life history has been reduced to less than 10% of historical abundance and is composed of significantly smaller trout. (*FOF 4-22*). Thus, the rainbow trout are not experiencing their full range of life history. Losses of juveniles through entrainment at the Project could, in the long run, adversely affect trout abundance and distribution. (*NMFS/FWS-Issue-4-Hooton Ex. 1 at 6:9-13; NMFS/FWS-Issue 4-Hamilton-Ex. 1 at 4:16 -16 and 7:3-4; NMFS/FWS-Issue 4-Hamilton-Ex. 17 at 4; HVT-Steward-Ex. 39 at 1:17 -22*). Therefore, PacifiCorp's argument that entrainment is not adversely affecting resident trout must be rejected.

### *1. USFWS/NMFS ISSUE 6 Discussion*

USFWS/NMFS Issue 6 asks whether 58 miles of habitat suitable for use by anadromous fish exists within the Project reach. PacifiCorp answers this question in the negative, and in actuality, it is difficult to ascertain exactly how much suitable habitat exists within the Project reach. Since the determination of what constitutes "suitable habitat" is within the realm of agency expertise, the Federal Fisheries Services definition of suitable habitat is hereby adopted. Under that definition, habitat is deemed "suitable" if it can be used successfully at least some of the time by one or more life stages of a Coho salmon. (*FOF 6-2*).

Based upon this definition, it is clear that a significant amount of habitat that is suitable for anadromous fish exists above Iron Gate Dam. Those habitat areas include: 1) The main stem (containing approximately 28 miles of suitable habit), which PacifiCorp admits is suitable for anadromous fish; 2) perennial tributaries (containing approximately 12 miles of suitable habitat) and intermittent streams (containing approximately 18 miles of suitable habitat). (*FOF 6-9 through 6-14*).

While connectivity is a problem, the record evidence shows that anadromous fish will not be precluded from using the areas identified as suitable habitat. (*FOF 6-8*). Moreover, the fact that much of the habitat deemed suitable for anadromous fish are currently being used by resident fish strongly suggests that anadromous fish would utilize the habitat if access is provided. (*FOF 6-7*). Accordingly, PacifiCorp's argument that the riverine and tributary habitat with the Project area is not suitable for production of anadromous fish must be rejected.

### *2. USFWS/NMFS ISSUE 7 Discussion*

In response to USFWS/NMFS Issue 7, PacifiCorp argues that providing access to habitat within the Project would not benefit Coho salmon but instead would harm the overall health of the Klamath Coho salmon population. PacifiCorp's argument rests on two grounds: first, that the Coho salmon habitat above Iron Gate Dam is "limited and marginal"; and second, that mortality risks of out-migrating smolts in the reservoir are great because of the high water temperatures and predation that providing access would be counterproductive. Both arguments must be rejected.

#### a. There is Significant Suitable Habitat above Iron Gate Dam for Coho Salmon.

As explained in the discussion addressing USFWS/NMFS Issue 6, there is significant suitable habitat for anadromous fish (including Coho salmon) above Iron Gate Dam. Suitable habitat above Iron Gate Dam includes Spencer, Fall, Beaver, Deer, Shovel, Scotch, and Jenny Creeks . The main stem also has suitable habitat (which is a fact recognized by PacifiCorp). (*FOF 7-9; see also PAC Ols-D-1, at 38:11; NGO Ex. 27, at 3:6-10*). Much of this habitat is currently being used by resident rainbow/redband trout that have similar habitat requirements to those of Coho salmon. (*FOF 6-5*). Said resident rainbow/redband trout are a self-sustaining population above Iron Gate Dam, and the evidence suggests that similar results could occur for the Coho salmon population. (*FOF 6-6*). As such, PacifiCorp's argument that the habitat above Iron Gate

Dam is limited and marginal for Coho salmon is not persuasive.

### b. Habitat above and below Iron Gate Dam are Equally Degraded.

PacifiCorp's argument that the high water temperatures and predation above Iron Gate Dam is so severe that providing access above Iron Gate Dam would be counterproductive is not supported by the evidence. The record evidence shows that the runs of Coho salmon have greatly diminished in the Klamath River to the extent that the species is listed as threatened under the Endangered Species Act. (*FOF 7-2 through 7-4*). Habitat degradation has been recognized as the primary cause for the decline of Coho salmon. (*FOF 7-5*). Historically, Coho salmon spawned in abundance at Fall Creek, and some evidence suggests that the upstream distribution extended as far as Spencer Creek . (*FOF 2A-6*). However, the construction of the Project dams has prevented Coho salmon from accessing its historic spawning grounds above the present site of Iron Gate Dam. (*FOF 2A-8 and 2A-11*). Coho salmon continue to use the habitat below Iron Gate Dam even though it has suffered degradation commensurate with that above the dam. (*FOF 7-6*). While water temperature above Iron Gate Dam is a problem for juvenile Coho salmon, the record evidence shows that water temperature will not preclude Coho salmon from successfully utilizing habitat within the Project area. (*FOF 7-11 and 7-12*). As a matter of fact, it is well documented that Coho salmon have been known to occupy waters below Iron Gate Dam where temperatures exceed $20^{o}$ C. (Id).

