ATTACHMENT D
RULINGS ON PROPOSED FINDINGS OF FACT

Index

RULINGS ON PACIFICORP'S PROPOSED FINDINGS OF FACT

BLM ISSUE 10:

1. The J.C. Boyle bypass reach was historically and is currently a "transport" reach, where capacity of the channel to transport sediment is significantly higher than the supply of sediment to the channel. PAC-Tomp-D-1 at 6:8-13; PAC-Carl-D-1 at 5:16-19.

   RULING: ACCEPTED (J.C. Boyle bypass reach is also considered a "response" reach under the Montgomery and Buffington geomorphic classification. (*BLM-Cluer-Ex. 0 at 6:21-23*).)

2. The bypass reach is typified by a V-shaped channel and bounded by steep hillslopes. PAC-Tomp-D-1 at 5:17 to 6:3; PAC-Dwer-D-1 at 5:6-8.

   RULING: ACCEPTED (Eighty percent of the reach is bounded by steep hillslopes and twenty percent of the reach is unconfined. (*Aug. 21, 2006 Tr. at 71:13-72:2*).)

3. The reach has a heavily armored bed and bank consisting of bedrock and large boulders and rocks. PAC-Dwer-D-1 at 5:12-14.

   RULING: ACCEPTED - BLM does not dispute this statement (About eighty percent of the reach is heavily armored, while about twenty percent is unconfined and consist of depositional features, including gravel bars. (*PAC-Dwer-D-1 at 5:20-23*).)

4. This armoring of the channel protects some riparian plants established in the reach from scouring. PAC-Dwer-D-1 at 5:14-16.

   RULING: ACCEPTED – NGO does not dispute this statement

5. PacifiCorp's geomorphologists observed that relatively coarse bed sediment (*i.e.*, gravel and cobble) is mobilized in the bypass reach by flows of 1,700 cfs and greater, which still occur relatively frequently under Project operations. (*PAC-Tomp-R-1 at 4:8-10*).

   RULING: ACCEPTED (While this is a correct statement, it has been found that coarse bed sediment will be mobilized to a higher extent with the proposed BLM flows. (*FOF 10-4*).).

6. PacifiCorp's studies show that the riparian zones in the bypass and peaking reaches are composed of a total of 95 plant species. PAC-Dwer-D-1 at 6:18-21.

   RULING: ACCEPTED – BLM and NGO do not dispute this statement

7. The presence of numerous plant species with different moisture and soil requirements and a diverse mix of herb, shrub and tree species that provide structural diversity are indicators of a healthy riparian habitat. PAC-Dwer-D-1 at 7:14-16.

   RULING: ACCEPTED – NGO does not dispute this statement (this finding does not propose what are the dominant riparian species)

8. The bypass reach supports woody riparian vegetation to the degree expected on the few depositional features present in the reach. (*PAC-Dwer-R-1 at 2:15-17*).

   RULING: REJECTED (The bypass reach does support woody riparian vegetation. (*PAC-Dwer-D-1 at 5:20-23; PAC-Dwer-D-9*). However, the phrase, "to the degree expected" is ambiguous and does not lead to a useful finding of fact.)

9. Spill flows in the bypass reach are sufficient to inundate and maintain riparian vegetation, including the upper boundary of woody riparian vegetation that occurs on surfaces protected from river scour. PAC-Dwer-D-1 at 11:15-18.

   RULING: ACCEPTED – NGO does not dispute this statement

10. There is uncontested testimony in this proceeding that the framework of bedrock and boulders that controls the channel form would remain in place under BLM's proposed seasonal high flows. PAC-Tomp-D-1 at 12:20 to 13:1.

    RULING: ACCEPTED – NGO does not dispute this statement

11. Existing riparian communities in the reach are qualitatively similar to pre-project conditions. PAC-Dwer-D-1 at 12:21 to 13:2; PAC-Dwer-R-1 at 3:7-13; PAC-Tres-D-1 at 12:5-14.

    RULING: REJECTED (The cites provided do not support this proposed finding. When Dwerlkotte was asked to identify the support for his direct testimony regarding changes in the riparian system, he first asked to change the testimony to eliminate "woody," then when asked about his cited source, he changed the source from what was cited in his written testimony. (*Aug. 21, 2006 Tr. 1 at 91:19-92:15*). A newly-cited document states exactly the opposite of Mr. Dwerlkotte's testimony. Compare PAC-Dwer-D-1 at 12:23 to 13:2 ("a comparison of pre-project and post-project aerial photography revealed that there were no large-scale changes in the distribution of alluvial features and woody riparian vegetation") with PAC-Dwer-D-5 at 6-66 ("Significant changes to geomorphology and riparian vegetation were observed in this reach.")); Aug. 21, 2006 Tr. 1 at 98:21 to 99:6 (Dwerlkotte admits that he has no knowledge regarding pre- versus post-Project changes in cover of reed canarygrass); Id. at 98:3 to 98:6 (Dwerlkotte cross—approximately two-thirds of the riparian habitat in the J.C. Boyle bypassed reach is currently reed canarygrass); Id. at 102:24 to 103:3 (reed canarygrass "has encroached further down into the channel in places that have been exposed by the Project-diverted flows, namely the reedcanary grass."); PAC-Dwer-D-1 at 7:8-10 (reed canarygrass is now the dominant riparian species); NGO-Ex. 1 at 13:7-9, 16:7-10 (flow regulation has promoted encroachment by reed canarygrass). Further, PacifiCorp's citation to Tressler's direct testimony is unavailing because Tressler admitted that any statements made regarding riparian resources were not based on his own knowledge or expertise. (*Aug. 21, 2006 Tr. 1 at 118:1-25*).)

12. PacifiCorp's avian surveys documented consistent use of riparian habitat in the J.C. Boyle bypass and peaking reaches during breeding season by a number of avian riparian focal species. PAC-Tres-D-1 at 7:6 to 9:12.

    RULING: ACCEPTED – NGO does not dispute this statement

13. As PacifiCorp Witness Tressler testified, BLM's proposed seasonal high flow is not necessary for avian riparian focal species habitat to persist in the bypass reach and no substantial improvement for avian riparian focal bird species would be realized under the proposed flow. PAC-Tres-D-1 at 12:3-17.

    RULING: REJECTED (This finding is not supported with sufficient evidence. Tressler's testimony makes assumptions regarding the effect of the proposed flow on riparian resources without providing support for such conclusions.)

14. BLM presented no specific evidence that seasonal high flows will help to improve riparian conditions in the J.C. Boyle bypass reach.

    RULING: REJECTED (BLM does provide specific evidence that seasonal high flows will help to improve riparian conditions in the J.C. Boyle bypass reach. Seasonal high flows will move fine sediments from the river bed to the channel margin where they are ecologically beneficial (*BLM-Cluer-Ex. 0 15:24-16:4*); sediment in the bypassed reach "would likely be mobilized and transported more frequently with the BLM seasonal high flows than with Project operations" (*PAC-Tomp-D-1 at 12:20-23*); discussion and citations regarding how seasonal high flows will improve riparian conditions (*BLM-Turaski-Ex. 4 at 84, 85, 93*); seasonal high flows will work with the gravel augmentation program to sort sediments higher on the channel margins, benefiting riparian resources (*Aug. 22, 2006 Tr. at 54:13-23 Cluer*); and seasonal high flows will create more diverse riparian habitat (*NGO-Ex. 1 at 17:11-18*).)

15. BLM's proposal of more frequent seasonal high flows with nutrient-rich water from upstream agriculture could result in an increase of invasive species such as reed canarygrass on alluvial substrates in the bypass reach. PAC-Dwer-R-1 at 8:17-20.

    RULING: REJECTED (Evidence has been provided that shows lower flows have increased dominance of reed canarygrass and that higher flows will possibly scour the grass, therefore decreasing the invasive species. (*PAC-Dwer-D-1 at 7:8-10; Aug. 21, 2006 Tr. 1 at 98:3-13, 102:24-103:3, NGO-Ex. 1 at 15:8-16; FOF 10-16, 11-8*).

16. As NGO Witness Trush testified, BLM flows would result in *less, not more*, woody riparian habitat. PAC-Tres-R-1 at 1:16-17; NGO Exh. 1 at 17:11-13.

    RULING: ACCEPTED – NGO does not dispute this statement. Trush does state that BLM flows will benefit wildlife and inhibit establishment of reed canarygrass. (*NGO-Ex. 1. at 17:11-18*).)

17. Numerous factors determine how useful riparian patches are to avian riparian focal bird species, and that 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 TR at 128:23 to 129:11 (Tressler).

    RULING: ACCEPTED – (Tressler does state that there is a "general" relationship between the amount of riparian habitat and number of birds. (*Aug. 21, 2006 Tr. 1 at 129: 6-9*).)

18. As BLM Witness Alexander conceded, if the BLM-mandated flows produced less willow shrub habitat than exists under current operations, then there would be fewer, not more, birds associated with that habitat. Aug. 22 TR at 10:2-12 (Alexander).

    RULING: ACCEPTED – NGO does not dispute this statement

19. As BLM Witness Alexander acknowledged, the quantity of riparian habitat is not the only factor in determining how many birds (*i.e.*, riparian focal species) there are. Aug. 22 TR at 18:5-14 (Alexander).

    RULING: ACCEPTED – BLM and the NGO do not dispute this statement

BLM ISSUE 11:

20. Project-controlled flows have not resulted in significant changes to underlying geomorphic processes that control river channel form, as they relate to channel narrowing, increased bank erosion, and reduced channel migration that would adversely affect riparian vegetation for riparian focal bird species. PAC-Tomp-D-1 at 3:19 to 4:1.

    RULING: REJECTED (The cite supporting this broad based proposed finding merely references the stated purpose of Tompkins testimony, it provided no detailed information supporting the finding.)

21. Any geomorphic change to the bypass reach caused by Project flows would be expressed as either: 1) excess sediment storage in the reach; 2) encroachment of persistent woody riparian vegetation into the channel; or 3) some combination of the two. PAC-Tomp-D-1 at 7:3-6.

    RULING: REJECTED (Tompkins admits that his analysis only considered flow, not changes to sediment supply. (*Aug. 21, 2006 Tr. at 53:12-54:8*). Tompkins admits that consideration of flows and the sediments those flow act upon is important to analyzing geomorphic changes. As a result, Tompkins statement is found to be incomplete.)

22. PacifiCorp's analysis of aerial photography taken before and after construction of J.C. Boyle Dam illustrates the lack of systematic channel narrowing, increased erosion, and decreased channel migration between 1952 (pre-J.C. Boyle dam) and 2000 (post-J.C. Boyle dam) that would have resulted from encroachment of persistent riparian vegetation into the channel or excessive sediment storage. PAC-Tomp-D-1 at 8:14-18; PAC-Dwer-D-1 at 12:21 to 13:2; PAC-Dwer-R-1 at 3:7-13.

    RULING: REJECTED (This proposed finding states that a lack of certain channel changes is proof that persistent riparian vegetation has not encroached into the cannel. However, evidence shows that encroachment of reed canarygrass has resulted form flow regulations in the bypass reach. (*FOF 11-13*).)

23. Local instances of geomorphic change in the bypass reach such as channel narrowing, increased bank erosion, and reduced channel migration were caused by the introduction of sidecast material (i.e. sediments excavated from the hillside during construction of the J.C. Boyle bypass canal and access roads that were pushed downslope toward the channel) and sediment inputs from the eroded slope at the emergency overflow spillway, and not by Project flows. PAC-Tomp-D-1 at 7:20 to 8:2.

    RULING: ACCEPTED – NGO does not dispute this statement (This finding specifically relates to Project flows. The finding does not consider if Project effects on sediment supply have affected geomorphic changes in the bypass reach. It is important to consider the effects of both flows and the available sediment when considering geomorphologic changes. (*Aug. 21, 2006 Tr. at 53:12-54:8*).)

24. In the bypass reach, there is more riparian vegetation as a result of Project operations than before the Project was constructed, because areas previously covered by water are now vegetated. Aug. 21 TR at 107:14 to 108:10 (Dwerlkotte).

    RULING: ACCEPTED – NGO does not dispute this statement (The reference cited in support of this proposed finding is specifically discussing reed canaygrass encroachment due to the Project flows.)

25. PacifiCorp's analysis of historic photography revealed that there were no large-scale changes in the distribution of alluvial features and riparian vegetation. PAC-Dwer-D-1 at 12:21 to 13:2; PAC-Dwer-R-1 at 3:7-13.

    RULING: REJECTED (The cites provided do not support this proposed finding. When Dwerlkotte was asked to identify the support for his direct testimony regarding changes in the riparian system, he first asked to change the testimony to eliminate "woody," then when asked about his cited source, he changed the source from what was cited in his written testimony. (*Aug. 21, 2006 Tr. 1 at 91:19-92:15*). Newly-cited documents states exactly the opposite of Mr. Dwerlkotte's testimony. Compare PAC-Dwer-D-1 at 12:23 to 13:2 ("a comparison of pre-project and post-project aerial photography revealed that there were no large-scale changes in the distribution of alluvial features and woody riparian vegetation") with PAC-Dwer-D-5 at 6-66 ("Significant changes to geomorphology and riparian vegetation were observed in this reach.")); Aug. 21, 2006 Tr. 1 at 98:21 to 99:6 (Dwerlkotte admits that he has no knowledge regarding pre- versus post-Project changes in cover of reed canarygrass); Id. at 98:3 to 98:6 (Dwerlkotte cross—approximately two-thirds of the riparian habitat in the J.C. Boyle bypassed reach is currently reed canarygrass); Id. at 102:24 to 103:3 (reed canarygrass "has encroached further down into the channel in places that have been exposed by the Project-diverted flows, namely the reedcanary grass."); PAC-Dwer-D-1 at 7:8-10 (reed canarygrass is now the dominant riparian species); NGO-Ex. 1 at 13:7-9, 16:7-10 (flow regulation has promoted encroachment by reed canarygrass).)

26. Photographs provided by NGO Witness Trush reveal that willow is established at the Powerhouse Floodplain and is being promoted and maintained by existing flows in the bypass reach. PAC-Dwer-R-1 at 3:14-20; NGO Exh. 1 at 12:14-18.

    RULING: ACCEPTED – NGO does not dispute this statement

27. Current operations support and maintain woody riparian vegetation in the bypass reach. PAC-Dwer-R-1 at 8:24-26.

    RULING: ACCEPTED – NGO does not dispute this statement (This finding does not propose to quantify the degree to which woody riparian vegetation is supported)

28. PacifiCorp separated the peaking reach into three distinct reaches and conducted bedload transport sampling and tracer gravel studies to quantify sediment transport capacity in the peaking reach. PAC-Tomp-D-1 at 9:8 to 10:10.

    RULING: ACCEPTED – NGO does not dispute this statement (The tracer study does have limitations. As PacifiCorp has stated, "[i]t is important to note that the estimates of the discharge at the threshold of bed mobility have significant uncertainty." (*BLM-Cluer-Ex. 5 at 128*).)

29. These studies showed that coarse sediment and channel bed features are not mobilized by flows within the range of peaking operations. PAC-Tomp-D-1 at 10:21 to 11:2.

    RULING: ACCEPTED

30. The sediment transport studies, together with PacifiCorp's analyses of aerial photography in the peaking reach, revealed that the channel changes observed in the peaking reach were almost exclusively changes in coarse alluvial features that occurred in response to higher flows that still occur with Project operations and could occur naturally even without the Project. PAC-Tomp-D-1 at 11:14-19.

    RULING: REJECTED (This finding seems to propose that Project operations have not affected channel changes in the peaking reach to an extent greater than would have occurred naturally. However, Project operations have affected channel features in an "unnatural" way. Project related coarsening of the bed has caused significant change in the frequency of flows that can move sediment. (*Aug. 21, 2006 Tr. at 68:8 to 69:6*). If Project related coarsening had not occurred, "it is likely that the active features (e.g., point bars, islands) in Klamath River reaches downstream of J.C. Boyle dam to approximately Shasta River would have been characterized by finer sediment . . . . " (*PAC-Tomp-D-3 at 6-129*).)

31. The relative abundance and diversity of riparian habitat varies according to the overall valley bottom, channel and floodplain characteristics. PAC-Dwer-D-1 at 4:3-4.

    RULING: ACCEPTED – NGO does not dispute this statement (Other factors, such as geomorphologic or valley bottom constraints affect riparian habitat abundance and diversity. (*PAC-Dwer-D-1 at 7:18-22*).)

32. As PacifiCorp Witness Dwerlkotte testified, the distribution and abundance patterns of riparian vegetation in both reaches is what one would expect given the geomorphic variability of the reaches. PAC-Dwer-D-1 at 6:13-15.

    RULING: ACCEPTED – NGO does not dispute this statement (The geomorphic variability of the reaches refers to current conditions, which would include any potential affects the Project may induce).

33. Avian riparian focal bird species were documented in PacifiCorp's studies at reasonable relative abundance levels, and avian riparian focal species have persisted under Project operations. PAC-Tres-D-1 at 12:20-22.

RULING: PARTIALLY ACCEPTED AND PARTIALLY REJECTED

ACCEPTED: Avian riparian focal species have persisted under Project operations.

REJECTED: Avian riparian focal bird species were documented in PacifiCorp's studies at reasonable relative abundance levels. (As PacifiCorp has noted, there was not direct pre-project data on avian communities. (*PAC-Tres-D-1 at 12:18*). It is difficult for the Court to conclude what is a "reasonable relative abundance levels," by merely looking at current levels)

34. PacifiCorp's bird abundance data does not suggest that avian riparian focal bird species are adversely affected by Project operations. PAC-Tres-R-1 at 2:20-22.

RULING: ACCEPTED – NGO does not dispute this statement (The data does not suggest if Project operations have adversely affected or helped riparian focal bird species)

35. There has been an 18.61% increase in the abundance estimate for yellow warbler between 1998 and 2004 at Frain Ranch without any known increase in riparian habitat in that area. Aug. 22 TR at 19:4 to 22:8 (Alexander); BLM Alexander Exh. 4 at 6.

RULING: ACCEPTED – BLM and the NGO do not dispute this statement

36. As NGO Witness Trush testified, it is likely that prior to Project construction, the depositional features in the bypass reach likely did not support significant woody riparian habitat and likely would not have provided habitat for riparian focal birds due to extended inundation throughout much of the May-June nesting season. PAC-Tres-R-1 at 3:5-11; NGO Exh. 1 at 10:5-7 and 11:18-19.

RULING: REJECTED (PacifiCorp incorrectly over generalizes specific portions of Trush's testimony. Trush does give specific examples of certain depositional features that will be scoured by flood flows and which will be inundated by water. (*NGO-Exh. 1 at 10:5-7,11:18-19*). However, Trush does not state that depositional features will not support habitat for riparian focal birds. Quite the opposite, Trush believes pre-Project flows would have created dispositional features which would provide habitat for riparian birds. (*NGO-Ex. 1 at 17:13-16*).)

37. BLM presented no evidence that Project operations adversely affect woody riparian resources and riparian focal bird species in the J.C. Boyle peaking and bypass reaches.

    RULING: ACCEPTED

BLM ISSUE 14:

38. One of the justifications given by BLM for its proposed seasonal high flows is to flush fine sediments from redband trout spawning beds. PAC-Carl-D-1 at 4:19-23; BLM Turaski Exh. 4 at A-41.

    RULING: ACCEPTED - BLM does not dispute this statement

39. In the J.C. Boyle bypass reach, it is the lack of sediment rather than its excess that affects the availability and function of trout spawning area in the reach. PAC-Carl-D-1 at 5:7-8.

    RULING: REJECTED (While a lack of sediment suitable for spawning is one of the limiting factors, it is not the only factor. Embeddedness (fine sediment settling on spawning habitat) of spawning beds greater than ten percent decreases the quality of spawning habitat. (*BLM-Gard-Ex. RO at 1:14-23*). Observations of spawning habitat in the bypassed reach showed spawning gravel patches were fifty percent embedded. (*BLM-Gard-Ex. 0 at 4:1-6*).)

40. The J.C. Boyle bypass reach is a "transport" reach, where the capacity of the channel to transport sediment is significantly higher than the supply of sediment to the channel. PAC-Carl-D-1 at 5:16-19; PAC-Tomp-D-1 at 6:8-13.

    RULING: ACCEPTED (J.C. Boyle bypass reach is also considered a "response" reach under the Montgomery and Buffington geomorphic classification. (*BLM-Cluer-Ex. 0 at 6:21-23*).)

41. Recruitment of mobile sediments, including gravel and fine sediments (i.e., silts, sands) to the J.C. Boyle bypass reach is low based on geologic controls and the effects of other historical human influences on channel form and processes, both present and past. PAC-Carl-D-1 at 5:20-6:1.

    RULING: REJECTED (While the geologic controls of the reach (*PAC-Carl-D-1 at 5:20-6:1*) may affect the degree to which mobile sediments are supplied, sediment trapping by J.C. Boyle Dam is the primary cause of low sediment availability in the bypass reach. (*FOF 11-1, 11-3, 14-2; BLM-Cluer-Ex. 0 at 6:14-20; BLM-Cluer-Ex. 5 at 111*).

42. Low gradients and surface runoff in the upper reaches of the Klamath River in the vicinity of Upper Klamath Lake and Keno reservoir contribute to a naturally low sediment yield and thus to low sediment loads to the steeper reaches of the Klamath River below Keno, including the J.C. Boyle bypass and peaking reaches. PAC-Carl-D-1 at 6:20-22.

    RULING: REJECTED (The current low sediment yield is not *natural*. Sediment trapping by J.C. Boyle Dam is the primary cause of low sediment availability in the bypass reach. (*FOF 11-1, 11-3, 14-2; BLM-Cluer-Ex. 0 at 6:14-20; BLM-Cluer-Ex. 5 at 111*).

43. In the J.C. Boyle bypass reach, the channel bed consists of 64% boulders and 28% cobbles, but only 3% gravel and 4% fines (*i.e.*, sand, silt, and organic matter). BLM Cluer Exh. 11 at 2.

    RULING: ACCEPTED.

44. The seasonal high flow proposed by BLM is unnecessary for maintaining trout spawning areas in the J.C. Boyle reach and cannot be justified on that ground. PAC-Carl-D-1 at 5:8-10.

    RULING: REJECTED (Seasonal high flows will help distributed gravel and will create new spawning areas. *(FOF 14-4, 14-8, 14-17, 14-19, 14-24).*)

45. Trout spawning activities, including the presence of redds, currently occur in the mainstem bypass reach just downstream of the existing J.C. Boyle emergency canal spillway; therefore, the BLM's proposed seasonal flushing flow would detrimentally impact spawning redds created by trout in this area of the bypass reach. PAC-Carl-D-1 at 8:13-19; PAC-Carl-R-1 at 5:22-6:1.

    RULING: ACCEPTED

46. Site-specific conditions indicate that the redband trout spawn in the J.C. Boyle bypass reach, where conditions are and have been characterized by stable flows that are dominated throughout the year by about 230 cfs of high-quality water from natural springs input to the channel. PAC-Carl-D-1 at 13:4-7.

RULING: ACCEPTED

47. In 2003, when no spills occurred except for a two-day period and flows were relatively constant during the spawning season, 56 trout spawning redds were observed in April 2003, and 67 trout redds were observed in May and June 2003 in the lower part of the bypass reach below the location of the existing emergency spillway canal. PAC-Carl-D-1 at 11:7-11; PAC-Carl-D-3 at 5-30 to 5-31; PAC-Carl-R-1 at 5:1-6.

RULING: ACCEPTED - BLM does not dispute this statement

48. The successful spawning of the redband trout demonstrates that the current flow regime provides favorable spawning conditions for trout spawning areas in the J.C. Boyle bypass reach. PAC-Carl-D-1 at 12:4-6, and 13:9-13.

RULING: REJECTED (The only area where trout spawning has been observed in the bypass reach is directly downstream of the emergency canal spillway. (*PAC-Carl-D-1 at 8:11-21*). This very limited spawning habitat, in a very unnatural environment, does not demonstrate that the current flow regime provides favorable conditions.)

49. The estimated fish species and life stage periodicity indicates that redband/rainbow trout spawning begins about February and that trout egg incubation begins about March. Both spawning and incubation extend beyond April 15. PAC-Carl-D-1 at 10:3-6; PAC-Carl-D-3 at 2-47; BLM Gard Exh. 0 at 2:15:17.

RULING: ACCEPTED - BLM does not dispute this statement

50. BLM's proposed seasonal flushing flow, required to be released between February 1 and April 15, would happen during the time when redband/rainbow trout spawning and egg incubation occurs. PAC-Carl-D-1 at 10:7-9; PAC-Carl-R-1 at 2:7-10.

RULING: ACCEPTED - BLM does not dispute this statement

51. As BLM Witness Gard acknowledged, BLM's proposed flushing flow would always occur during spawning season. Aug. 22 TR at 60:4-7 (Gard).

RULING: ACCEPTED - BLM does not dispute this statement

52. Because gravels start to dislodge and mobilize from the streambed in the J.C. Boyle bypass reach at about 1,700 cfs, there would be a high risk of deleterious scouring effects on trout spawning redds, including loss of eggs, from BLM's proposed seasonal flushing flow of 3,300 cfs or greater. PAC-Carl-D-1 at 10:9-15; PAC-Carl-D-9 at 6-124, 6-134.

    RULING: REJECTED (The finding that a deleterious souring effect on trout spawning redds will occur is not persuasive. First, the gravel study (indicating the threshold for mobilizing gravel starts at 1,700 cfs) has bias. The gravel study was done in one of the steepest parts of the bypassed reach where sediments are more likely to be mobilized. (*Aug. 21, 2006 Tr. at 56:10-57:15*). The gravel study was also conducted at twenty feet or greater from the bank; fifty-eight percent of the redds were within ten feet of the bank. (*Aug. 21, 2006 Tr. at 58:2-14; Id. at 172:5-9*). At a given flow, particles toward the center of the channel are more likely to move than particles along the channel margins. (*Id. at 58:2-14*). Eighty-one percent of the redds examined were deposited within "boulder pockets." (*BLM-Cluer-Ex. 10 at 30; Aug. 21, 2006 Tr. at 171:23-172:2*). Such locations will protect redds by creating a velocity break and by providing shelter from high flows. (*BLM-Cluer-Ex. 10 at 30; Aug. 21, 2006 Tr. at 171:23-172:2*).)

53. Although BLM's proposed seasonal flushing flow would commence at 3,300 cfs, BLM Turaski Exh. 4 at A-16; PAC-Carl-D-1 at 4:15-19, as BLM Witness Gard testified, the median flow during the flushing flow events would actually exceed 4,200 cfs. BLM Gard Exh.0 at 2:11-13.

    RULING: ACCEPTED - BLM does not dispute this statement

54. In addition to dislodging gravel currently present in the reach, there is also a risk that the BLM flushing flow would dislodge gravel placed in the reach under a gravel augmentation program. Aug. 21 TR at 203:15-20 (Carlson).

    RULING: REJECTED (The term "risk" in the finding is unclear. It is likely referring to the possibility of a scouring effect on trout spawning redds. (*Aug. 21, 2006 Tr. at 203:1-5)*. However, the purpose of the augmentation program is to have the gravel flushed downstream. (*Aug. 21, 2006 Tr. at 201: 10-15*). As agreed upon by PacifiCorp's witness, such flushing of gravel would improve spawning habitat. (*Id*.).)

55. As BLM Witness Gard testified, spawning gravel deposits existing in the emergency spillway prior to the 2006 high flows were mobilized and transported downstream. BLM Gard Exh. 0 at 4:13-14.

    RULING: ACCEPTED - BLM does not dispute this statement

56. BLM's rationale for developing the seasonal high flushing flow was based on needs of riparian vegetation on BLM-administered lands in the bypass and peaking reaches, and not as stimulus for trout spawning migration. PAC-Carl-R-1 at 2:16-19, and 4:20-22; BLM Turaski Exh. 4 at A-41.

    RULING: REJECTED (Justifications also included the need for seasonal high flows to clean and redeposit gravel so as to provide quality spawning habitat. (*BLM-Turaski-Ex. 4 at 84*). Such seasonal high flow should be adequate to mobilize and redistribute sediments, and flush fine sediments from spawning bed. (*Id*.).)

57. BLM has acknowledged that there could be impacts to existing redband trout spawning habitat that could be expected from its proposed seasonal high flow. PAC-Carl-D-1 at 12:12-17; PAC-Carl-R-1 at 4:9-15; BLM Turaski Exh. 4 at A-41.

    RULING: ACCEPTED - BLM does not dispute this statement

58. BLM witnesses presented no evidence that there are benefits to spawning of seasonal high flows; thus, there are no beneficial impacts to offset adverse impacts on spawning.

    RULING: REJECTED (Evidence is presented. (*See the discussion section of Issue 14; See also FOF 14-4; 14-8; 14-17; 14-19; 14-24).*)

BLM ISSUE 16:

59. Under current operations there is an existing trout population that supports a high quality recreational fishery in the J.C. Boyle bypass and peaking reaches that is maintained by natural reproduction in Shovel Creek, the J.C. Boyle bypass reach, and Spencer Creek. PAC-Ols-D-1 at 5:3-5.

    RULING: REJECTED (While current operations support a recreational fishery with a high catch rate (*PAC-Ols-D-1 at 5:3-6:5*), other factors should be examined before subjectively declaring a fishery is "high quality." Fishermen would also consider such factors as how often fishing is permitted and what size fish are being caught.)

60. In the J.C. Boyle peaking reach from the powerhouse to the Oregon-California state line, the fishery has been designated as an "outstandingly remarkable value" under the National Wild and Scenic River System administered by the Secretary of the Interior. PAC-Ols-D-1 at 5:5-9.

    RULING: ACCEPTED – Indian Tribes and NGO do not dispute this statement (A more accurate statement would be to say the "fish" themselves are the "outstandingly remarkable value," not the "fishery." (*PAC-Whit-D-7 at 18*).)

61. The fishery in the J.C. Boyle reaches is designated and managed by the Oregon Department of Fish and Wildlife as a "wild trout fishery" and by the California Department of Fish and Game as a "wild trout area." PAC-Ols-D-1 at 5:9-12.

    RULING: ACCEPTED – BLM, Indian Tribes, and NGO do not dispute this statement

62. For Oregon, data show the Klamath River having higher catch rates for trout than three other acclaimed trout streams in Oregon: the Deschutes, Williamson, and Metolius Rivers. PAC-Ols-D-1 at 6:2-4; PAC-Ols-D-4.

    RULING: ACCEPTED -NGO does not dispute this statement

63. For California, 2004 data available for 34 wild trout streams showed that among these, the Klamath River had the highest catch rate of all. PAC-Ols-D-1 at 6:4-5; PAC-Ols-D-3.

    RULING: ACCEPTED - NGO does not dispute this statement

64. PacifiCorp Witness Kirkendall testified that he has recorded angler/per rod fish counts of 15-50+ on every occasion he has fished in the Upper Klamath. PAC-Kirk-D-1 at 2:9-11.

    RULING: ACCEPTED - BLM and NGO do not dispute this statement

65. FWS and NMFS have not taken the position that, for the J.C. Boyle peaking reach, the resident trout fishery resource is not healthy and self-sustaining. PAC-Cross-5.

    RULING: ACCEPTED - NGO does not dispute this statement

66. As PacifiCorp Witness Olson testified, current peaking operations do not affect any known or potential trout spawning areas. PAC-Ols-D-1 at 8:1-2.

RULING: REJECTED (Olson did testify to this statement, however other evidence shows peaking operations do affect potential spawning areas. Surveys for spawning gravels in the 1980's did find some locations in the peaking reach with suitable spawning gravels, but these areas were on the margins of the stream channels and subject to dewatering from the peaking operations. (*BLM-Snedaker-Ex. 0 at 3:13-19*)).

67. BLM Witness Snedaker did not provide site-specific data in support of his testimony regarding the effects of Project operations on habitat and mortality. PAC-Ols-R-1 at 1:9 to 3:23; Snedaker Direct Testimony at 4:18-21, and 5:7, 10, and 22-23.

RULING: REJECTED (Snedaker cites to data, developed via site-specific studies, in the Salt Caves FERC proceeding report. (*BLM-Snedaker-Ex. 0 at 4:25 to 5:3, 5:7-8; 8:15-9:8*). A copy of the Salt Cave report is found at BLM-Snedaker-Ex. 8.)

68. BLM Witness Snedaker's suggestion that peaking operations limit the production of forage fish is not supported by the proper interpretation of site-specific data. PAC-Ols-R-1 at 9:6-7; Snedaker Direct Testimony at 10:21-25.

RULING: REJECTED (Snedaker's testimony is found to be credible and the peaking operations have been shown to limit production of forage fish. (*FOF 16-15, 16-32*).)

69. Trout fry stranding studies conducted following downramping events provided no indication that trout fry were being stranded by current downramping in the J.C. Boyle peaking reach. PAC-Ols-D-1 at 8:4-7; PAC-Ols-D-20 § 6.7.1.1 at 6-12 to 6-15.

RULING: REJECTED (This stranding study is found to be non-persuasive. As admitted to by PacifiCorp's own witness (Olson), the fry stranding study in the Oregon portion of the peaking reach was done where PacifiCorp's fry distribution study found no fry. (*Aug. 21, 2006 Tr. at 148:6-150:6*). The study was thus predetermined to find no stranding, since no fry existed to strand.)

70. As Klamath Tribes Witness Dunsmoor testified, he observed mortality of young fish on July 5, 2006, the first major downramp event of the season, although none of the observed stranded fish were trout. KTr Dunsmoor direct on BLM 16 at 4:3-8; PAC-Ols-R-1 at 16:4-11.

RULING: ACCEPTED - BLM does not dispute this statement

71. As Klamath Tribes Witness Dunsmoor also testified, he found no stranded fish on July 6, during the second major peaking cycle, or on July 7-8, 2006, during the third major peaking cycle. KTr Dunsmoor direct on BLM 16 at 4:8-13; PAC-Ols-R-1 at 16:7-11.

RULING: ACCEPTED - BLM does not dispute this statement

72. As PacifiCorp Witness Olson testified, such stranding may happen a few times a year during the first peaking event after several months of steady flow, and that similar stranding could occur under BLM's proposed flow conditions. PAC-Ols-R-1 at 16:16-17:7; Aug. 21 TR at 152:15-18 and 166:13 to 167:1 (Olson).

RULING: PARTIALLY ACCEPTED AND PARTIALLY REJECTED

ACCEPTED: As PacifiCorp Witness Olson testified, such stranding may happen a few times a year during the first peaking event after several months of steady flow. (*PAC-Ols-R-1 at 16:16-17:7*).

REJECTED: That similar stranding could occur under BLM's proposed flow conditions. (Reduced ramp rates can resolve the problem of fish stranding. (*PAC-Ols-R-1 at 17:1-9*). BLM's lower ramp rate of two inch per hour is similar to that of another cite where no stranding has occurred. (*FOF 16-14*).)

73. Results of trout fry distribution-over-time studies in the J.C. Boyle peaking reach indicated very little if any downstream dispersal of fry associated with flow fluctuations. PAC-Ols-D-1 at 8:10-12.

RULING: REJECTED (Olson's general cite, to PAC-Ols-D-20 at App. 3A, makes it difficult to ascertain on exactly what facts he bases his opinion since no page numbers are provided. However, evidence, in PAC-Ols-D-20 at App. 3A, shows few fry were captured in the peaking reaches that have the greatest (Oregon peaking reach) ramp rates. (*PAC-Ols-D-20 at App. 3A at 20; KTr. LKD Ex. 6 at 6-46*). This evidence would indicate that fry in those areas are being dispersed downstream (therefore they don't exist to be caught) or that fry do not inhabit these areas (therefore none would be dispersed downstream). This evidence does not show that high ramp rates would not disperse fry, if they were in those waters).

74. PacifiCorp's mark-recapture studies indicated that trout fry maintained their general location during peaking cycles by simply moving up and down with the changing water's edge. PAC-Ols-D-1 at 8:12-15; PAC-Ols-D-20 at App. 3A.

RULING: REJECTED (Olson's general cite, to PAC-Ols-D-20 at App. 3A, makes it difficult to ascertain on exactly what facts he bases his opinion since no page numbers are provided. The mark and recaputure study did not mark or recapture any fry in the Oregon peaking reach where peaking effects would be most pronounced; no conclusions were made for this area. (*PAC-Ols-D-1 App. 3A at 36-37*). In the California peaking reach, 9 of 73 fry were recaptured indicating some ability to maintain their location during peaking events. (*Id*.).)

75. For adult trout, PacifiCorp's radio-telemetry study results indicated that peaking operations did not induce any significant trout movement that would not otherwise be expected in a stable-flow regime as seen in the bypass reach. PAC-Ols-D-1 at 8:15-18; PAC-Ols-D-20 § 5 at 5-41.

RULING: REJECTED (Peaking operations do induce trout movement that would not be expected in a stable-flow regime. PacifiCorp's radio-telemetry study only detects upstream-downstream fish movement, so it would not detect all fish movement which would increase energetic costs. (*PAC-Ols-D-20 at Sec. 5, 5-8, 5-9*). Holding territory, while flows increase, force trout to swim faster to stay in place. (*BLM-Simons-Ex. 0 at 5:8 to 6:7*). Fish 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-Exh. 10 at 26*).)

76. PacifiCorp's comparison of growth rates of trout in the peaking reach and non-peaking Keno reach demonstrated that trout through age 3 were actually larger in the peaking reach, indicating that there was no significant movement causing extra energy costs. PAC-Ols-D-1 at 8:22 to 9:5; PAC-Ols-D-5.

RULING: REJECTED (PacifiCorp's comparison of growth rates of trout in the peaking reach and the non-peaking Keno reach demonstrated that growth is greater in the peaking reach through age 2, similar between ages 2 and 3, and growth is greater in the Keno reach after age 3. (*BLM-Simons-Ex. 13 at 64*). Olson testimony actually states that there was either no significant movement causing extra energy costs or something else was occurring that offset this effect. (*PAC-Ols-D-1 at 9:3-5*). Larger fish operate closer to the energetic margin, so energetic costs of peaking would be expected to reveal themselves in larger fish before smaller. (*KTR-LKD-R-BLM 16 at 7:12-17*). Peaking reach trout likely have significantly higher energetic costs due to movements required to adjust to peaking operations. (*FOF 16-23, 16-26, 16-30*).)

77. Although BLM Witness Hooton testified that in the peaking reach, trout have lower condition factors than in the Keno reach, the report he cited in support of such testimony was biased because of different data collection seasons between the two reaches. PAC-Ols-R-1 at 12:21 to 13:4; BLM Hooton Exh. 0A at 10:14-17.

RULING: ACCEPTED (This report does contain some bias; data was collected during different seasons at the two reaches. (*PAC-Ols-6 at 4*). The amount of this bias was not determined. The ODFW report and 2002 PacifiCorp did have similar results, showing that Keno reach fish have higher condition factors than peaking reach fish in the fall. (*Id*.).)

78. PacifiCorp's data, collected from all seasons, show that 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.

RULING: ACCEPTED (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-6 at 4*).)

79. PacifiCorp's evaluation of the macroinvertebrate community in the peaking reach, the non-peaking Keno reach, and the non-peaking reach below Iron Gate dam did not indicate any significant effects associated with peaking. PAC-Ols-D-1 at 9:6-11.

RULING: REJECTED (PacifiCorp's studies show that peaking operations reduce the production of sessile organisms like macroinvertebrates by ten percent to twenty-five percent. (*BLM-Simons-Ex. 13 at 26*). PacifiCorp's studies showed that 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*). The study concluded that "flow fluctuations in the peaking reach are undoubtedly a contributing factor to the lower [macroinvertebrate drift] rates there." (*Id*.).)

80. The only observed impact in PacifiCorp's evaluation of the macroinvertebrate community was that macroinvertebrate drift increased as flows increased in the peaking cycle; however, drift which occurs in the morning as flows are brought up for power peaking operations, may actually benefit sight-feeding fish such as trout. PAC-Ols-D-1 at 9:12-23.

RULING: REJECTED (Other impacts on the macroinvertebrate community have occurred. (*See reasons stated for rejection to PC PFF 79*).)

81. PacifiCorp's bioenergetics modeling shows that trout would be expected to grow faster under existing food (macroinvertebrates) conditions with the water temperatures seen in the existing peaking operation compared to what would occur if peaking was not occurring. PAC-Ols-D-1 at 10:9-12.

RULING: ACCEPTED

82. While a typical peaking cycle will cause flow fluctuations from 350 cfs to 1,500 cfs, the results of PacifiCorp's habitat modeling, which incorporated both qualitative and quantitative aspects of habitat, show that adult trout habitat changes only by about 11% between the low and high flow within the cycle. PAC-Ols-D-1 at 10:13-20; PAC-Ols-D-6.

RULING: ACCEPTED

83. PacifiCorp's studies revealed that peaking reach trout were larger through age 3 compared to those in the Keno reach, which is counter to BLM's assertion that peaking operations create conditions that reduce trout growth. PAC-Ols-D-1 at 12:16-18.

RULING: REJECTED (Comparison of growth rates of trout in the peaking reach and the non-peaking Keno reach demonstrated that growth is greater in the peaking reach through age 2, similar between ages 2 and 3, and growth is greater in the Keno reach after age 3. (*BLM-Simons Ex.-13 at 64; FOF 16-26*). Evidence also indicates that average trout size has decrease since Project operations. (*BLM-Hooton-Ex. 28*). For trout residing below J.C. Boyle Dam, the average length has decreased from about 12 inches (30 cm) in 1961 shortly after the J.C. Boyle facility was completed to about seven inches (18 cm) in 1990. (*Id*.))

BLM ISSUE 17:

84. Although BLM references Hunter in support of its proposal for ramping rates of less than 2 inches per hour, Hunter's report was a review of studies conducted on other rivers only for anadromous fish, not trout. PAC-Ols-D-1 at 14:5-12; BLM Turaski Exh. 4 at A-43 to A-44.

RULING: ACCEPTED (While the study's focus is not trout stranding, it does address trout stranding. (*BLM-Snedaker-Ex. 6 at 37-38*).)

85. Although BLM Witness Snedaker testified that a 2-inch per hour ramp rate is not unusual in the Northwest and that recently issued licenses follow this rate, the relicense ramp rates he references are for non-peaking projects where the licensees are generally willing to accept conservative ramp rates. PAC-Ols-R-1 at 5:11-15; BLM Snedaker Exh. 0 at 7:12-24.

RULING: REJECTED (No factual support is provided to establish this statement.)

86. The results of PacifiCorp's site-specific study demonstrate that the current 9-inch per hour rate (which attenuates to about 3 inches per hour in California) provides adequate protection to the redband trout fishery in the J.C. Boyle peaking reach. PAC-Ols-D-1 at 14:9-11.

RULING: REJECTED (Olson's testimony does not provide a citation to the "site-specific" study referred. Furthermore, a lower ramp rate would provide more protection. (*FOF 17-1 to 17-9; See discussion section of Issues 16/17*).)

87. As PacifiCorp Witness Olson testified, adverse fisheries effects associated with flow-change amplitude in other rivers are usually due to the limited amount of suitable habitat available at the minimum flow within the cycle. PAC-Ols-D-1 at 15:5-6.

RULING: REJECTED (The testimony cited provides no underlying facts, citation to authority, or other basis form which the conclusion can be drawn. It merely mentions certain "literature." (*PAC-Ols-D-1 at 15:4*).)

88. The results of PacifiCorp's PHABSIM study for the Klamath River show that the amount of usable habitat for trout is nearly maximized at the low flow within the typical peaking cycle. PAC-Ols-D-1 at 15:6-10; PAC-Ols-D-6.

RULING: ACCEPTED

89. In support of its ramping proposal, BLM relies on general laboratory and field studies in other rivers regarding ramp rates over two inches per hour that are not specific to the J.C. Boyle reach of the Klamath River. PAC-Ols-D-1 at 16:22-23.

RULING: REJECTED (BLM does provide site-specific studies. (*BLM-Snedaker-Ex. 8 at 18-19* (FERC Salt Caves EIS); *BLM-Hooton-Ex. 0B at 7:12-15* (*ODFW and other studies observe very few salmonid fry or other fish species in the margins of the peaking reach likely because they have been flushed downstream by extreme daily flow fluctuations*.))

90. PacifiCorp's site-specific studies of trout fry movement found no evidence that flow increases cause juvenile fish to be washed downstream. PAC-Ols-D-1 at 17:9-12.

RULING: REJECTED (Evidence shows that increased flows can wash juvenile fish downstream. (*FOF 16-16 to 16-20*).)

91. In comparing growth, PacifiCorp found that trout ages 1, 2, and 3 in the peaking reach were larger than those in the Keno reach, just the opposite of what would be expected with the impaired growth theory asserted by BLM. PAC-Ols-D-1 at 17:14-18.

RULING: ACCEPTED

92. Increasing flows during peaking cycles increased macroinvertebrate drift; however, stimulating drift would be expected to increase the availability of this primary "forage base" for trout. This increased macroinvertebrate drift may contribute to the fact that juvenile trout in the peaking reach grow faster than those in the non-peaking Keno reach. PAC-Ols-D-1 at 17:19 to 18:3.

RULING: ACCEPTED

93. PacifiCorp's studies found no evidence that current ramp rates adversely affect fish populations in the J.C. Boyle peaking reach, or that populations of other aquatic species are harmed under existing conditions in the J.C. Boyle reaches. PAC-Ols-D-1 at 18:6-8.

RULING: REJECTED (Evidence does indicate that fish populations are adversely effected by current ramp rates. (*FOF 16-1 to 16-62)*.)

BLM ISSUE 19:

Current Flow Regime

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

RULING: ACCEPTED - BLM does not dispute this statement

95. 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 to 5:4; PAC-Carl-D-1 at 15:1-6.

RULING: ACCEPTED

96. 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.

RULING: ACCEPTED - BLM does not dispute this statement

97. 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.

RULING: ACCEPTED - BLM does not dispute this statement (in the original finding of fact, the last word on the first line was "though," this appears to be a typographical error, therefore the word has been changed to "through").

98. During drier times of the year, the powerhouse is operated in a daily "peaking" mode with alternate periods of storage and generation through a 24-hour cycle. PAC-Whit-D-1 at 5:10-11.

RULING: ACCEPTED - BLM does not dispute this statement

99. 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.

RULING: ACCEPTED - BLM does not dispute this statement

100. 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.

RULING: ACCEPTED

BLM's Proposed Flows

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

RULING: ACCEPTED

102. Under BLM's proposal, there would be a higher base flow in the bypass reach of either 40% 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 Exh. 4 at A-16.

RULING: ACCEPTED - BLM does not dispute this statement

103. 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 to 6:1.

RULING: ACCEPTED

104. 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 Exh. 4 at A-16.

RULING: ACCEPTED - BLM does not dispute this statement

105. During the period between May 1 and October 31, the BLM proposal 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 Exh. 4 at A-16.

RULING: ACCEPTED

Whitewater Boating

106. Based on PacifiCorp's recreation use estimates and surveys conducted during relicensing, boating is a common recreation activity in the peaking and bypass reaches. PAC-Whit-D-1 at 6:21 to 7:1.

RULING: PARTIALLY ACCEPTED AND PARTIALLY REJECTED

ACCEPTED: Boating is a common recreational activity in the peaking reach.

REJECTED: Boating is a common recreation activity in the bypass reach. (Not relevant to Issue 19. Issue 19 deals specifically with the peaking reach. The discussion of the bypass reach is not relevant to the issue at hand)

107. About 4,000 to 5,000 recreation days are specifically associated with commercial rafting. PAC-Whit-D-1 at 7:3-4.

RULING: ACCEPTED (4,000 to 5,000 is a subset of the estimated 12,000 "recreation days" per year in the J.C. Boyle peaking and bypass reaches. "Recreation days" is defined as "one person visiting for any portion of a day.")

108. BLM has identified whitewater boating in the peaking reach as an "outstandingly remarkable value" as designated by the Wild and Scenic River System. PAC-Whit-D-1 at 7:19-23; PAC-Whit-D-3 at 3-4 to 3-5; PAC-Bald-D-1 at 3:7-16.

RULING: REJECTED (Not relevant to Issue 19. Issue 19 addresses how BLM flows may affect the existing current whitewater boating and flyfishing in the J.C. Boyle peaking reach. (*See Order on Parties' Stipulation Regarding Disputed Issues of Material Fact at 2 (July 19, 2006) (defining Issue 19*)). This stipulation followed BLM's motion to more clearly define Issue 19, which noted how the Wild and Scenic River Act (WSRA) issues were legal and policy issues not within the scope of this proceeding. (*BLM Motion to Narrow, Clarify, and More Clearly Define Issues PacifiCorp/BLM 16 and 19 at 4-7 (June 26, 2006*)).)

109. 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.

RULING: ACCEPTED

110. According to the BLM's estimates, in 2004 there were 4,141 commercial rafting visits on the Upper Klamath between May and October with 2,712 visits, or 66% of the total visits, occurring in the months of July and August. PAC-Bald-D-1 at 4:5-8; BLM Turaski Exh. 4 at A-36.

RULING: ACCEPTED

111. PacifiCorp's recreation flow study found that boaters in kayaks may be able to use the river for transportation 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.

RULING: ACCEPTED - BLM does not dispute this statement

112. 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.

RULING: ACCEPTED - BLM does not dispute this statement

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

RULING: ACCEPTED - BLM does not dispute this statement

114. 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.

RULING: ACCEPTED - BLM does not dispute this statement

115. As PacifiCorp Witness Carlson testified, the evidence from PacifiCorp's whitewater boating studies indicates that 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.

RULING: ACCEPTED

116. As PacifiCorp Witness Whittaker testified, the BLM proposal would substantially reduce the number of days when optimal whitewater boating (flows over 1,500 cfs) is available compared to existing conditions. PAC-Whit-D-1 at 16:17-19.

RULING: ACCEPTED

117. As PacifiCorp Witness Baldwin testified, under the BLM's proposed flow conditions, opportunities for whitewater boating would be severely cut and the outfitting industry on the Upper Klamath would be crippled. PAC-Bald-D-1 at 4:12-14.

RULING: ACCEPTED

118. In an average year, the existing regime provides boating nearly every day, while BLM's proposal provides boating about 29% of the total number of available days in July and August. PAC-Whit-R-1 at 4:6-8.

RULING: ACCEPTED ("nearly every day" refers to days within July and August)

119. Over the entire May through October boating season, the BLM regime would provide boatable flows about 55% of the days, compared to 99% of the days under the current flow regime. PAC-Whit-R-1 at 4:8-10.

RULING: ACCEPTED (the percentages referenced refer to "average" years)

120. BLM's Flow Management Scenario Model (FMS model), which BLM used to assess and support its proposed flow conditions, assumes perfect control capability to ramp the bypass reach at two inches per hour. However, because actual ramping will be slower than two inches per hour and consume a larger volume of water, the BLM flow condition will reduce available hours for rafting by 1-2 hours per day. PAC-Smit-R-1 at 3:1-8.

RULING: REJECTED (Smith's rebuttal testimony fails to provide sufficient evidence to substantiate his assertions. No studies or calculations are cited to support the finding that rafting will be reduced by one to two hours per day.)

121. 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 TR at 88:22-25 (Turaski).

RULING: ACCEPTED

122. The FMS model incorrectly assumes that a seven day rolling average inflow to J.C. Boyle is a reasonable and predictable value since flows are managed according to the annual operating plan provided by the Bureau of Reclamation. PAC-Smit-R-1 at 6:10-12.

RULING: REJECTED (Smith's rebuttal testimony fails to provide sufficient evidence to substantiate his assertions. No studies or calculations are cited to support this finding.)

123. Inflow is difficult to predict because of irrigation project operation impacts in Lake Ewauna, power demands and attempts to maximize value, and operating requirements, including maintenance outages and minimum flows below Iron Gate dam. PAC-Smit-R-1 at 6:12-15.

RULING: REJECTED (Smith's rebuttal testimony fails to provide sufficient evidence to substantiate his assertions. No studies or calculations are cited to support this finding.)

124. 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 TR at 87:22 to 88:5 (Turaski).

RULING: ACCEPTED

125. 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 TR at 88:6-21 (Turaski).

RULING: ACCEPTED

126. As a result of these limitations of the FMS model, the uncontradicted testimony of PacifiCorp witnesses was that the model overstates the number of days and hours rafting will be available even under the reduced rafting availability regime with the BLM flow conditions. PAC-Smit-R-1 at 2:14-20; PAC-Carl-R-1 at 13:4-16.

RULING: ACCEPTED

127. The BLM has acknowledged that only in very wet years will there be enough water through the system to allow for boating during the week without peaking under the BLM flows. Aug. 22 TR at 85:9-24 (Turaski).

RULING: ACCEPTED

128. If the number of boating days during the peak months (July and August) in an average year will be reduced from seven days a week (62 days out of a 62-day season) to about two days a week (18 out of a 62-day season), use levels on boatable days are likely to be substantially higher and will create higher crowding and congestion impacts. PAC-Whit-R-1 at 4:4-14.

RULING: REJECTED (Whitaker's rebuttal testimony fails to provide sufficient evidence that "crowding and congestions impacts" will occur. No quantitative analysis was provided and Whitaker seems to purely speculate when he asserts that the conditions will "likely create crowding." (*PAC-Whit-R-1 at 4:13*).)

129. Although BLM Witness Weidenbach initially testified that BLM's proposed flows would allow more flexibility for boating parties to spread out trips to avoid or mitigate potential crowding or congestion, on cross examination he agreed that there would be limited opportunity to spread out use. BLM Weidenbach Exh. R0 at 2:2-5; Aug. 22 TR at 103:14-19 (Weidenbach).

RULING: ACCEPTED

130. Although BLM Witness Weidenbach testified that, if rafters could no longer use the Klamath River, they could use other dam-controlled rivers in the region such as the Rogue, Middle and Lower Klamath, none of these rivers provide Class 4 day trips during mid and late summer, and the Middle and Lower Klamath Rivers are relatively remote from Southern Oregon and Northern California population centers. Aug. 22 TR at 105:24-106:4 (Weidenbach).

RULING: REJECTED (This finding asserts facts not supported by the record. PacifiCorp only cites to Weidenbach's cross, which states there are other dam-controlled rivers in the region, to include the Rogue, Middle and Lower Klamath. (*Aug. 22, 2006 Tr. at 105:15-105:21*).)

Fly-fishing

131. Trout fishing occurs in both the J.C. Boyle bypass and peaking reaches. PAC-Whit-D-1 at 8:1.

RULING: PARTIALLY ACCEPTED AND PARTIALLY REJECTED

ACCEPTED: Trout fishing occurs in the J.C. Boyle peaking reach.

REJECTED: Trout fishing occurs in the J.C. Boyle bypass reach. (Not relevant to Issue 19. Issue 19 deals specifically with the peaking reach. The discussion of the bypass reach is not relevant to the issue at hand)

132. BLM identified trout fishing as an "outstandingly remarkable value" of the peaking reach in its final eligibility report for the Upper Klamath Wild and Scenic River Study. PAC-Whit-D-1 at 8:9-13; PAC-Carl-D-1 at 15:13-15.

RULING: REJECTED (Not relevant to Issue 19. Issue 19 addresses how BLM flows may affect the existing current whitewater boating and flyfishing in the J.C. Boyle peaking reach. (*See Order on Parties' Stipulation Regarding Disputed Issues of Material Fact at 2 (July 19, 2006) (defining Issue 19*)). This stipulation followed BLM's motion to more clearly define Issue 19, which noted how the Wild and Scenic River Act (WSRA) issues were legal and policy issues not within the scope of this proceeding. (*BLM Motion to Narrow, Clarify, and More Clearly Define Issues PacifiCorp/BLM 16 and 19 at 4-7 (June 26, 2006*)).)

133. PacifiCorp's recreation flow study found that optimal fly-fishing conditions generally occur at 330 cfs base flows, particularly for those who wade. PAC-Whit-D-1 at 12:11-13.

RULING: ACCEPTED

134. PacifiCorp's study revealed that higher flows diminish the quality of this opportunity, which becomes sub-optimal about 700 cfs and unacceptable about 1,400 to 1,500 cfs. PAC-Whit-D-1 at 12:13-15.

RULING: ACCEPTED

135. As BLM Witness Denman testified, higher flows are difficult to effectively fish. BLM Denman Exh. 0 at 4:9-10; PAC-Whit-R-1 at 2:1-4.

RULING: ACCEPTED

136. Spin/bait fishing, which seldom involves wading, does not decline from base flows to about 800 cfs, but does decline at higher flows, also becoming unacceptable about 1,400 to 1,500 cfs. PAC-Whit-D-1 at 12:15-17.

RULING: REJECTED (Not relevant to Issue 19. Issue 19 addresses how the BLM flows may affect fly-fishing. Issue 19 does not address spin/bait fishing.)

137. PacifiCorp's recreation flow study found that lower flows were preferred by anglers because they 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.

RULING: ACCEPTED

138. As NGO Witness Knight acknowledged, wadeability, access to fishable water, the ability to use preferred tackle and techniques, and water clarity are important components of fishability, and that collecting fishability information is useful to consider during relicensing efforts. Aug. 22 TR at 126:25 to 127:21 (Knight).

RULING: ACCEPTED – NGO does not dispute this statement

139. Current Project operations have generally enhanced fishing in the peaking reach by providing a stable base flow through most of the year during those portions of the day when peaking generation is not occurring. PAC-Carl-D-1 at 16:1-4.

RULING: REJECTED (The finding that "[c]urrent project operation have generally enhanced fishing" is not supported by the single citation. Factors other than a stable base flow, such as fish size and production, need to be considered when determining if Project operations have generally enhanced fishing.)

140. 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 59% of the season from May through October, and 52 days or 84% of the season from June through August. PAC-Whit-R-1 at 3:7-13.

RULING: ACCEPTED (PAC-Whit-R-1 at 3 references PAC-Whit-R-2)

141. In an average year (2000), the existing regime provides at least three hours of "preferred" fishing flows for 45 of 78 (about 58%) of the "weekend" days (Friday, Saturday, or Sunday) from May to October. PAC-Whit-R-2.

RULING: ACCEPTED

142. The BLM proposal changes the availability of fishing opportunities, substantially reducing the number of days with a period of preferred fishing flows, particularly for wading-based anglers. PAC-Whit-R-1 at 4:20-23.

RULING: REJECTED (PacifiCorp 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 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, PacifiCorp's 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.)

143. The BLM proposal would produce only 15 days with flows in this "preferred" range during the May-October season (about 8% of the season) with none of the days on weekends, and in the July to August season, only 5 days (8% of the season) would be in the preferred range. PAC-Whit-R-1 at 4:20-23; PAC-Whit-R-3.

RULING: REJECTED (Same rational as set for in PAC PFF 142)

144. The BLM proposal would provide all day "high flow fishing" (flows over 1,500 cfs) for 102 days or 55% of the May-October season, and 64 of those days would be on weekends (82% of the weekend days in a season). PAC-Whit-R-1:1-5; PAC-Whit-R-2.

RULING: REJECTED (Same rational as set for in PAC PFF 142)

145. Under current operations, all day "high flow fishing" only occurs on 26 days or 20% of the May-October season. PAC-Whit-R-2.

RULING: ACCEPTED

146. As NGO Witness Knight testified, BLM's higher flows could make wade-based fishing more difficult. NGO Exh. 5 at 7:12-13; Aug. 22 TR 2 at 120:21-23 (Knight).

RULING: ACCEPTED (Knight is addressing the short term wading experience in the citation listed)

USFWS/NMFS ISSUE 2(A):

Proposed Findings of Fact

147. To be suitable for reintroduction, selected anadromous fish stocks must possess the biological and behavior traits needed to successfully spawn, rear and migrate to, through and from the riverine and intermittent stream habitat in the Project reaches upstream of Iron Gate Dam. PAC-MAL-D-1 at 6:15-17; PAC-MAL-D-22 at 66; PAC-MAL-D-11 at 2.

RULING: ACCEPTED

148. To be suitable for reintroduction, the selected anadromous fish stock's spawning, rearing and migration life cycle windows must fit the spatial, temporal and environmental conditions in the Project area above Iron Gate dam in order for the anadromous fish to persist and thrive. PAC-MAL-D-1 at 6:15-17; PAC-MAL-D-22 at 66; PAC-MAL-D-11 at 2.

RULING: REJECTED. The evidence shows that the selected anadromous fish stock possess the keen ability to adapt to changing condition and can colonize unused habitat. (*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*). Therefore, they are suitable for reintroduction even though the Project area above Iron Gate Dam may pose challenges for the selected anadromous fish stock.

149. To be suitable for reintroduction, because the Fisheries Agencies have prescribed volitional passage through a hydro compless with both dams and reservoirs, the selected anadromous fish stocks must possess the biological and behavioral traits needed to withstand and overcome the anticipated mortality levels associated passage passage above Iron Gate dam through the prescribed volitional passage system. PAC-Mal-D-1 at 7:1-3; PAC-Mal-D-23 at 75: Table 10; PAC-Mal-D-24 at 16: Table 4.

RULING: REJECTED. Survival above Iron Gate Dam and suitability of the stock are two separate and distinct issues. *NMFS/FWS-Issue 2-Curtis Rebuttal at 2:18-23; Aug. 24, 2006 at 16:24-17:18*. The latter question has been reserved for latter proceedings in this licensing process.

150. The estimated range of juvenile and adult passage survival rates as associated with a volitional fish passage system was developed by the Habitat Modeling Group ("HMG"). PAC-Mal-D-1 at 9:16-17. The HMG consisted of members of the Federal Agencies, Tribes and other parties with extensive fisheries experience. PAC-Mal-D-1 at 9:18-19. HMG modeling, using KlamRAS, showed that based on the range expected, on average only 42% of the juvenile fall Chinook arriving at Upper Klamath Lake would survive passage to just below Iron Gate dam, with only 34% of those juveniles surviving to the ocean. PAC-Mal-D-1 at 9:22 to 10:1; PAC-Mal-D-24 at 16:Table 4. In addition, of the adults that returned, only 60% were modeled to survive upstream migration through the system. PAC-Mal-D-1 at 10:1-2; PAC-Mal-D-24 at 16:Table 4; Aug. 24 TR 50:21 to 51:14 (Malone).

RULING: REJECTED. The study upon which this fact is based is scientifically unreliable.

151. Site-specific radio-tag studies provide empirical evidence that indicates that HMG modeling assumption regarding juvenile anadromous fish passage survival may be optimistic (higher survival than would actually occur). PAC-Mal-D-1 at 11:7-8. For Chinook, migration success through Copco reservoir was equal to the juvenile passage survival minima used in the HMG modeling (65%). At Iron Gate reservoir, overall Chinook migration success (18.3%) was substantially below the juvenile passage survival minima (69%). PAC-Mal-D-1 at 11:3-7; PAC-Mal-D-15 at 32:Table 4; PAC-Mal-D-24 at 16:Table 4.

RULING: REJECTED. The study upon which this fact is based is scientifically unreliable.

152. The survival challenges that anadromous fish would face if introduced to the area above Iron Gate dam through prescribed fishways includes: 1) extended juvenile downstream migration; 2) predation; 3) seasonally poor water quality; and 4) disease. PAC-Mal-D-1 at 11:11-13.

RULING: ACCEPTED IN PART, REJECTED IN PART. The fact that anadromous fish will face challenges above Iron Gate Dam does not render that habitat unsuitable. The record evidence demonstrates that the challenges that anadromous fish would face above Iron Gate Dam commensurate with that currently faced below 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*).

153. Salmon stocks evolved in a riverine environment where the timing, magnitude, and temperature of river water have great influences on the life history pattern exhibited by each stock. PAC-Mal-D-1 at 11:15-17. Salmon migration timing is especially keyed to river flow and prevailing water velocity. PAC-Mal-D-1 at 11:17-18; Aug. 24 TR 24:5-9 (Malone).

RULING: ACCEPTED IN PART, REJECTED IN PART. While it appears that salmon migration is keyed to river flow and temperature, salmon migration has been observed where these stimuli are reduced. (*KTr-CWH-Ex. 4 at 217*).

154. The migration corridor in the basin above Iron Gate dam is dominated by slackwater reservoirs and lakes where migration cues from stream flow and associated water velocity are greatly reduced, due to the large volumes of water present in a reservoir versus a riverine environment. PAC-Mal-D-1 at 11:18-21; Aug. 24 TR 22:17 to 24:19 (Malone).

RULING: ACCEPTED IN PART, REJECTED IN PART. While it appears that salmon migration is keyed to river flow and temperature, salmon migration has been observed where these stimuli are reduced. (*KTr-CWH-Ex. 4 at 217*).

155. In the Klamath River above Iron Gate dam, any delay in migration may extend the juvenile migration period later into June when stream temperatures above 20ºC result in increased stress and increased mortality on juvenile anadromous fish. PAC-Mal-D-1 at 11:22 to 12:3; PAC-Mal-D-13 at 3-13:Fig. 3.7-4; Turaski Exh. 4 at C-61; NMFS/FWS – Issue 6-Hamilton-Exhibit 1 at 6:8-10; Aug. 24 TR 233:3-22 (Hamilton).

RULING: REJECTED. The record clearly establishes that warm water temperatures will not preclude juvenile migration. (*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); 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*).

156. The data show that median juvenile fall Chinook travel-time through Copco reservoir (~4.8 mile) was 11.3 days and Iron Gate reservoir (~6.3 mile) was 12.9 days—a very protracted time of ~24 days combined. PAC-Mal-D-1 at 12:10-12; PAC-Mal-D-15 at 33:Table 5.

RULING: REJECTED. The study upon which this fact is based is scientifically unreliable.

157. Coho smolts were even slower, required approximately 20-days to migrate through both Copco reservoir and Iron Gate reservoir—a combined 40 days. PAC-Mal-D-1 at 12:15-16; PAC-Mal-D-15 at 33:Table 5.

RULING: REJECTED. The study upon which this fact is based is scientifically unreliable.

158. Juvenile anadromous fish originating from streams above Upper Klamath Lake would have to migrate through Upper Klamath Lake, Lake Ewauna, J.C. Boyle reservoir, Copco reservoir and Iron Gate reservoir. PAC-Mal-D-1 at 13:1-3. Juvenile anadromous fish would require at least 55 days to migrate to Iron Gate dam. PAC-Mal-D-1 at 13:3-4. At that point the fish would still have an additional ~180 miles of lower river to negotiate to reach the ocean. PAC-Mal-D-1 at 13:4-5.

RULING: REJECTED. The study upon which this fact is based is scientifically unreliable.

159. Longer migration times through the Project reservoirs extend the juvenile anadromous fish migration period later into the summer when stream temperatures reach levels above 20ºC—temperature levels that are likely to reduce juvenile migration survival. PAC-Mal-D-1 at 13:6-8; PAC-Mal-D-13 at 3-13:Fig. 3.7-4; PAC-Mal-D-32 at 28.

RULING: REJECTED. The study upon which this fact is based is scientifically unreliable. Further, warm water temperatures will not preclude juvenile migration. (*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); 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*).

160. Delays in migration due to the necessary migration through the system that attends a volitional fish passage system will expose juvenile anadromous fish to elevated stream temperatures, predators, and pathogens, which will likely increase mortality rates. Aug. 24 TR 233:3-22 (Hamilton); PAC-Mal-D-1 at 13:6-12; PAC-Mal-D-13 at 3-13:Fig. 3.7-4; PAC-Mal-D-25 at 9-10:Fig. 2; PAC-Mal-D-32 at 28.

RULING: REJECTED. The study upon which this finding is based is scientifically unreliable. Further, elevated stream temperatures, predators, and pathogens will not preclude juvenile anadromous fish migration. Those environmental conditions are faced by anadromous fish to an equal degree both above and below Iron Gate 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*).

161. Copco and Iron Gate reservoirs have large populations of introduced yellow perch and bass which have been shown to prey upon salmonids. PAC-Mal-D-1 at 13:19 to 14:4; PAC-Mal-R-1 at 2:8-16; PAC-Mal-D-4 at 3-88, 3-98; PAC-Mal-D-17; PAC-Mal-D-18 at 1-2; NMFS/FWS-Issue 2- Hamilton-Rebuttal-Exh. 4 at 225; Aug. 24 TR 31:14 to 33:20 (Malone).

RULING: ACCEPTED IN PART, REJECTED IN PART. Predation is not a unique phenomenon to habitat above Iron Gate Dam. Predation is also experienced by anadromous fish below Iron Gate 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*). It is 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*).

162. Juvenile anadromous fish passing through Upper Klamath Lake and Lake Ewauna will likely face large amounts of bird predation because these lakes are in, or near, the Klamath Basin Wildlife Refuges, which have large populations of birds that are known to prey on juvenile salmonids. PAC-Mal-D-1 at 14:12-16; PAC-Mal-D-26 at 2. A site-specific radio-tag study showed that birds consumed a minimum of 10% of juvenile coho and a minimum of 4% for Chinook released in the reservoirs. PAC-Mal-D-1 at 14:11-12; PAC-Mal-D-15 at 45.

RULING: REJECTED. The study upon which this finding is based is scientifically unreliable. Further, predation is 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*).

163. The proposed volitional passage design requires salmonids to, with the exception of fish spawning in areas of Iron Gate dam, to pass through more than one juvenile collection/bypass system which will result in increased mortality. PAC-Mal-D-1 at 14:20-22. Juvenile anadromous fish migrating from the Williamson or Sprague Rivers will have to migrate through as many as six systems. PAC-Mal-D-14:22-23; PAC-Mal-D-24 at 11. Exposure to multiple bypass systems reduces overall juvenile survival. PAC-Mal-D-1 at 7:6-10, 14:18 to 15:22, and 21:1-11.

RULING: REJECTED. This finding of fact is outside the scope of the disputed issues of material fact identified for the hearing. Further, 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*).

164. Fish migrating from Williamson or Sprague rivers will move through the reservoirs into the lower river after June 1. Disease related stress and mortality become a problem starting around June 1. Aug. 24 TR 227:12-16, 231:3 to 233:22 (Hamilton).

RULING: REJECTED. The record evidence demonstrates that juvenile fish most likely would not migrate from the Williamson or Sprague River during periods of sub-optimal water quality. (*Aug. 25, 2006, Tr. at 40:21-41:6*). Moreover, 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 the risk of disease is relative low. (*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*).

165. Juvenile anadromous fish migrating to and from the Williamson or Sprague River will have to migrate through poor water quality conditions in the Upper Klamath Lake. As CDFG Witness Cox stated, "The conditions in Klamath Lake during the poor water periods, according to the ODFW pathologists are so bad that it couldn't get worse." Aug. 25 TR 52:14-16 (Cox).

RULING: REJECTED. The testimony of Dr. Cox has been mischaracterized. At the hearing, Dr. Cox recognized that their were period of times during the year when water quality is sub-optimal, and he concluded that anadromous fish would not be migrating during that period of time. (*Aug. 25, 2006, Tr. at 40:21-41:6*).

166. The proposed juvenile bypass systems at J.C. Boyle, Copco 1 and 2, and Iron Gate dams will be full screening systems that will concentrate juvenile salmon and predators into smaller areas with less flow. PAC-Mal-D-1 at 15:4-9. This will increase predation by yellow perch, bass and other resident fish and avian predators. PAC-Mal-D-1 at 15:9-11; PAC-Mal-D-27.

RULING: REJECTED. This finding of fact is outside the scope of the disputed issues of material fact identified for the hearing. Further, 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*).

167. Anadromous fish stock suitability is influenced by susceptibility to disease mortality. PAC-Mal-D-1 at 16:1-4; PAC-Mal-D-1 at 16:14 to 17:2; PAC-Mal-D-19 at 12; PAC-Mal-D-25 at 9-10 Fig. 2; PAC-Mal-D-29. Pathogens such as *Flavobacterium colimnare, Ceratomyxa Shasta,* and *Parvicapsula minibicornis* are causing high levels of mortality to juvenile anadromous fish in the lower river. Aug. 24 TR 36:1-21 (Malone). For this Project, passage through multiple reservoirs and fish passage facilities, combined with longer migration times, would make these reintroduced stocks more susceptible to these pathogens, likely resulting in even higher mortality rates. PAC-Mal-R-1 at 2:23 to 3:3.

RULING: REJECTED. Suitability of andromous fish stock and susceptibility to disease are separate and distinct issues. A majority of the pathogens currently found in the lower basin also exist in the upper basin of the Klamath River system. Therefore, anadromous fish migrating above Iron Gate Dam from below the dam will not face any greater risk of disease. (*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*).

168. Anadromous fish stock suitability is influenced by the smolt-to-adult survival rates ("SARs"), a reflection of ocean survival. PAC-Mal-D-1 at 17:7-8; Aug. 25 TR 86:21-25 (Curtis).

RULING: REJECTED. Suitability of andromous fish stock and survival are two separate and distinct issues. The latter is not at issue in this proceeding, and has been reserve for another forum. Further, the modeling efforts rely on assumptions that are unsubstantiated. (*Aug. 24, 2006 Tr. at 46:7-47:7, 50:4-52:8, 65:17-66:22; NMFS/FWS-Issue 2-Curtis Rebuttal Testimony Ex. 1 at 3:15-25; NMFS/FWS-Issue 7-McElhany-Ex. 1 at 8:20-10:16*).

169. For fall Chinook salmon, empirical data collected on wild and hatchery subyearling fall Chinook from the lower Klamath River show that on average fall Chinook SARs are less than 1%. PAC-Mal-D-1 at 17:8-10; PAC-Mal-D-10 at 2-21, 2-22.

RULING: REJECTED. Suitability of andromous fish stock and survival are two separate and distinct issues. The latter is not at issue in this proceeding, and has been reserve for another forum. Further, the modeling efforts rely on assumptions that are unsubstantiated. (*Aug. 24, 2006 Tr. at 46:7-47:7, 50:4-52:8, 65:17-66:22; NMFS/FWS-Issue 2-Curtis Rebuttal Testimony Ex. 1 at 3:15-25; NMFS/FWS-Issue 7-McElhany-Ex. 1 at 8:20-10:16*).