Further, the evidence shows that adult Coho salmon enter the river to spawn in late September and reach peak migration strength between late October and mid-November when the water temperatures above Iron Gate Dam is low. (*FOF 7-10*). On the other hand, juvenile Coho salmon begin outmigrating to the ocean in late February, and continue migration through early July. (*FOF 7-11*). For a significant amount of the outmigration period, water temperatures are low. Therefore, contrary to PacifiCorp's argument, water temperature should not significantly affect adult or juvenile Coho salmon. Further, with respect to predation, that can be minimized through use of remedial measures. (*FOF 7-13*).

### a. Providing access above Iron Gate Dam will Benefit Coho Salmon.

Last, the record shows that restoring access to historical habitat above Iron Gate Dam will improve the viability of the Coho salmon population by: a) extending the range and distribution of the species thereby increasing the Coho salmon's reproductive potential; b) increasing genetic diversity in the Coho stocks; c) reducing the species vulnerability to the impacts of degradation; and d) increasing the abundance of the Coho population. (*FOF 7-16*). As such, PacifiCorp's arguments must fail.

### 2. ***USFWS/NMFS ISSUE 8 Discussion***

USFWS/NMFS Issue 8 asks whether access to habitat within the Project would benefit Pacific Lamprey. PacifiCorp answers this question in the negative and focuses much of its argument on the fact that lamprey-friendly ladders are unavailable.

The issue concerning habitat benefit and whether lamprey-friendly ladders exist are two separate and distinct questions. The latter, is not an issue in this proceeding. While the evidence concerning the upstream distribution of Pacific lamprey above Iron Gate Dam is inconclusive, the evidence shows that those species would indeed benefit from access to habitat within the Project reach. (*FOF 2A-7, 8-3, and 8-9*). Essentially, Pacific lamprey would be gaining additional habitat for spawning and rearing. Therefore, PacifiCorp failed to show that Pacific lamprey would not benefit from access within the Project reaches.

## B. BLM DISPUTED ISSUES OF MATERIAL FACT

### 1. ***BLM ISSUE 10 and 11 Discussion***

BLM Issues 10 and 11 are closely related – has the Project adversely affected riparian habitat and riparian-focal species in the two J.C. Boyle reaches (Issues 11) and would the proposed BLM seasonal high flows improve those resources (Issue 10).[1] The evidence shows that Project operations have negatively affected riparian habitat and the proposed BLM high flows will help improve riparian habitat. However, the evidence does not show that riparian-focal species have been negatively affected by Project resources or that the proposed seasonal high flows will assist riparian-focal bird species.

The Project has greatly affected and continues to affect the Project reaches. One of the Project's largest impacts involves effects to sediment supply. (*FOF 11-1, 11-3*). On average, 6,124 tons of channel bedload is blocked each year at the J.C. Boyle dam. (*FOF 11-2*). By limiting sediment supply, the bed material in the reaches has coarsened and active features (e.g., point bars, islands) are made up of less fine sediment. (*FOF 11-3; 11-9*). Negative impacts can occur from such limited sediment supply. For example, desirable riparian plants use freshly deposited sediment to germinate and a lack of sediment adversely affects fish habitat. (*FOF 10-5, 11-10, 14-4*). A gravel augmentation program has been developed which will offset some of the negative effects of the bedload blockage.[2] Therefore, an important question to ask is whether the gravel augmentation program together with the current flow regime can improve the channel conditions, and whether BLM's proposed seasonal high flow would provide additional benefit.

PacifiCorp argues that the results of a study it sponsored indicate current flows effectively mobilize some coarse bed sediment. [3] However, BLM high flows, as compared to current operations, will mobilize and transport sediment more frequently within the Project. (*FOF 10-4*). Higher flows will allow for a wider range of sediment deposits and allow sediment to be deposited higher on the channel margin. (*FOF 10-5*). Both of which can serve as an ecological benefit. ( *Id.* )

Current low flows not only affect the ability to mobilize coarse bed sediment, low flows also increase the prevalence of reed canary grass. (*FOF 11-7, 11-8*). Reed canary grass is a non-native invasive riparian plant. (*FOF 10-7; 11-12*). Moreover, it is not used by riparian-focal bird species for nesting. (*FOF 10-11*). Finally, reed canary grass can adversely affect the abundance and quality of fish habitat and out-compete woody riparian vegetation. (*FOF 11-7, 11-8*). High and medium flows can scour (uproot and dislodge) reed canary grass. (*FOF 11-6*). The current low base flows result in a diminished scouring effect on the reed canary grass. (*FOF 11-6, 11-7, 11-8*). Increasing flows would allow for an increased scouring effect. ( *Id.* ). Low flows also allow reed canary grass to encroach into the channel in places that have been exposed by Project-diverted flows. (*FOF 10-6*). Project operations result in more riparian vegetation; however, this increase is attributed mainly to the encroachment of reed canary grass. (*FOF 11-13*). Approximately two-thirds of the riparian habitat in the J.C. Boyle bypass reach is currently riparian grassland, which is predominately reed canary grass. (*FOF 10-8*).

While the proposed high flows will effectively scour and limit channel encroachment of reed canary grass, evidence fails to show that riparian-focal bird species habitat will be improved or that Project operations have adversely affected such habitat. Eight species of riparian-focal birds exist within the Project. (*FOF 10-11*). These birds prefer structurally diverse habitat and primarily nest in woody riparian vegetation. (*FOF 10-12; 10-13*). An increase in woody riparian vegetation would likely result in an

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[1] Many of the findings of facts associated with Issue 10 and 11 apply to both issues. Therefore, each is cross-referenced and incorporated therein.

[2] PacifiCorp entered into a stipulation with BLM to clarify the composition of the sediment to be used and the intent of the BLM gravel augmentation plan. (*See Order Granting PacifiCorp's Motion to Withdraw Disputed Issue of Material Fact 12 (issued Aug. 2, 2006* )).

[3] This study contained several biases. The tracer particles used in the study at the bypass reach were placed in the steepest section of the river and were limited to the center of the channel. Both of these actions bias the study toward a finding that a given flow can greatly mobilize particles. ( *Aug. 21, 2006 Tr. 1 at 56:10-58:14*).

increase of riparian-focal bird species. (*FOF 10-14, 10-15*). Seasonal high flows, in combination with the BLM's proposed gravel augmentation program, will likely create a more dynamic channel with a wider range of sediment deposit, therefore increasing ecological benefits. (*FOF 10-5*). However, woody riparian vegetation (the key habitat for riparian-focal bird species) will not increase under BLM's proposed flows.[1] Without an increase in woody riparian vegetation, an increase in riparian-focal birds species is not likely. Furthermore, while low flows allow for the encroachment of reed canary grass, higher flows have a tendency to scour woody riparian vegetation. (*NGO Ex. 1 at 10:5-8*). Because pre-project flows would have likely scoured any woody riparian vegetation where reed canary grass is currently located, it is not likely that the Project has decreased the potential establishment of woody riparian habitat.

PacifiCorp has established that the extent of any improvement on ripariam-focal bird species is indeterminate since an increase of woody riparian vegetation is not expected.

### 1. ***<u>BLM ISSUE 14 Discussion</u>***

BLM Condition 4.A.1(c) will provide a net positive effect on redband trout spawning. Specifically, the proposed flows will assist in the distribution of gravel used for spawning, will clean established spawning beds, and will assist in migratory movement of trout. (*FOF 14-1 to 14-8, 14-17 to 14-21*). Negative effects include a loss of spawning habitat below the emergency spillway and the possible scouring of trout eggs. (*FOF 14-14, 14-15, 14-24, 14-25*). PacifiCorp has not met its burden to show that the negative effects outweigh positive effects.

The J.C. Boyle bypass reach channel bed consists mainly of course material not suitable for trout spawning. (*FOF 14-1*). On average, 6,124 tons of channel bedload is blocked a year at the J.C. Boyle Dam. (*FOF 11-1*). This blockage is the primary factor in the coarsening of the channel. (*FOF 14-2*). A gravel management plan has been introduced that would place sediment in the Klamath River below the J.C. Boyle Dam. (*FOF 14-3*). For this plan to be effective, the gravel needs to be deposited downstream where it can create spawning pockets. (*FOF 14-4*). The implantation of seasonal high flows would assist in the deposition of this gravel.[2] ( *Id.* ).