170. SARs values for spring Chinook and coho are also less than 2% in most years. PAC-Mal-D-1 at 17:22-23; PAC-Mal-D-9 at Fig. 13, 22, 23. Steelhead would be subject to the same mortality sources as other species. PAC-Mal-D-1 at 18:10-12.

RULING: REJECTED. Suitability of andromous fish stock and survival are two separate and distinct issues. The latter is not at issue in this proceeding, and has been reserve for another forum. Further, the modeling efforts rely on assumptions that are unsubstantiated. (*Aug. 24, 2006 Tr. at 46:7-47:7, 50:4-52:8, 65:17-66:22; NMFS/FWS-Issue 2-Curtis Rebuttal Testimony Ex. 1 at 3:15-25; NMFS/FWS-Issue 7-McElhany-Ex. 1 at 8:20-10:16*).

171. Stocks of anadromous fish that only return at a rate of 2% are unlikely to be able to withstand the large juvenile and adult losses associated with traversing the reservoir system above Iron Gate dam as a result of the volitional fish passage system. PAC-Mal-D-1 at 18:3-5.

RULING: REJECTED. Suitability of andromous fish stock and survival are two separate and distinct issues. The latter is not at issue in this proceeding, and has been reserve for another forum. Further, the modeling efforts rely on assumptions that are unsubstantiated. (*Aug. 24, 2006 Tr. at 46:7-47:7, 50:4-52:8, 65:17-66:22; NMFS/FWS-Issue 2-Curtis Rebuttal Testimony Ex. 1 at 3:15-25; NMFS/FWS-Issue 7-McElhany-Ex. 1 at 8:20-10:16*).

172. The conversion of riverine habitat to slackwater reservoirs has produced completely different environmental conditions than those in which anadromous fish evolved. PAC-Mal-D-1 at 19:14-15; PAC-Mal-D-15 at 32:Table 4; PAC-Mal-D-24 at 16:Table 4; PAC-Mal-D-25 at 9-10:Fig. 2. The mortality pressures associated with anadromous fish traversing the reservoir system above Iron Gate dam as a result of the volitional fish passage system is likely to decrease the likelihood that anadromous fish stock introduced through volitional fish passage could result in sustainable populations. PAC-Mal-D-1 at 20:1-2; Aug. 24 TR 21:4 to 22:9 (Malone).

RULING: REJECTED. This fact is not supported by the record evidence.

173. The unique environmental conditions located above the Project area in Upper Klamath Lake and above the lake exacerbate the mortality levels and decrease the likelihood that anadromous fish stock introduced through volitional fish passage above Iron Gate dam could result in sustainable populations. PAC-Mal-D-36 at 7.

RULING: REJECTED. The effectiveness of volitional passage is not an issue in this proceeding. That issue was reserved for another forum. In addition, the record shows that the environmental conditions experienced above the dam are not different from those experienced below Iron Gate 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*). It is 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*).

174. PacifiCorp presented empirical and site-specific evidence that demonstrates that no stocks of anadromous fish were identified by the Federal Agencies or in the prescriptions that can: 1) overcome the mortality associated with traversing the reservoir system above Iron Gate dam as a result of the volitional fish passage system; or 2) possess the biological characteristics needed to thrive in a system dominated by lakes and reservoirs. PAC-Mal-D-1 at 7:18 to 8:33; PAC-Mal-D-1 at 7:15 to 8:3; PAC-Mal-D-22 at 66. Neither the Fisheries Agencies nor other parties to the proceedings presented credible evidence that rebuts or conflicts with this evidence.

RULING: REJECTED. This finding is argument, which is not supported by the record evidence.

175. For the reasons stated above, no stocks of anadromous fish have the biological and behavioral traits needed to re-colonize through volitional fish passage the habitat upstream of Iron Gate dam are available. PAC-Mal-D-1 at 7:15-17.

RULING: REJECTED. This finding is argument, which is not supported by the record evidence.

176. For the reasons stated above, no stocks of anadromous fish have the biological and behavioral traits needed to withstand and overcome the estimated level of mortality associated with traversing the reservoir system above Iron Gate dam as a result of a volitional fish passage system. PAC-Mal-D-1 at 7:17-19.

RULING: REJECTED. This finding is argument, which is not supported by the record evidence.

177. For the reasons stated above, based upon the lower river habitat conditions and realistic ocean survival levels (Smolt-to-Adult Survival Rates), it is unlikely that any stock of anadromous fish facing such mortality levels could be sustainable over time. PAC-Mal-D-1 at 7:19 to 8:3.

RULING: REJECTED. This finding is argument, which is not supported by the record evidence.

Proposed Ultimate Finding of Fact for USFWS/NMFS Issue 2(A): Stocks of anadromous fish with biological and behavioral traits suitable to conditions above Iron Gate Dam are not available to use prescribed fishways.

RULING: REJECTED. Stocks of anadromous fish suitable to the conditions above Iron Gate Dam are available to use prescribed fishways. (*KTr-CWH-Ex. 13 at 17-8; NGO Ex. 3 at 7-9; NGO Ex. 19; 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*).

USFWS/NMFS ISSUE 2(B):

Proposed Findings of Fact

178. Disease is an outcome of the interaction of a susceptible host and a pathogen in a foreign environment which favors the pathogen. Disease places stresses on the fish. Aug. 25 TR at 36:16-22 (Cox).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

179. In the lower Klamath River, the incidence of C. *shasta* infection in recent years has varied between 30% to 45% of fall Chinook. Aug. 24 TR at 189:6-9 (Foott). Nichols and Foott (2005) reported that low survival was expected in the 45% of the Klamath River Chinook salmon infected with C. *shasta*. PAC-Mal-R-2 at 12; Aug. 24 TR at 69:23 to 70:20.

RULING: REJECTED. The study upon which this finding of fact is based does not established thaeir is an increased risk of *C. Shasta* in the lower basin below Iron Gate Dam. The record evidence shows that *C. Shasta* exists in both the upper and lower basins of 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*).

180. To the extent that infected anadromous fish migrate to the Upper Basin, such infected anadromous fish would transport the parasite to the Upper Basin. PAC-Mal-R-1 at 3:4-10; Aug. 24 TR at 70:21 to 71:9 (Malone); Aug. 25 TR at 37:3-9 (Cox).

RULING: REJECTED. The record evidence shows that 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*).

181. With respect to disease risks to resident fish, although native fish populations have some resistance to these pathogens, as the environment becomes degraded conditions favor the pathogen, which allows for severe disease outbreaks to occur. PAC-Mal-R-1 at 2:17-19; Aug. 24 TR at 70:8-15 (Malone); Aug. 25 TR at 40:23 to 41:15, 47:23 to 48:22 (Cox).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

182. Historically, when environmental conditions in the Klamath River were more pristine, the pathogen loads were lower. As habitat conditions in the lower Klamath River have degraded, *C. shasta* (the pathogen) has taken advantage. In the lower river, Chinook with resistance are now experiencing a higher level of *C. shasta*. Aug. 24 TR at 70:4-15 (Malone).

RULING: REJECTED. This finding is not supported by the record evidence, which shows that *C. Shasta* have historically existed in the Klamath River prior to construction of the dams. Further, *C. Shasta* exists in the lower basin in nearly equal levels as that contained in the upper basin. (*Aug.25, 2006 Tr. at 39:13-18; NMFS/FWS PFF 2B.8*)

183. Native redband and rainbow trout have shown resistance to *C. shasta* under good habitat conditions. However, as recognized by USFWS/NMFS Witness Hooton during cross-examination, the Fisheries Agencies lack site specific empirical data that demonstrates trout in Spencer Creek and Williamson River are highly resistant to *C. shasta*. Aug. 22 TR at 168:1-10 (Hooton).

RULING: REJECTED. Redband trout are resistant to *C. Shasta*. (*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*).

184. Under degraded habitat conditions, there is a risk of *C. shasta* infecting resident redband and rainbow trout. Aug. 24 TR at 71:17-24 (Malone). Should this risk materialize, it may result in very high resident native redband and rainbow trout mortality. Aug. 24 TR at 71:17-24 (Malone).

RULING: REJECTED. Redband trout are resistant to *C. Shasta*. (*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*).

185. Based in part upon concerns about disease risks to resident fish, ODFW representatives state that subsequent steelhead movements into the tributaries above Upper Klamath Lake should be deferred pending successful efforts in the Klamath River system upstream of Iron Gate dam. Aug. 22 TR at 171:2-18 (Hooton).

RULING: ACCEPTED IN PART, REJECTED IN PART. Progressive introduction of steelhead is good management practice. (*KTr-Hunington Ex. 1*).

186. For this Project, passage through multiple reservoirs above Iron Gate dam as a result of the volitional fish passage system, combined with longer migration times, would make anadromous fish more susceptible to this parasite, potentially resulting in even higher mortality rates. PAC-Mal-R-1 at 2:23 to 3:3.

RULING: REJECTED. 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. Therefore, the risk of transmitting disease to the lower basin is relatively low. (*Aug. 24, 2006 Tr. at 199:1-8 and 199:22-200:12; NGO PFF 2B.2*).

187. Infectious Hematopetic necrosis (IHN) has been detected in the lower basin. Aug. 24 TR 199:2-15 (Foott). IHN has not been detected in the Upper Basin. Aug. 24 TR at 199:12-15 (Foott). Providing volitional fish passage to anadromous fish would potentially expose resident fish above Iron Gate Dam to IHN. Aug. 25 TR at 44:14-18.

RULING: REJECTED. The evidence is inconclusive as to whether *IHN* exists in the upper basin of the Klamath River above Iron Gate Dam. (*Aug. 24, 2006 Tr. at 199: 12-15; Aug. 25, 2006 Tr. at 44:7-9*).

Proposed Ultimate Finding of Fact for USFWS/NMFS Issue 2(B): Facilitating the movements of anadromous fish via prescribed fishways will likely result in infected anadromous fish transporting pathogens to the Upper Basin, thereby increasing disease loading and subsequent exposure of the resident fish inhabiting the basin above Iron Gate Dam to lethal pathogens such as *C. shasta* and IHN.

RULING: REJECTED. 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. (*Aug. 24, 2006 Tr. at 199: 12-15; Aug. 25, 2006 at 44:7-9; 52:1-20; NMFS/FWS-Issue 2B-Foott-Ex. 1 at 3:13-16, 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.2, 2B.7 and 2B.15; NGO PFF 2B.6, Indian Tribes PFF 2B.3, 2B.6, and 2B.7; Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 14 and 18*).

USFWS/NMFS ISSUE 2(C):

Proposed Finding of Fact

188. Steelhead are the anadromous life history form of rainbow trout (*O. mykiss*). PAC-Ols-D-1 at 18. Steelhead grow and mature in the ocean before returning to their natal stream to spawn. PAC-Ols-D-1 at 18:19-20. Steelhead also occur as the resident trout form that spends their entire life cycle in freshwater. PAC-Ols-D-1 at 18:20-21. In the upper Klamath River, the resident rainbow trout are referred to as "redband" trout. PAC-Ols-D-1 at 18:22-23.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

189. The redband trout are an "interior" form that is genetically distinct from the "coastal" form that includes the steelhead population below Iron Gate. PAC-Ols-D-1 at 18:22 to 19:1; PAC-Ols-D-9 at 2; Aug. 23 TR at 198:18-25, 204:1 to 205:18 (Olson).

RULING: REJECTED. Resident redband and anadromous steelhead trout are genetically similar species (both are designated *O. Mykiss*), their 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).*

190. Some individual fish in resident redband trout populations may go to the ocean to explore anadromy. PAC-Ols-D-1 at 19:9-10; Aug. 23 TR at 196:16-22 (Olson). Similarly, some anadromous (steelhead) individuals may "residualize" in fresh water and not go to the ocean. PAC-Ols-D-1 at 19:10-11; Aug. 23 TR at 195:2-14, 265:7-24 (Olson).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

191. Steelhead released at the Iron Gate Hatchery are known to have a high rate of residualization. PAC-Ols-D-1 at 19:14-15; PAC-Ols-D-7 at 32; PAC-Ols-D-10. Of the tested hatchery-reared steelhead returning to the Iron Gate Hatchery, 42% had never gone to the ocean and instead reared and matured in the Klamath River (in other words, the steelhead residualized). PAC-Ols-D-1 at 19:20-22; PAC-Ols-R-1 at 21:18-20; PAC-Ols-D-10.

RULING: REJECTED. Residualization (remain in freshwater) is common in juvenile hatchery 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*).

192. Many steelhead similarly would likely residualize above Iron Gate dam if reintroduced there. PAC-Ols-D-1 at 19:22 to 20:2; Aug. 23 TR at 180:9 to 181:19 (Olson).

RULING: REJECTED. Residualization (remain in freshwater) is common in juvenile hatchery 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*).

193. Residualization of steelhead would lead to interbreeding between the "coastal" steelhead stock and the resident "interior" redband trout. PAC-Ols-D-1 at 20:5-7; Aug. 23 TR at 197:21 to 199:5 (Olson).

RULING: REJECTED. Residualization (remain in freshwater) is common in juvenile hatchery 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*). Further, the two species of trout historically co-existed and intermingled prior to the construction of Copco I Dam in 1917. (*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*).

194. Allowing rainbow trout (*i.e.*, steelhead) of a different genetic lineage and alternative life history type to interbreed and compete with the redband trout population conflicts with the stated desire of ODFW, CDFG and BLM to protect the resident redband trout. PAC-Ols-D-1 at 20:7-9; PAC-Ols-D-12 at 108-109, 136; PAC-Ols-D-13 at 46; PAC-Ols-D-14 at 12, 15, 30; Aug. 23 TR at 207:17-21 (Olson).

RULING: REJECTED. The two species of trout historically co-existed and intermingled prior to the construction of Copco I Dam in 1917. (*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*).

195. This interbreeding through residualization would weaken the genetic fitness of the resident redband population. PAC-Ols-R-1 at 21:20 to 22:2; Aug. 23 TR at 198:9 to 199:5 (Olson).

RULING: REJECTED. The two species of trout historically co-existed and intermingled prior to the construction of Copco I Dam in 1917. (*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*).

Proposed Ultimate Finding of Fact for USFWS/NMFS Issue 2(C):
Facilitating the movements of steelhead above Iron Gate dam via prescribed fishways will likely result in residualization of steelhead, which will in turn adversely affect resident redband trout because of interbreeding and competition between the "coastal" steelhead stock and the "interior" resident redband trout in USFWS/NMFS ISSUE 3

RULING: REJECTED. Residualization (remain in freshwater) is common in juvenile hatchery 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*). Further, the two species of trout historically co-existed and intermingled prior to the construction of Copco I Dam in 1917. (*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*). Facilitating the movement of steelhead above Iron Gate Dam will not adversely affect the resident redband trout population.

USFWS/NMFS ISSUE 3:

Proposed Finding of Fact

196. The Project contains three habitat locations for resident trout: the J.C. Boyle bypass reach, extending 4.3 miles from J.C. Boyle dam to the J.C. Boyle powerhouse; the J.C. Boyle peaking reach, 17.3 miles long and traversing the California/Oregon state line; and the 1.4-mile section between the Copco 2 diversion dam and Iron Gate reservoir. PAC-Ols-D-1 at 20:20 to 22:2.

RULING: ACCEPTED IN PART, REJECTED IN PART. The record evidence also shows that trout use reservoirs within the Project reach to migrate through as part of their life history strategy. (*Aug. 23, 2004 Tr. at 167:11-168:7; CDFG-Dean-Ex. 1 at 4:29-26; NGO-Ex. 14 at 4; NMFS/FWS-Issue 3-Sneadker-Ex. 1 at 3:24-4:6; NMFS/FWS-Issue 3-Snedaker-Ex. 1 at 6:15-18; CDFG-Dean-Ex. 1 at 4:19-26, 5:22-6:4; NGO-Ex.2 at 19:7-9*).

197. The predominance of spring water makes the bypass reach a particularly important spawning area for trout from below J.C. Boyle dam and powerhouse. PAC-Ols-D-1 at 21:2-4.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

198. The redband trout population in the J.C. Boyle peaking reach has been described in various agency reports as highly productive, excellent, outstanding, exceptional, and robust. PAC-Ols-D-1 at 21:6-8; PAC-Ols-R-1 at 5:2-5.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

199. As PacifiCorp Witness Olson testified, the peaking reach supports one of the finest stream trout fisheries on the West Coast. PAC-Ols-D-1 at 21:15-17.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

200. As PacifiCorp Witness Olson testified, the 1.4-mile section of river between the Copco 2 Diversion dam and Iron Gate reservoir contains marginal trout habitat at best. PAC-Ols-D-1 at 21:21-23.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

201. Other Project waters containing a limited number of trout include the J.C. Boyle, Copco, and Iron Gate reservoirs. PAC-Ols-D-1 at 22:4-5.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

202. In the summer, water temperatures in all three reservoirs often exceed 22˚C, and thus the fish species reflect that of a warm water community. PAC-Ols-D-1 at 22:7-9.

RULING: ACCEPTED IN PART, REJECTED IN PART. The water temperature does not exceed 22˚C throughout the entire summer. The temperature varies (i.e., there are some warm water days and there are some cool water days). Further, throughout the reservoirs, areas that provide cool water that could serve as thermal refugia for fish. (*Aug. 24, 2006 Tr. at 202:18-24; NMFS/FWS-Issue 6-Hamilton-Ex. 7 at 3, Table 1).*

203. Comprehensive seasonal, multi-year studies reveal that fish populations in the J.C. Boyle reservoir consisted of less than 1% trout. PAC-Ols-D-1 at 22:10-11.

RULING: REJECTED. The study upon which this finding is based did not use equipment that caught all trout present in the reservoir. (*Aug. 24, 2006 Tr. at 244:15-245:5*).

204. In Copco reservoir, only three trout were collected in the studies out of a total of all-species catch of 35,816. PAC-Ols-D-1 at 22:11-12; Aug. 24 TR at 241:20 to 242:3 (Hamilton).

RULING: REJECTED. The study upon which this finding is based did not use equipment that caught all trout present in the reservoir. (*Aug. 24, 2006 Tr. at 244:15-245:5*).

205. Although FWS/NMFS Witness Hamilton testified that he found credible evidence that redband/rainbow trout occur in Copco reservoir in numbers that support a popular sporting fishery, he provided no documented evidence of significant numbers of trout. Aug. 24 TR at 240:23 to 241:3 (Hamilton).

RULING: REJECTED. This finding is baseless. The finding also conflicts with PacifiCorp proposed finding of fact 201 (which recognizes that resident trout exists in Copco reservoir). Further, *NMFS/FWS-Issue 4-Hamilton-Ex. 7* demonstrates (using recreational anglers catch data) that that redband/rainbow trout occur in Copco reservoir.

206. In Iron Gate reservoir, only 17 trout were captured out of a total all-species catch of 4,113. PAC-Ols-D-1 at 22:12-13.

RULING: REJECTED. The study upon which this finding is based did not use equipment that caught all trout present in the reservoir. (*Aug. 24, 2006 Tr. at 244:15-245:5*).

207. These data reflect the fact that these reservoirs support only an occasional trout. PAC-Ols-D-1 at 22:14-15.

RULING: REJECTED. The study upon which this finding is based did not use equipment that caught all trout present in the reservoir. (*Aug. 24, 2006 Tr. at 244:15-245:5*).

208. Because there are very few trout in the reservoirs, very few trout would move downstream from the reservoir because there would be no biological inclination for trout to do so other than the fact that some trout move around with no directed migration. PAC-Ols-D-1 at 23:16-18.

RULING: REJECTED. The record evidence shows that migration is one of many life history strategies of trout in the Klamath River. (*Aug. 23, 2006 Tr. at 167:11-168:7; CDFG-Dean. Ex. 1 at 4:19-26; NGO-Ex. 14 at 4; NMFS/FWS-Issue 3-Snedaker-Ex. 1 at 3:24-4:6, 6:16-18; NGO Ex. 2 at 19:7-9*). Thus, this finding of fact is unsupported by the record.

209. The number of fish using the ladder at the J.C. Boyle dam has decreased from several thousand in the first few years of operation to less than 100 per year now. PAC-Ols-D-1 at 25:1-3.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

210. Over the years, trout from below the dam have adapted to the new conditions at the site with the dam in place and now spawn below the dam. PAC-Ols-D-1 at 25:3-9.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

211. Reduced use of the fish ladder by mature trout is not an indicator of reduced fitness. PAC-Ols-R-1 at 13:12-14.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

212. PacifiCorp has agreed to improve channel configuration below the fish ladder so that the current configuration will not impede any trout that attempt to approach the ladder. PAC-Ols-R-1 at 25:1-4.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Ultimate Finding of Fact on USFWS/NMFS Issue 3: Current Project operations do not adversely affect the resident trout fishery resource in the absence of passage.

RULING: REJECTED. The record evidence demonstrates that resident trout fishery is adversely affected by current project operations. (*Aug. 23, 2006 Tr. at 158:12-24; 161:13-163:1, 176:17-23; NGO-Ex. 2 at 13:4-16, 14:10-12, 15:1-5, 17:15-18:2, and 19:4-18; NGO-Ex. 14 at 4-6; CDFG-Dean-Ex. 1 at 4:19-5:25; NGO-Ex. 14 at 4; CDFG-Dean-Ex. 1 at 5:4-18; NGO-Ex. 17 at 2; NMFS/FWS-Issue 3-Hooton-Ex. 0A at 4:7-22, 6:15-20, 7:10-9:14; BLM-Hooton-Ex. 3 at 7-8; BLM-Hooton-Ex. 4 at 19 and 22; NMFS/FWS-Issue 3-Snedaker-Ex. 16 at 126-130; NMFS/FWS-Issue 3-Snedaker-Ex. 1 at 2:20-3:5 and 6:15-21; NMFS/FWS-Issue 3-Snedaker-Ex. 23 at 137; PAC-MAL-D4 at 7-31*).

USFWS/NMFS ISSUE 4:

Proposed Finding of Fact

213. During the study planning phase of relicensing, PacifiCorp conducted a literature-based assessment, a commonly-utilized tool in relicensing proceedings, to characterize resident fish entrainment and turbine-induced mortality at the Project. PAC-Ols-D-1 at 26:5-8.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

214. PacifiCorp also reviewed potential entrainment mortality at J.C. Boyle, Copco, and Iron Gate dams. PAC-Ols-D-1 at 26:8-9.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

215. Since the J.C. Boyle dam has a screening and bypass system in place, entrainment is not as relevant for that site. PAC-Ols-D-1 at 26:10-11.

RULING: REJECTED. The fish screens at the J.C. Boyle Dam are ineffective. (*FOF 4-8*).

216. Populations of resident fish, mostly non-native species, are abundant and self-sustaining in Project reservoirs. PAC-Ols-D-1 at 26:19-20.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

217. The majority of entrained fish are non-native, introduced species that tolerate warm water. PAC-Ols-D-1 at 26:20-21.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

218. Nearly all of the entrained fish are lake-preference species that would derive little benefit from downstream passage facilities. PAC-Ols-R-1 at 27:8-10; PAC-Ols-D-8.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

219. Most entrainment of fish at Copco would consist of small young-of-year individuals. PAC-Ols-D-1 at 27:14-15.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

220. Small fish survive turbine passage better than larger fish, and loss of young individual fish typically has a minimal effect on the population as a whole because of density dependent mortality compensation. PAC-Ols-D-1 at 27:15-18.

RULING: ACCEPTED IN PART, REJECTED IN PART. It is accepted that small fish survive turbine better than larger fish. However, the remainder of PacifiCorp's proffer is rejected as factually incorrect.

221. This compensation operates to offset losses of individual fish from natural environmental conditions or anthropogenic acts such as fishing and power plant operations. PAC-Ols-D-1 at 27:21 to 28:1.

RULING: REJECTED. This fact is baseless. The entrainment of young-of-year fish has a greater impact on the success of the trout fishery resources because it interferes with gene flow in the Project reach. (*CDFG-Dean-Ex. 1 at 5:21-23; NMFS/FWS-Issue 4-Hamilton-Ex. 1 at 4:13-16; NMFS/FWS-Issue 4-Hamilton-Rebuttal Ex. 1 at 2:25-3:21*).

222. When the power canal for J.C. Boyle is dewatered, stranded fish are captured and returned safely to the river. PAC-Ols-R-1 at 26:19-21.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE. However, entrained fish face a high risk of mortality and death. (*FOF 4-6*).

223. BLM Witness Hooton testified that although the Oregon Department of Fish and Game ("ODFW") estimated that 70,000 trout are entrained annually at the J.C. Boyle development. However, ODFW's estimates for the number of fish coming out of Spencer Creek are approximately 26,000 per year, for which their own radio tag study showed only 3%, or 780, enter the power canal. Aug. 22 TR at 153:22 to 154:2 (Hooton).

RULING: REJECTED. The ODFW estimate of 26, 000 juvenile trout captured in 1991 does not constitute a current yearly rating because the trap did not capture all the juvenile fish leaving Spencer Creek. (*Aug. 23, 2006 Tr. 181:8-14I).*

224. As BLM Witness Hooton conceded, for the estimated number of fish entrained, the number of trout produced in Spencer Creek would need to be orders of magnitude higher than ever estimated in any of ODFW's studies for the 70,000 number to be correct. Aug. 22 TR at 157:5-16 (Hooton).

RULING: REJECTED. The ODFW's 2005 radio-tag study of juvenile trout has been misapplied.

225. Because Iron Gate is the lowest dam on the Klamath, resident fish that become entrained there would enter riverine habitat where they would soon perish for lack of suitable habitat. PAC-Ols-D-1 at 29:2-4.

RULING: REJECTED. The evidence shows that resident fish are adaptable and can colonize unused habitat. Therefore, there is no record evidence that these fish could not adapt or that they would perish in a riverine environment.

226. The impact of entrainment at J.C. Boyle appears to be minor since a healthy, self-sustaining population of trout exists downstream. PAC-Ols-R-1 at 26:22 to 27:1.

RULING: REJECTED. Entrainment will, in the long run, adversely affect trout abundance and distribution. (FOF 4-24).

227. While federally-listed shortnose and Lost River suckers are found in small numbers in the Project reservoirs, the reservoirs are inherently unsuitable for these suckers to complete their life cycles. PAC-Ols-D-1 at 29:9-11.

RULING: REJECTED. There is a sucker fish population in the Keno Reservoir and Lake Ewauna. (*NMFS/FWS-Issue 4-Hamilton-Ex. 1 at 3:14; NMFS/FWS-Issue 4-Hamilton-Ex. 8 at 2*).

228. Nearly all of the non-larval shortnose or Lost River suckers residing in Copco and Iron Gate reservoirs appear to be too large to pass through the existing trash racks at the powerhouse intakes; therefore, providing fish passage facilities for anadromous fish at these two dams would add no additional protection for suckers at these sites. PAC-Ols-D-1 at 30:1-6; PAC-Ols-D-15.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

229. Larval suckers cannot be effectively screened at large intakes because of their small size and poor swimming ability; therefore, downstream protection facilities designed for salmonids will provide minimal if any real protection for shortnose and Lost River suckers. PAC-Ols-D-1 at 30:9-16.

RULING: ACCEPTED IN PART, REJECTED IN PART. Whether downstream protection facilities denied for salmonid will provide protection for shortnose and Lost River suckers is not a proper issue before this judge.

Proposed Ultimate Finding of Fact on USFWS/NMFS Issue 4: Entrainment at Project facilities is not adversely affecting resident fishery resources.

RULING: REJECTED. Entrainment is adversely affecting the resident fishery resources. (*Aug. 23, 2006 Tr. at 214: 4-10; PAC-Ols-R-1 at 26: 21-27:1; 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 178:16-1; NMFS/FWS-Issue 4-Hooton-Ex. 14 at 112; NMFS/FWS-Issue 4-Hamilton-Ex. 12 at 17 and 29; PAC-Ols-D-1 at 26:20-21; PAC-Ols-D-15; PAC-Olson-D-15 at 8 and 10; 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; 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*).

USFWS/NMFS ISSUE 6:

Proposed Finding of Fact

230. Habitat is suitable for anadromous fish if, and only if, it is linked to other habitat that allows the fish to successfully complete their life-cycle (i.e., produce a second generation of fish). PAC-Mal-D-1 at 23:12-14; Aug. 23 TR 23:21 to 24:8, 24:24 to 25:5 (Snedaker); Aug. 24 TR 18:13-18 (Malone). Determining if habitat is linked requires a spatial and temporal component - the link must be in the right place and the right time in an anadromous fish's life cycle. PAC-Mal-D-1 at 23:14-17.

RULING: REJECTED. The Federal Fisheries definition of suitable habitat is adopted. Under that definition, habitat is "suitable" if it can be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*).

231. The linkage of suitable habitat is critically important for anadromous fish as they must migrate to and from the ocean in order to successfully complete their life-cycle. If one link in the habitat chain is broken, then the anadromous fish produced from the previous cycle will perish from the system. PAC-Mal-D-1 at 23:18-21; Aug. 23 TR 26:9-23 (Snedaker)

RULING: REJECTED. The Federal Fisheries definition of suitable habitat is adopted. Under that definition, habitat is "suitable" if it can be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*).

232. Unless habitat can contribute to sustainable populations, that habitat should not be considered suitable. PAC-Mal-D-1 at 23:12-14; Aug. 25 TR 91:20 to 92:2 (Smith).

RULING: REJECTED. The Federal Fisheries definition of suitable habitat is adopted. Under that definition, habitat is "suitable" if it can be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*). Further, the fact that resident rainbow/redband trout are self-sustaining in habitat above Iron Gate Dam, suggests that anadromous stocks will probably do the same if access is provided. (*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*).

233. A simple expression of habitat potential in terms of miles ignores key quality components. PAC-Mal-D-1 at 24:23 to 25:5; Aug. 25 TR 80:3-16 (Pisano); Aug. 25 TR 74:11-20 (Huntington).

RULING: REJECTED. To the extent that the finding of fact suggests that the Federal Fisheries Service determined habitat suitability based solely upon mileage, the finding is factually incorrect. The record demonstrates that habitat suitability was determined based upon whether that habitat could be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*).

234. The issue of "suitability" is especially important for the Iron Gate reservoir's and Copco reservoir's small tributaries. PAC-Mal-D-1 at 23:22-23. Anadromous fish produced by these tributaries will likely experience high mortality levels as the fish are forced to rear in reservoirs inhabited by large numbers of predators and poor water quality conditions. PAC-Mal-D-1 at 24:5-7.

RULING: REJECTED. While access to habitat for steelhead trout might be a problem because of gradients, it is not 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*). Further, the record shows that the environmental conditions experienced above the dam are not different from those experienced below Iron Gate 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*).

235. In assessing suitable habitat for anadromous fish, it is necessary to consider: 1) the type of habitat the stream reach provides (i.e., whether the stream reach provides spawning or the rearing habitat); 2) whether that habitat is meaningfully connected to other life cycle habitat (i.e., whether the spawning habitat is connected to rearing habitat); and 3) whether, in light of the anticipated mortality levels associated with the anadromous fish's life cycle, meaningful production would likely be anticipated from such riverine or intermittent stream reaches. PAC-Mal-D-1 at 27:8-15.

RULING: REJECTED. Those factors are not determinative of suitability. The Federal Fisheries definition of suitable habitat is adopted. Under that definition, habitat is "suitable" if it can be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*). Further, the fact that resident rainbow/redband trout are self-sustaining in habitat above Iron Gate Dam, suggests that anadromous stocks will probably do the same if access is provided. (*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*).

236. When calculating the amount of suitable habitat within the Project, the Fisheries Agencies did not assess the type or quality of habitat that would be included as suitable habitat or assess whether that habitat was substantially connected to other necessary life history habitat. PAC-Mal-D-1 at 25:2-5; NMFS/FWS-Issue 6-Snedaker-Exh. 1 at 5:1-16; PAC-Mal-R-1 at 11:5-9; NMFS/FWS-Issue 6-Hamilton-Exh. 1 at 4:3 to 5:17; NMFS/FWS-Issue 6-Smith-Exh. 1 at 1:22-3:5; Aug. 24 TR 150:8-11 (Hamilton). The Fisheries Agencies did not analyze whether the habitat in the project would contribute to sustainable populations of anadromous fish. Aug. 25 TR 91:24 to 92:2 (Smith).

RULING: REJECTED. Under the Federal Fisheries Services' definition of "sutability", the ability to connect to habitat is not a totally determinative factor. Habitat is "suitable" if it can be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*). Further, the fact that resident rainbow/redband trout are self-sustaining in habitat above Iron Gate Dam, suggests that anadromous stocks will most likely do the same if access is provided. (*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*).

237. In some cases, the Fisheries Agencies included historic habitat that has been inundated by the reservoirs as suitable habitat, regardless of its current habitat potential. Aug. 24 TR 263:5-17 (Hamilton); Aug. 22 TR 204:4-8, 204:25 to 205:7 (Snedaker).

RULING: REJECTED. The record evidence demonstrates that the inundated areas at Fall Creek were not included in the suitable habitat estimate. (*Aug. 22, 2006 at 204:14-21; NMFS/FWS-Issue-6-Ex. 6 at 2; Yurok-Hillemeier-ex. 18 at C-15*).

238. The Fisheries Agencies' calculation of suitable habitat was based primarily upon an assessment of historical use by USFWS/NMFS witnesses, Mr. Hamilton and Mr. Snedaker. NMFS/FWS-Issue 6-Hamilton-Exh. 1 at 3:1-14; NMFS/FWS-Issue 6-Snedaker-Exh. 1 at 5:21 to 6:2; –Aug. 22 TR 199:23 to 200:8, 201:1-4 (Snedaker).

RULING: REJECTED. The record demonstrates that the suitability determination was also based on whether the habitat could be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*).

239. The Fisheries Agencies relied upon a simple Geographic Information System (GIS) analysis of streams within the Project. NMFS/FWS-Issue 6-Snedaker-Exh. 1 at 5:1-3; Aug. 22 TR 206:19-23 (Snedaker). This GIS analysis identified streams with a stream gradient of 15percent or less and a drainage area of greater than 1200 acres. The Fisheries Agencies included streams with those criteria as suitable habitat. Aug. 22 TR 207:8-10 (Snedaker).

RULING: REJECTED. The record demonstrates that the Federal Fisheries service also relied upon historical distribution, field reconnaissance and personal knowledge of expert field biologists in determining the suitability of habitat above Iron Gate Dam for anadromous fish. (*NMFS/FWS-Issue 6-Sneadker-Ex. 1 at 4:11-8:24; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 3:16-7:10; NMFS/FWS-Issue 6-Hamilton-Ex. 16*).

240. The GIS model used to determine the amount of suitable habitat in the Project area did not take into account appropriate stream gradient, stream temperature, sediment levels, large woody debris, covered riparian habitat, precipitation, and flow for anadromous fish. Aug. 22 TR 210:2 to 213:19 (Snedaker).

RULING: REJECTED. The determination of the overall estimate of habitat available for anadromous fish was keyed to the species that could make the most use of the habitat (i.e. anadromous steelhead trout). (*Aug. 23, 2006 Tr. at 45:9-13*). That species can utilize gradients of up to 15%. In addition, the suitability determination was also made based upon historical distribution, field reconnaissance and personal knowledge of expert field biologists. (*NMFS/FWS-Issue 6-Sneadker-Ex. 1 at 4:11-8:24; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 3:16-7:10; NMFS/FWS-Issue 6-Hamilton-Ex. 16*). The record evidence shows that the gradient of the habitat determined to be suitable for anadromous fish was actually within the 1-8% range. (*Aug. 22, 2006 Tr. at 208:24-209:4; Aug. 23, 2006 Tr. at 45:11-13; 48:6-10; NGO-Duffy-Rebuttal Testimony and Ex. 27 at 6, Fig. 1*).

241. Anadromous fish are not found in streams with gradient of 15percent. Aug. 22 TR 208:2-21, 210:18-25 (Snedaker); Aug. 24 TR 152:1-7 (Hamilton). Coho salmon are found in streams with gradients of less than four percent. PAC-Cross-2; Aug. 22 TR 217:11-15 (Snedaker). Chinook salmon are not found in streams with gradients exceeding four percent. Aug. 24 TR 152:1-7 (Hamilton).

RULING: REJECTED. This finding is unsupported by the record. Steelhead trout are anadromous fish. (*Aug. 24, 2006 Tr. at 42:16-43:13; PAC-Ols-D-1 at 18:22-23; PAC-Carl-D-3 at 2:18*). The GIS model was keyed to the species that could make the most use of the habitat (i.e. anadromous steelhead trout). (*Aug. 23, 2006 Tr. at 45:9-13*). That species can utilize gradients of up to 15%. In addition, the suitability determination was also made based upon historical distribution, field reconnaissance and personal knowledge of expert field biologists. (*NMFS/FWS-Issue 6-Sneadker-Ex. 1 at 4:11-8:24; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 3:16-7:10; NMFS/FWS-Issue 6-Hamilton-Ex. 16*). The record evidence shows that the gradient of the habitat determined to be suitable for anadromous fish was actually within the 1-8% range. (*Aug. 22, 2006 Tr. at 208:24-209:4; Aug. 23, 2006 Tr. at 45:11-13; 48:6-10; NGO-Duffy-Rebuttal Testimony and Ex. 27 at 6, Fig. 1*).