Fine sediment buildup on spawning gravel reduces the successful emergence of fry. (*FOF 14-5, 14-6*). An annual flushing flow can clean fine sediments from the spawning beds, thus improve the quality of habitat. (*FOF 14-8*). Since fine sediment buildup has been observed on the limited spawning habitat in the bypass reach, an annual flushing flow would assist in developing a quality habitat. (*FOF 14-7).* PacifiCorp classifies the J.C. Boyle bypass reach as a "transport" reach and believes fine sediment buildup will not occur on spawning grounds.[3] (*PC Reply Brief Appendix at 19*). However, the observance of fine sediment buildup on the spawning habitat in the bypass shows that a buildup can occur, even in a "transport" reach.[4]

Historically, trout in the Klamath River downstream of the J.C. Boyle Dam migrated upstream to spawn and juvenile trout migrated downstream to rearing areas. (*FOF 14-18, 14-19*). Heavy spring and fall river flows signal to spawning trout and juvenile trout to begin their migrations. ( *Id.* ). Such migrations have diminished after the installation of the J.C. Boyle Dam and reduction in river flows. (*FOF 14-16, 14-20, 14-21*). The BLM seasonal high flows will better reflect the natural flood flows and improve fish migration. (*FOF 14-17*). PacifiCorp believes the presence of spawning trout, in the bypass reach, show that current flows provide favorable spawning conditions. (*PC PFF 48*). However, the only area where trout spawning is observed is directly downstream of the emergency canal spillway. (*FOF 14-21*). This very limited spawning, in a very unnatural environment, does not demonstrate that the current flow regime provides favorable conditions.

PacifiCorp correctly states that the BLM flows will adversely impact the spawning redds just downstream of the existing J.C. Boyle emergency canal spillway. (*PC PFF 45*). BLM counters this argument by showing that the current location is unstable and seasonal high flows could mobilize the sediment accumulated in the emergency spillway and distribute the sediment to a more stable location. (*FOF 14-22, 14-23*). However unstable the current location is, the proposed flows would still disrupt the only spawning grounds in hope that more productive grounds would develop. These arguments are rendered basically irrelevant when another factor is considered. PacifiCorp has proposed to install bypass valves at the J.C. Boyle powerhouse. (*FOF 14-26*). This means the emergency spillway will no longer be used and the unnatural sediment loads in the area will not be replenished. ( *Id.* ). Since this unnatural habitat will no longer be self-sustaining, any detrimental results of the seasonal high flows will not be relevant.

Another negative factor to consider is the possible scouring effect high flows will have on spawning trout and their fry. The spawning period for trout between the Copco 1 Reservoir and J.C. Boyle Dam takes place between February and May, with the majority of spawning taking place between March 15 and April 15. (*FOF 14-11*). BLM's proposed flushing flows, which last for seven days, would always occur during the spawning season. (*FOF 14-13, 14-14*). The high flows would be implemented between March 15 and April 15 in fourteen percent of the years. (*FOF 14-12*). Flushing flows scheduled during spawning may scour eggs and result in less successful spawning. (*FOF 14-15*). Ideally, flushing flows should occur just prior to spawning. ( *Id*. ). While spawning trout will hold during high flows and resume spawning once flows have dropped, this does not discount the negative effects the high flows will have on already established egg nests. (*FOF 14-13*).

The proposed seasonal high flows will result in the scouring of some trout eggs. Such effects will be felt most severely during the fourteen percent of the years when the high flows occur during peak spawning times. However, the median start date for the seasonal high flows is February 18, which corresponds close to the beginning of the spawning season. (*FOF 14-9, 14-11*). Since fewer egg nests will have been established at the beginning of the spawning season, the effects of the high flows will be less intrusive than if the flows were to commence near the end of the twenty-two week spawning season. It has been shown that the proposed seasonal high flows will assist in the creation of fish spawning grounds, will clean established spawning beds, and will improve migratory movement of trout. The creation of new and healthier spawning grounds will offset the loss of some eggs to scouring. PacifiCorp has not met is burden to show, by a preponderance of the evidence, that the negative effects of scouring is greater than the positive effects created by the seasonal high flows.

### *2. BLM ISSUE 16 and 17*

The evidence in the record establishes that current operations have adversely affected the redband trout fishery resource. First, the J.C. Boyle Dam traps sediment necessary for spawning habitat. Second, the existing flow regime has increased the embedment of fine sediment in spawning gravel, impairs spawning migrations, and

[1] BLM believes that larger floods will decrease reed canary grass and allow the woody riparian community to have a relative competitive advantage. (*BLM PFF 10.4*). BLM's only cite for this proposition is Dr. Trush's testimony at NGO Ex. 1. While this testimony does state that the proposed flows will "benefit native birds," it clearly states that, "[t]he River Corridor Management Condition will change the baseline conditions of the riparian resources in the bypassed reach. **It will support less, rather than more, woody riparian vegetation than today**." (*NGO Ex. 1., at 17:11-13 (bold added*)).