242. The Fisheries Agencies also relied upon the professional judgment of Mr. Snedaker. Mr. Snedaker stated during the hearing that he relied upon the professional advice of Dennis Maria, a retired CDFG biologist. Aug. 22 TR 201:10 to 202:2, 202:9-11, 214:3 to 215:10 (Snedaker). Email correspondence between Mr. Snedaker and Mr. Maria contradicts this assertion and instead reveals that Mr. Snedaker ignored Mr. Maria's professional advice regarding tributary habitat within the project area. PAC-Cross-2; Aug. 22 TR 217:6-25, 218:8-25 (Snedaker).

RULING: REJECTED. The record evidence shows that Mr. Sneadker consulted with Mr. Maria coho salmon habitat above Iron Gate Dam. The 58-mile habitat estimation was keyed to the species keyed to the species that could make the most use of the habitat (i.e. anadromous steelhead trout, not coho salmon). (*Aug. 23, 2006 Tr. at 45:9-13*). Thus, the evidence does not demonstrate that Mr. Maria's advice was ignored.

243. As Mr. Snedaker conceded during cross-examination, the Fisheries Agencies' determination of the quantity of suitable habitat is highly speculative. Aug. 23 TR 27:2-14 (Snedaker).

RULING: REJECTED. The record evidence demonstrates that the estimate of suitable habitat was based on the best available scientific evidence. This included: historical distribution data, field reconnaissance and personal knowledge of expert field biologists. (*NMFS/FWS-Issue 6-Sneadker-Ex. 1 at 4:11-8:24; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 3:16-7:10; NMFS/FWS-Issue 6-Hamilton-Ex. 16*).

244. The Fisheries Agencies' determination of the quantity of suitable habitat did not analyze or assess whether the identified habitat would produce sustainable populations of anadromous fish. Aug. 23 TR 30:13-24, 33:20 to 34:11, 35:21 to 36:1 (Snedaker).

RULING: REJECTED. The record evidence demonstrates that habitat is "suitable" if it can be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*). Further, the fact that resident rainbow/redband trout are self-sustaining in habitat above Iron Gate Dam, suggests that anadromous stocks will probably do the same if access is provided. (*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*).

245. The Iron Gate reservoir tributary stream habitat miles included by the Fisheries Agencies are not suitable habitat for anadromous fish. The majority of the smaller tributaries to Iron Gate reservoir are not likely to provide summer rearing habitat for anadromous fish because the tributaries lack in-stream flows and elevated water temperature resulting in exceedences of acceptable temperature thresholds for anadromous fish. Aug. 23 TR 8:7-14 (Snedaker); Aug. 23 TR 220:8-15 (Olson).

RULING: REJECTED. The record clearly establishes that warm water temperatures and water flow will not preclude juvenile migration. (*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); 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*). In addition, 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).

246. Many of the smaller streams, including Scotch, Camp, Slide, Salt and Hayden, dry-up at critical times in the anadromous fish life cycle due to multiple impacts including irrigation withdrawals and changes in natural hydrology. PAC-Mal-D-1 at 28:10-12. The drying up of these intermittent streams would force small juvenile anadromous fish to leave the streams (due to reduced flows) and rear in Project reservoirs where they would be exposed to large numbers of fish predators including yellow perch and bass. PAC-Mal-D-1 at 28:12-14; PAC-Mal-R-1 at 7:21 to 8:7.

RULING: REJECTED. Most anadromous fish will not be migrating during periods of adverse environmental conditions. (*Aug. 25, 2006, Tr. at 40:21-41:6*). However, if they are migrating during those times, the fish are resilient and 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). Scotch, Camp, Slide, Salt and Hayden are not their only options. The intermittent streams in other tributaries, refugial areas in other areas, and the main stem habitat could be utilized. (*KTr-CWH-Ex. 1 at 5; 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; NMFS/FWS-Issue 7-White Ex. 14, Table 3 at A-21; 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*).

247. Even without exposure to fish predators in the reservoir, survival by juvenile anadromous fish in intermittent streams during the summer would be quiet low. PAC-Mal-D-1 at 28:22 to 29:1. Studies have found steelhead mortality ranged from 44 percent to 96 percent in intermittent streams, while coho mortality was 34 percent to 51 percent in intermittent streams. PAC-Mal-D-1 at 29:2-4. Juvenile anadromous fish that did survive to smolt size would then need to migrate to and from the ocean to complete their life cycle. PAC-Mal-D-29:4-5; PAC-Mal-D-9 at 47:Figure 22, 48:Figure 23.

RULING: REJECTED. The record demonstrates that juvenile steelhead trout would not remain in streams that dry out in the summer. Juvenile fish would move to cooler tributaries and/or perennial streams. (*NMFS/FWS-Issue 6_Hamilton-Rebuttal-Ex. 1 at 4:3-7; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 5:16-17; NMFS-Issue6-Hamilton-Ex. 4 at 10; CDFG-Dean-Ex. 1 at 5:25-6:*4).

248. The riverine habitat between Copco Lake and J.C. Boyle reservoir is not suitable for anadromous fish because self-sustaining runs will not be established due to the mortality levels anadromous fish would experience over their entire life-cycle from: (1) anticipated loss associated with passage above Iron Gate dam through the prescribed volitional passage system; (2) increased exposure to pathogens during extended migration time; (3) presence of aquatic and avian predators; and (4) degraded downstream river conditions. PAC-Mal-D-1 at 30:7 to 32:7. Consistent with ODFW existing fish management plan for the Klamath River Basin, "While perhaps no single factor in itself precludes the possibility of establishing anadromous fish in the Upper Klamath Basin, the interaction of all factors would prevent the establishment of self-sustaining runs capable of perpetuating themselves at a useful level." PAC-Mal-D-22 at 66; PAC-Mal-D-1 at 32:8-11; PAC-Mal-D-22 at 66.

RULING: REJECTED. The modeling relied upon by PacifiCorp was designed to determine fish passage alternative rankings. It was not designed to predict fish mortality. (*NMFS/FWS-Issue 6-Curtis-Rebuttal_Ex. 1 at 1:19-2:8*). Further, the radio tag study upon which this finding is based is scientifically unreliable.

249. The anticipated mortality levels that anadromous fish produced within the Project area will likely experience over their entire life cycle, establishes that habitat within the Project area is not suitable for anadromous fish. PAC-Mal-D-1 at 32:12-15.

RULING: REJECTED. The record evidence demonstrates that habitat is "suitable" if it can be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*). The risk of mortality is not a determinative factor.

250. The inflow of water from the natural springs into the J.C. Boyle bypass reach (starting about 0.5 mile below J.C. Boyle dam) substantially enhances water quality in the bypass reach. PAC-Carl-D-1 at 19:2-5; PAC-Carl-D-9 at Sec. 6.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

251. The water temperature of the springs is roughly constant at approximately 9-11°C, which acts to significantly moderate the annual water temperature regime throughout the J.C. Boyle bypass reach downstream of the springs. PAC-Carl-D-1 at 19:5-8; PAC-Carl-D-9 at Sec. 6.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

252. The higher instream flow releases proposed by BLM would cause the beneficial cooling effects of the springs in the bypass reach to be overwhelmed by the greater quantity of warmer water from the Klamath River upstream of the bypass reach. PAC-Carl-D-1 at 19:15-17; PAC-Mal-R-1 at 9:16-19.

RULING: REJECTED. The record evidence demonstrates that the BLM flow conditions would leave approximately a 200-yard thermal refugia area for use of anadromous fish. Further, in the J.C. Boyle bypass reach, springs would continue to offer a thermal refugia area for fish. (*Aug. 21, 2006 Tr. at 210:17-21 and 217:6-20; Aug. 24, 2006 Tr. at 275:11-278:21; Aug. 25, 2006 Tr. at 96:22-99:2; Yurok-Issue 6-Belchik-Direct Testimony at 6:14-18; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 8:11-13*).

253. The proposed BLM flow conditions would increase daily minimum water temperatures by approximately 4-5ºC and daily maximum water temperatures by approximately 2-4ºC over existing conditions. PAC-Carl-D-1 at 20:10-15; PAC-Carl-D-6.

RULING: ACCEPTED IN PART, REJECTED IN PART. The Federal Agencies concede that increased flow in the J.C. Boyle bypass reach will increase water temperatures in the summer. However, the record evidence is inconclusive as to the degree of temperature change. (*Aug. 24, 2006 Tr. at 90:20-25; PAC-Carl-D-6; PAC-Cross-6; NMFS/FWS-Issue 6-Hamilton-Rebuttal Ex. 5 at 21, Table 1*).

254. The data and findings within the 2005 USGS Report, "J.C. Boyle Bypass Segment Temperature Analysis" prepared for BLM and USFWS corroborates PacifiCorp's analysis of the impacts of the BLM's flow condition on water temperature conditions in the bypass reach. Aug. 24 TR 134:1 to 135:3 (Hamilton). The USGS Report indicates that the BLM proposed flow conditions may cause an increase in daily maximum water temperatures even greater than approximately 2-4ºC over existing conditions. PAC-Carl-C-6 at 18-31; 2005 USGS Report at 18-21. The data and findings indicate that the BLM flow conditions would under certain situations transform the temperature conditions in the bypass reach from a thermal refugia area into a thermal barrier. Aug. 21 TR 212:2-12 (Carlson); 2005 USGS Report at 28-31.

RULING: REJECTED. The record evidence is inconclusive as to the degree of temperature change. (*Aug. 24, 2006 Tr. at 90:20-25; PAC-Carl-D-6; PAC-Cross-6; NMFS/FWS-Issue 6-Hamilton-Rebuttal Ex. 5 at 21, Table 1*).

255. Increased flows in the bypass reach would degrade or reduce quantity and quality of thermal refugia habitat that would be important to anadromous fish. PAC-Mal-D-1 at 33:14-16; PAC-Mal-R-1 at 13:14-15; Aug. 25 TR 55:9-23 (Dunsmoor); Aug. 23 TR 17:14 to 20:5 (Snedaker).

RULING: REJECTED. The record evidence demonstrates that the BLM flow conditions would leave approximately a 200-yard thermal refugia area for use of anadromous fish. Further, in the J.C. Boyle bypass reach, springs would continue to offer a thermal refugia area for fish. (*Aug. 21, 2006 Tr. at 210:17-21 and 217:6-20; Aug. 24, 2006 Tr. at 275:11-278:21; Aug. 25, 2006 Tr. at 96:22-99:2; Yurok-Issue 6-Belchik-Direct Testimony at 6:14-18; NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 8:11-13*).

256. The reduction of the size of the J.C. Boyle bypass reach thermal refugia will increase the risk of predation and disease for the anadromous fish that would attempt to rely upon the thermal refugia. NMFS/FWS-Issue 6-Hamilton-Exh. 14 at 2; Aug. 23 TR 20:2 to 21:8 (Snedaker); Aug. 24 TR 204:15 to 205:22 (Hamilton).

RULING: REJECTED. The evidence upon which this proposed finding is based is inconclusive.

Proposed Ultimate Finding of Fact on USFWS/NMFS Issue 6: There are not 58 miles of habitat suitable for use by anadromous fish within the Project area. The riverine and tributary habitat within the project area is not suitable for the sustainable production of anadromous fish.

RULING: REJECTED. 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

USFWS/NMFS ISSUE 7:

Proposed Finding of Fact

257. Factors to be considered when assessing whether access to habitat within the Project would benefit coho salmon are: 1) the amount of suitable coho habitat upstream of Iron Gate dam; 2) the possibility of additional survival risks facing coho; and 3) the current health of the coho population downstream of Iron Gate dam. PAC-Ols-D-1 at 37:11-14.

RULING: REJECTED. The Federal Fisheries definition of suitable habitat is adopted. Under that definition, habitat is "suitable" if it can be used successfully at least some of the time by one or more life stages of anadromous fish. (*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*).

258. The limited and marginal habitat available above Iron Gate dam is not suitable for coho because coho salmon primarily spawn and rear in relatively small but perennial tributary streams (Aug. 22 TR 238:5-9) and do not tend to use mainstem rivers, like the Klamath River, except as a migration corridor. PAC-Ols-D-1 at 37:17-18.

RULING: REJECTED. The record evidence demonstrates that the main stem areas within the Project, such as the J.C. Boyle bypass reach, Keno Reach, and Copco 2 contain a significant amount of habitat suitable for anadromous salmonids, including coho salmon. Perennial streams and intermittent streams within the Project also provide suitable habitat for coho salmon. (*Aug. 25, 2006 Tr. at 98:10-14 and 101:20-102:7; NMFS/FWS-Issue 7-White-Ex. 14, Table 3 at A-21; 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; 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).

259. Streams appropriate for coho are typically low gradient (0% to 4%) and have relatively cool water temperatures, preferably less than 20°C in the summer. PAC-Ols-D-1 at 37:19-20.

RULING: REJECTED. The gradient and water temperature preferences for coho salmon are not absolutes. 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*). The record evidence also demonstrates 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)*).

260. Most of the streams the Federal Agencies identified as habitat for coho (e.g., Scotch, and Camp creeks) are extremely small, and/or intermittent and/or would be inaccessible to coho. PAC-Ols-D-1 at 38:1-3; Aug. 23 TR 260:8 to 261:14 (Olson); Aug. 22 TR 222:23 to 223:13, 237:18 to 238:1, 238:10 to 241:23 (Snedaker).

RULING: REJECTED. The record evidence demonstrates that the main stem areas within the Project, such as the J.C. Boyle bypass reach, Keno Reach, and Copco 2 contain a significant amount of habitat suitable for anadromous salmonids, including coho salmon. Perennial streams and intermittent streams within the Project also provide suitable habitat for coho salmon. (*Aug. 25, 2006 Tr. at 98:10-14 and 101:20-102:7; NMFS/FWS-Issue 7-White-Ex. 14, Table 3 at A-21; 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; 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*).

261. Warm water temperatures in the summer would severely limit rearing potential for juvenile coho. PAC-Ols-D-1 at 38:5-6; Aug. 23 TR 220:8-15 (Olson).

RULING: REJECTED. The record evidence also demonstrates 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)*).

262. The tributaries above Iron Gate dam have degraded conditions due to poor water quality, cattle grazing, irrigation, withdrawals and diversion, logging, agriculture, and other land use activities. PAC-Ols-R-1 at 31:19-21.

RULING: REJECTED. The habitat above and below Iron Gate Dam are similarly degraded. Yet, much of the habitat remains suitable for coho salmon. (*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*; *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*).

263. Of the tributaries above Iron Gate dam, only Fall Creek and Jenny Creek could support some limited spawning and rearing of coho salmon, but both streams have impassible waterfalls near their confluences with the reservoir waters. PAC-Ols-D-1 at 38:11-14; PAC-Ols-D-16.

RULING: REJECTED. Suitable habitat for coho salmon 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*).

264. The spawning and rearing habitat of Fall Creek and Jenny Creek is also limited by high summer water temperatures in Jenny Creek and a relatively high gradient and confined channel in Fall Creek. PAC-Ols-D-1 at 38:16-20; Aug. 22 TR 228:1-21, 235:18 to 236:25 (Snedaker).

RULING: REJECTED. Fall and Jenny Creeks are among the perennial streams that will support spawning and rearing habitat for coho salmon and warn water temperatures in the summer will not preclude the fish from successfully using the habitat. (*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)*). Further, the gradient in many of the reaches identified as suitable habitat are very low (between 1-5%). Therefore, although gradient might be a problem, it will not preclude coho salmon from using habitat above Iron Gate Dam. (*BMFS/FWS-Issue 7-Simondet-Rebuttal-Ex. 1 at 3:10-17, 4:15-5:5; NMFS/FWS-Issue 7-Simondet-Ex. 14 at 25*).

265. Above Copco dam, most of the creeks are extremely small, steep, warm and most likely could not support much coho production. PAC-Ols-D-1 at 39:3-4; PAC-Ols-D-16. For example, Long Prairie Creek might be able to support a few coho in the 3/4-mile accessible reach, but its summer stream flows are only about 1 cfs. PAC-Ols-D-1 at 39:5-7. Shovel Creek could support coho production in its accessible lower two miles of the stream, but the stream has a relatively steep gradient of about four percent that limits the number of pools necessary for coho rearing. PAC-Ols-D-1 at 39:8-12; Aug. 22 TR 229:22-25, 230:8-22, 231:3 to 232:8 (Snedaker).

RULING: REJECTED. Warn water temperatures in the summer will not preclude the fish from successfully using the habitat. (*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)*). Further, the gradient in many of the reaches identified as suitable habitat are very low (between 1-5%). Therefore, although gradient might be a problem, it will not preclude coho salmon from using habitat above Iron Gate Dam. (*BMFS/FWS-Issue 7-Simondet-Rebuttal-Ex. 1 at 3:10-17, 4:15-5:5; NMFS/FWS-Issue 7-Simondet-Ex. 14 at 25*).

266. In the Project reservoirs, juvenile coho would be significantly compromised by bird and non-native fish predation. In Klamath River above Iron Gate Dam, juvenile coho would also be exposed to warm water temperatures which have been shown to impede migration stimuli, increase stress and disease, and the temperature may exceed the lethal tolerance limits for coho. PAC-Ols-D-1 at 39:21 to 40:1.

RULING: REJECTED. The Miller Radio Telemetry study upon which this finding of fact is based is scientifically unreliable.

267. In a site specific study, it was found that juvenile coho had poor success migrating through the reservoirs, were exposed to bird and fish predation risks, and encountered other negative impacts associated with the warmer water temperatures. PAC-Ols-D-1 at 40:17-22; PAC-Ols-D-11 at 31 to 33; PAC-Ols-R-1 at 30:13-16.

RULING: REJECTED. The Miller Radio Telemetry study upon which this finding of fact is based is scientifically unreliable.

268. Access to habitat within the Project would impede the overall health of Klamath River Coho because allowing adult coho to migrate above Iron Gate dam through volitional fish passage, where habitat is scarce and of marginal quality exposes those at-risk coho to predation and other risks that the coho might otherwise not encounter downstream of Iron Gate dam. PAC-Ols-D-1 at 41:8-11.

RULING: REJECTED. 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*). Predation may also be an issue 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*).

269. The marginal amount of habitat within the Project would not likely provide for sustainable production of coho to a degree which would help the overall population status. PAC-Ols-D-1 at 41:16-18.

RULING: REJECTED. The evidence demonstrates that a significant amount of suitable habitat exists above Iron Gate Dam for coho salmon. Access to this habitat 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).

270. The added risks facing juvenile coho in the reservoirs and the poor ability of coho smolts to successfully migrate through the reservoirs make it highly unlikely that if provided access to habitat in the Project area, sustainable coho populations could be established above Iron Gate dam. PAC-Ols-R-1 at 30:13-16.

RULING: REJECTED. The radio tag study upon which this proposed finding is based is scientifically unreliable. In addition, Coho salmon will not face any additional risks above Iron Gate Dam than that which is being experienced below 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*).

271. Providing access to habitat above Iron Gate dam through volitional fish passage would shift the distribution of some coho away from their stream of origin (where conditions allowed for the coho to survive to adulthood) into relatively unproductive habitat above the dams, and expose the coho to additional risks that would not be encountered downstream of Iron Gate dam (i.e., risks in the reservoirs including predation and disease). PAC-Ols-D-1 at 41:23 to 42:2; Aug. 23 TR 262:17 to 264:3 (Olson).

RULING: REJECTED. The record evidence demonstrates that much of the habitat above Iron Gate Dam remains suitable and restoration projects are currently in progress or planned to improve other areas.. (*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; NMFS-Issue 7-Simondet-Ex. 1 at 2:13-18, 5:15-19*).

272. The accessible habitat above Iron Gate dam would be limited and of marginal quality. PAC-Ols-D-1 at 37:21 to 38:6; PAC-Ols-D-16: Aug. 23 TR 206:8 to 261:14 (Olson).

RULING: REJECTED. The record evidence demonstrates that there is significant habitat for coho salmon above Iron Gate Dam. Such habitat 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*).

Proposed Ultimate Finding of Fact on USFWS/NMFS Issue 7: Providing access to habitat within the Project would not benefit coho but instead would harm the overall health of Klamath coho.

RULING: REJECTED. 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*).

USFWS/NMFS ISSUE 8

Proposed Finding of Fact

273. Accessing habitat above Iron Gate dam for Pacific lamprey will be problematic as volitional upstream passage through conventional fish ladders designed for anadromous salmonids does not provide efficient passage for Pacific lamprey. PAC-Gior-D-1 at 5:10-12; PAC-Gior-R-1 at 1:16-2:1; PAC-Gior-D-4 at 56; PAC-Gior-D-5 at iv; PAC-Gior-R-1 at 1:17 – 2:1-8; Moser-Rebuttal Exhibit 1 at 2:6-7; Aug. 24 TR 163:13-17, 166:24 – 167:1-16 (Moser).

RULING: REJECTED. Effective volitional passage for Pacific lamprey is not at issue in this proceeding. However, the record demonstrates that 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*).

274. Although passage research on Pacific lamprey has identified ladder modifications that could improve efficiency, no lamprey-friendly ladder has been constructed, tested, evaluated and shown to be as effective for Pacific lamprey as for anadromous salmonids. Thus, no effective Pacific lamprey ladder is available for use as a model for application at the Project. PAC-Gior-D-1 at 6:17-20, 7:8-11, 7:16-20; PAC-Gior-D-4 at 56; Aug. 24 TR 168:14-23, 169:8 – 170:1, 179:17-23 (Moser).

RULING: REJECTED. Effective volitional passage for Pacific lamprey is not at issue in this proceeding. However, the record demonstrates that 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*).

275. Conventionally designed juvenile fish bypass screens have not been evaluated with respect to negative effects on juvenile Pacific lamprey. PAC-Gior-D-1 at 4:8; Aug. 24 TR 171:2-25, 172:14-21 (Moser). There are no existing screened bypass systems that have been constructed, tested and shown to efficiently provide safe passage for Pacific lamprey. PAC-Gior-D-1 at 8:3-4; Aug. 24 TR 172:14-21 (Moser). If Pacific lamprey are given access to habitat within the Project, their migration downstream is likely to cause juvenile mortality due to the effects of the bypass screens. Moser-Exhibit 1 at 6:16-22 to 7:1-2.

RULING: REJECTED. Effective volitional passage for Pacific lamprey is not at issue in this proceeding. However, the record demonstrates that 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*).

276. Inefficient fish ladders and/or juvenile fish bypass screens would impair the ability of Pacific lamprey to reach the habitat above Iron Gate dam and safely and effectively migrate downstream. PAC-Chan-R-1 at 2:11-14; PAC-Gior-D-1 at 3:10-17, 4:1-10; (Moser).

RULING: REJECTED. Effective volitional passage for Pacific lamprey is not at issue in this proceeding. However, the record demonstrates that 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*).

277. There is no evidence that the limitations associated with conventionally designed fish ladders and juvenile fish bypass systems could be alleviated by envisioned conceptual designs, such that passage efficiency on par with salmonids could be achieved at the Project. PAC-Gior-D-1 at 6:5-8, 7:8-11, 8:3-8; PAC-Gior-R-1 at 1:12-15, 2:16-22; Aug. 24 TR at 171:5-25, 172:16-21; (Moser).

RULING: REJECTED. Effective volitional passage for Pacific lamprey is not at issue in this proceeding. However, the record demonstrates that 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*).

278. The prescription for volitional fish passage will not provide safe, timely or effective passage for Pacific lamprey. Further testing and refinement are needed before an efficient volitional passage system can be constructed in the Klamath River. PAC-Gior-D-1 at 6:19-7:2; PAC-Gior-R-1 at 1:12-15; PAC-Gior-D-4 at 56.

RULING: REJECTED. Effective volitional passage for Pacific lamprey is not at issue in this proceeding. However, the record demonstrates that 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*).

279. There is no clear evidence to support the position that Pacific lamprey were historically present above Iron Gate dam. PAC-Chan-R-1 at 2:23-3:1; Aug. 24 TR at 121:2-122:1, 124:2 to 125:19 (Chane); CDFG Pisano Exhibit 1 at 13:8-9; Aug. 24 TR 250:23 – 252:13, 253:13-23, 255:8-13 (Hamilton).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

280. Suitable spawning habitat for Pacific lamprey (pool tail-out areas, runs, or large gravel dominated rifles) is not abundant in the Project area. PAC-Chan-D-1 at 3:25-28; PAC-Chan-D-4 at 15; PAC-Chan-R-1 at 2:3-10.

RULING: REJECTED. A significant amount of suitable habitat for spawning and juvenile rearing is available within tributaries and stream reaches in the Project area. (Y*urok-Hillemeier 2 and 8 Direct at 6:4 to 7:15; Yurok-Steward 8 Direct at 5:1-8; NMFS/FWS PFF 8.4*).

281. Suitable rearing habitat for Pacific lamprey is not abundant in the Project area. Intermittent tributaries do not provide adequate habitat for larval Pacific lamprey to rear. PAC-Chan-D-1 at 8:3-5, 9:1-11.

RULING: REJECTED. A significant amount of suitable habitat for spawning and juvenile rearing is available within tributaries and stream reaches in the Project area. (Y*urok-Hillemeier 2 and 8 Direct at 6:4 to 7:15; Yurok-Steward 8 Direct at 5:1-8; NMFS/FWS PFF 8.4*).

282. It is unlikely that there is 13.7 miles of suitable habitat for Pacific lamprey between Iron Gate dam and the next barrier upstream. PAC-Chan-D-1 at 6:20-22. Of the tributaries USFWS/NMFS included, only Fall Creek and Jenny Creek consistently provide approximately 2 miles of summer rearing habitat with the other tributaries lacking water in the summer months due to either natural or human activities. PAC-Chan-D-1 at 6:1-4; PAC-Chan-R-1 at 3:14-17. Substrate in the Copco 2 bypass, included in the assumed 13.7 miles of habitat, precludes lamprey spawning and subsequent larval rearing. PAC-Chan-D-1 at 6:4-6.

RULING: REJECTED. A significant amount of suitable habitat for spawning and juvenile rearing is available within tributaries and stream reaches in the Project area. (Y*urok-Hillemeier 2 and 8 Direct at 6:4 to 7:15; Yurok-Steward 8 Direct at 5:1-8; NMFS/FWS PFF 8.4*).

283. Of the 27.1 miles of habitat existing between the Copco 1 and J.C. Boyle dams, only approximately 2.7 miles are appropriate for Pacific lamprey rearing. PAC-Chan-D-1 at 8:14-17; PAC-Chan-R-1 at 3:17-20. The majority of that habitat consists of the 17 mile J.C. Boyle peaking reach and the four mile bypass reach, which are high gradient areas with little potential lamprey spawning gravels. PAC-Chan-D-1 at 7:4-6. Topsy, Tom Hayden (Hayden Creek), Frain, and Edge Creeks are either intermittent or diverted and do not always maintain continuous flow and are thus not appropriate for Pacific lamprey rearing. PAC-Chan-D-1 at 8:5-7. Only the habitat containing fine substrate types in the mainstem of Shovel Creek (approximately 2.7 miles) can be assumed to be suitable for Pacific lamprey rearing. PAC-Chan-D-1 at 7:14-17, 8:15-17; PAC-Chan-R-1 at 3:18-20.

RULING: REJECTED. A significant amount of suitable habitat for spawning and juvenile rearing is available within tributaries and stream reaches in the Project area. (Y*urok-Hillemeier 2 and 8 Direct at 6:4 to 7:15; Yurok-Steward 8 Direct at 5:1-8; NMFS/FWS PFF 8.4*).

284. Pacific lamprey survival decreases and abnormalities increase at rearing temperatures above 20° C. PAC-Chan-R-1 at 4:17-23; Aug. 24 TR 90:11-25 (Chane).

RULING: REJECTED. The record evidence shows that juvenile Pacific lamprey can successfully rear in warm water temperatures exceeding 22^{o} C. (*Aug. 24, 2006 Tr. at 90:11-12 (PacifiCorp's witnesse, Mr. Chane concedes that ammocoetes can survive in water up to* 28^{o} C*); NMFS/FWS-Issue 8-Hamilton-Ex. 1 at 5:9-11; NMFS/FWS-Issue 8-Hamilton-Ex. 12 at 42, Fig.3.7-4; Yurok-Steward Direct-Issue 8 at 15 (stating that "[a]mmocoetes . . . have been collected in waters ranging up to* 25^{o} C")).

285. Outside of the spring influenced areas, temperature within the Project area is likely to be in an unacceptable range for portions of the year, impacting Pacific lamprey spawning and rearing. PAC-Chan-R-1 at 4:19-23.

RULING: REJECTED. Warm water temperatures will not preclude Pacific lamprey from successfully using habitat above Iron Gate Dam. (*Aug. 24, 2006 Tr. at 90:11-12 (PacifiCorp's witnesse, Mr. Chane concedes that ammocoetes can survive in water up to* 28° C*); NMFS/FWS-Issue 8-Hamilton-Ex. 1 at 5:5-11; NMFS/FWS-Issue 8-Hamilton-Ex. 11 at 236; NMFS/FWS-Issue 8-Hamilton-Ex. 1 at 5:9-11;; NMFS/FWS-Issue 8-Hamilton-Ex. 12 at 42; Yurok-Steward Direct-Issue 8 at 15 (stating that "[a]mmocoetes . . . have been collected in waters ranging up to* 25° C")). In addition, ammocoetes have the keen ability to colonize new habitat when conditions are unsuitable. (*Aug. 24, 2006 Tr. at 98:2-11; NMFS/FWS-Issue 8-Hamilton-Ex. 10 at 5; NMFS/FWS-Issue 8-Hamilton-Ex. 11 at 236*).

286. Temperature regimes in the upper basin are different than the lower portions of the Klamath River. This difference would impact migratory timing for out migrating juvenile Pacific lamprey and returning adults. PAC-Chan-R-1 at 2:18-20; Aug. 24 TR 81:22-24 (Chane).

RULING: REJECTED. Water temperature will not preclude juvenile Pacific lamprey from rearing above Iron Gate Dam. *(PacifiCorp's witnesse, Mr. Chane concedes that ammocoetes can survive in water up to* 28° C*); NMFS/FWS-Issue 8-Hamilton-Ex. 1 at 5:5-11; NMFS/FWS-Issue 8-Hamilton-Ex. 11 at 236; NMFS/FWS-Issue 8-Hamilton-Ex. 1 at 5:9-11; NMFS/FWS-Issue 8-Hamilton-Ex. 12 at 42; Yurok-Steward Direct-Issue 8 at 15 (stating that "[a]mmocoetes . . . have been collected in waters ranging up to* 25° C")). As a matter of fact, water temperature above Iron Gate Dam is as warm as some of the areas located below the dam. (*KTr-CWH-Ex. 4 at 229*).

287. Pacific lamprey larvae require 4-6 years of freshwater rearing. If provided access to habitat within the Project, Pacific lamprey would be exposed to the potential impacts from water quality perturbations and variable water year types for a significant number of years. PAC-Chan-D-1 at 4:1-3.

RULING: ACCEPTED IN PART, REJECTED IN PART. While Pacific lamprey larvae will be exposed to varying conditions over a period of years, this should not adversely affect the population. The record evidence demonstrates that Pacific lamprey are adaptable and can survive in a wide range of conditions. (*NMFS/FWS-Issue 8-Moesa Rebuttal Ex. 1 at 4:65-67*). They also have the keen ability to colonize new habitat when conditions become unfavorable. (*Aug. 24, 2006 Tr. at 98:2-11; NMFS/FWS-Hamilton Ex. 10 at 6; NMFS/FWS-Issue 8-Hamilton Ex. 11 at 236*).

288. If provided access to habitat within the Project, juvenile Pacific lamprey migrating to the ocean would encounter downstream passage difficulties relating to predation, water quality, and passage facilities. PAC-Chan-D-1 at 4:3-6.

RULING: REJECTED. Effective volitional passage for Pacific lamprey is not at issue in this proceeding. However, the record demonstrates that 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*). In addition, the conditions outmigrating Pacific lamprey from above Iron Gate Dam would face are not dissimilar to the condition already faced by the species below the dam.

289. Pacific lamprey which access habitat within the Project area would encounter the same conditions as the current (and declining) population of Pacific lamprey encounter during juvenile outmigration, ocean rearing conditions and subsequent adult upstream migration. PAC-Chan-D-1 at 4:11-14. As the reason for the current declining population of Pacific lamprey has not been determined, there is no indication that the decline will not be a continuing issue for any Pacific lamprey with access to habitat within the Project area. PAC-Chan-D-1 at 4:11-14; PAC-Chan-R-1 at 4:4-10.

RULING: REJECTED. Habitat degradation has been identified as one of the causes for decline of the Pacific lamprey population below Iron Gate Dam. (*NMFS/FWS-Issue 8-Hamilton-Rebuttal Ex. 4; Yurok-Steward Direct Issue 8 at 2:7-8; Yurok-Steward Rebuttal Issue 8 at 2:9-3:2). The record evidence demonstrates that* 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*).

290. There does not appear to be documentation of Pacific lamprey spawning immediately below Iron Gate dam or mass congregations of Pacific lamprey in this area. PAC-Chan-D-1 at 10:8-10. Therefore, there is not documented indication that Pacific lamprey would attempt to access habitat within the Project if volitional fish passage was provided at Iron Gate dam and other Project facilities.

RULING: ACCEPTED AND INCORPORATED.

Proposed Ultimate Finding of Fact

Access to habitat within the Project would not benefit Pacific lamprey.

RULING: REJECTED. Access to habitat above Iron Gate Dam would benefit Pacific lamprey. (*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; CDFGPisano-Ex. 1 at 11:19*).

RULINGS ON BLM PROPOSED FINDINGS OF FACT

BLM ISSUE 10:

10.1 The seasonal high flows proposed by BLM for the J.C. Boyle bypassed 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.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

10.2 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 that will improve riparian productivity. BLM Cluer Ex. 0 at 15:5-7.

RULING: ACCEPTED

10.3 Higher flows will also distribute sediments higher on the river margins and alluvial features. Tr. 1 at 106:22-23 (Dwerlkotte cross); BLM Cluer Ex. 0 at 16:2-4.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

10.4 More frequent and larger magnitude floods will likely result in a shift in the riparian community such that reed canarygrass will be competitively disadvantaged and a more complex woody riparian community will have a relative competitive advantage. NGO Ex. 1 at 17:16-18**.**

RULING: REJECTED (The cited testimony does not state that woody riparian vegetation will gain a relative competitive advantage. (*NGO Exh. 1 at 10:5-16, 17:12-13*). It states that the proposed flows will inhibit the establishment of reed canary grass. (*Id*.). Moreover, there is record evidence in this proceeding that BLM flows would result in less willow vegetation. (*FOF 10-16*).)

10.5 A relative increase in early successional woody riparian vegetation and a relative decrease in reed canarygrass will likely increase abundance of riparian-focal bird species in the J.C. Boyle bypassed reach. BLM Alexander Ex. 0 at 9:10-14; Tr. 1 at 120:21-25 (Tressler cross).

RULING: ACCEPTED

BLM ISSUE 11:

11.1 Project diversions roughly double the "return period" of high flow events in the bypassed reach (unregulated 2-year flood would be 5,530 cubic feet per second (cfs) compared to regulated 5-year flood of 5,790 cfs; unregulated 5-year flood of 8,640 compared to regulated 10-year flood of 8,050; unregulated 10-year flood of 10,900 cfs compared to regulated 20-year flood of 10,550 cfs; unregulated 20-year flood of 13,400 cfs compared to regulated 50-year flood of 13,950 cfs; unregulated 50-year flood of 16,800 cfs compared to regulated 100-year flood of 16,750 cfs). PAC-Dwer-D-5 at page 5-46, Table 5.7-16 (as explained at page 5-45).

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

11.2 In the J.C. Boyle bypassed reach, the average annual flow released from the J.C. Boyle Dam has been reduced by 81%—from approximately 1,560 cfs to 296 cfs—with the 100 cfs minimum flow occurring 89% of the time. BLM Turaski Ex. 4 at 68, 83.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

11.3 Project operations, through operation of J.C. Boyle Dam and Reservoir, block and trap bed load sediment that would be delivered to the Klamath River by Spencer Creek and other Klamath tributaries above the J.C. Boyle Dam. Tr. 1 at 53:16-20 (Tompkins cross); BLM Turaski Ex. 4 at 103. Approximately 6,134 cubic yards of bedload sediment is trapped by J.C. Boyle Dam annually. BLM Cluer Ex. 5 at 145-46.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

11.4 The bed material in the J.C. Boyle bypassed and peaking reaches has coarsened due to 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 bypassed reach and during peaking flows in the peaking reach. BLM Cluer Ex. 0 at 8:5-7; 14:10-12.

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

11.5 The alluvial features in the J.C. Boyle bypassed and peaking reaches have become less dynamic due to armoring of the bed and banks by sediment trapping from J.C. Boyle Dam and less frequent reworking by flood flows. Less geomorphically dynamic features create less productive riparian habitat. BLM Cluer Ex. 0 at 5:16-17, 7:17-21; 8:2-4; BLM Cluer Ex. 5 at 129; NGO Ex. 1 at 10:13-16.

RULING: ACCEPTED (In interpreting the statement that alluvial features have become less dynamic, greater weight should be given to changes in sediment characteristics (i.e. coarsening) caused by sediment trapping of Project dams, rather than to changes brought by flood flows. (*Aug. 21, 2006 Tr. at 68:22-25; See BLM-Cluer-Ex. 0 at 7:17-21, 8:2-4; BLM-Cluer-Ex. 5 at 129 (discussing changes in sediment and not specifically changes in flow); NGO-Ex. 1 at 10:13-16 (referring to a typical alluvial river, which Trush agreed during cross examination the bypass reach is not)).*

11.6 Alluvial features in the J.C. Boyle bypassed reach are composed of coarse sediment, limiting the habitat available for establishment of early successional woody riparian vegetation such as willow. BLM Cluer Ex. 0 at 7:17-21, 8:2-4.

RULING: REJECTED (Woody riparian species occur on some of the alluvial features in the reach, indicating that coarse sediment in the bars is not preventing early-successional woody riparian vegetation from establishing. (*PAC-Dwer-D-1 at 5:20-23; PAC-Dwer-D-9 (Bypass_500_3_7_06: photo 6 of 6; BypassPhotos_5_24_06: photos 1, 2, 3, 4, 15 and 16 of 16; BypassPhotos09_23_02: photos 1 and 2 of 6*). Furthermore, evidence has been presented that even if changes in sediment were to occur, woody riparian vegetation would not flourish. (*FOF 10-16*). Coarse sediment is not the main factor limiting woody vegetation growth.)

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

RULING: ACCEPTED

11.8 Project diversions have created a hyper-variable pattern of daily high and low flow fluctuations in the J.C. Boyle peaking reach where flows over the course of a day may range from 320 cfs to 3000 cfs. BLM Turaski Ex. 4 at 69. Peaking reach flows exhibit a greater than 1,000 percent increase in daily range of flows, and a greater than 500 percent increase in rise and fall rates (ramp rates) compared to flows that would occur without the J.C. Boyle facility. BLM Simons Ex. 10 at 8, 10.

RULING: ACCEPTED (This statement is true for existing operations, however it does not consider changes that may occur under PacifiCorp's new operations as proposed in its Final License Application.)

11.9 Peaking flows contribute to erosion of river banks and depositional features through repeated wetting and drying which acts to specifically erode fine sediment. Tr. 1 at 62:12-19 (Tompkins cross); BLM Cluer Ex. 6 at 86; BLM Cluer Ex. 0 at 5:14-16.

RULING: ACCEPTED (This potential factor in bank erosion is accepted by PacifiCorp. (*PC Reply Brief Appendix at 10*). However, no evidence has been presented that shows if or to what extent this factor has contributed to bank erosion in the Project reaches.)

11.10 Reed canarygrass is an invasive riparian grass that can establish dense root mats and exclude other riparian vegetation. NGO Ex. 1 at 16:11-12; Tr. 1 at 98:10-13 (Dwerlkotte cross). Approximately two-thirds of the riparian habitat in the J.C. Boyle bypassed reach is currently reed canarygrass, id. at 97:24 to 98:9, and it is the dominant riparian species in both J.C. Boyle reaches. PAC-Dwer-D-1 at 7:8-10.

RULING: ACCEPTED

11.11 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.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

11.12 High flows can scour (uproot and dislodge) reed canarygrass. Moderate floods are likely to scour plants with less well-established root mats, NGO Ex. 1 at 15:14-16, while larger flood 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.

RULING: ACCEPTED - PacifiCorp does not generally dispute this statement - (NGO Ex. 1 at 15:14-16 and 16:1-7 only provides speculation that reed canarygrass will be more difficult to remove if left alone for two years or longer)

11.13 By increasing the "return period" of moderate floods (e.g. 5,500 cfs) from two to five years (i.e., decreasing the frequency of these floods), Project operations have promoted the establishment of reed canarygrass because more frequent moderate floods would likely scour and remove the younger grass before its root mats are established. NGO Ex. 1 at 15:8-16.

RULING: REJECTED (Trush's testimony is too speculative. Trush concludes that a flood flow of approximately 5,500 cfs in the bypassed reach likely has the capability of scouring newly established vegetation. (*NGO-Ex. 1 at 15:10-12*). However, Trush does not provide any supporting data or further explanation for this number. Trush seems a little unsure of his approximation by later using the phase, "[i]f that is the threshold . . . ." (*NGO-Ex. 1 at 15:12*). Such wording does not instill confidence in the numbers used to support his conclusion.)

11.14 By increasing the "return period" of larger floods, Project operations have reduced the frequency of flood events that could scour established reed canarygrass. NGO Ex. 1 at 16:4-10.

RULING: ACCEPTED

11.15 Under Project operations, reed canarygrass has a competitive advantage over woody riparian vegetation such as Coyote willow in the J.C. Boyle bypassed reach due to lower base flows, less frequent and lower magnitude high flow events, and lack of smaller-sized sediment. BLM Turaski Ex. 4 at 72; Tr. 1 at 76:9-21; NGO Ex. 1 at 13:17-19.

RULING: ACCEPTED (This finding does not conclude that the stated factors are the only factors that would allow reed canarygrass to have a competitive advantage over woody riparian vegetation. Nor does this proposed finding hold that BLM proposed flows would necessarily result in an increase of woody riparian vegetation)

11.16 Reed canarygrass is adapted to survive in frequently inundated coarse substrate and is capable of out-competing woody riparian vegetation such as willow under the daily peaking flows in the J.C. Boyle peaking reach. BLM Turaski Ex. 4 at 73; PAC-Dwer-D-4 at 3-28.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

11.17 Riparian-focal bird species are birds that use riparian habitats and have declining population trends or reductions in historic breeding range. 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. BLM Alexander Ex. 0 at 5:21-22.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

11.18 In the J.C. Boyle bypassed 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; Tr. 1 at 124:14 to 125:15.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

11.19 A relative decrease in woody riparian vegetation relative to reed canarygrass has likely resulted in a corresponding decrease in riparian-focal bird species. BLM Alexander Ex. 0 at 10:6-12.

RULING: REJECTED (The cited testimony argues that "*assuming* project operations have reduced the extent and quality of riparian habitat," then riparian-focal bird species will be negatively affected (italic added). The cited testimony does not argue that woody riparian vegetation *has* decreased.)

BLM ISSUE 14:

14.1 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 24% of the years, in March 24% of the years, and in April 3% of the years. *Id.* The median start date for the seasonal high flow would be February 18. *Id.*

RULING: ACCEPTED – PacifiCorp does not dispute this statement

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

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

14.3 Based on an analysis of the historical flow record, the seasonal high flow would be implemented between March 15 and April 15 in 14% of the years. BLM Gard. Ex. 0 at 2:23-25.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

14.4 Salmonids will hold during high flows and resume spawning once the flows have dropped. BLM Gard Ex. 0 at 3:6-10. Given this behavior, a one week seasonal high flow would still leave 21 weeks for rainbow trout to spawn and thus not adversely affect trout spawning. *Id.*

RULING: ACCEPTED

14.5 Fish present in a stream have evolved around and adapted to the seasonal run off and base flow conditions of the system, and flows scheduled during the seasonal peak flow periods may provide the most benefits. PAC-Carl-D-8 at 121.

RULING: REJECTED (The cite provided to support this finding, Resier et al., does state, "flow releases scheduled during normal peak-flow periods may provide the most benefits." (*PAC-Carl-D-8 at 121*). However, Resier et al., also says that the best timing for a flushing flow would not occur during or immediately after fish spawning. (*PAC-Carl-D-8 at 116*). Since the proposed flushing flow would, at times, occur during the spawning period, it can therefore not be classified as the best time to schedule a flushing flow.)

14.6 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; Tr. 1 at 175:20-22 (Cross of Carlson).

RULING: ACCEPTED – PacifiCorp does not dispute this statement

14.7 The BLM seasonal high flow condition does not constitute a substantial risk to spawning or emergence of redband trout because the seasonal high flow will occur during the period when winter high flows are naturally receding, and prior to redband trout fry emergence. BLM Gard Ex. 0 at 3:18-22.

RULING: ACCEPTED (Since the proposed flushing flow would, at times, occur during spawning – "such flows could dislodge eggs and fry and result in reduced recruitment." (*PAC-Carl-D-8 at 116*). However, there is no evidence that shows proposed seasonal high flows would be a *substantial risk* to spawning or emergence.

14.8 In the bypassed reach, PacifiCorp provides flows limited to 100 cfs 89% of the time. BLM Turaski Ex. At 68. When flows greater than 100 cfs do occur in the bypassed reach, they are abrupt, are short in duration, and do not reflect a flow regime with seasonal variability. *Id.*

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

14.9 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.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

14.10 Of the 66 redds or trout nests PacifiCorp located in the bypassed reach, 43 were f found in and around the emergency spillway deposit. BLM Cluer Ex. 0 at 9:9-11.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

14.11 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 (Tr. 1 at 56:10 to 57:7 (Tompkins cross)), making this location inherently unstable during flood flows in the bypassed channel. BLM Cluer Ex. 0, 10:1-8; BLM Gard Ex. 0 at 4:9-14.

RULING: ACCEPTED

14.12 Fine sediment can infiltrate salmonid spawning gravels 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. Gravel embedded with greater than 10% fine sediment results in a substantial reduction in suitability of steelhead spawning habitat. BLM Gard Ex. R0 at 1:20-21.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

14.13 Trout spawning gravel in the bypassed 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 bypassed reach below the emergency spillway was 50% embedded with silt and sand. BLM Gard Ex. 0 at 4:1-14. PacifiCorp's data shows that of the trout redds surveyed below the emergency spillway, at least 30% were embedded with fine sediments in an amount greater than 10%. BLM Gard Ex. R0 at 1:23 to 2:6.

RULING: ACCEPTED

14.14 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.*

RULING: ACCEPTED

14.15 Spring and fall freshets are necessary to attract spawning rainbow trout upstream past J.C. Boyle Dam and juvenile trout migrants 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.

RULING: ACCEPTED

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

RULING: ACCEPTED

14.17 The 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. This plan reflects an adaptive approach to determine the character, locations, and amounts of sediment to be placed. *Order Granting PacifiCorp's Motion to Withdraw BLM Disputed Issue of Material Fact 12* at 2 (August 2, 2006).

RULING: ACCEPTED (Issue 14 deals with BLM's proposed seasonal high flow and possible adverse effect on redband trout spawning. Since seasonal high flows and the gravel augmentation will work in concert with one another, it is appropriate to address portions of the gravel augmentation plan in this Issue).

14.18 Implementation of coordinated sediment delivery with a seasonal high flow can result in deposition of gravel in velocity pockets on the bed and fine sands on the banks. These deposits have ecological benefits including spawning pockets around boulders as well as larger spawning patches in pools. BLM Cluer Ex. 0 at 13:10-14.

RULING: ACCEPTED

14.19 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 downstream where the channel slope decreases markedly. BLM Cluer Ex. 0 at 15:17-25. Although redband trout presently use the gravel patches near the emergency spillway deposit, if the gravels were transported downstream by seasonal high flows they would be more valuable fish habitat because the gravels would be transported to more stable locations and better sorted into spawning sizes. *Id.*; Ex. PAC-Carl-D-8 at 120-121 (flushing flows serve to remove and clean fine sediments from substrates to enhance egg and alevin survival).

RULING: ACCEPTED

14.20 The BLM seasonal high flow combined with the proposed BLM gravel placement in the bypassed reach will distribute gravel, and benefit redband trout spawning. Tr. 1 at 201:10-15 (Carlson cross); BLM Gard Ex. R0 at 2:6-9.

RULING: ACCEPTED

BLM ISSUE 16:

16.1 J.C. Boyle Dam traps sediment necessary for spawning habitat. BLM Cluer Exhibit 0 at 6:14-20; BLM Snedaker Ex. 0 at 3:1-19; PAC-Ols-R-1 at 7:17.

RULING: ACCEPTED – PacifiCorp does not dispute this statement

16.2 The Project has diminished fine grain deposits that would have supported increased size, number, and qualities of invertebrate and fish habitat. BLM Cluer Ex. 0 at 7:24 to 8:4.

RULING: REJECTED (The referenced cites do no provided sufficient evidence to support this proposed finding.)

16.3 Before J.C. Boyle Dam was built, there was much spawning gravel in the Frain Ranch area of the peaking reach, and large rainbow trout used to spawn there. BLM Denman Ex. 0 at 3:6-15; BLM Snedaker Ex. 0 at 3:9-13.

RULING: ACCEPTED (Denman provided very detailed descriptions of his childhood visits to the Frain Ranch area, to include watching the trout spawning. Denman's testimony is deemed credible. (*BLM-Denman-Ex. 0 at 3:6-15*). Denman's testimony was not found credible for BLM PFF 19.11 and NGO PFF 19.2. Denman's testimony in those proposed finding involved providing the exact length of fish he had caught. The ability to remember exact lengths, over the period of more than forty years, was deemed not credible.)

16.4 Surveys for spawning gravels in the 1980s did find some locations in the peaking reach with suitable spawning gravels, but these areas were on the margins of the stream channels and subject to dewatering from the peaking operations. BLM Snedaker Ex. 0 at 3:13-19; BLM Gard Ex. 6 at 21-24.

RULING: ACCEPTED (The 1980's survey did not explicitly state that "dewatering" made the gravel unsuitable. However, the survey did say the gravel was at the high water line, indicating that the water level rises and falls. (*BLM Gard Ex. 6 at 21-24*). Since the gravel is on the high water line, lower water levels would expose the gravel, making it unusable to fish – in essence dewatering).

16.5 Today, trout are not known to spawn anywhere in the peaking reach. PAC-Ols-D-1 at 7:20. This is likely due to the lack of suitable sized spawning gravel in this reach, or because the large stage changes during the peaking cycle inhibit spawning, or both. BLM-Simons-Ex. 0 at 7:12-20; BLM-Simons-Ex. 16 at 69, section 4.10; BLM-Gard-Ex. 6 at 24 ("Much 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.").

RULING: ACCEPTED

16.6 PacifiCorp's peaking operations cause high mortality to fish and other aquatic organisms through stranding of those organisms. BLM Snedaker Exhibit 0 at 4:25 to 5:11; Klamath Tribes' Testimony of Larry K. Dunsmoor on Issue BLM 16 ("Dunsmoor Direct Testimony") at 4:3-22; Klamath Tribes' Testimony of F. Al Espinosa on Issue BLM 16 at 7:13-17.

RULING: ACCEPTED (Peaking operations which cause high mortality likely only happen a few times a year (not with every peaking operation), during the first peaking event after several months of steady flow. (*PAC-Ols-R-1 at 16:16-17:7*).)

16.7 Before the J.C. Boyle facility was constructed, crayfish were one of the primary food sources for large rainbow trout in the area below the J.C. Boyle powerhouse, and crayfish were seen in very large numbers. BLM Denman Ex. 0 at 2:20-22. For quite some time after the J.C. Boyle facility was built, numerous dead crayfish were seen in the peaking reach after peaking events. *Id*. at 3:6-8.

RULING: PARTIALLY ACCEPTED AND PARTIALLY REJECTED

ACCEPTED:

- Before the J.C. Boyle facility was constructed, crayfish were a food source for rainbow trout in the area below the J.C. Boyle powerhouse, and crayfish were seen in large numbers. (Denman provided detailed descriptions of seeing crawfish and observed fishermen using crayfish as bait. His testimony is deemed credible. (*BLM-Denman-Ex. 0 at 2:20-22*).)
- For quite some time after the J.C. Boyle facility was built, numerous dead crayfish were seen in the peaking reach after peaking events. (Denman's testimony is deemed credible. (*BLM-Denman-Ex. 0 at 3:6-8*).)

REJECTED: Crayfish were one of the primary food sources for large rainbow trout in the area below the J.C. Boyle powerhouse. (While Denman saw trout eating crayfish, he provides not evidence showing that crayfish were the primary food source for large rainbow trout)

16.8 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*.

RULING: ACCEPTED

16.9 The Klamath Tribes performed an investigation at Frain Ranch in the peaking reach in July 2006, in which it documented severe stranding in a 225 foot long reach, "about 5,000 fish, more crayfish, and an order of magnitude more aquatic insects perished in a single peaking cycle . . . ." Dunsmoor Direct Testimony at 4:3-10. Although no redband trout mortalities were documented, the likely reason for this is there are few trout fry in the peaking reach. KTr LKD Ex. 3 at 5.

RULING: ACCEPTED

16.10 The severe loss of fish and other aquatic life in July 2006 documented by the Klamath Tribes is directly attributable to PacifiCorp's peaking operations. Tr. 1 at 153:18-21 (Olson cross).

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

16.11 The downramp rate at the site where the severe mortality of aquatic organisms occurred was about 4.0 inches/hour. Dunsmoor Direct Testimony at 4:14-20. At a site further downstream the witness saw no mortalities of fish. The ramp rate at this site was 2.4 inches/hour. *Id*. The witness opined that these observations directly support the draft BLM condition of a 2 inch/hour maximum downramp rate. *Id*. at 4:20-22.

RULING: ACCEPTED

16.12 PacifiCorp's studies show that peaking operations likely reduce the production of sessile organisms like benthic macroinvertebrates (trout prey) by about 10 to 25%. BLM Simons Ex. 13 at 26.

RULING: ACCEPTED

16.13 PacifiCorp's studies showed that 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 Simon's Ex. 13 at 70. The PacifiCorp study concluded that "flow fluctuations in the peaking reach are undoubtedly a contributing factor to the lower [macroinvertebrate drift] rates there." *Id*.

RULING: ACCEPTED

16.14 Very few salmonid fry or other fish species are observed in the margins of the peaking reach, likely because they have been displaced downstream by extreme daily flow fluctuations of the peaking reach or have perished as a result of peaking operations. BLM Hooton Ex. 0A at 11:7-10; BLM Snedaker Ex. 0 9:16-23; Dunsmoor Direct Testimony at 3:16 to 4:8.

RULING: ACCEPTED

16.15 Flushing of juvenile salmonids downstream is likely in the peaking reach. BLM Snedaker Ex. 0 at 9:16-17; 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."); BLM Snedaker Ex. 5 at 52 (PacifiCorp's investigations find low numbers of fry in the peaking reach).

RULING: ACCEPTED

16.16 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.

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

16.17 Before the J.C. Boyle facility was built, it was not uncommon to catch 40-50 trout in a day in the peaking reach, and seven or eight would range in length from 16-20 inches. BLM Denman Ex. 0 at 2:17-18. Prior to the dam being built, about the same numbers of large rainbow trout (15-20 inches in length) were caught in the peaking reach below J.C. Boyle Dam and the Keno reach above J.C. Boyle Dam. *Id*. at 3:24-26.

RULING: REJECTED (Denman testimony describes exact length of fish he caught over forty years ago. Such detailed recollection, without supporting documentation, is not unpersuasive).

16.18 Today, trout grow larger and older in the Keno reach compared to the peaking reach and large fish are rarely caught in the peaking reach. Ex. PAC-Ols-D-5, Figure 1 Length frequency of trout all seasons (2002) angling; BLM Denman Ex. 0 at 3:24 to 4:2; BLM Hooton Ex. 28 (exhibit shows for that for trout residing below J.C. Boyle Dam, the average length has decreased from about 12 inches (30 cm) in 1961 shortly after the J.C. Boyle facility was completed to about seven inches (18 cm) in 1990).

RULING: ACCEPTED (BLM-Hooton-Ex. 28 shows the size of fish migrating from downstream are smaller and it also shows fewer fish are migrating. BLM asserts that the larger fish are choosing not to migrate (thus decrease the average size of fish migrating), but sufficient evidence has not been presented to justify this position. (*PAC-Ols-D-1 at 24:18 to 25:19*).)

16.19 PacifiCorp's fishery comparisons, designed to provide insight into the effects of peaking operations in the peaking reach, showed that in the non-peaking Keno reach trout are larger and exhibit higher growth rates for fish after age three. BLM Simons Ex. 13 at 60, 64.

RULING: ACCEPTED

16.20 The Project-caused impacts to macroinvertebrates and forage fish in the peaking reach may explain the lower growth rates and absence of larger and older fish in the peaking reach compared to the Keno reach. BLM Snedaker Ex. 0 at 10:15-17, 11:8-13; Dunsmoor Direct Testimony at 9:7-11.

RULING: ACCEPTED (Larger fish are not found in the Keno reach until after age three. (*PAC-Ols-D-1 at 9:6-23 to 10:5*).).

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.

RULING: ACCEPTED – PacifiCorp does not dispute this finding

17.2 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 a rare event such as an intense storm or flood event. BLM Snedaker Ex. 0 at 7:13-15; HVT, Steward, Ex. 4 at 2:18-22.

RULING: ACCEPTED (Further support for this proposed finding is found at BLM-Snedaker-Ex. 6 at 12-13)

17.3 Daily peaking causes chronic increases in macroinvertebrate drift events due to flow fluctuations. This in turn reduces the quality and abundance of drift forage for trout. BLM Snedaker Ex. 6:8-11.

RULING: ACCEPTED

17.4 Increased drift may increase fish feeding activity in the short term. Over the long term, however, this can result in a depletion of macroinvertebrates, resulting ultimately in lower fish productivity. BLM Snedaker Ex. 7:4-5.

RULING: ACCEPTED

17.5 Macroinvertebrate sampling conducted by PacifiCorp in the peaking reach 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.

RULING: ACCEPTED

17.6 It is likely that trout in the peaking reach have significantly increased energetic costs due to movements required to adjust to extreme flow fluctuations resulting from peaking operations. BLM Simons Ex. 0 at 5:9 to 6:7; BLM Snedaker Ex. 0 at 8:15-24; Dunsmoor Direct Testimony at 7:13-17 (stress to trout associated with repositioning as a result of the peaking operations can reasonably be expected to impose greater energetic demands and reduce foraging effectiveness).

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

17.7 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*.

RULING: ACCEPTED

17.8 Impacts to native forage fish species (species on which trout prey) can impair growth and feeding of trout in the peaking reach and can in part explain the difference higher growth rate of trout in the non-peaking Keno reach compared to the peaking reach. BLM Snedaker Ex. 0 at 11:8-13; Dunsmoor Direct Testimony 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).

RULING: ACCEPTED

17.9 The BLM has proposed an upramp rate of two inches per hour. BLM Turaski Ex. 4 at 59.

RULING: ACCEPTED - PacifiCorp does not dispute this finding.

17.10 Recommendations by Hunter, (BLM Snedaker Ex. 6 at 31) that limit ramp rates to no more than two inches per hour have been widely accepted as being protective of fish resources. BLM Snedaker Ex. 0 at 7:15-16.

RULING: ACCEPTED

17.11 Recently issued FERC licenses in the Pacific Northwest contain license provisions with upramp rates of approximately two inches per hour. BLM Snedaker Ex. 0 at 7:18 to 8:7.

RULING: ACCEPTED (These licenses were for non-peaking sites. (*PAC-Ols-R-1 at 5:6-18*).)

BLM ISSUE 19:

Whitewater Boating:

19.1 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 (objectives of FMS model) & 4:1-8 (discussing model outputs).

RULING: ACCEPTED - PacifiCorp does not dispute this finding

19.2 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; Tr. 1 at 181:9 to 182:4 (Carlson cross).

RULING: ACCEPTED - PacifiCorp does not generally dispute this statement

19.3 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).

RULING: ACCEPTED - PacifiCorp does not dispute this finding

19.4 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 to 8:11 (explaining how the ten-year period is representative of the 1960-2000 period of record).

RULING: ACCEPTED - PacifiCorp does not generally dispute this statement

19.5 PacifiCorp does not disagree with the model outputs for the FMS model. PAC-Carl-R-1 at 13:3-4; Tr. 1 at 203:18-21 (Carlson re-direct).

RULING: ACCEPTED - PacifiCorp does not generally dispute this statement

19.6 The highest use days for whitewater boating are weekends (Friday-Sunday). BLM Turaski Ex. 4 at 80, 85. July and August are typically the months with the highest number of rafting visits. BLM Turaski Ex. 4 at 80, 89; BLM Weidenbach Ex. 0 at 5:6; Tr. 2 at 93:10 (Weidenbach cross).

RULING: ACCEPTED - PacifiCorp does not dispute this finding

19.7 The BLM condition emphasized protecting the weekend boating opportunities. BLM Turaski Ex. 4 at 59; BLM Weidenbach Ex. R0 at 3:23 to 4:2; Tr. 2 at 93:18-20 (Weidenbach cross).

RULING: ACCEPTED - PacifiCorp does not dispute this finding

19.8 The annual amount and seasonal distribution of whitewater boating use under the BLM condition is expected to be similar to historic and current levels. Weidenbach Ex. 0 at 6:12-14; Tr. 2 at 93:7-16 (Weidenbach cross). 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.

RULING: PARTIALLY ACCEPTED AND REJECTED

ACCEPTED - *Seasonal distribution* of boating use under BLM proposed condition is expected to be similar to historic and current levels. PacifiCorp does not dispute this finding

REJECTED – *Annual amount* of boating use under BLM proposed condition is expected to be similar to historic and current levels. (Boating opportunities will be lost due to the unavailability of adequate rafting flows during weekdays. (*BLM-Turaski-Ex. 4 at 100*). Ample evidence has not been provided to show that all opportunities lost during the weekdays will shift toward the weekends. Therefore, annual boating use is not expected to remain the same.)

19.9 The viability of commercial rafting operations in response to the proposed flow conditions has not been defined or quantified. BLM Weidenbach Ex. R0 at 4:3-6; Tr. 2 at 94:13 to 96:20; 105:6-20; 107:7-15 (Weidenbach cross and re-direct).

RULING: REJECTED (First, the numbers of boatable days are directly related to the viability of commercial rafting operations, and those have been quantified by BLM's model. This models show fewer boatable days will be available. (*PC PFF 116, 118, and 119*). Second, PacifiCorp offered witnesses that attested to the negative impacts the proposed flow conditions would have on rafting operations. (*PAC-Whit-D-1 at 10:7-9; PAC-Whit-D-1 at 17:3-7; PAC-Whit-R-1 at 9:19 to 10:7, PacifiCorp Finding 117; PAC-Bald-D-1 at 4:12-14, 5:11-12*).

Fly-fishing:

19.10 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.

RULING: ACCEPTED - PacifiCorp does not dispute this finding

19.11 Fishing in the peaking reach, in terms of production and size, was better prior to the Project than it is currently. BLM Denman Ex. 0 at 2:23 to 3:4 & 3:21 to 4:2; Tr. 2 at 144:5-9 (Denman re-direct).

RULING: REJECTED (Denman's testimony is unpersuasive. Denman provides no specific data, has no river biology or geomorphology experience, and his testimony is based upon personal observations made more than forty-six years ago (he testifies to the size of fish prior to construction of J.C. Boyle Dam). (*BLM-Denman-Ex. 0 at 2:23 to 3:4 & 3:21 to 4:2.*)

19.12 Measured flows at a gage are not indicative of velocity conditions at all spots within the river. Tr. 2 at 114:23 to 115:8 (Knight cross) (higher flows do not mean that wading is more difficult in all areas—some areas may be faster, some slower); Tr. 2 at 133:15-23 (Knight cross) (noting fisherman's ability to find back water area to fish when measured flows were 1,500 cfs).

RULING: ACCEPTED - PacifiCorp does not generally dispute this statement

19.13 The BLM condition may make wading more difficult in certain areas of the peaking reach. Tr. 2 at 120:9-10 (Knight cross); BLM Weidenbach Ex. 2 at 93 (each higher flow increment may provide less wadeable area); PAC-Carl-D-7 at 2-93 (same).

RULING: ACCEPTED - PacifiCorp does not dispute this statement

19.14 The BLM condition may also improve wading in certain areas of the peaking reach. Tr. 2 at 121:14-17 (Knight cross); Tr. 2 at 121:20 to 122:1 (Knight cross) (new riparian vegetation may create more space for casting); Tr. 2 at 123:2-18 (Knight cross) (stating that sediment deposited under the BLM condition may make wading easier that it is currently).

RULING: REJECTED – (NGO Witness Knight testimony is too speculative. Knights testifies that "[y]ou might have a little bit more space" for casting if small riparian vegetation developed. (*Aug. 22, 2006 Tr. at 121:25-122:1*). Knight also testifies that he "would expect sediment" to be deposited, which would help the wading. However, he is unsure of how long this will take to develop, possibly five to twenty years for this to occur. (*Aug 22, 2006 Tr. at 122:23 to 123:18*). Such a large time frame indicated his conclusion is not well developed.)

19.15 Anglers will adapt to changes in wadeability. Tr. 2 at 130:19-21 (Knight re-direct); NGO Ex. 5 at 7:10-15 & 11:8-10; BLM Weidenbach Ex. 2 at 74, 95, 97, 116; PAC-Carl-D-7 at 2-74, 2-95, 2-97, 2-116 (same); PAC-Whit-D-1 at 20:1-4.

RULING: REJECTED (Anglers will be unable to adapt to all changes in wadeability. Anglers will likely adapt to small base flow changes (350 cfs to 700 cfs). However, if large changes occur (350 cfs to 1,500 cfs), angle will likely be unable to adapt. (*PAC PFF 133-34; PAC-Whit-D-1 at 12:11-15; PAC-Whit-D-6 at 2-74, 2-93, 2-97; Aug. 22, 2006 Tr. at 121:1-8*).

19.16 Many anglers believe that the biological concerns of the fish trump concerns about wading. BLM Weidenbach Ex. 2 at 98; PAC-Carl-D-7 at 2-98 (same); Tr. 1 at 232:16 to 233:1 (Whittaker cross); Tr. 2 at 131:1-4 (Knight re-direct).

RULING: ACCEPTED

19.17 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); Tr. 1 at 231:18 to 232:4 (Whittaker cross).

RULING: ACCEPTED - PacifiCorp does not generally dispute this statement

19.18 The flows proposed by BLM will provide for a positive flyfishing experience in the J.C. Boyle peaking reach. Tr. 2 at 121:14 to 122:16 (Knight cross).

RULING: REJECTED (This is an over-generalized assertion. Certain aspects of the BLM proposed flows my result in negative impacts on fly-fishing. (*FOF 19-49, 19-50*).

RULINGS ON USFWS, NMFS AND CDFG PROPOSED FINDINGS OF FACT

USFWS/NMFS ISSUE 2(A):

Proposed Ultimate Finding of Fact : Stocks of anadromous fish, including Chinook salmon, Coho salmon, steelhead and Pacific lamprey, suitable to conditions above IGD are available to use prescribed fishways.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact

2A.1 Fish from stocks of wild Chinook salmon, Coho salmon, steelhead and Pacific lamprey migrated to and used habitat above IGD before Project dams blocked their passage. *Aug 24 Tr. at 0011:2-6, 0026:21 to 0027:7, and 0068:10-13 (Malone cross ex.); NMFS/FWS-Issue 2A-Garza-Exh. 7 at 1, col. 1, para. 1 to 2, col. 1, para. 1; NMFS/FWS-Issue 6 Hamilton-Exh. 1 at 3:1-14; NMFS/FWS-Issue 6-Hamilton-Exh. 10 at 5, para. 5; 6, para. 4; 7, paras. 1-4 and 7; 9, para. 7 (conclusion); HVT, Franklin, Exh. 1 at 2:3-9; 2:20 to 3:4;* ***PF*** *8.2 (Pacific lamprey); CDFG Pisano Exhibit 1 at 6:10-15.*

RULING: ACCEPTED IN PART, REJECTED IN PART. The record evidence is inconclusive as to whether Pacific Lamprey used habitat above 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*).

2A.2 There are currently stocks of wild Chinook salmon, Coho salmon, steelhead and Pacific lamprey in the Klamath River below IGD. *Aug 24 Tr. 0010:18 to 0011:1 (Malone cross ex.); NMFS/FWS-Issue 2A-Garza-Exh. 1 at 4:4 to 5:7; NMFS/FWS-Issue 2A-Garza-Exh. 7 at 1, col. 2, last para. to 2, col. 1, para. 1; NMFS/FWS-Issue 2A-Curtis Rebuttal Testimony Exh. 1-Page 2, lines 1-16; CDFG Pisano Exhibit 1 at 4:20 to 5:28; CDFG Pisano Exhibit 4; HVT, Franklin, Exh. 1 at 2, lines 1017; PF 8.3 (Pacific lamprey).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE. However, the record is inconclusive whether Pacific lamprey uses habitat immediately below Iron Gate Dam. The sampling effort in Bogus Creek where only four lamprey ammocoetes were found is not determinative. This is especially true given the fact that Pacific lamprey larvae are similar to the resident species, making identification based on visual observation difficult. (*PAC-Chan-D-1 at 10:8-10, Yurok-Steward Rebuttal at 2; Yurok-Hillemeir Ex. 13*).

2A.3 Resident trout, which are salmonids, and resident lamprey currently use habitat above IGD. *PAC-Ols-D-1at 5:3-12; 7:20 to 8:1; 20:20 to 23:3; NMFS/FWS-Issue 7-Snedaker-Exhibit 1 at 2:18-19 (definition of salmonids); PF 8.5 (Pacific lamprey).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.4 Fish from stocks of wild Chinook salmon, Coho salmon, steelhead and Pacific lamprey below IGD would migrate above IGD if the fish have access through prescribed fishways. *Aug. 24 Tr. at 0011:20-22, 0064:12-15 (Malone cross ex.); PAC-Ols-D-1 at 41:18-22 (Coho salmon); NMFS/FWS-Issue 2A-Garza-Exh. 1 at 2:8 to 3:6; HVT, Franklin, Exh. 1 at 2:20 to 3:15*; *NMFS/FWS-Issue 7-White-Exhibit 1 at 6:13-17 (Coho salmon); NMFS/FWS-Issue 7-Simondet-Exhibit 1 at 6:17 to 7:3 (Coho salmon); PF 8.8 (Pacific lamprey); CDFG Pisano Exhibit 1 at 6:16-19; 10:12-22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.5 Existing populations of steelhead, Coho, and Chinook salmon that still occur in the Klamath River Basin are most genetically similar to anadromous salmonids that once occurred above IGD. *NMFS/FWS-Issue 2A-Garza-Exh. 1-Page 4, line 4 to Page 5, line 7; Page 6, lines 2-7.* There is no measurable genetic difference between Pacific lamprey inhabiting different river basins along the Pacific coast. *PF 8.6.*

RULING: ACCEPTED IN PART, REJECTED IN PART. Mr. Garza testified that the genetic composition and relationship of the stocks which historically inhabited the Upper Klamath basin is unknown. (*NMFS/FWS-Issue 2A-Garza-Ex. 1 at 5:3-4; see also Appendix to Reply of PacifiCorp and Siskiyou County Responses to Proposed Findings on USFWS/NMFS Issues at 3*). The safest assumption is that those anadromous stocks of fish most proximate to Iron Gate Dam are genetically similar to those populations that existed in the upper basin prior to construction of the dams. (*NMFS/FWS-Issue 2A-Garza-Ex. 1 at 5:1-7*).

2A.6 The timing of anadromous fish spawning and out-migration corresponds with periods of high flows, lower temperatures, and lower predation; therefore these factors would not preclude anadromous salmonids from successfully utilizing Project-area habitat. *NMFS/FWS-Issue 6-Hamilton-Exh. 1 at 5:25 to 6:23, and 7:1-10; NMFS/FWS-Issue 6-Hamilton-Exh. 6; NMFS/FWS-Issue 6-Hamilton-Exh. 16 at 3, fig. 1, and 6, fig. 2; NMFS/FWS-Issue 6-Hamilton-Exh. 7 at 3, Table 1; NMFS/FWS-Issue 2Hamilton Rebuttal Exh. 1 at 3:17-20; 4:7 to 5:5; NMFS/FWS-Issue 6-Hamilton Rebuttal Exh. 1 at 2:23 to 3:16; 5:19 to 6:4; NMFS/FWS-Issue 7-Simondet-Rebuttal Exhibit 1 at 4:3-6; KTR-CHW-Issue 2, 6-Reb. Testimony at 2:11-17; 25 Aug. Tr. at 0065:17-22 (Dunsmoor re-direct); 21 Aug. Tr. at 0195:2-25, 0215:4 to 0216:9 (Carlson cross ex.); Aug 24 Tr. at 0213:4 to 0216:25 (Hamilton cross).*

RULING: ACCEPTED IN PART, REJECTED IN PART. Some anadromous fish stock will experience the sub-optimal environmental conditions above Iron Gate Dam if fish passage is provided. For instance, fall-run Chinook salmon pawn in early September and continues through late October. 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*). This also happens to be the time when flows are generally at their lowest above Iron Gate Dam. (*PAC-MAL-D-1 at 36:8-14*).

Similarly, juvenile fall-run Chinook salmon begin out-migration 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*).