[2] Current flows would mobilize augmented gravel to an extent. However, BLM high flows, as compared to current operations, will mobilize and transport sediment more frequently and to a greater extent within the Project. (*FOF 10-4*).

[3] PacifiCorp defines "transport reach" as "the capacity of the channel to transport sediments is significantly higher than the supply of sediment to the channel." (*PC PFF 40*).

[4] It is noted that the only spawning habitat in the bypass is found downstream of the emergency spillway and the emergency spillway significantly increases the rate of fine and coarse sediment in the area. (*FOF 14-21, 14-22).* It may be argued that this is the only reason fine sediment buildup has occurred on the spawning gravel. However, with the introduction of additional sediment by means of the gravel management plan, the entire bypass reach will be inundated with an increased supply of fine and coarse sediment – resulting in an increased need to have annual flushing flows.

causes low flows, which contribute to the lack of successful spawning.[1] Third, the peaking operations cause stranding of aquatic organisms, results in downstream displacement of juvenile fish, increases the energetic demands placed upon adult trout, and lowers the production of macroinvertebrate prey. The proposed River Corridor Management Condition would address these negative impacts.

The Project's artificial low flow regime contributes to the lack of available spawning gravel in the J.C. Boyle peaking and bypass reaches. (*FOF 16-3 to 16-6*). Prior to the J.C. Boyle Dam, trout were observed spawning in the peaking reach. (*FOF 16-2*). Currently, trout do not spawn in the peaking reach and only limited spawning has been observed in the bypass reach. (*FOF 14-21; 16-1*). While sediment blockage at the J.C. Boyle Dam has contributed to lack of suitable spawning gravel in both reaches, low flows reduce access to spawning gravel that remains. Spawning gravel has been observed along channel margins and on depositional features in the peaking and bypass reach. (*FOF 16-3 to 16-6*). However, when low flows occur, portions of this margin-habitat are no longer inundated with water, making the spawning gravel unusable. ( *Id.* ). The proposed conditions would substantially alter the current flows by providing an overall increase in base flows. (*FOF 19-8 to 19-10*). Higher base flows allow for greater inundation of habitat suitable for spawning.

PacifiCorp's peaking operations cause extreme daily flow fluctuations and create upramp rates as high as nine inches/hour in the J.C. Boyle peaking reach. (*FOF 17-1*). BLM conditions propose an upramp rate of no more than two inches/hour. (*FOF 17-2*). Upramp rates of two inches/hour are similar to naturally occurring rates and will be protective of fish resources. (*FOF 17-2 to 17-4*). The current peaking operations and their unnatural upramp rates create several conditions that are harmful to the trout fishery.

First, PacifiCorp's peaking operations create strandings that lead to the loss of thousands of fish and other aquatic animals. [2] (*FOF 16-9, 16-10*). Few trout fry exist in the peaking reach where the strandings occurred and none were reported stranded. (*FOF 16-9*). However, such strandings do kill large numbers of young fish and aquatic invertebrates that are the primary prey for trout. (*FOF 16-15*). The peaking operations that cause high mortality only happen a few times a year following the first peaking event after several months of steady flow. (*FOF 16-12*). Reduced ramp rates can resolve the problem of fish standing. (*FOF 16-13, 16-14*). The BLM proposed conditions calls for a two inch/hour maximum downramp rate, a drop from the four inch/hour ramp rate used at the sites where severe mortality of aquatic organism occurred. (*FOF 16-13, 16-14*). Ramp rates of two inch/hour have been shown to be effective at stopping the occurrence of stranding. ( *Id.* )

BLM provides evidence that Project peaking flows above 1,500 cfs result in the downstream displacement of juvenile salmonids. (*FOF 16-16*). Trout prey is affected in a similar manner, since peaking flows can displace forage fish eggs and push fry downstream. (*FOF 17-8, 17*-9). BLM proposed conditions would eliminate the Project's peaking flows, thus eliminating the downstream displacement. (*FOF 19-1 to 19-13*). PacifiCorp counters this evidence by citing a study it sponsored, which indicates trout fry can maintain their location during peaking flows. (*FOF 16-17 to 16-19*). The mark retrieved study recaptured nine of seventy-three marked fry in portions of the California peaking reach. (*FOF 16-19*). This indicates that fry do have an ability to maintain their position in the lower portions of the peaking reach. ( *Id.* ). However, the study did not mark or recapture any fry in the Oregon portion of the peaking reach; the section of the peaking reach with the highest ramp rate. (*FOF 16-17*). Therefore, the study is inconclusive as to the effects higher ramp rates have on fry.[3] PacifiCorp did not meet its burden to show that peaking flows, in the Oregon portions of the peaking reach, do not result in downstream displacement of juvenile salmonids.