Conversely, 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. July and August are the times of high water temperature. 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*). Although warm temperature is a problem, it will not preclude anadromous fish from successfully using habitat above Iron Gate Dam. (*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.7 Migration is a defining life history characteristic of anadromous salmonids. In addition, anadromous salmonids colonize different habitat and adapt to differing conditions. *NMFS/FWS-Issue 2A-Garza-Exh. 1 at 2:8 to 3:25; NMFS/FWS-Issue 2A-Garza-Exh. 6 at 6, col. 2, full paras. 1-3; NMFS/FWS-Issue 2A-Garza-Exh. 8 at 13, col. 2, full paras. 1 and 2; NMFS/FWS-Issue 2A-Garza-Exh. 4 at 3, col. 1, full para. 1; Aug. 24 Tr. at 0011:24 to 0015:9 (Malone cross ex. (adaptability and lack of site specific studies on wild fish)).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.8 There are numerous examples from other streams and rivers systems of anadromous fish successfully colonizing new habitat or re-colonizing historic habitat, including streams or river systems with lakes or reservoirs. *NMFS/FWS-Issue 2A-Garza-Exh. 1 at 2:8 to 3:25; NMFS/FWS-Issue 2A-Garza-Exh. 6 at 6, col. 2, full paras. 1-3; NMFS/FWS-Issue 2A-Garza-Exh. 8 at 13, col. 2, full paras. 1 and 2; NMFS/FWS-Issue 2A-Garza-Exh. 4 at 3, col. 1, full para. 1; NGO Ex. 3 at 12:13 to 13:9; HVT, Franklin, Exh. 1 at 4:1 to 5:2; CDFG Pisano Exhibit 1 at 10:20-22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.9 Proposed supporting findings of fact under NMFS/FWS Issues 6, 7, and 8 on suitable habitat for anadromous fish are incorporated by reference. *PF 6.4 to 6.8, 6.12 and 6.13; PF 7.5; PF 8.4.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 2(B):

Proposed Ultimate Finding of Fact: Facilitating the movement of anadromous fish via the prescribed fishways does not present a significant risk of introducing pathogens to the resident fish inhabiting the basin above Iron Gate Dam.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact

2B.1 The pathogens that are common to the Klamath River basin anadromous fish stocks are *R. salmoninarum*, *F. columnaris*, *C. Shasta*, *P. minibicornis*, Trematode metacercaria, and *Ichthyophithirius multifiliis* (*Ich*). *NMFS/FWS-Issue 2B Foott-Exh. 1 at 2:7-3:3.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.2 Multiple surveys on adult and juvenile Chinook show that *R. salmoniranrum* is not a significant pathogen, and Trematode Metacercaria does not appear to be a significant health threat. *NMFS/FWS-Issue 2B Foott-Exh. 1 at 2:7-11, 2:23-25.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.3 *F.columnaris* and *Ich* are ubiquitous in freshwater systems, and both are present throughout the Klamath River system above and below IGD. *NMFS/FWS-Issue 2B Foott-Exh. 1 at 2:12-18; 3:1-3; CDFG Cox Exhibit 1 at 3:11-15.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.4 *C. Shasta* and *P. minibicornis* are myxozoan parasites that are found throughout the Klamath River. *NMFS/FWS-Issue 2B Foott-Exh. 1 at 2:18-23.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.5 Klamath River salmonids and *C.shasta* and *P. minibicornis* co-evolved in the river system so that these fish stocks are expected to demonstrate some resistance to disease caused by these pathogens. *NMFS/FWS-Issue 2B Foott-Exh. 1 at 4:24 to 5:2.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.6 Generally, with the exception of *columnaris* and *Ich*, pathogens associated with anadromous fish do not impact non-salmonids. *NMFS/FWS-Issue 2B Foott-Exh. 1 at 3:25 to 4:3.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.7 Many of the pathogens listed above are currently found in the upper basin, suggesting that migrating anadromous fish would not be a significant factor contributing to the effects of disease on resident fish. *NMFS/FWS-Issue 2B Foott-Exh. 1 at 4:19-23; CDFG Cox Exhibit 1 at 5:6-9.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.8 *C.shasta* has been detected in the lower Williamson River, a tributary of Upper Klamath Lake, and in areas below IGD in nearly equal levels. *25 Aug. Tr. at 39:13-20 (Cox Re-Cross).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.9 Steelhead are very resistant to *C.shasta* and infection is rarely found. Coho are somewhat less resistant than steelhead, while Chinook are the most susceptible of the species at issue here. *24 Aug. Tr. at 197:10-17 (Foott Direct); 25 Aug. Tr. at 50:15-20 (Cox Re-Cross-exam).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.10 Resident trout in the Project Reach display resistance to C.shasta. NMFS/FWS-Issue 2B Foott-Exh. 1 at 5:2-3; NGO Ex 3, Testimony of Dr. Richard Williams at 10:18 to 11:1; NMFS/FWS-Issue 2C Hooten-Exh. 5 at 11 para 2; NMFS/FWS-Issue 2C Hooten-Exh. 18 at 20 para 1; 24 Aug. Tr. at 68:17 to 69:6 (Malone Cross-exam); 25 Aug. Tr. at 46:22 to 47:2 (Cox Re-Direct).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.11 IHN is a virus that is quite uncommon in the Klamath basin's salmonid populations. *NMFS/FWS-Issue 2B Foott-Exh. 1 at 2:4-5; CDFG Cox Exhibit 1 at 4:2-13.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.12 IHN was detected at the Iron Gate Hatchery in one adult fish that most likely strayed from the Trinity River system in 1997, and since then there has been no further detection. 25 *Aug. Tr. at 43:21 to 44:8 (Cox Re-Cross).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.13. The risk of IHN exposure to resident trout populations in the upper Klamath basin as a result of anadromous fish passage is low due to its rarity in the lower basin. 25 *Aug. Tr. at 44:24 to 45:3 (Cox Re-Cross).*

RULING: ACCEPTED IN PART, REJECTED IN PART. 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. 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.14 Even if a resident trout were to be infected by IHN, the strain of the virus found in coastal Oregon/California typically does not cause disease to trout species. *NMFS/FWS-Issue 2B Foott-Exh. 1 at 2:5-7; 4:13-17.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.15 The risk of introducing an unknown or highly virulent pathogen into the upper basin by anadromous fish can be categorized as low. *NMFS/FWS-Issue 2B Foott-Exh. 1 at 4:7-9; HVT-Franklin, Exh. 1 at 6:11-14; 25 Aug. Tr. at 44:24 to 45:3 (Cox Re-Cross).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 2(C):

Proposed Ultimate Finding of Fact: Facilitating the movement of steelhead above Iron Gate Dam does not present a significant risk of residualization, and to the extent some residualization may occur, it is unlikely that it would pose adverse effects to the resident trout fishery resource.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact

2C.1 Anadromous steelhead and resident redband-rainbow trout found in the Klamath River basin are the same species of fish (*O. Mykiss*). *Pac-OLS-D-1 at 18:18-21; CDFG Chesney Exhibit 1 at 4:18-20.*

RULING: REJECTED. Resident rainbow/redband trout are distinct from anadromous steelhead trout. Although the two species are similar (*O. Mykiss*), the life histories are different. (*Aug. 22, 2006 Tr. at 0160:2-15; Aug. 24, 2006 Tr. at 0042:16-0043:13, 0043:5-13; 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 0042:16-0043:13; 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 Prior to the construction of the Project dams, coastal steelhead and resident redband/rainbow trout co-existed in the Upper Klamath River system. *KTR-Huntington-Issue 2 Direct at 3:64-65; HVT-Franklin, Exh.1 at 2:3-6; id.* at *6:1-10; NMFS/FWS-Issue 2C-Hooten-Exh. 9 at 6 para. 2, and 7 paras. 1-3; 23 Aug. Tr. at 268:8 -11 (Olson Re-Cross).*

RULING: REJECTED. The strong similarities between the two species, and the distribution and resistance of rainbow/redband trout in upper Klamath Lake to *C. Shasta* lends additional support that the two species co-existed prior to the construction of Copco Dam in 1917. (*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*).

2C.3 Examples can be found today where stocks of wild steelhead and resident redband/rainbow co-exist in the same river system with no adverse affects. *NMFS/FWS-Issue 2C-Hooten-Exh. 1 at 4:8-11; KTR-Espinoza-Issue 2 Direct at 7:3-11*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.4 Residualization is a phenomenon generally associated with hatchery-reared steelhead, not wild. *KTR-Espinoza-Issue 2 Direct at 7:11-18; NGO Exh. 3, Testimony of Dr. R. Williams at 11:4-5.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.5 The study that PacifiCorp used to estimate wild steelhead residualization was of hatchery-reared steelhead and was of limited size and scope. *CDFG Chesney Exhibit 18 at 19 para 2., 21 para 1*; *23 Aug. Tr. at 192:23 to 193:22, 197:8 -17 (Olson Cross).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.6 No examples exist in the scientific literature to imply that wild steelhead stock would residualize at rates comparable to hatchery reared steelhead, suggesting it is a rare occurrence among wild steelhead stocks. *NGO Exh. 3, Dr. Richard Williams Testimony at 11:5-7; KTR-Espinoza-Issue 2 Direct at 7:7-11, 7:18-22; HVT-Franklin, Exh.1, at 5:18-22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.7 A strong genetic similarity exists between steelhead from Bogus Creek below IGD and resident trout from Spring and Trout Creeks (above Upper Klamath Lake), and those in Spencer Creek and the Klamath River (within the Project-bounded area). *NGO Ex 3 Dr. Richard Williams Testimony at 9:15-20; NMFS/FWS-Issue-2C-Hooten-Exh. 5 at 11 para.2.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.8 The strong genetic similarity of the steelhead from Bogus Creek to resident trout from Spring and Trout Creeks and those in Spencer Creek and the Klamath River suggests that these stock were once associated with anadromous rainbow trout (i.e. steelhead). *NGO Ex 3 Testimony of Dr. R. Williams at 9:15-20; NMFS/FWS-Issue-2C-Hooten-Exh. 5 at 11 para.2.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.9 The strong genetic similarity between the steelhead below IGD and those resident trout above IGD shows that at one time there was an intermixing of genetic material that resulted in the trout stocks that currently exist in the Klamath basin. *NMFS/FWS-Issue 2C-Hooten-Exh. 1 at 2:21-25; 23 Aug. Tr. at 204:19 to 205:9 (Olson Cross).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.10 No scientific studies exist specific to the Klamath basin that demonstrate that a reintroduction of steelhead would have a detrimental effect on the genetic makeup of the resident trout. *23 Aug. Tr. at 208:16 to 208:21 (Olson Cross).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.11 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.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.12 Researchers suggest that in some circumstances resident trout may have a competitive advantage over steelhead in some areas of the Klamath. *NGO Ex 3, Testimony of Dr. R. Williams at 11:13-17; KTR CWH Ex 01 at 30.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 3:

Proposed Ultimate Finding of Fact: Project operations have and continue to adversely affect the resident trout fishery resource in many ways including the following: PacifiCorp's Project confines the resident trout population between the Project's dams and associated reservoirs; unscreened flow through Project turbines results in mortality of juvenile and adult trout migrating downstream; isolated adult populations are impaired or precluded from moving upstream to otherwise usable spawning habitat; and the inability to effectively migrate adversely affects the genetic health and long term survivability associated with opportunities to maximize life history strategies that effective up and downstream passage would otherwise provide.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact

3.1 Prior to construction of the Project, redband trout upstream and downstream of what became the Project area belonged to a single, large, intermixing population throughout the Klamath River Basin. *NGO-Exh. 2 at 13:4-9; NGO-Exh. 14 at 4.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.2 Trout are migratory; their ability to migrate is an evolutionary advantage; and this advantage is the reason that trout in the Klamath River have survived millions of years through dramatic environmental changes. *Olson cross-exam, Aug. 23 Tr. at 167:11 to 168:7; CDFG Dean Exhibit 1 at 4:19-26; NGO-Exh. 14 at 4*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.3 As a matter of survival strategies, it is better for a species to maximize the number of the life history strategies available to it by maximizing the diversity of habitat available to it. *CDFG Dean Exhibit 1 at 5:4-18; Olson cross-exam, Aug. 23 Tr. at 162:22 to 163:1.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.4 Actions that increase population size by reconnecting islands of habitat for trout will help stabilize the loss of genetic variation and reduce the risk of extinction. *NGO-Exh. 14 at 6*. Maintaining genetic variation is crucial as it enables the fish to adapt to or cope with normal variability in environmental conditions, including future changes in climatic conditions, and is critical in maintaining healthy, resilient salmonid populations. *NGO-Exh. 2 at 13:14-16; CDFG Dean Exhibit 1 at 5:22-25; NGO-Exh. 17 at 2.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.5 Life history strategies are denied to the resident trout population below JCB Dam as a result of the trout population not passing above JCB Dam to spawn. *NMFS/FWS-Issue 3-Hooton-Exh. 0A at 6:17-20; Hooton-BLM-Exh. 4 at 22; NGO-Exh. 2 at 14:10-12; Ibid at 17:15 to 18:2; id. at 19:4-18; CDFG Dean Exhibit 1 at 5:1-2; Olson cross-exam, Aug. 23 Tr. at 161:13 to 162:17.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.6 Downstream migration of trout is impaired due to poor downstream passage hydraulics at Project dams *NMFS/FWS-Issue 3-Snedaker Exh. 16 at 126 and 128-130* and mortality related to unscreened flow resulting in fish passage through Project dam turbines. *NMFS/FWS-Issue 3-Hooton Exh. 0A at 7:10 to 9:14; BLM-Hooton-Exh. 3 at 7-8; NMFS/FWS-Issue 3-Snedaker Exh. 16 at 126-128.*

RULING: ACCEPTED IN PART, REJECTED IN PART. The fish ladder screens are ineffective, but 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*).

3.7 Fish passage has dramatically declined at the fish ladder at JCB Dam since its initial construction. *NMFS/FWS-Issue 3-Snedaker-Exhibit 0 at 2:11-12; NMFS/FWS-Issue 3-Snedaker-Exhibit 8 at 8, Hooton-BLM-Exh. 4 at 11; NGO-Exh. 2 at 14:4-10; NGO-Exh. 17 at 3.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.8 Upstream passage at JCB Dam is impaired. *NMFS/FWS-Issue 3-Snedaker-Exh. 0 at 2:20 to 3:5; NMFS/FWS-Issue 3-Snedaker-Exh. 23 at 137; BLM-Hooton-Exh. 0A at 4:19-22.*

RULING: ACCEPTED IN PART, REJECTED IN PART. The fish ladder screens are ineffective, but 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*).

3.9 The existing fish screens and ladder at JCB Dam do not meet current state and federal fish passage criteria. *PAC-MAL-D4 at 7-31.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.10 Current design criteria for fish ladders would make it easier for trout in the Klamath River to use a ladder designed to such criteria than the criteria used to design the existing fish ladder at JCB Dam. *Olson cross-exam, Aug. 23 Tr. at 158:12-24.*

RULING: REJECTED. This finding goes beyond the scope of the controversial issues agreed upon by the parties.

3.11 Improvements in efficiency to the fish ladder at JCB Dam would result in the trout population below JCB Dam migrating over the dam in larger numbers over time. *Olson cross-exam, Aug. 23 Tr. at 176:17-23.*

RULING: REJECTED. This finding goes beyond the scope of the controversial issues agreed upon by the parties.

3.12 Juvenile trout from above JCB Dam are the only known consistent production of trout reseeding the Oregon portion of the Klamath River in the Project reach. *NMFS/FWS-Issue 3-Hooton-Exh. 0A at 4:7-8; id. at 6:15-17; Hooton-BLM-Exh. 4 at 22.* Interannual variability in discharge and operation of JCB Dam affects juvenile fish passage over JCB Dam and thus recruitment to the trout population below JCB Dam. *NGO-Exh. 2 at 15:1-5; Hooton-BLM-Exh. 4 at 19.*

RULING: REJECTED. The record evidence is inconclusive as to whether resident trout above J.C. Boyle Dam are the "only known consistent production of trout reseeding the Oregon portion of the Klamath River.

3.13 Trout in C2 reservoir are not self-sustaining, as these trout are limited to migrating downstream to spawn as no spawning habitat exists between C2 Dam and C1 Dam *NMFS/FWS-Issue 3-Snedaker-Exh. 1 at 6:15-21; NMFS/FWS- Issue 3-Snedaker-Exh. 16 at 127* and no upstream passage facilities are provided at C1 Dam which would otherwise provide spawning opportunities upstream. *NMFS/FWS-Issue 3-Snedaker-Exh. 16 at 127-8*.

RULING: ACCEPTED AND INCORPORATED.

3.14 Loss of dispersal of forage fish from upstream of JCB Dam to the JCB Bypass and Peaking Reaches impairs an important forage resource for the resident trout population in those areas. *NMFS/FWS-Issue 3-Snedaker-Exh. 1 at 5:1-9; NMFS/FWS-Issue 3-Snedaker-Exh. 23 at 40:Table 3.7-10; Ibid at 45:Table 3.7-15; Ibid at 50:Table 3.7-20.*

RULING: ACCEPTED AND INCORPORATED.

USFWS/NMFS ISSUE 4:

Proposed Ultimate Finding of Fact: Entrainment at Project facilities is adversely affecting resident fishery resources.

RULING: ACCEPTED IN PART, REJECTED IN PART. The evidence shows that entrainment is adversely affecting non-native species primarily. With respect to the federally listed as endangered sucker fish, entrainment has had a minimal adverse affect. Conversely, resident trout are adversely affected because they are unable to experience their full life histories and entrainment of juveniles in the long run, will affect the abundance and distribution of the species.

Proposed Supporting Findings of Fact

4.1 Entrainment refers to the drawing of fish 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-Exh. 1, at 4:22-25; NMFS/FWS-Issue 4-Hamilton-Exh. 5, at 1.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.2 IGD, C1, and C2 are not equipped with fish screens or downstream bypass facilities to minimize fish entrainment. *NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 5:5-6.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.3 Existing fish screens and downstream bypass facilities at JCB Dam do not conform to current fish screen criteria for resident and anadromous fish. *NMFS/FWS-Issue 4-Johnson-Exh. 1, at 4:21 to 6:8; NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 5:6-7; NMFS/FWS-Issue 4-Johnson-Exh. 5, at 65-66.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.4 Fish screens at JCB Dam are 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 TR at 213:13 to 214:13 (Olson cross ex.); NMFS/FWS-Issue 4-Hooton-Exh.1, at 4:4-5; NMFS/FWS-Issue 3-Snedaker-Exh. 1, at 3:12-14.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.5 Several tens of thousands of resident fish are annually entrained at each of the Project facilities. *NMFS/FWS-Issue 4-Hamilton-Exh. 12, at 28 (PacifiCorp's Literature-Based Characterization of Resident Fish Entrainment and Turbine-Induced Mortality); NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 6:7-9; NMFS/FWS-Issue 4-Hooton-Exh. 14, at 112 (PacifiCorp's 2004 Exh. E, Final License Application); NMFS/FWS-Issue 4-Hooton-Exh. 1, at 5:3-5.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.6 Sucker fish that are listed under the federal Endangered Species Act are entrained in Project facilities. Gutermuth et al., 2000, estimated that 109,429 suckers (the vast majority were listed suckers), along with 974,442 non-suckers, were entrained in the diversion canals for the Eastside and Westside powerhouses near Link River Dam from July 1997 to October 1999. *NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 5:11-20; NMFS/FWS-Issue 4-Hamilton-Exh. 10, at 2-3; NMFS/FWS-Issue 4-Hamilton-Exh. 15, at 6; HVT-Steward-Exh. 1, at 3:14-17, 19-20.*

RULING: REJECTED. The Link River and Eastside/Westside facilities reviewed in the study are not currently proposed for decommissioning and are not part of the Project. Moreover, the Canal salvage data demonstrates that sucker fish are entrained at a higher rate at the Link River and Eastside/Westside facilities than at J.C. Boyle. Therefore, there is no comparison, and reliance on the study is misplaced.

4.7 Records from canal salvage operations at the JCB power canal show that resident fish, in particular resident trout, are entrained in the power canal each year. *NMFS/FWS-Issue 4-Hooton-Exh. 1, at 5:6-17; NMFS/FWS-Issue 4-Hooton-Exh. 15; NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 5:17-19 and 6:3-5; NMFS/FWS-Issue 4-Hamilton-Exh. 14, at 1; Aug. 23 TR at 213:2-6, 23-24 (Olson cross-ex.).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.8 Canal salvage data only provides information on the number of fish entrained at the time that the salvage operation is 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-Exh. 1, at 6:3-5; NMFS/FWS-Issue 4-Hamilton-Exh. 14, at 1; NMFS/FWS-Issue 4-Hooton-Exh. 1, at 5:10-17.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.9 PacifiCorp has not conducted site-specific studies for mortality levels of entrained resident fish at Project facilities, despite repeated requests from the Agencies to do so. *NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 5:20-23; NMFS/FWS-Issue 4-Hamilton-Exh. 13, at 2; NMFS/FWS-Issue 4-Hamilton-Reb. Exh. 1, at 2:7-10; NMFS/FWS-Issue 4-Hamilton-Reb. Exh. 5, at 21 (Response to Interr. 4.5);PAC-Ols-D-1, at 26:2-9; Aug. 22 TR at 178:16-19 (Hooton redirect).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.10 The JCB 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-Exh. 1, at 5:23 to 6:2; NMFS/FWS-Issue 4-Hooton-Exh. 7, at 51, Table 4-1; NMFS/FWS-Issue 4-Johnson-Exh. 1, at 2:11-15; Aug. 22 TR at 186:1-17 (Hooton redirect); CDFG Hughes Exhibit 1, at 4:12-18; HVT-Steward-Exh. 1, at 2:17-20; NMFS/FWS-Issue 4-Hamilton-Exh. 12, at 28 (PacifiCorp's literature review notes [that the] rate of mortality with turbine passage is probably greater because of the relatively higher head of project dams).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.11 In light of the large percentage of river flow that is diverted into the JCB power canal, the operation of Francis turbines, and the high operational head of 440 feet, fish mortality from entrainment at the JCB 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-Exh. 12, at 28 (PacifiCorp's Literature-Based Entrainment Study estimates mortality at JCB facility to be in range of 20-40%); NMFS/FWS-Issue 4-Hooton-Exh. 1, at 5:23 to 6:5; NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 5:15-17; NMFS/FWS-Issue 4-Johnson-Exh. 1, at 2:11-15.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.12 Resident trout are a migratory species. Because Spencer Creek, located upriver of the JCB 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 JCB Dam. *NMFS/FWS-Issue 4-Hooton-Exh. 1, at 3:6-17; NMFS/FWS-Issue 4-Hooton-Exh. 11, at 2; NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 4:8-12; NMFS/FWS-Issue 4-Hamilton-Exh. 14, at 2; NMFS/FWS-Issue 4-Hamilton-Exh. 17, at 4; NMFS/FWS-Issue 4-Hamilton-Exh. 13, at 4; Aug. 23 TR at 161:5 to 162:18 (Olson cross ex.); Aug. 24 TR at 64:20-24 (Malone cross ex.).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.13 Juvenile trout attempting to migrate from Spencer Creek downriver are likely to be entrained in the JCB power canal and turbines. *PAC-OLS-D-1, at 27:14-15; NMFS/FWS-Issue 4-Hooton-Exh. 1, at 2:9-16, 3:25-26 and 5:6-17; NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 4:13-14; NMFS/FWS-Issue 4-Hooton-Exh. 15.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.14 Mortality from entrainment can occur at each Project facility, thus compounding total losses for resident fish species. *NMFS/FWS-Issue 4-Hooton-Exh. 1, at 5:19-21; HVT-Steward-Exh. 39, at 2:3-7; NMFS/FWS-Issue 4-Hooton-Exh. 14, at 113 (PacifiCorp License Application notes that fish surviving through one powerhouse could be exposed to potential cumulative mortality).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.15 Losses of juvenile trout through entrainment at Project facilities adversely affect trout abundance and distribution in the Klamath River. *NMFS/FWS-Issue 4-Hooton-Exh. 1, at 6:9-13; NMFS/FWS-Issue 4-Hamilton-Exh. 1, at 4:14-16 and 7:3-4; NMFS/FWS-Issue 4-Hamilton-Exh. 17, at 4; HVT-Steward-Exh. 39, at 1:17-22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 6:

Proposed Ultimate Finding of Fact: Regardless of the exact mileage estimate, the preponderance of the evidence shows that a substantial and significant amount of habitat suitable for use by anadromous fish exists within the Project. The Agencies' estimate of approximately 58 miles of habitat for anadromous fish is reasonable and supported by the record.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact

6.1 Habitat may be used by anadromous fish if the habitat can be occupied by at least one life history phase of a fish species for at least part of the year. *PAC-MAL-D-30, at 65 (NMFS/FWS Answer to Inter. 51); Aug. 22 TR. 197:6-8 (Snedaker cross ex.)*; *HVT-Franklin-Issue 6-7, at 3:1-4; NMFS/FWS-Issue 6-Hamilton-Reb. Exh. 1, at 4:20 to 5:2; NMFS/FWS-Issue 6-Hamilton-Exh. 16; Yurok-Issue 6-Belchik-Dir. Test., at 5:10-15; CDFG Pisano Exh. 1, at 8:11 to 9:3, and 9:8-13, 23 to 10:2; KTR-LKD-Issue 6-Reb. Test., at 1:11-16; NGO-Dr. Duffy -Dir. Test.-Exh. 4, at 6:1-6, 7:15-20, and 8:1-12; NGO-Dr. Duffy-Reb. Test.-Exh. 27, at 6, figure 1(shows distance and gradient information for some streams above IGD); Aug. 24 TR at 37:4-12 (Malone cross ex.).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.2 Steelhead, Chinook salmon, Coho salmon and Pacific lamprey 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. *HVT-Franklin-Exh. 2 at 2:20-26; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 3:1-14; NMFS/FWS-Issue 6-Hamilton-Reb. Exh. 1 at 1:22-25; 4:21-5:1; and 5:6-11;*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.3 Historically, anadromous Chinook, Coho, steelhead and lamprey used habitat above the current IGD. *See Proposed Finding 2A.1.*

RULING: ACCEPTED IN PART, REJECTED IN PART. The evidence is inconclusive as to whether Pacific lamprey historically used habitat above 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*).

6.4 Main stem Klamath River reaches within the Project, such as the JCB Bypass Reach, JCB Peaking Reach, Keno Reach, and Copco No. 2 Bypass Reach, total approximately 28 miles of habitat for steelhead, excluding reservoirs; currently support resident fish populations, including salmonids such as resident trout; historically supported anadromous salmonids; and presently contain habitat suitable for use by anadromous salmonids, including Coho salmon, Chinook salmon and steelhead. *Yurok-Issue 2 and 8-Hillemeier-Exh. 18, at C-15, Table 3; NMFS/FWS-Issue 6-Smith-Exh. 1-at 1:22-25; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 3:19-25; NMFS/FWS-Issue 6-Hamilton-Exh. 16, at 2, 4-5, 7; NMFS/FWS-Issue 6-Hamilton-Exh. 10, at 4-5, 8; PAC-OLS-D-1, at 7:22 to 8:1, 15:13-14, and 18:10-13; HVT-Franklin-Exh. 12, at 1:14 to 3:2; KTR-FAE-Issue 6-Dir. Test. at 2:11-16; KTR-FAE-Exh.4, at 56, 59, 61; KTR-FAE-Exh. 5, at 1-4; Yurok-Issue 6-Belchik-Dir. Test., at 6:5-9; Yurok-Belchik-Exh. 4; CDFG Dean Exh. 1 at 3:19-24.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.5 Perennial streams (streams that flow throughout the year) within the Project, including Jenny, Fall, Shovel, and Spencer Creeks, total approximately 13.9 miles of habitat for steelhead; presently support spawning by resident salmonids (trout); historically supported anadromous salmonids; and presently contain habitat suitable for use by anadromous salmonids, including Coho salmon, Chinook salmon and steelhead. *Yurok-Issue 2 and 8-Hillemeier-Exh. 18, at C-15, Table 3;PAC-OLS-D-1, at 7:22 to 8:1, and 22:19 to 23:3; NMFS/FWS-Issue 4-Hooton-Exh. 1, at 3:6-9; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 4:3 to 5:9; NMFS/FWS-Issue 6-Hamilton-Exh. 16, at 1-3, 5-7; NMFS/FWS-Issue 7-Snedaker-Exh. 1 at 6:13-17; 7:17-22; NMFS/FWS-Issue 6-Smith-Exh. 1 at 5:12-14; NMFS/FWS-Issue 7- Simondet-Reb. Exh. 1 at 3:10-17; 4:18-19; NMFS/FWS-Issue 6-Hamilton-Exh. 16; Aug 23 Tr. at 0072:17 to 0073:8; 0077:4 to 0078:22 (Snedaker redirect); Aug. 24 Tr. at 0312:8-20; 0314:19-23 (Simondet redirect); KTR-CHW-Issue 6-Dir. Test., at 7:3-4; KTR-FAE-Issue 6, at 4:3-5; KTR-FAE-Exh. 5, at 1-4; NMFS/FWS-Issue 6-Hamilton- Exh. 10, at 4, 6-9 (historical data); Yurok-Belchik-Exh. 4; NGO-Dr. Duffy-Dir. Test.-Exh. 4, at 9:3 to 10:20; NGO-Dr. Duffy-Reb. Test.-Exh. 27, at 2:3 to 3:10; Aug. 24 TR at 37:4-12 and 65:10-15 (Malone cross ex.); CDFG Dean Exh. 1 at 3:24 to 4:2 .*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.6 Intermittent streams are those which carry water for only part of the year and are dry the other part, but they receive flow from the groundwater table when it is high enough. Intermittent streams within the Project total about 16.9 miles of steelhead habitat and include Scotch, Camp, Salt, Tom Hayden, Negro, and Long Prairie Creeks. Intermittent streams presently contain habitat suitable for use by anadromous salmonids, including Coho salmon, Chinook salmon, and steelhead, for parts of the salmonid life history, usually for spawning and early rearing. Additionally, once streams become intermittent, fish will seek out appropriate refugia. *Yurok-Issue 2 and 8-Hillemeier-Exh. 18, at C-15, Table 3; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 4:5-7, 5:5-17; Yurok-Issue 6-Hillemeier-Dir. Test., at 3:1 to 5:17; NMFS/FWS-Issue 6-Smith-Exh. 1, at 3:10-22; NMFS/FWS-Issue 6-Hamilton-Exh. 9, at 48, para. 4; NMFS/FWS-Issue 6-Hamilton-Exh. 4, at 10, para. 4; NMFS/FWS-Issue 6-Smith-Exh. 13, at 2, last para.; NMFS/FWS-Issue 6-Snedaker-Exh. 1, at 7:12 to 8:18; Yurok-Belchik-Exh. 4; KTR-FAE-Exh. 5, at 1-4; NGO-Dr. Duffy-Reb. Test.-Exh. 27, at 2:16-21; KTR-CHW-Issue 6-Dir. Test., at 4:14-17; NMFS/FWS-Issue 7-Snedaker-Exh. 1 at 5:7-12; 6:18 to 7:10; NMFS/FWS-Issue 7-Simondet-Reb. Exh. 1 at 3:21 to 4:9; NMFS/FWS-Issue 6-Hamilton-Reb. Exh. 1 at 3:7-16; 5:22-25; Aug. 23 Tr. at 0073:9 to 0075:5 (Snedaker redirect).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.7 Anadromous fish are mobile and disperse widely, with juveniles often moving many miles from where their parents spawn. In doing so, those that require a year of freshwater residence (Coho and steelhead) are able to locate habitat that will be suitable during adverse conditions. This habitat may include refugial areas elsewhere within the Project or downstream of IGD. Various areas throughout the Project, such as inflows of tributaries, springs, seeps, or upflowing hypereic flow of ground water in an otherwise warm channel, may provide thermal refugia for anadromous fish. *NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 7:18-25; NMFS/FWS-Issue 6-Hamilton-Exh. 15, at 5, para. 1; NMFS/FWS-Issue 6-Hamilton-Exh. 16, at 2-3; NMFS/FWS-Issue 6-Hamilton-Reb. Exh. 1 at 3:7-16, 23 to 4:7; Aug. 24 TR at 202:3-15 (Hamilton cross ex.); Aug. 25 TR at 98:17-25 to 99-103 (Belchik redirect)(Draft Transcript); Yurok-Issue 6-Belchik-Dir. Test., at 5:16-21; KTR-CHW-Issue 6-Dir. Test., at 4:20-22; Aug. 21 TR at 192:14-17, 194:10-13 (Carlson cross ex.), 210:17-21(Carlson redirect), and 217:6-23 (Carlson cross ex.).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.8 The JCB Bypass Reach provides a spring-fed 220 cfs cool-water refugia that can be used year round by salmonids. *NMFS/FWS-Issue 6-Hamilton-Exh. 16, at 5, Para. 1; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 8:1-7; HVT-Franklin-Exh. 2, at 3: 9-15; Yurok-Issue 6-Belchik-Dir. Test., at 6:10-14.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

[6.9 Bracketed Proposed Finding] This same spring system in the JCB Bypass Reach will continue to provide a thermal refuge for anadromous fish, even should the proposed Bureau of Land Management flows be implemented. *Yurok-Issue 6-Belchik-Dir. Test., at 6:14-18; Aug. 21 TR at 217:6-20 (Carlson cross ex.); Aug. 24 TR at 275:8 to 278:18 (Hamilton redirect); Aug. 25 TR at 97:1 to 98:14 (Belchik redirect)(Draft Transcript); NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 8:11-13.]*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.10 Resident trout and anadromous steelhead are the same species. *HVT-Franklin-Exh. 12, at 3:3-8; NMFS/FWS-Issue 6-Curtis-Reb.Exh. 1, at 2:13-15; CDFG Chesney Exhibit 1 at 4:17-20.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.11 The timing of anadromous fish spawning and out-migration (usually at night) corresponds with periods of high flows, lower temperatures, and lower predation; these factors thus would not preclude anadromous salmonids from successfully utilizing habitat in the Project area. *See PF 2A.6.*

RULING: REJECTED. Some anadromous fish stock will experience the sub-optimal environmental conditions above Iron Gate Dam if fish passage is provided. For instance, fall-run Chinook salmon pawn in early September and continues through late October. 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*). This also happens to be the time when flows are generally at their lowest above Iron Gate Dam. (*PAC-MAL-D-1 at 36:8-14*).

Similarly, 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*).

Conversely, 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. July and August are the times of high water temperature. 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*). Although warm temperature is a problem, it will not preclude anadromous fish from successfully using habitat above Iron Gate Dam.

(*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*).

6.12 The Agencies' estimate of approximately 58 miles of habitat within the Project that is suitable for anadromous fish to use was developed with particular reference to steelhead, the anadromous species with the greatest range and flexibility. *Yurok-Issue 2 and 8-Hillemeier-Exh. 18, page C-15 (Fishway Prescription, Table 3); NMFS/FWS-Issue 6-Hamilton-Reb. Exh. 1, at 4:20 to 5:1; KTR-CHW-Issue 6-Direct Testimony, at 3:1-6.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.13 A significant amount of habitat exists within the Project that is suitable for anadromous fish to use; the evidence in the record supports the estimate of approximately 58 miles of habitat for steelhead. *Yurok-Issue 2 and 8-Hillemeier-Exh. 18, at C-12 to C-18; KTR-FAE-Issue 6-Dir. Test., at 2:21 to 4:6; KTR-FAE-Exh. 5, at 1-5; KTR-FAE-Exh. 6, at 1-4; KTR-FAE-Issue 6-Reb. Test., at 7:11-19; KTR-CHW-Issue 6-Dir. Test., at 6:22 to 7:4; NMFS/FWS-Issue 6-Snedaker-Exh. 1, at 6:4-20; Aug. 23 TR at 57:15-17 (Snedaker redirect); HVT-Franklin-Exh. 1, at 2:5-15; CDFG Pisano Exh. 1, at 7:4-7; NMFS/FWS- Issue 7-White-Exh. 1 at 5:21-23; NMFS/FWS-Issue 7 Snedaker-Exh. 1 at 5:10-15; 6:8 to 8:4; NMFS/FWS-Issue 7-Simondet-Reb. Exh. 1 at 2:9-13; 2:23 to 3:5; 3:10-17; 3:21 to 4:11; 4:15 to 5:5; NMFS/FWS-Issue 7-White-Exh. 14 at A-21; NMFS/FWS-White Exh. 9 at 4; NGO Dr. Duffy - Reb. Test. Ex. 27 at 1:24 to 2:2; NMFS/FWS-Issue 6-Hamilton-Exh. 1 at 3:19-25; NMFS/FWS-Issue 6-Hamilton Reb. Exh. 1 at 4:20 to 5:2; 5:7-11: 5:15 to 6:6; 7:16-18; NMFS/FWS-Issue 6-Hamilton-Exh. 16; August 24 Tr. at 0312:21 to 0313:2 (Simondet redirect); CDFG Dean Exh. 1 at 3:19 to 4:2.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 7:

Proposed Ultimate Finding of Fact: Access to habitat within the Project would benefit Coho salmon by providing additional habitat suitable for freshwater life stages of Coho and increasing the viability of the Upper Klamath population and the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho salmon.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact

7.1 The Southern Oregon/Northern California Coast ("SONCC") Evolutionarily Significant Unit ("ESU") of Coho salmon, which includes Coho salmon in the Klamath River, is listed as a threatened species under the Endangered Species Act. *E.g. (related testimony and the following exhibits were also included with several other NMFS/FWS witnesses on this issue), NMFS/FWS-Issue 7-Williams-Exhibit 7 at 1, col. 1, para. 1; NMFS/FWS-Issue 7-Williams-Exhibit 6 at 34, col. 1, para. 1; NMFS/FWS-Issue 7-Williams-Exhibit 1 at 2:17 to 3:9.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.2 Habitat degradation is a primary cause for the decline of the SONCC Coho ESU. *NMFS/FWS-Issue 7-White-Exhibit 1 at 6:3-5; NMFS/FWS-Issue 7-White-Exhibit 18 at 6, para. 5; 104, para. 4; 137, Table 15, col. 3, row 3; NMFS/FWS-White-Exhibit 4 at 3 (of the report), 4th para.; NMFS/FWS-White-Exhibit 5 at 363 (page 401 of the report)); see also NMFS/FWS-Issue 7-Simondet-Exhibit 1 at 5:22 to 6:1.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.3 The historical upstream distribution of Coho salmon in the Klamath River extended to Spencer Creek, which is within the Project Reach. *NMFS/FWS Issue 7-Williams-Exhibit 1 at 5:18 to 6:4; NMFS/FWS Issue 7-Williams-Exhibit 9 at 7, col.2, para. 3.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.4 The boundaries of historical habitat of the Upper Klamath population of Coho salmon extended from Portuguese Creek upstream to Spencer Creek, *NMFS/FWS Issue 7-Williams-Exhibit 14 at 41*, and approximately 40% of the historical habitat of this population is upstream of IGD. *NMFS/FWS Issue 7-Williams-Exhibit 1 at 6:7-11.*

RULING: ACCEPTED IN PART, REJECTED IN PART. The record evidence is inconclusive as to whether Coho salmon's historical distribution extended upstream to Spencer Creek. The evidence definitively shows that Coho salmon used habitat 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*).