Peaking operations also affect the energetic demands placed on trout and decrease macroinvertebrates prey. Peaking operations force trout to increase movement, which in turn decreases energy available for overall health, growth, and reproduction.[4] (*FOF 16-21*). Peaking operations reduce the production of macroinvertebrates by ten to twenty-five percent. (*FOF 16-24*). Macroinvertebrate drift rates, a measure of food availability for trout, is five to six times greater in the non-peaking Keno reach than in the peaking reach. (*FOF 16-25*). Peaking operations contribute to the lower macroinvertebrate drift rates, which in turn decrease the macroinvertebrate prey available for trout. ( *Id.* ).

Comparing growth of trout in the non-peaking Keno reach to the trout in the J.C. Boyle peaking reach provides insight into the effects peaking has on trout growth. Growth rates are greater in the peaking reach through age two. (*FOF 16-26*). Growth rates are similar in both reaches between ages two and three. ( *Id.* ). Growth rates are greater in the non-peaking Keno reach after age three, and the Keno reach trout are older. (*FOF 16-26, 16-30*). Since larger fish operate closer to the energetic margins than smaller fish, it makes sense that lower energetic demands in the non-peaking reach would result in larger adult trout. (*FOF 16-23*). Mature fish grow larger when they prey on forage fish, a higher energy source than invertebrate drift. (*FOF 16-31*). The Project-caused impacts to forage fish (via stranding and displacement) help explain the lower growth rates and absence of larger trout in the peaking reach.[5] (*FOF 16-32*). High growth rates of younger trout in the peaking reach indicate that peaking effects on macroinvertebrate prey are not substantial. Since younger fish prey mainly on macroinvertebrate, if peaking operations were having a substantial effect on macroinvertebrate prey, a lower growth rate in younger fish would be expected. By comparing the growth of trout in the non-peaking Keno reach to the growth of trout in the J.C. Boyle peaking reach, it has been established the peaking operations decrease growth rates for mature trout. Therefore, PacifiCorp has failed to meet its burden of proof with respect to BLM Issues 16 and 17.

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[1] Issue 14 addresses the negative effects associated with the J.C. Boyle Dam's trapping of sediment, embedment of fine sediment in spawning gravel, and low flow (limiting spawning migrations). Therefore, these effects will not be discussed in Issue 16.

[2] Stranding is the separation of fish from flowing surface water as a result of a declining river state. (*FOF 16-7*).

[3] PacifiCorp's distribution-over-time study had similar flaws, capturing only a few fry in the Oregon portion of the peaking reach. (*PAC-Ols-D-20 at App. 3A at 20; KTR-LKD-Ex. 6 at 6-46*).

[4] PacifiCorp's radio-telemetry study indicated that peaking operations did not induce any significant trout movement. (*PAC PFF 75*). However, PacifiCorp's radio-telemetry study only detects upstream-downstream fish movement, so it would not detect all fish movement that would increase energetic costs. (*PAC-Ols-D-20*

*at Sec. 5, 5-8, 5-9*). High water flows force trout to swim faster to stay in place. (*BLM-Simons-Ex. 0 at 5:8-6:7).* Fish also move laterally with changes in flow; fish move from the center of the channel at low flows to the edges of the channel at high flows. (KTR-*LKD-DT-BLM 16 at 7:13-17; KTR-LKD-Ex. 10 at 26*).

[5] PacifiCorp cites a study they sponsored which asserts that Keno trout are larger because they have access to a minnow forage base and reservoirs. (*PAC Reply Brief Appendix at 28*). Such conditions may contribute to the increased size of Keno reach trout, however PacifiCorp has failed to adequately discount the effects that stranding and downstream displacement will have on forage fish supply.

## *1. BLM ISSUE 19 Discussion*

### a. Whitewater Rafting

The BLM Flow Management Scenario model was used to predict the effects of the BLM conditions on whitewater boating opportunities. (*FOF 19-30*). While this model has limitations, it provides the best quantitative evidence of anticipated impacts on whitewater opportunities. (*FOF 19-30 to 19-37*). This evidence shows the proposed flows will severely limit whitewater boating opportunities and impact the viability of the commercial rafting operations. (*FOF 19-25 to 19-27*).