7.5 Proposed supporting findings of fact 6.4, 6.5, 6.6, 6.7, 6.8, 6.12, and 6.13, under NMFS/FWS Issue 6 regarding suitable habitat for anadromous fish, are incorporated by reference here. In summary, these proposed supporting findings of fact provide that reaches of the main stem Klamath River, perennial streams, and intermittent streams within the Project presently contain significant amount of habitat suitable for use by anadromous salmonids, including Coho salmon. *PF 6.4, 6.5, 6.6, 6.7, 6.8, 6.12, and 6.13.*

RULING: REJECTED. The above is not a finding of fact. It is a conclusion or argument.

7.6 Restoration projects and management efforts are planned or have been implemented in the Klamath River watershed above IGD to improve the amount and quality of habitat for salmonids, which will increase the amount and quality of habitat suitable for freshwater life history phases of Coho salmon. *NMFS/FWS-Issue 7-White-Exhibit 1 at 6:7-9; NMFS/FWS-Issue 7-Snedaker-Exhibit 1 at 8:7 to 9:17; NMFS/FWS-Issue 6-Hamilton-Exh. 1 at 8:11-13; NMFS/FWS-Issue 7-Snedaker-Exhibit 7 at 35 (under heading "Watershed Values") to 48, para. 4; NMFS/FWS-Issue 6-Smith-Exh. 1 at 6:1 to 9:18.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.7 The presence of salmon in the watershed above IGD is expected to assist in restoration of habitat suitable for freshwater life history phases of Coho salmon, both in terms of nutrient delivery from carcasses and from physical processes of spawning. *NMFS/FWS-Issue 7-Williams-Exhibit 1 at 7:2-4; NMFS/FWS-Issue 7-Williams-Exhibit 11 at 8, last para. to 9, para. 1.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.8 Coho below IGD would migrate above IGD if given access through fishways. *PF 2A.4.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.9 The timing of anadromous fish spawning and out-migration corresponds with periods of high flows, lower temperatures, and lower predation; therefore these factors would not preclude anadromous salmonids, including Coho salmon, from successfully utilizing habitat within the Project. *PF 2A.6.*

RULING: ACCEPTED IN PART, REJECTED IN PART. Some anadromous fish stock will experience the sub-optimal environmental conditions above Iron Gate Dam if fish passage is provided. For instance, fall-run Chinook salmon pawn in early September and continues through late October. 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*). This also happens to be the time when flows are generally at their lowest above Iron Gate Dam. (*PAC-MAL-D-1 at 36:8-14*).

Similarly, juvenile fall-run Chinook salmon begin out-migration 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*).

Conversely, 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. July and August are the times of high water temperature. 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*). Although warm temperature is a problem, it will not preclude anadromous fish from successfully using habitat above Iron Gate Dam. (*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*).

7.10 Reestablishing access to available habitat above IGD will increase the likelihood that the local Upper Klamath population and, in turn, the SONCC ESU of Coho salmon will meet the various measures used to assess viability (i.e., abundance, productivity, diversity, and spatial structure). *NMFS/FWS-Issue 7-Williams-Exhibit 1 at 8:9-23; 9:2-13; 10:3-6; NMFS/FWS-Issue 7-Simondet-Exhibit 1 at 6:1-7; NMFS/FWS-Issue 7-Simondet-Rebuttal Exhibit at 5:11 to 6:2; NMFS/FWS-Issue 7-White-Exhibit 14 at A-22; NMFS/FWS-Issue 7-McElhany-Exhibit 1 at 5:22 to 6:14; NMFS/FWS-Issue 7-Williams-Exhibit 10 at 28, para. 1; 143, para. 1; NGO Ex. 4 at 5:5-12; 11:5 to 12:7.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 8:

Proposed Ultimate Finding of Fact: Access to habitat within the Project will benefit Pacific lamprey by increasing spawning and rearing habitat for anadromous Pacific lamprey below IGD, and opening a potential migration corridor to habitat above the Project. Further, Pacific lamprey spawned and reared above IGD would increase the overall abundance of Pacific lamprey.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact:

8.1 Pacific lamprey fishery resources in the lower Klamath River are in decline. *Exhibit PAC-Chan-D-1 at 4:7-9*. Lack of habitat has been identified as one of the causes for this decline. *Yurok Tribe's Direct Testimony, Witness: Cleveland R. Steward, Issue: NMFS/FWS 8 ("Steward 8 Direct") at 2:14-20; NMFS/FWS-Issue 8-Hamilton-Rebuttal Exhibit 1 at 1:7-13; Aug. 24 Tr. p.116:9-7 (Chane cross, acknowledging the possibility of habitat as being a limiting factor for Pacific lamprey).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.2 Lamprey have had historical access to habitat upstream of IGD and have ranged at least as far upstream as Spencer Creek, probably further. *NMFS/FWS-Issue 8-Hamilton-Exhibit 6 at 6-7; Steward 8 Direct at 3:20 to 4:8; Yurok Tribe's Rebuttal Testimony, Witness: Cleveland Steward ("Steward 8 Rebuttal") at 4:12 to 5:8; Aug. 24 Tr. p.273:8 to 274:5 (Hamilton redirect).*

RULING: REJECTED. There is insufficient evidence in the record to determine whether Pacific lamprey was historically 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*).

8.3 Pacific lamprey are found throughout the Klamath River main stem and tributaries downstream of the Project, as well as immediately below IGD. *NMFS/FWS-Issue 8-Hamilton-Rebuttal Exhibit 4; Steward 8 Rebuttal at 2:9 to 3:2.*

RULING: ACCEPTED IN PART, REJECTED IN PART. There is insufficient evidence in the record determine whether Pacific lamprey are found "immediately below 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*).

8.4 Considerable habitat suitable for Pacific lamprey spawning and juvenile rearing is available within tributaries and stream reaches in the Project area. *Yurok Tribe's Direct Testimony, Witness: David Hillemeier Issue NMFS/FWS 2 and 8 ("Hillemeier 8 Direct") at 6:4 to 7:15; Steward 8 Direct at 5:1-8.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.5 Resident lamprey ammocoetes (juveniles) already rear within tributaries within the Project. *Steward 8 Rebuttal at 4:2-11; CDFG Pisano Exhibit 16.* Ammocoetes of resident and Pacific lamprey have similar habitat requirements. *Exhibit PAC-Chan-D-1 at 8:8-9; Steward 8 Rebuttal at 4:4-6.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

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

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.7 Pacific lamprey ammocoetes can move downstream. *NMFS/FWS-Issue 8-Hamilton-Exhibit 10 at 6; Aug. 24 Tr. p.97:22 to 98:6 (Chane cross).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.8 Safe, timely and effective mechanisms for lamprey passage are available and can be constructed. Upstream passage is effective and so it will allow Pacific lamprey to reach habitat within the Project area, as well as give Pacific lamprey a possible migration corridor to additional habitat upstream of the Project. *NMFS/FWS-Issue 8-Johnson-Rebuttal Exhibit 1 at 2:3-19, 3:5-7; Aug. 24 Tr. p.178:8 to 179:1 (Moser cross), p.184:1 to 185:15 (Moser redirect); NMFS/FWS-Issue 8-Moser-Exhibit 1 at 9:12-16*; *Steward 8 Direct at 5:12-26.* Minor changes to juvenile bypass systems at hydroelectric dams will increase juvenile lamprey outbound-migration survival. *NMFS/FWS-Issue 8-Moser-Exhibit 1 at 7:8 to 8:3; Aug. 24 Tr. p.170:15 to171:16 (Moser cross.).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.9 If access to the Project area is provided, Pacific lamprey would use available habitat. *Hillemeier 8 Direct at 3:10-21, 6:12-16; NMFS/FWS-Issue 8-Mesa-Exhibit 1 at 5:5 to 6:6; NMFS/FWS-Issue 8-Mesa-Rebuttal Exhibit 1 at 2:13-28, 4:56-67.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.10 Pacific lamprey spawned and reared within the Project area would increase the abundance of Pacific lamprey by adding to those spawned and reared in the lower Klamath basin. *NMFS/FWS-Issue 8-Hamilton-Exhibit 1 at 8:1-11.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

RULINGS ON INDIAN TRIBES PROPOSED FINDINGS OF FACT

BLM ISSUE 16:

16.1 Project peaking operations kill, through stranding, large numbers of young fish and enormous numbers of aquatic invertebrates that are the primary prey food for trout. *KTr LKD Exh. 17 at 4:3-133 (enormous prey losses from stranding); KTr LKD Exh. 3 at 4-5 (field study re enormous prey loss from stranding); KTr FAE Exh. 31 at 8:19-20 (redbands feed primarily on invertebrates; invertebrate "drift" 5 to 6 times higher in Keno reach than in peaking reach); TR 1 at 153:13-23 (significant loss of fish prey is a Project effect); BLM-Denman-Exh. 0, at 2:19-22 (crayfish were major food source for trout before peaking).*

RULING: ACCEPTED (Peaking operations which cause high mortality likely only happen a few times a year (not with every peaking operation), during the first peaking event after several months of steady flow. (*PAC-Ols-R-1 at 16:16-17:7*).)

16.2 PacifiCorp's conclusion that trout fry are not stranded by peaking in the Oregon peaking reach has no evidentiary support. *KTr LKD Rebuttal Exh. 13, at 8:9-14 (PacifiCorp stranding study useless because it looked for stranded trout fry where there were no fry to be stranded); NGO Exh. 1, at 23:9 to 24:12 (same); KTr LKD Rebuttal Exh. 5, at 1:17-24, 2:1-18 (PacifiCorp study useless re trout fry stranding, current peaking ops likely kill trout fry in upper peaking reach); TR 1 at 150:3-8 (trout fry stranding study done where there were no trout fry).*

RULING: ACCEPTED

16.3 J.C. Boyle dam traps gravel, depriving the bypass and peaking reaches of gravel that is necessary for trout spawning, thereby reducing the extent and distribution of spawning areas for trout in the Boyle bypass and peaking reaches. *KTr FAE Exh. 31 at 9:11-13 (lack of spawning gravel due to dams); PAC-Ols-R-1 at 7:17-18 (reservoir as "gravel trap" is impact of dam); TR 1 at 74:16 to 75:5 (bypass reach sediment starved); NGO Exh. 1 at 10:13-18 (habitat impacts of lack of gravel); BLM-Denman, Exh. 0 at 3:8-20 (spawning gravel and trout spawning common in Frain Ranch reach before Boyle dam); PAC-Ols-D-1 at 7:20 to 8:2 (currently no spawning in the peaking reach).*

RULING: ACCEPTED – PacifiCorp does not dispute this statement

16.4 Project peaking operations dewater and render dysfunctional channel margin habitat that fry use for rearing. *KTr FAE Exh. 31 at 9:6-10 (margin habitat dysfunctional in low peaking flow); KTr LKD Exh. 17 at 3:18-23 and 6:16-20 (same).*

RULING: ACCEPTED (Cited material used to support BLM proposed findings 16.3 and 16.4 can also be used to support this similar proposed finding.)

16.5 Project operations cause severely fluctuating flows and water temperatures in the River that are detrimental to trout. *KTr LKD Exh. 17 at 2:16 to 3:14 (peaking puts fish through seasonal range of flows on a daily basis), citing KTr LKD Exh. 2 and Exh. 3; KTr LKD Exh. 4 at p. A-34 (abrupt temperature swings); KTr LKD Exh. 10 at p. 36 (negative bioenergetic effects).*

RULING: REJECTED (PacifiCorp conducted a site-specific study which showed trout would actually be expected to grow faster with the water temperatures seen under existing operations, compared to what would occur if peaking was not occurring. (*PAC-Ols-D-1 at 10:6-12*). However, the bioenergetics modeling shows that if peaking were not to occur, "food would likely increase" and not stay the same. (*BLM-Simons-Ex. 14 at 55*). Also, there is little difference in predicted growth when only changes to the water temperature were incorporated into the modeling; the biggest effect on predicated growth came from increased invertebrate drift/food availability. (*Id*.))

16.6 The fact that larger, older trout are rare or absent in the peaking reach, yet are common in the Keno reach, results from the negative effects of peaking. *KTr LKD Exh. 10 at xvi-xvii, pp. 18-20 and Nugget (size discrepancy explained); KTr LKD Exh. 17 at 7:8-12 and 9:7-9 (same); KTr LKD Exh. 17 at 6:7-10; KTr LKD Rebuttal Exh. 13 at 4:8 to 5:4 and 7:12-17 (larger fish feel peaking regime's negative bioenergetic effects before smaller fish do); TR 1 at 145:2-14 and TR 2 at 149:15-25 and KTr LKD Rebuttal Exh. 13 at 5:8 to 7:2 (discrediting PacifiCorp's explanations re greater harvest in Keno Reach); BLM-Denman Exh. 0, at 2:14-18 (large fish common before Boyle dam), and at 2:23 to 3:4 (large trout rare after Boyle dam), and at 3:24 to 4:2 (pre- and post-Boyle dam trout in Keno v. peaking reach).*

RULING: ACCEPTED

16.7 Relatively high catch rates during those few hours each day when Project peaking operations allow for effective angling in the peaking reach do not mean the fishery is not negatively affected by Project operations. *KTr LKD Rebuttal Exh. 13 at 2:13 to 3:22 (large trout are rare, in poor condition during summer, fishable flows are rare on daily basis; ODFW concludes negative fishery impacts, fishery not particularly good); KTr LKD Exh. 10 at p. xviii; KTr LKD Exh. 17 at 7:9-12 and 9:7-9; KTr Rebuttal LKD Exh. 13 at 4:1 to 5:4 (explaining negative effects); TR 1 at 145:6-8; BLM-Denman, Exh. 0 at 4:6-10 (limited hours for fishing due to peaking operations); TR 2 at 144:19-23 (midday fishing quality before and after Boyle dam).*

RULING: ACCEPTED (Not just one factor, but many factors (fish health, abundance, ability to wade, catch rate, etc.) should be considered when determining if the Project is affecting angling.)

16.8. River Corridor Management Conditions proposed by BLM will benefit the trout fishery. *KTr LKD Exh. 17 at 8:22 to 9:15 (more stable flows, limited ramp rates, less frequent peaking all benefit fishery); KTr FAE Exh. 31 at 9:16 to 10:205 (BLM Conditions will reduce dysfunctional perturbations); NGO Exh. 2 at 18:3-18 (flow regime change will help the channel, substrate, riparian conditions of fishery); BLM-Denman-Exh. 0, at 3:8-20 (spawning gravel common in Frain Ranch reach before Boyle dam).*

RULING: ACCEPTED (The proposed conditions will benefit the fishery. However, the proposed conditions will also negatively affect certain aspects of the fishery (*see BLM Issue 19 and fly-fishing*).)

BLM ISSUE 17:

17.1 The upramp rate for the J.C. Boyle facility under the existing FERC license is nine inches per hour. *PAC-Ols-D-1, at 14:9*.

PACIFICORP RESPONSE: PacifiCorp does not dispute this finding

17.2 In a naturally flowing river, a change in river stage of two inches per hour is an extremely rare event that typically occurs only following intense storms; thus, the current nine-inch-per-hour upramp rate results in daily flow fluctuations in the peaking reach that are over four times more powerful than fluctuations that occur only rarely in a natural system. *HVT-Steward, Exh. 4, at 2:18-21; see also HVT-Steward, Exh. 37, at pp. 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).*

RULING: ACCEPTED

17.3 An upramp rate of two-inches-per hour is commonly prescribed for hydroelectric projects in the Pacific Northwest for the purpose of protecting fish and aquatic resources. *BLM-Snedaker-Exh. 0, at 7:10 to 8:11*; *HVT-Steward-Exh. 4, at 4:8-14 (noting that ramping rates at many hydroelectric projects are limited to one to two inches per hour), and at 7:19-22 (concurring that upramp rate of two inches (or less) per hour is necessary to protect fish resources in J.C. Boyle peaking reach).*

RULING: ACCEPTED

17.4 Studies on the J.C. Boyle peaking reach, including a prior Environmental Impact Statement prepared by FERC, support BLM's position that fry are vulnerable to physical displacement in the peaking reach as a result of rapid flow increases. *BLM-Snedaker-Exh.0, at 9:17-21; BLM-Hooton-Exh. 0B, at 7:12-14.*

RULING: ACCEPTED

17.5 Daily fluctuations in flow and temperature increase energetic demands on fish. *HVT-Steward-Exh. 4, at 7:1-7 (describing energetic impacts of short-term flow fluctuations on fish species); BLM-Hooton-Exh. 0B, at 9:25 to 10:4.*

RULING: ACCEPTED (While fluctuations in flow and temperature can increase the energetic demands of fish, PacifiCorp conducted a site-specific study which showed trout would actually be expected to grow faster with the water temperatures seen in the existing peaking operation compared to what would occur if peaking was not occurring. (*PAC-Ols-D-1 at 10:6-12*).)

17.6 The preponderance of the evidence supports BLM's position that a reduced upramp rate of two-inches-per-hour is necessary to protect fish and aquatic resources.

RULING: REJECTED (This all-encompassing statement will be addressed in the ultimate finding of fact section.)

NMFS/FWS ISSUE 2(A):

Issue 2(A) Proposed Ultimate Finding of Fact: Stocks of steelhead trout, Coho salmon, Chinook salmon, and Pacific lamprey suitable to conditions above Iron Gate Dam are available to use prescribed fishways.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact:

2A.1 Several existing Klamath River Chinook salmon stocks suitable to conditions above Iron Gate Dam are available to use prescribed fishways, based on an objective assessment of (a) size and run strength of the donor population; (b) disease concerns; (c) ecological goodness-of-fit; (d) evolutionary/genetic relatedness; (e) history of hatchery influence; and (f) adult fish stray rates. *KTr CWH Exh. 34, at 2:24-27, 7:137-149; KTr CWH Exh. 13, entire document (stock assessment technical memo); KTr FAE Exh. 32 at 1:20-2:19; KTr Dunsmoor Rebuttal Exh. 15, at 7:11-16.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.2 Stocks of steelhead trout, Coho salmon, Chinook salmon, and Pacific lamprey regularly migrate to the base of Iron Gate Dam, using nearby tributary and main stem habitats similar to those found within the Project above Iron Gate Dam in terms of habitat quality, temperature and anthropogenic impacts. *KTr CWH Exh. 34, at 2:21-22, and 5:102 to 6:113; NMFS/FWS-Curtis-Issue 2A, at 2:1-5; CDFG-Pisano-Exh. 1, at 4:21 to 5:1, and 6:11-20; HVT-Franklin-Exh. 1, at 2:10-20; KTr CWH Exh. 34, at 5:102-104; NGO Exh. 3 at 7:16-19, and 9:18*; *NMFS/FWS-Issue 8-Hamilton-Rebuttal Exh. 1, at 2:5-7; KTr LKD Exh. 18, at 3:21 to 4:5.*

RULING: ACCEPTED IN PART, REJECTED IN PART. The record evidence is inconclusive as to whether Pacific Lamprey used habitat above 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*).

2A.3 Migration and re-colonization of habitat are defining life history characteristics of salmonids that have allowed anadromous fish stocks to persist despite varying environmental conditions over thousands of years. *NMFS/FWS-Issue 2A-Garza-Exh. 1, at 2:8-9; NMFS-Issue 2-Curtis Rebuttal, at 4:15-17; CDFG-Pisano-Exh. 1, at 5:15-28; CDFG-Dean-Exh. 1, at 3:8-17.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.4 There are numerous examples from other streams and river systems of anadromous fish colonizing new habitats or re-colonizing historic habitats to which the anadromous fish stocks were not perfectly pre-adapted, including examples from the Pacific Northwest. *NGO Ex. 3, at 12:31 to 13:9; HVT Franklin, Exh. 1, at 4:1-19; KTr CWH Exh. 34, at 7:151-163; NMFS/FWS-Issue 2A-Garza-Exh. 1, at 2:21 to 3:4; KTr FAE Exh. 32, at 5:7 to 6:9.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.5 Historical existence of anadromous stocks in the Upper Klamath Basin, the current distribution of anadromous fish (Chinook and Coho salmon, steelhead, and Pacific lamprey) up to Iron Gate Dam, and the continued presence of salmonids and lamprey in the Upper Klamath Basin is strong evidence that anadromous fish can successfully re-colonize habitat above Iron Gate Dam, and that stocks are available to use the prescribed fishways. *NMFS/FWS -Issue 2A-Garza-Exh. 1, at 3:12-17; HVT-Franklin-Exh. 12, at 1:4 to 4:10; KTr CWH Exh. 34, at 1:17-19, 5:90-95; KTr FAE Exh. 32, at 3:2 to 5:2; CDFG-Dean-Exh. 1, at 3:28 to 4:2; KTr LKD Rebuttal Exh. 15, at 2:16 to 3:6; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 3:1-14.*

RULING: ACCEPTED IN PART, REJECTED IN PART. The record evidence is inconclusive as to whether Pacific Lamprey used habitat above 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*).

2A.6 Stocks of Pacific lamprey suitable for conditions above Iron Gate Dam are available to use prescribed fishways. Based on their genetic homogeneity and widespread distribution in the lower Klamath, the Pacific lamprey population that currently exists below Iron Gate Dam would be a suitable donor stock for lamprey reintroduced into the upper Klamath. (*Yurok- Hillemeier Direct 2 and 8, at 5:3-25 (genetic stocks of Pacific lamprey are relatively uniform across the Pacific Northwest); Yurok-Steward Rebuttal, at 2:14 to 3:2, 11-20 (Pacific lamprey are found directly below Iron Gate Dam at present).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

[2A.7] The question of whether stocks of anadromous fish suitable to conditions above Iron Gate are available for reintroduction is separate and distinct from the question of what level of mortality stocks may encounter migrating through volitional fish passage facilities and associated reservoirs; the latter question has been reserved for later proceedings in the re-licensing process. *NMFS/FWS-Issue 2-Curtis Rebuttal, at 2:18-23; TR 4 at 16:24-17:18 (National Academy of Sciences distinctly separated "access" and "suitability" when describing habitat for Coho salmon).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

[2A.8] PacifiCorp's EDT model results for steelhead produced in Spencer Creek greatly under-estimated the productive capacity of that stream, suggesting a major flaw in the modeling that has led to dramatic, basin-wide under-estimation of the productive capacity for steelhead. *KTr Huntington Rebuttal Exh. 6, at 9:7-20, 11:18-19, 13:16 to 14:16; TR4 at 42-11:15 (PCorp's witness admits that EDT model underestimates steelhead production in Spencer Creek).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

[2A.9] The fact that anadromous salmonids 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. *TR 4, at 26:21 to 27:7*; *KTr FAE Rebuttal Exh. 7, at 2:2-17; KTr FAE Exh. 32, at 5:21-25.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

[2A.10] PacifiCorp's reliance on the Miller radio-tag study to estimate passage mortality and travel time is inappropriate because it was a pilot study intended to focus on behavior of out-migrants, and was not designed for or intended to quantify passage mortality expected for reintroduced fish migrating naturally. *NMFS/FWS-Issue 2-Hamilton Rebuttal, at 2:18 to 3:7; KTr LKD Rebuttal Exh. 15, at 3:8 to 5:12; KTr CWH Rebuttal Exh. 6, at 4:2-10.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

[2A.11] Fish passage success and travel time measured by the Miller radio-tag study under-estimated reservoir passage survival for reintroduced anadromous fish for many reasons, including: (a) the authors' explicit statement of this fact; (b) test fish were naive hatchery fish, which do not perform as well as naturally produced fish; (c) the physiological readiness to migrate was not measured, so test fish may not have been migratory; (d) two days after surgery, the test fish were required to migrate through the reservoirs with a 7-inch antenna protruding from their bodies, causing stress and attracting aquatic and avian predators; (e) Chinook were tested only in May, near the end of the expected out-migration period; conditions would be better earlier; and (f) there was no control group. *KTr LKD Rebuttal Exh. 15, at 3:11 to 4:2, 4:20 to 5:12; TR 3, at 224:18 to 227:17 (describing study procedures); TR 3, at 237:7-20*; *see NMFS/FWS-Issue 7-Simondet Rebuttal, at 7:7-8 (noting that hatchery bred fish lack predator avoidance skills possessed by wild fish); KTr CWH Rebuttal Exh. 6, at 3:22 to 4:2; NMFS/FWS-Issue 2-Hamilton Rebuttal, Exh. 1, at 3:17-20, 2:2-5; TR 3 at 226:20-25.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

[2A.12] 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 Exh. 6 at 2:6-17, 3:10-14; TR 5 at 64:7 to 65:8, 65:14-22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

[2A.13] Some yellow perch predation is likely on small sub-yearling Chinook out-migrants, and larger out-migrants are likely to be immune, so overall impact of yellow perch predation on out-migrating salmonids is likely to be low. *NMFS/FWS-Issue 2 Hamilton-Rebuttal Exh. 4, p. 224-225 (*study of yellow perch food habits in the Klamath River system downstream of Copco Dam in 1951-52, in which zero salmonids were found in the 880 yellow perch stomachs examined; perch ate salmonids only when confined together in net pens or aquaria); *TR 5 at 64:7 to 65:8, 65:17-22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

NMFS/FWS ISSUE 2(B):

Issue 2(B) Proposed Ultimate Finding of Fact: Facilitating the movement of anadromous fish via prescribed fishways presents a low to non-existent risk of introducing pathogens to resident fish inhabiting the basin above Iron Gate.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact:

2B.1 The following pathogens are associated with species of anadromous fish that would pass via prescribed fishways to areas above Iron Gate Dam: (1) Infectious Hematopoietic Necrosis (IHNV); (2) *R. salmoninarum*; (3) *F. columnaris*; (4) *C. Shasta*; (5) *P. minibicornis*; (6) Trematode metacercaria; (7) *Ichthyophthirius multifiliis (Ich)*. *NMFS/FWS-Issue 2B-Foott-Exh. 1 at 2:1 to 3:3*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.2 The viral pathogen IHNV is exceedingly rare in Klamath River salmon stocks and the form of IHNV present in coastal Oregon and California typically affects only Chinook salmon and does not cause disease to trout or non-salmonid species, thus the risk of introducing IHNV to resident fish above Iron Gate Dam is virtually non-existent. *NMFS/FWS-Issue 2B-Foott-Exh. 1 at 2:3-7, 3:11-15, and 4:1-3*; *CDFG-Cox-Exh. 1, at 3:24 to 4:13*; *TR 5, at 43:21-25 (only one adult Chinook with IHNV ever detected on Klamath side).*

RULING: ACCEPTED IN PART, REJECTED IN PART. 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. 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.3 Multiple year surveys of juvenile and adult Chinook populations in the Klamath River basin indicate that the bacteria *R. salmoninarum* is not a significant pathogen or cause of disease in Klamath river salmonids, thus the risk of introducing *R. salmoninarum* to resident fish above Iron Gate Dam is low. *NMFS/FWS-Issue 2B-Foott-Exh. 1 at 2:8-11*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.4 Pathogens already present in both the lower basin and upper Klamath Basins include *F. columnaris, C. Shasta, P. minibicornis, Ichthyophthirius multifiliis (Ich),* so there is no risk of anadromous fish introducing these already-present pathogens above Iron Gate Dam. *NMFS/FWS-Issue 2B-Foott-Exh. 1 at 2:12-22, 3:1-3, 4:19-25, and Exh. 7 at p. 12, para 2; NMFS/FWS-Issue 2C-Hooton-Exh. 1, at 5:14-16; CDFG-Cox-Exh. 1, at 3:16, and 4:20-21*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.5 Parasitic trematode metacercaria are present in juvenile and adult Chinook salmon in the basin but do not present a significant health threat. *NMFS/FWS -Iss. 2B - Foott at 2:23-25.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.6 The risk of introducing an exotic or highly virulent pathogen into the upper Klamath basin via reintroduction of anadromous fish is low or "very, very low." *NMFS/FWS-Issue 2B-Foott-Exh. 1 at 4:7-8; CDFG-Cox-Exh. 1 at 6:6-11; TR 5 at 52:11-13.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.7 A consensus among knowledgeable professionals is that fish passage from the Lower Basin to the Upper Basin would not introduce new pathogens into the system, because most of the relevant pathogens currently exist both above and below Iron Gate Dam, and because anadromous fish were present in the Upper Basin for thousands of years, making it likely that resident stocks have resistance to fish pathogens found in lower river stocks. *NMFS/FWS-Issue 2B-Foott-Exh. 1 at 3:24-25, 4:8-9, and 4:16-19*; *TR 5, at 51:22 to 52:13*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.8 The risk of anadromous fish introducing pathogens to resident fish above Iron Gate Dam is low to non-existent because most of the relevant pathogens, with the exception of the ubiquitous *F. columnaris* and *Ich*, do not impact non-salmonids. *NMFS/FWS-Issue 2B-Foott-Exh. 1 at 3:25 to 4:3*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.9 To the extent risk does exist, disease management protocols are commonly used in reintroduction efforts above hydropower dams and could be used in the Klamath. *KTR CWH Exh. 34, at 8:168-174; KTR CWH Exh. 17 at pp. 16, 85-87.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

NMFS/FWS ISSUE 2(C)

Issue 2C Proposed Ultimate Finding of Fact: Introducing steelhead above Iron Gate Dam will not cause or increase the occurrence of steelhead residualization, and to the extent that some steelhead do residualize, it is unlikely that such residualization would adversely affect the resident trout fishery resource.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact:

2C.1 Anadromous steelhead trout and resident trout co-existed in the Klamath River for thousands of years prior to the construction of Copco Dam in 1917, which resulted in the present unnatural isolation of anadromous and resident forms of the same species. *HVT-Franklin-Exh. 1 at 6:1-10; NMFS/FWS-Issue 2C-Hooton-Exh. 1 at 2:3-17; CDFG-Dean-Exh. 1, at 4:8-14.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.2 Residualization of wild, naturally-spawned steelhead trout stocks is uncommon. *NGO Exh. 3, at 11:5-7; HVT-Franklin, Exh. 1, at 5:18-22; KTr FAE Exh. 32, at 7:3-22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.3 Evidence of steelhead residualization resulting from hatchery practices at Iron Gate Hatchery does not support a conclusion that naturally produced steelhead accessing habitats above Iron Gate Dam would residualize. *KTr FAE Exh. 32, at 7:11-22; TR 3, at 197:8-17 (acknowledging that hatchery practices could result in inflated estimates of residualization).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.4 There are many examples from other nearby river systems where resident and anadromous trout successfully co-exist and maintain abundant populations of both the resident and anadromous life history, including the Deschutes River in Oregon and the Yakima River in Washington, and river systems in Idaho. *NMFS/FWS-Issue 2C-Hooton-Exh. 1 at 4:7-11; HVT-Franklin-Exh. 1 at 5:22-25; NGO Exh. 3, at 11:14-16; KTr, FAE Exh. 32, at 7:3-11.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.5 There is not evidence of a causative relationship between reintroduction of steelhead trout above Iron Gate Dam and residualization. The predominance of resident or anadromous trout in a given river basin is largely dependent on whether prevailing river conditions are more favorable than prevailing ocean conditions and vice versa. *NMFS/FWS-Issue 2C-Hooton-Exh. 1 at 4:12-16; TR 3, at 196:12 to 197:3 (acknowledging that the potential for residualization is dependent primarily on environmental conditions in river and ocean).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.6 Restoring access below Iron Gate Dam to resident trout will result in some percentage of resident trout reestablishing anadromous life histories, thus increasing the overall life history diversity of trout stocks currently above and below Iron Gate Dam and offsetting residualization that may occur. *NMFS/FWS-Issue 2A-Garza-Exh. 1, at 5:20-23; NMFS/FWS-Issue 2C-Hooton-Exh. 1, at 5:3-5, 6:1-3; TR 3, at 182:18-21 (acknowledging that a percentage of [O. mykiss] presently above Iron Gate would attempt to migrate to the ocean if they had access to it); see also TR 3, at 183:20 to 184:22, 196:12 to 197:3.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.7 No scientific studies demonstrate that reintroduction of steelhead above Iron Gate Dam would adversely effect the genetic makeup of resident trout. *TR 3, at 208:18-23*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.8 Studies specific to the Klamath River find genetic similarity between steelhead and resident trout stocks; specifically, for example, wild steelhead trout stocks in the Klamath River are genetically similar to resident trout found spawning in Spencer Creek above J.C. Boyle Dam. *NMFS/FWS-Issue 2C-Hooton-Exh. 1 at 2:21 to 3:11, 3:25 to 4:1; NMFS/FWS-Issue 2C-Hooton-Exh. 5, p. 11, para. 2; see also NMFS/FWS-Issue 2A-Garza-Exh. 1 at 4:9-12, 6:8-9.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 4

Issue 4 Proposed Ultimate Finding of Fact: Entrainment at Project facilities is adversely affecting resident fishery resources.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.1 Several tens of thousands of resident fish are annually entrained at each of the Project facilities. NMFS/FWS-Issue 4-Hamilton-Exh. 1 at 5:11-14 and 6:3-9 (describing entrainment of resident trout and suckers); NMFS/FWS-Issue 4-Hamilton-Exh. 12, at p. 28, para. 2-3 (citing PacifiCorp's admission that annual entrainment is several tens of thousands of fish at each Project); NMFS/FWS-Issue 4-Hamilton-Exh. 10, p. 3 (reporting entrainment of 109,429 endangered suckers at Eastside/Westside diversion facilities during 2.5 year study period); NMFS/FWS-Issue 4-Hamilton-Exh. 14, at p. 1; HVT-Steward -Exh. 1 at 3:19-20.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.2 Records from canal salvage operations at the J.C. Boyle power canal show that substantial numbers of resident fish, including resident trout, are entrained in the power canal each year. Canal salvage data only provides information on the number of fish entrained at the moment in time that the salvage operation is 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-Exh. 14, at p. 1; NMFS/FWS-Issue 4-Hooton-Exh. 1, at 5:6-17.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.3 The J.C. Boyle project facility uses Francis turbines, at an operational head of 440 feet. A 1987 report prepared by the Electric Power Research Institute concluded that fish mortality from entrainment at hydroelectric projects using Francis turbines averaged 24 percent. The Electric Power Research Institute report found that entrainment mortality at hydroelectric projects using Francis turbines with operational head greater than 335 feet ranged from 33 percent to 48 percent. NMFS/FWS-Issue-4-Hooton-Exh. 1 at 5:23 to 6:2 (describing study results); NMFS/FWS-Issue-4-Hooton-Exh. 7, at p. 51, Table 4-1.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.4 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 comparable to the mortality levels described in the Electric Power Research Institute report. NMFS/FWS-Issue-4-Hooton-Exh. 1 at 6:3-6:6 (estimating mortality to be at the high end of the 33 to 48 percent range); NMFS/FWSIssue-4-Johnson-Exh. 1 at 2:11-15 (explaining why turbine mortality is likely higher at Klamath dams); NMFS/FWS-Issue-4-Hamilton-Exh. 12, at p. 28 (estimating mortality at J.C. Boyle facility to be in range of 20 to 40 percent).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.5 Spencer Creek, located upriver of the J.C. Boyle facility, is a primary spawning and rearing area for resident trout within the Project area. Most adult trout attempting to migrate from Spencer Creek downriver are entrained in the J.C. Boyle power canal and turbines. NMFS/FWS-Issue 4-Hooton-Exh. 1 at 2:12-13, 3:2-8, and 3:25-26 (explaining impacts of entrainment on resident trout populations); NMFS/FWS-Issue 4-Hamilton-Exh. 1 at 4:13-14.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.6 Mortality from entrainment occurs at each Project facility, thus compounding total losses as resident fish species such as trout and endangered suckers [that] migrate downriver. HVT-Steward, Exh. 39, at 2:3-4.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

4.7 Losses of juvenile trout through entrainment at Project facilities adversely affect trout abundance and distribution in the Klamath River. NMFS/FWS-Issue-4-Hooton-Exh. 1 at 6:9-13 (explaining that entrainment losses significantly suppress trout abundance and distribution in the Klamath River); NMFS/FWS-Issue-4-Hamilton-Exh. 1 at 7:3-4 (stating that entrainment adversely affects resident fishery resource); HVT - Steward, Exh. 39, at 1:17-22 (explaining that ten to 30 percent mortality is a significant impact)

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 6:

Issue 6 Proposed Ultimate Finding of Fact: Regardless of the exact mileage estimate, the preponderance of the evidence shows that a substantial and significant amount of habitat suitable for use by anadromous fish exists within the Project. The agencies estimate of 58 miles is reasonable and supported by the record.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact:

6.1 Habitat is suitable for use by anadromous fish if the habitat could be occupied by at least one life history phase of one anadromous fish species for at least one period of the year. *HVT-Franklin-Exh. 2, at 2:20-26; TR 2 at 197:17-21*; *KTr CWH Exh. 35, at 2:22 to 3:6; NMFS/FWS -Issue 6- Smith-Exh. 1, at 2:18-24*; *KTr CWH Rebuttal Exh. 6, at 5:14 to 6:2; KTr LKD Rebuttal Exh. 14, at 1:5 to 2:22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.2 For the volitional fish passage option, both EDT and KlamRAS modeling results submitted to FERC by PacifiCorp corroborate the judgment of agency and tribal biologists responsible for managing fisheries in the Klamath River by predicting that habitat within the Project will support all life stages of Chinook and steelhead, and will allow them to complete their life cycles. *KTr CWH Exh. 35, at 5:1-19, 7:9 to 8:4, and 10:2-15; KTr CWH Rebuttal Exh. 6, at 5:10-13; KTr CWH Exh. 34, at 6:123-126; KTr LKD Rebuttal Exh. 14, at 4:1 to 5:14.*

RULING: ACCEPTED IN PART, REJECTED IN PART. Recognizing the limitations of the EDT and KlamRAS modeling efforts, the study is being accorded appropriate weight.