BLM acknowledges in its proposed ultimate finding of fact that the proposed flows will decrease raftable days by an estimated forty-four percent a year. (FOF 19-27). At the peak of the rafting season, July and August, the proposed flows will decrease the total raftable days by seventy-one percent. ( *Id*. ). While PacifiCorp/Siskiyou County believes the proposed decreases should be even greater, the decreases cited by BLM are sufficient to justify a finding that significantly detrimental effects on rafting operations will occur. (*PC PFF 126*). When an industry's ability to conduct business is reduced by nearly half (forty-four percent), the financial viability of that industry will be severally diminished.

PacifiCorp/Siskiyou County has shown, by the preponderance of the evidence, that a forty-four percent reduction in raftable days will substantially reduce the whitewater boating opportunities. Having met this initial burden of proof, the burden of persuasion shifts to BLM and BLM must establish other factors which may offset the decrease in raftable days. BLM conditions emphasis the protection of weekend boating opportunities. (*FOF 19-25*). As such, BLM contends that there may be a shift of some historical weekday to weekend use. (*FOF 19-28, 19-29*). However, BLM fails to provide evidence indicating the size of this potential shift. Without having an estimate of how many customers may shift to weekend use, BLM has failed to show, by a preponderance of the evidence, that a shift to weekend use will substantively offset the forty-four percent reduction of raftable days.

### b. Fly Fishing

The ability to wade is an integral component to fly-fishing. (*FOF 19-41*). Without the ability to effectively wade, an aesthetic experience and an important element in positioning oneself to catch fish would be lost. ( *Id*. ) Evidence shows the proposed flows will reduce the ability to wade. (*FOF 19-42 to 19-44*). The degree of such reduction has not been established in this record.

Low flows are preferred by fly-fishing anglers. (*FOF 19-43*). BLM proposed flows will increase the current base flow and will make wading difficult in certain areas of the peaking reach. (*FOF 19-49, 19-50*). The central question is therefore, how much more difficult will wading become? PacifiCorp/Siskiyou County cites statistics that show current operations produce "preferred" fishing flows on fifty-nine percent of the days in the May-October season. (*FOF 19-46*). PacifiCorp/Siskiyou County then argues that BLM's proposed flows will produce "preferred" fishing flows on about eight percent of the days in the May-October season. (*PC PFF 143*). However, PacifiCorp/Siskiyou County's analysis relies on a flawed use of the BLM FMS model.[1] No other statistics have been provided which show, quantitatively, how much more difficult wading will become.

BLM and the Conservation/Fisheries Groups concede that higher flows will make wading (therefore affecting the ability to fly-fish) more difficult in the short term. (*FOF 19-49, 19-50*). However, they contend that there will be no long-term negative affects on fly-fishing. (*FOF 19-50 to19-54; BLM PFF 19.14-15, 19.18*). First, BLM correctly asserts that wading access is only one component of "fishabilty" and other biological factors (e.g. – fish health) are important to consider when determining if an area is good for fishing. (*FOF 19-52 to 19-54*). BLM contends that high flows will improve such biological factors and improve overall fishing. ( *Id*. ). However, even if higher flows were to improve biological conditions, if flows are too high to allow wading, fly-fishing would not be possible (other forms of fishing may improve). Second, BLM argues that wading may become easier (e.g. – sediment will make the ground less rocky). (*BLM PFF 19.14*). However, BLM fails to provide sufficient evidence in support of this claim. ( *Id*. ). Third, BLM assumes that anglers will adjust their techniques to accommodate the proposed flows changes. (*FOF 19-51; BLM PFF 19.15*). While anglers will likely adjust their techniques to an extent, evidence has not been provided to show anglers would continue to fly-fish in area with flows higher than traditionally accepted for fly-fishing. (*FOF 19-8 to 19-13, 19-40 to 19-44, BLM PFF 19.15*). The record evidence does not support the proposition that

BLM's proposed conditions will improve fly-fishing in the peaking reach.

# ULTIMATE FINDINGS OF FACT AND CONCLUSIONS of LAW

1. Under Daubert, the Miller Radio-Telemetry study is scientifically unreliable.

2. The effectiveness of volitional passage is not at issue in this case because those issues were withdrawn/dismissed following the initial prehearing conference conducted under 50 C.F.R. Part 221.

3. USFWS/ISSUE 2(A): Stocks of anadromous fish suitable to conditions above Iron Gate Dam are available to use prescribed fishways.

4. USFWS/NMFS ISSUE 2(B): Facilitating the movement of anadromous fish via prescribed fishways presents a relatively low risk of introducing pathogens to resident fish above Iron Gate Dam. Many of the pathogens (such as *C. Shasta, F. Columnaris, P. minibicornis, and Ich*) present below Iron Gate Dam, are also present above the dam. The evidence is inconclusive as to whether *IHN* exists either above or below Iron Gate Dam. The evidence is also inconclusive as to whether *R. salmoniranrum* exists above Iron Gate Dam.

5. USFWS/NMFS ISSUE 2(C): Facilitating the movement of wild anadromous steelhead trout above Iron Gate Dam via prescribed fishways presents a low risk of residualization (a phenomenon most common among hatchery steelhead trout). Moreover, while resident trout have the genetic capacity to adopt anadromy, the risk of residualizing can be minimized through use of adaptive management.

6. USFWS/NMFS ISSUE 3: Project operations have and continue to adversely affect the resident trout fishery by, among other things: a) confining the resident trout between the Project dams and associated reservoir thereby impairing their utilization of the full range of life history strategies and spawning productivity; b) unscreened flow through Project turbines result in mortality of juvenile and adult trout migrating down stream; and the inability to effectively migrate adversely affects the genetic health and long term survival of the resident species.

7. USFWS/NMFS ISSUE 4: Entrainment at Project facilities have and continue to adversely affect the resident fishery resources.

8. USFWS/NMFS ISSUE 6: While the exact miles of habitat for use by anadromous fish within the Project reach is unknown, 58 miles is a reasonable estimate based on the evidence contained in the record.

9. USFWS/NMFS ISSUE 7: Access to habitat within the Project would benefit Coho salmon by: a) extending the range and distribution of the species thereby increasing the Coho salmon's reproductive potential; b) increasing genetic diversity in the Coho stocks; c) reducing the species vulnerability to the impacts of degradation; and d) increasing the abundance of the Coho population.

10. USFWS/NMFS ISSUE 8: Although the evidence is inconclusive as to whether Pacific lamprey were historically present above Iron Gate Dam, the record evidence shows that access to habitat would benefit that species of fish by providing it with additional spawning and rearing grounds.

11. BLM ISSUE 10: The seasonal high flows will contribute to improving the quality of riparian habitat in the J.C. Boyle bypass reach by increasing the sediment deposit within the channel and decreasing reed canary grass. However, the extent of any improvement on riparian-focal bird species is indeterminate since an increase of woody riparian vegetation is not expected.

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[1] PacifiCorp/Siskiyou County relies upon a flawed interpretation of the BLM FMS model. The FMS model produces outputs on an average *daily* basis. (*BLM-Turaski-Ex. 3 at 12*). The criteria PacifiCorp/Siskiyou County used when analyzing current operations was a *three-hour window* in the "preferred" fishing flow range. (*PAC-Whit-R-1 at 2:18 -21, 3:11-13*). In contrast, the PacifiCorp/Siskiyou County analysis of the proposed flows was based on *average daily flow* data (FMS model outputs), and therefore implicitly required an entire day (as opposed to three hours) in the preferred range. (*PAC-Whit-R-2 (columns 4 and 6 showing BLM FMS model outputs); PAC-Carl-R-5 (Excel spreadsheet showing inappropriate use of BLM FMS model outputs*)). Comparing an average daily flow to a three-hour window flow data does not lead to a fair comparison.

12. BLM ISSUE 11: Project operations have adversely affected riparian resources in both the bypass and peaking reaches by supporting the perpetuation of reed canary grass and by affecting the structure, size, and nature of depositional features. However, the extent of any loss to riparian-focal bird species is indeterminate, based upon evidence that woody riparian vegetation has not decreased noticeably

13. BLM ISSUE 14: The BLM seasonal high flows will assist in the creation of redband trout spawning habitat, decrease fine sediment embedment in spawning gravel, and improve redband trout migration. These benefits provide for a net positive effect to redband trout spawning; overcoming the possible scouring effects high flows will have on spawning trout.

14. BLM ISSUE 16: Current Project operations, particularly sediment blockage at the J.C. Boyle Dam, the flow regime, and peaking operations, negatively affect the redband trout fishery. The proposed River Corridor Management Conditions would improve fishery resources.

15. BLM ISSUE 17: The BLM's proposed upramp rate will improve conditions for fish resources and other aquatic organisms by reducing adverse effects caused by the existing nine inch/hour upramp rate.

16. BLM ISSUE 19: The BLM's proposed flows will substantially reduce the frequency and quality of whitewater boating in the J.C. Boyle peaking reach. The ability to fly-fish in the J.C. Boyle peaking reach will be reduced; the extent of this reduction has not been established.

Done and dated September 29, 2006

Alameda , California

**HON. PARLEN L. MCKENNA**

**ADMINISTRATIVE LAW JUDGE**

**U.S. COAST GUARD**