6.3 A substantial, biologically significant amount of habitat that will support various life stages of anadromous species at relevant times of the year exists within the Project-bounded area. Approximate mileage of such habitat within the Project-bounded area includes: a) 26.4 miles of the un-impounded Klamath River main stem; b) 17.5 miles of perennial tributaries in the project area (Jenny, Fall, Shovel, and Spencer creeks) plus unmeasured mileage for Deer and Beaver creeks; c) 15.5 miles of intermittent streams; and d) 37.6 miles of main stem Project reservoirs. *HVT-Franklin-Exh. 2, at 3:1-8; KTr FAE Exh. 33, at 1:10-2:3, and 7:11-13; NMFS/FWS-Issue 6 Smith-Exh.1, at 1:22-2:24; KTr CWH Direct on FWS 6, at 1:8-13; KTr CWH Rebuttal Exh. 6, at 6:6-15.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.4 The springs in the J.C. Boyle bypassed reach would provide a unique and important thermal refuge for anadromous fish that would be the largest thermal refugium in the entire main stem Klamath River. *HVT-Franklin-Exh. 2, at 3:9-15; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 7:18 to 8:7; KTr FAE Exh. 33 at 6:8-16 and 7:6-10; TR 5, at 93-103.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.5 The un-impounded main stem Klamath River and larger perennial streams (Jenny, Fall, Shovel, and Spencer creeks) within the Project presently support resident trout, historically supported anadromous salmonids and lamprey, and presently contain habitat suitable for use by anadromous salmonids and lamprey. *PAC-Ols-D-1, at 7:22 to 8:1 (describing present-day trout spawning in Shovel Creek and Spencer Creek), 14:3-18:13 (describing existing trout populations in J.C. Boyle and Keno reaches), and 22:19 to 23:3(describing Shovel Creek, Fall Creek, and Jenny Creek as suitable for trout spawning); NMFS/FWS-Issue 6-Smith-Exh. 1, at 1:22-1:25, 4:2-9, and 4:19-6:24; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 3:1-25, 4:12-5:9; KTr FAE Exh. 33, at 2:9-20, 3:23-4:5, 7:11-8:12; NMFS/FWS-Issue 4-Hooton-Exh. 1, at 3:6-9 (describing trout spawning in Spencer Creek); KTr CWH Exh. 35, at 3:2-13, and 4:1-8:4; KTr CWH Rebuttal Exh. 6, at 2:1-3, 7:10-13, 12:7-12, and 14:1-16.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.6 Intermittent streams can provide suitable habitat for anadromous salmonids, typically for spawning and early rearing life stages. Many examples of such use can be found throughout the Pacific Northwest. *Yurok-Hillemeier Direct-Issue 6, at 3:14 to 5:17; NMFS/FWS-Issue 6-Smith-Exh. 1, at 3:10-22; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 5:11-17.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.7 There are numerous streams within the Project reach (including but not necessarily limited to Scotch, Camp, Salt, Tom Hayden, Negro, Deer, Beaver, and Long Prairie Creeks) that are small and/or intermittent and could provide suitable habitat for one or more life history phases of anadromous fish at one or more times of year. *NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 5:11-17; NMFS/FWS-Issue 6-Smith-Exh. 1, at 2:13-16, and 20-24; Yurok-Hillemeier Direct-Issue 6, at 2:21 to 6:22; KTr FAE Exh. 33, at 8:16-18; KTr FAE Rebuttal Exh. 7, at 6:12-18; KTr CWH Exh. 35, at 6:4-21.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.8 The fact that substantial numbers of anadromous species such as steelhead, Coho, Chinook, and lamprey historically thrived above Iron Gate Dam, and the existence of self-sustaining resident trout populations, supports the position that anadromous species could utilize that habitat today. *HVT-Franklin-Exh. 12 (explaining that existence of self-sustaining trout populations bodes well for anadromous salmonid reintroduction).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.9 Steelhead rainbow trout, Chinook and Coho salmon, and Pacific lamprey will find suitable rearing and migratory habitat within the Project reservoirs. *TR 5 at 75:2-11; TR 4 at 28:24-29:1; Malone Supplemental Rebuttal Exhibit, Attachment 2, at p. 1, last full paragraph and at p. 3, first paragraph; NMFS/FWS-Issue 6 Smith-Exh.1, at 2:1-8; KTr CWH Rebuttal Exh. 6, at 2:6-17, and 3:7-18; KTr FAE Rebuttal Exh. 7, at 6: 18-20.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.10 Habitat conditions are likely to improve within the Project reaches and tributaries over the 30 to 50 year term of the FERC license, as a result of the conditions and water quality certification of the new FERC license, and other actions by state, federal, and tribal resource managers, and private parties in the Klamath Basin. *HVT-Franklin-Exh. 2, at 5:17 to 6:15; NMFS/FWS-Issue 6-Hamilton-Exh. 1, at 8:11-13; KTr FAE Exh. 33, at 8:21 to 10:9; NMFS/FWS-Issue 6-Smith-Exh. 1, at 6:1 to 8:14; BLM-Denman-Exh. 0, all pages.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.11 Based on the above findings of fact, the preponderance of the evidence shows that the main stem riverine habitat, perennial streams, and intermittent streams within the Klamath project provide substantial suitable habitat for anadromous species, and that the estimate of 58 miles of suitable habitat is reasonable.

RULING: REJECTED. This is not a finding of fact. It is a conclusion or argument.

FWS/NMFS ISSUE 7:

Issue 7 Proposed Ultimate Finding of Fact: Access to habitat within the Project would benefit coho salmon by increasing their viability through (1) increasing the range and distribution of the species, (2) providing additional spawning and rearing habitat, (3) increasing genetic diversity, and (4) increasing abundance.[1]

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact

7.1 Prior to dam construction, coho salmon occupied habitat now within the Project. NMFS/FWS-Issue 7-Simondet, Exh. 1, at 4:7-18; NMFS/FWS-Issue 7-(Thomas)Williams, Exh. 1, at 5:8 to 6:4; KTr CWH Exh. 4 at pp. 216-224 (National Academy of Sciences study).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.2 With construction of PacifiCorp's impassable dams beginning in 1917, coho and other anadromous species were unable to continue their migration past the dams and were deprived of a substantial percentage of historical habitat. NMFS/FWS-Issue 7-(Thomas) Williams, Exh. 1, at 6:7-11 (estimating a loss of 40% of historical habitat within the Upper Klamath Independent Population of the SONCC ESU).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.3 Though habitat below Iron Gate Dam has suffered degradation in many instances commensurate with that above the dam, coho salmon still have access to habitat below the dam and utilize that habitat. CDFG-Pisano-Exh. 1, at 7:10 to 11:17; Yurok-Hillemeier, at 4:15 to 5:3; NMFS/FWS-Issue 7-Simondet-Exh. 1, at 5:22 to 6:7.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

[1] "Viability" is used here in its technical, biological sense; a viable population is one that has a high probability of persistence (i.e., low probability of extinction). The four key population attributes used to assess the viability of a population include abundance, productivity, spatial structure, and diversity. *NMFS/FWS-Issue 7-McElhany-Exh. 1, at 3:16-18.*

7.4 Though PacifiCorp's dams, reservoirs and related activities have contributed to a degradation of habitat above Iron Gate Dam, there remains habitat suitable for coho within and above the Project. Yurok -Hillemeier at 2:18 to 4:2; NGO Exh. 27, at 1:25 (" … the amount of habitat above Iron Gate dam that is suitable for coho is substantial."); KTr CWH Exh. 34 at 1-2.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.5 Suitable habitat above Iron Gate Dam includes that found at Fall, Beaver, Deer, Shovel and Spencer Creeks. KTr CWH Ex. 12 at pp. 1-20; KTr CWH Exh 21 at pp. 1-4; KTr CWH Exh. 36 at 2:18-26; KTr FAE Exh. 34 at p. 2; Yurok-Hillemeier Direct at 3:6 (and exhibit 1, photographs of "good habitat" at Spencer Creek).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.6 Annually, several hundred naturally produced (unmarked) coho salmon return to Iron Gate Hatchery; these fish would be available to use habitat above Iron Gate Dam. NMFS/FWS-Issue 7-Simondet-Exh. 1, at 6:17 to 7:3.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.7 Restoring access by coho salmon to historic habitat above Iron Gate Dam will provide a significant opportunity for recovery of the coho salmon population; all generally accepted fish recovery strategies include the goals of extension of the range and enhancement of the distribution of the species NMFS/FWS-Issue 7-Simondet-Exh. 1, at 5:13 to 6:7; Yurok - Hillemeier 5:4-19 (one of the "quickest ways" to increase abundance); CDFG-Pisano-Exh. 1, at 12:22 (habitat increase is one of the "quickest ways to increase Klamath Basin salmonid populations"); KTr FAE Exh. 34 at p. 6.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.8 Access to now-closed habitat benefits the coho salmon population by making it more viable. A viable population is one that has a high probability of persistence (i.e., low probability of extinction). NMFS-Issue 7-McElhany-Exh. 1, at 2:20-21, and 3:16-18; NMFS-Issue 7-Williams-Exh. 1, at 3:22-23.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.9 Abundance of the coho population would be increased because the production from the Upper Basin would be in addition to current population levels. Hillemeier, at 5:4-7.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.10 Range and distribution (spatial structure) of the population would be improved by allowing coho salmon to once again inhabit a major portion of the historic range of the Upper Klamath coho population. Yurok-Hillemeier Direct, at 6:11-14; NMFS/FWS-Issue 7-Williams-Exh. 1, at 9:7-13.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.11 The genetic diversity of the coho population would be increased by allowing coho salmon once again to adapt to conditions of the Upper Basin, and allowing these fish to stray and exchange genetic material with other fish in other areas of the population. Yurok-Hillemeier Direct, at 6:15-22.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.12 The provision of spatially dispersed habitats, which would result by providing access above Iron Gate dam, reduces the extinction risks associated with catastrophic events. NMFS-Issue 7-McElhany, at pp. 3:9-11, and 4:7-9; Yurok-Hillemeier Direct, at 7:1-9.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 8:

Issue 8 Proposed Ultimate Finding of Fact: Access to habitat within the Project will benefit Pacific lamprey by increasing (1) spawning and rearing habitat, (2) diversity of habitat, (3) abundance, and (4) range and distribution.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact:

8.1 Prior to dam construction, Pacific lamprey occupied habitat now within the Project. Yurok-Steward direct, at 3:20 to 4:5.

RULING: REJECTED. There is insufficient evidence in the record to determine whether Pacific lamprey was historically 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*).

8.2 Pacific lamprey are found throughout the Klamath River mainstem and tributaries below the Project, as well as immediately below Iron Gate Dam. Yurok-Steward direct at 2:7-8.

RULING: ACCEPTED IN PART, REJECTED IN PART. There is insufficient evidence in the record determine whether Pacific lamprey are found "immediately below 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*).

8.3 Pacific lamprey stocks now located below Iron Gate Dam are genetically suited to occupy habitat within the Project now occupied by resident lamprey. Yurok-Hillemeier at 5:20-25; Yurok-Steward rebuttal at 3:11-20.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.4 Juveniles (ammocoetes) of resident lamprey are present in abundance in the majority of tributaries in the Klamath River in the Project reach. Ammocoetes of resident and Pacific lamprey have similar habitat requirements, and juveniles of both are often found cohabitating the same site. Yurok-Steward rebuttal at 4:22 to 5:8; Yurok-Steward at 4:2; PAC-Chane-D-1 at 8:8.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.5 Pacific lamprey exhibit the ability to re-populate areas from which they have been excluded. Yurok-Steward rebuttal at 4:5 [Exh. 1].

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.6 Volitional passage has been designed, is in place on other river systems, and is providing safe, effective passage for Pacific lamprey. NMFS/FWS-Issue 8-Moser at p. 5; NMFS/FWS-Issue 8-Moser rebuttal at 2:4 to 4:3; TR 4 at 178:12 to 180:23, 184:17 to 185:20; Yurok-Hillemeier Direct at 9:4-17.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

8.7 Benefits to lamprey from access to increased habitat include additional spawning and rearing areas (Yurok-Steward Direct at 4:27), opportunity for increased population growth (Id. at 5:17; NMFS/FWS-Issue 8-Hamilton, at 8:5-11, NMFS/FWS-Issue 8-Mesa at 5:16 to 6:6), and increased diversity of habitat and species distribution, further protecting the species. NMFS/ FWS-Issue 8-Mesa at 3:56 to 4:65; and CDFG-Pisano-Exh. 1 at 11:19 (spatially separated habitat protects species from catastrophic events which occur in one portion of the habitat).

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

RULINGS ON CONSERVATION AND FISHERIES GROUPS' (NGO) PROPOSED FINDINGS OF FACT

BLM ISSUE 10:

10.1. Subsection A.1(c) of BLM Condition 4 requires that PacifiCorp release a seasonal high flow between February 1 and April 15, and that it cease diversion to the powerhouse for a week, whenever the inflow to J.C. Boyle Dam first exceeds 3,300 cfs during this period in any given year. *See BLM-Turaski-Ex. 4 (BLM Preliminary Conditions) at A-16*.

RULING: ACCEPTED (This finding paraphrases the condition. To clarify, subsection A.1(c) of BLM Condition 4 requires that PacifiCorp release a seasonal high flow *for a period of seven days* between February 1 and April 15, and that it ceases diversion to the powerhouse for a week, when [*not* "whenever"] the inflow to J.C. Boyle Dam first exceeds 3,300 cfs during this period in any given year. (*BLM-Turaski-Ex. 4 at A-16*).)

10.2. The high flows will be implemented in combination with other requirements in BLM Condition 4. Subsection A.1(a)-(b) provides that PacifiCorp will release a continuous minimum flow not less than 40% of inflow into the bypassed reach. *BLM-Turaski-Ex. 4 at A-16.* Subsection D requires that PacifiCorp place gravel in an amount (varying between 1,226 to 6,134 tons/year), quality, and locations appropriate to restore channel depth, velocity, and substrate in the bypassed and peaking reaches. *Id. at A-17 – A-20.* Subsection E provides for adaptive management of the flow and gravel placement measures, to improve habitat quality and quantity for riverine and anadromous fish. *Id. at A-20 – A-21.*

RULING: REJECTED (This proposed finding addresses, in detail, an issue that has been withdrawn. 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)*).)

10.3. By diverting available inflow up to powerhouse capacity of 2,850 cfs (*Trush DT (NGO Ex. 1) at 14:16)*, J.C. Boyle Dam has significantly altered the flow pattern in the bypassed reach. An average minimum daily flow in the bypassed reach today (inclusive of the 100 cfs Project release and spring accretion) is roughly one-third of the historical 1,000 cfs. *Trush DT (NGO Ex. 1) at 11:3-17.1* During the spring, flood flows of any magnitude occur less frequently than pre-Project. For example, an annual flood peak of 5,530 cfs occurs 60% less frequently today than historically in the bypassed reach. *Trush DT, supra at 14:13 – 15:7.*

RULING: ACCEPTED (The 1,000 cfs cited from NGO-Ex. 1 at 11:3-17 represents water from years 1905 to 1913 which pre-date the damming of Upper Klamath Lake (1921 construction of Link River dam). (*PAC-Dwer-D-5 5.7.1 at 5-9 to 5-11, 5.7.3 at 5-15 to 5-10*). After this period, minimum average flows were sometimes lower than the 1,000 cfs baseline. (*NGO-Ex. 1, Figure 8; PAC-Dwer-D-5 5.7.1 at 5-9 to 5-11, 5.7.3 at 5-15 to 5-10*). This indicates that the J.C. Boyle dam is not the only factor affecting bypass reach flows.)

10.4. 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 gravels of sediment. *Tompkins XT (8/21 TR) at 64:12-23*. Diversion has reduced the capacity of flow to mobilize the bedload by an estimated 83 to 96% in the bypassed reach. *PAC-Tomp-D-3 (Water Resources FTR) at 6-139; Tompkins XT, supra at 69:7 – 70:15*.

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

10.5. Because of reduced frequency of bedload mobilization that scours vegetation within the wetted channel, the Project has permitted reed canarygrass (which is probably an exotic in this basin) to encroach into the bypass reach. *Trush DT (NGO Ex. 1) at 15:8-16*. This non-woody vegetation is now 62.9% of the total vegetation in the reach. *PAC-Dwer-D-4 (Terrestrial Resources FTR) at 2-49; Dwerlkotte XT (8/21 TR) at 98:1-20.*

RULING: REJECTED (This proposed finding suggests that the reduced frequency of bedload mobilization that scours vegetation has been the main cause of the encroachment of reed canarygrass. While reduced scouring may have contributed to the increase in reed canarygrass, it is likely not the main factor. Reduced flows attributed to the Project have created more exposed surface area for grass to grow; this has allowed for further encroachment of reed canary into the channel. (*FOF 10-6, 10-8, 10-16, 11-13*). Such non-woody vegetation now makes up approximately 2/3 of the vegetation in J.C. Boyle bypass reach. (*Id.*))

10.6. The eight species of riparian-focal bird species in the Project area *(Tressler DT (PAC-Tres-D-1) at 4:17-23)* do not nest in reed canarygrass (*Tressler XT (8/21 TR) at 124:16 – 125:25; see also Tressler DT, supra at 11:14-20),* which is accessible to predators. They prefer structurally diverse habitat. *Tressler XT, supra at 124:22-24; Tressler DT, supra at 13:7-11.*

RULING: ACCEPTED – PacifiCorp does not dispute this statement

10.7. Seasonal flows of 3,300 cfs or more, as required by BLM Condition 4.A.1(c), will increase the frequency of occurrence of bedload mobilization. *Trush DT (NGO Ex. 1) at 17:16-18; Carlson DT (PAC-Carl-D-1) at 10:9-11 (estimating that a flow of 1,700 cfs mobilizes bedload in bypass reach).* Such flows will result in more frequent scour of reed canarygrass within the active channel. *Trush DT, supra at 17:16-18, 15:10-12 (estimating that a flow of 5,500 cfs will scour newly established reed canarygrass).* Over time, this scour will reduce the current encroachment of reed canarygrass. That in turn will permit the growth of additional woody vegetation more suitable for the nesting and other life stages of riparian-focal bird species. *Id. at 17:11-18.*

RULING: REJECTED (Sufficient evidence has not been provided to show that additional woody vegetation will develop if BLM proposed conditions are initiated. (*FOF 10-16; See discussion section of BLM Issues 10-11*).)

10.8. In addition, since construction, J.C. Boyle Dam has captured an average of 6,124 tons/year of channel bedload and thus blocked its transport into the bypassed and peaking reaches. *Tompkins DT (PAC-Tomp-D-1) at 14:9-15; Tompkins XT (8/21 RT) at 74:22-25).* BLM Condition 4.D requires PacifiCorp to replace the amount of gravel and other sediments captured by J.C. Boyle Dam. Seasonal high flows which exceed the 1,700 cfs threshold for bedload transport will mobilize and distribute such placed gravel and cobble throughout the bypassed reach. *Trush DT (NGO Ex. 1) at 17:16-18.*

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

BLM ISSUE 11:

11.1. The findings under BLM Issue 10 addressing Project impacts on riparian vegetation in the bypassed reach are incorporated herein.

RULING: ACCEPTED

11.2. The Project has reduced the capacity of flow to mobilize channel bedload by 18 to 100%, by subreach, within the peaking reach. *PAC-Tomp-D-3 (Water Resources FTR) at 6-139.* This permits the encroachment of reed canarygrass, which is 6% of the riparian vegetation in the peaking reach (*PAC-Dwer-D-4 (Terrestrial Resources FTR at 2-49).*

RULING: ACCEPTED – PacifiCorp does not dispute this statement

11.3. The combined impact of flow regulation, and capture of bedload behind J.C. Boyle Dam, is to reduce the amount of gravel and cobble (relative to boulders and fine sediment) at the edges of depositional features in both reaches. *Trush DT (NGO Ex. 1) at 12:3-20; NGO Ex. 11 at 6.* However, the total acreage of depositional features has probably not changed in either reach since Project construction. *See Tompkins DT (PAC-Tomp-D-1) at 8:14-20, 11:6-14.*

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

BLM ISSUE 16:

16.1. The findings under BLM Issues 10 and 11, which address the impacts on depositional features, are incorporated herein.

RULING: ACCEPTED

16.2. Depositional features, such as gravel bars and side channels, are suitable spawning and rearing habitat for redband trout. Indeed, for juvenile trout, these features function as oases from the higher-velocity flows that occur, during springtime snowmelt, in the channel thalweg (the primary course of flow in the mainstem). *Trush DT (NGO Ex. 1) at 21:9-16, 21:1-2 (estimating that such features are roughly ½ of suitable habitat in bypass reach).*

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

16.3. The Project substantially reduces the frequency and extent of inundation of depositional features (*Trush DT (NGO Ex. 1) at 21:3-16)* which are roughly 16-20% of the bypassed reach (*id. at 20:20; Dwerlkotte DT (PAC-Dwer-D-1) at 5:20-23).* This hydrologic impact reduces the availability of suitable rearing habitat for juveniles. *See Trush DT, supra at 21:3-16.*

RULING: ACCEPTED (The J.C. Boyle dam is not the only factor affecting the historical higher flows which used to pass through the bypass reach. The damming of Upper Klamath Lake (1921 construction of Link River dam) would also contribute to lowing historical flows. (*PAC-Dwer-D-5 5.7.1 at 5-9 to 5-11, 5.7.3 at 5-15 to 5-10*). However, PacifiCorp has not shown that the damming would drop the flows to the current levels of approximately 100-330 cfs (100 cfs released from the dam and 230 cfs from springs in the bypass reach). (*FOF 19-2*). High flows will result in more suitable rearing habitat. (*NGO-Ex. 1 at 17:19-21:16; GO-Ex. 11 at 11-13 .)*

16.4. The Project reduces the frequency and extent of day-long inundation of depositional features in the peaking reach. Powerhouse discharge results in flow swings up to 2,850 cfs in this reach, resulting in intermittent inundation and drying-out of such features. This hydrologic impact reduces the availability of suitable rearing habitat for juveniles in the peaking reach. *Trush DT (NGO Ex. 1) at 32:4-7.*

RULING: ACCEPTED (PacifiCorp believes the PHABSIM studies show that the amount of usable habitat for trout is nearly maximized at the low flow within the typical peaking cycle. (*PAC-Ols-D-1 at 15:8-10*). However, credible testimony refutes this assertion. (*NGO-Ex. 1 at 21:17-23:7; NGO-Ex. 11 at 11-13).)*

16.5. J.C. Boyle Dam captures spawning gravels as well as other channel bedload. This capture has contributed to a very limited supply of gravel suitable for redband spawning in both reaches. *Carlson DT (PAC-Carl-D-1) at 9:9 (low amount of gravel in bypass reach); Olson XT (8/21 RT) at 154:19-23.* In the mainstem of the bypassed reach, redband are known to spawn only in the vicinity of a blow-out of the emergency spillway. *Carlson DT, supra at 8:13-19, 11:12-13*. They are not known to spawn anywhere in the mainstem of the peaking reach. *Olson DT (PAC-Ols-D-1) at 7:20-21.* As stated in Finding 10.8, the River Corridor Management Condition will enhance the deposit of spawning and other gravels at depositional features in these reaches.

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement

BLM ISSUE 19:

19.1. In the peaking reach, the typical experience flyfishing for redband trout is superior to many other rivers in the region. Many anglers describe the experience as good or excellent. *PAC-Carl-D-7 (Recreation FTR) at 2-68; Knight DT (NGO Ex. 5) at 10:11-19; Knight XT (8/22 TR) at 124:18-125:16.*

RULING: ACCEPTED - PacifiCorp does not dispute this statement

19.2. That flyfishing experience today is inferior to pre-Project condition. *Denman DT (BLM-Denman - Ex. 0) at 2:14-3:4.*

RULING: REJECTED (Denman's testimony is unpersuasive. Denman provides no specific data, has no river biology or geomorphology experience, and his testimony is based upon personal observations of fish size made more than forty-six years ago. (*BLM-Denman-Ex. 0 at 2:23 to 3:4 & 3:21 to 4:2*).)

19.3. The River Corridor Management Condition will result in steadier flows across the angling day. The proposed baseflows (approximately 700 cfs, including project release and spring accretion) will be higher than current dawn and dusk flows (approximately 350-400 cfs) but lower than current daytime peaking flows (approximately 1,500-3000 cfs). *BLM-Turaski-Ex. 4 (Preliminary Conditions) at 89, 94; PAC-Carl-D-7 (Recreation FTR) at 2-80.*

RULING: ACCEPTED (This proposed finding provides a brief overview of BLM proposed flows. A more complete description of the proposed base flows are found in PAC PFF 94-105)

19.4. Under this proposal, wading access (or fishability) at dawn and dusk will likely 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 (Recreation FTR) at 2-94; Knight DT (NGO Ex. 5) at 7:10-15; Knight XT (8/22 TR) at 121:14 - 123-4, 133:10-134:16.*

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement.

19.5. At some locations, the proposed flow will improve fishability during dawn and dusk hours by improving traction (as a result of increased gravel availability at the channel margin) and decreasing the encroachment of reed canarygrass into the channel. *Knight DT (NGO Ex. 5) at 9:7-17; Knight XT (8/22 TR) at 122:8-123:4; see Proposed Findings 10.7 - 10.8.*

RULING: REJECTED – (NGO Witness Knight testimony is too speculative. Knights testifies that "you might have a little bit more space" for casting if small riparian vegetation developed. (*Aug. 22, 2006 Tr. at 121:25-122:1*). Knight also testifies that he "would expect sediment" to be deposited, which would help the wading. However, he is unsure of how long this will take to develop, possibly five to twenty years for this to occur. (*Aug 22, 2006 Tr. at 122:23 to 123:18*). Such a large time frame indicated his conclusion is not well developed.)

19.6. Based on experience with changed flow regulation on other rivers, it is reasonable to expect that anglers in the peaking reach will adjust their tackle and techniques to accommodate the proposed flows if implemented. *PAC-Carl-D-7 (Recreation FTR) at 2-97; id. at 2-63-64, 2-95; Knight XT (8/22 TR) at 131:8-10.*

RULING: ACCEPTED – PacifiCorp does not generally dispute this statement.

19.7. The proposed flows will probably increase the population of the redband trout fishery. *See BLM Issue 16 Proposed Findings.*

RULING: ACCEPTED – (See discussion section of BLM Issue 16/17)

19.8. Many anglers believe that this biological benefit is more important than any incremental difficulty in their wading access. *PAC-Carl-D-7 (Recreation FTR) at 2-98; Knight DT (NGO Ex. 5) at 9-11; Knight XT (8/22 TR) at 131:11-22; Whittaker XT (8/21 TR) at 233:1-234:13.*

RULING: ACCEPTED

USFWS/NMFS ISSUE 2(A):

Proposed Finding: Stocks of steelhead trout, coho salmon, chinook salmon, and Pacific below Iron Gate Dam have the genetic and other traits suitable for use of habitat above that dam if fishways provide effective passage.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings of Fact

2A.1. Steelhead trout, coho salmon, chinook salmon, and Pacific lamprey historically used habitat in the Klamath River above and below the current site of Iron Gate Dam. *See Franklin DT (HVT-Franklin-Ex. 1*) *at 2:23-3:5; HVT-Franklin-Ex. 4, at 4:21-23; HVT-Franklin-Ex. 6 (Fall Creek); NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 3:1-3:14; NMFS/FWS-Issue 6-Hamilton-Ex. 10 (historical review of data on fish presence, including Pacific lamprey, in upper basin); NMFS/FWS-Issue 8-Hamilton-Ex. 6 at 6-7 (Pacific lamprey); Malone XT (8/24 TR) at 11:1-6; Hooton DT (NMFS/FWS-Issue 2C-Hooton-Ex. 1) at 2:1-17 (steelhead); CDFG-Pisano-Ex. 6 (anadromous fish spawned up to Copco prior to Iron Gate Dam); Malone XT (8/24 TR) at 11:1-6.*

RULING: ACCEPTED IN PART, REJECTED IN PART. The record evidence is inconclusive as to whether Pacific Lamprey used habitat above 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*).

2A.2. These anadromous fish today use the Klamath River downstream of Iron Gate Dam. *MLONW xt (8/24 tr) AT 10:18-11:1; Franklin DT (HVT-Franklin-Ex. 1) at 2:10-17; Cleve Steward Direct (for Yurok Tribe, Issue 8) at 3:1-9 (Pacific lamprey); Steward Yurok Ex. 5 (distribution of lamprey); NMFS/FWS-Issue 4-Hooten-Exh. 14 (Fish Resources FTR, passim.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.3. Iron Gate Dam, which blocks upstream passage, has necessarily changed the behavior of these anadromous fish, limiting them to habitat below the dam; but it has not resulted in any changes in their genetic traits which favor migration. *Malone XT (8/24 TR) at 64:12-15.* These stocks, which evolved in the entire Klamath and still exist in the lower Klamath, still have the genetic traits suitable for reintroduction. *Garza DT (NMFS/FWS-Issue 2A-Garza-Ex. 1) at 4:1-5:7 and 6:1-3; Hooton DT (NMFS/FWS-Issue 2C-Ex. 1) at 2:19-3:11; 4:12-5:10 and 6:1-3 (steelhead in Bogus Creek genetically very similar to Spencer Creek resident trout).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.4. These anadromous fish each use habitat below Iron Gate Dam that is similar to that which is found above Iron Gate Dam. *Huntington DT (KTr. Huntingron Direct-Issue 2) at 2:21-22 and 5:106-109; KTr-CWH-Ex. 1 (fish reintroduction plan); KTr-Dunsmoor Direct-Issue 2, at 1:10-12, 3:3-9 and 4:3-4:5; Curtis RT (NMFS/FWS-Curtis-Issue 2A) at 2:1-5; Pisano DT (CDFG-Pisano-Ex. 1) at 4:20-5:1 and 7:24-82.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.5. It is likely that these fish will migrate above Iron Gate Dam if fishways provide access. *Franklin DT (HVT-Franklin-Ex. 1) at 3:10-20 and 5:22-23, 7:11-9:20 and 13:11-17; KTr-CWH-Ex. 1 (reintroduction plan); Malone XT (8/24 TR) at 11:20-22; Moser XT (8/24 TR) at 170:2-14 (lamprey); Moser DT (NMFS/FWS-Issue 8-Moser-Ex. 1) at 8:4-9:16 (lamprey); Steward DT (Yurok Issue 8) at 4:28-6:8 (lamprey); Hamilton XT (8/24 TR) at 273:11-274:8 (lamprey); Pisano DT (CDFG-Pisano-Ex. 1) at 10:12-11:8.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.6. The timing of spawning and out-migration of anadromous fish corresponds with periods of higher flows and lower temperatures so that conditions within the Project are not expected to preclude anadromous fish from successfully using habitat with and above the Project. *Hamilton DT (NMFS/FWS-Issue 6-Hamilton-Ex. 1) at 5:19-7:13; NMFS/FWS-Issue 6-Hamilton Rebuttal-Ex. 1, at 2:23-3:16 and 5:19-6:4; NMFS/FWS-Issue 2-Hamilton Rebuttal-Ex. 1 at 3:14-22 and 5:3-5; NMFS/FWS-Issue 7-Simondet Rebuttal-Ex. 1 at 4:3-6; Hamilton XT (8/24 TR) at 213:12-214:6.*

RULING: ACCEPTED IN PART, REJECTED IN PART. Some anadromous fish stock will experience the sub-optimal environmental conditions above Iron Gate Dam if fish passage is provided. For instance, fall-run Chinook salmon pawn in early September and continues through late October. 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*). This also happens to be the time when flows are generally at their lowest above Iron Gate Dam. (*PAC-MAL-D-1 at 36:8-14*).

Similarly, juvenile fall-run Chinook salmon begin out-migration 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*).

Conversely, 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. July and August are the times of high water temperature. 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*). Although warm temperature is a problem, it will not preclude anadromous fish from successfully using habitat above Iron Gate Dam. (*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.7. Anadromous fish are highly adaptive to changing conditions and will migrate to and colonize unused habitat. *R. Williams DT (NGO Ex 3) at 12:3-21; Garza DT (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 (colonization of Great Lakes); Malone XT (8/24 TR) at 11:24-15:9 (wild fish could adapt to conditions above Iron Gate, no studies indicating contrary); HVT-Franklin-Ex. 8 (colonization in NZ); Franklin DT (HVT-Franklin-Ex. 2) at 2:20-2:26; Pisano DT (CDFG-Pisano-Ex. 1) at 8:14-9:7 (Klamath salmonids usually tolerant of high water temperatures).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.8. Fish predation is not likely a significant risk to juvenile salmonids migrating through Project reservoirs. While smallmouth bas in other basins predate on such juveniles (*Malone DT (PAC-Mal-D-1) at 13:15-14:10)*, that species is not known to be present in the Klamath above Iron Gate Dam. *Hamilton RT (NMFS/FWS-Issue 2-Hamilton Rebuttal-Ex. 1) at 4:7-13*. Yellow perch will probably also not cause significant mortality to such juveniles, because few exist in these reservoirs. Predation by largemouth bass in the lower Klamath will probably not be a greater risk to outmigration than currently. *Hamilton RT (NMFS/FWS-Issue 2-Hamilton Rebuttal-Ex. 1) at 4:13-5:5; NMFS/FWS-NMIssue 2-Hamilton Rebuttal-Ex. 4; NMFS/FWS-Issue 2-Hamiltion Rebuttal-Ex. 6.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2A.9. PacifiCorp's radio-tag study is suggestive but not persuasive evidence of a high mortality rate for outmigrating juveniles. *See PAC-Ols-D-11*. The study, which used small sample cohorts of radio-tagged juveniles, did not produce statistically reliable results, as shown by cohort mortality rates ranging from 0 to 100%. *NMFS/FWS-Issue 2-Hamilton Rebuttal at 2:18-3:7; NMFS/FWS-Issue 6-Hamilton Rebuttal at 6:7-24; NMFS/FWS-Issue 2-Hamilton Rebuttal-Exh. 8 (letter from FWS objecting to use of pilot study to predict transit mortality); Malone XT (8/24 TR) at 54:10-55:2 (acknowledging that one of the three chinook study groups had a passage success rate of 0% and another of the three had a passage success rate of 100%)*. Further, the overall mortality rate was high in that study partly because the study used hatchery fish that were unused to wild conditions and particularly vulnerable to predation because of the procedures used. *See Olson XT (8/23 TR) at 221:6-233:7, 237:7-237:20; Simondet RT (NMFS/FWS-Issue 7-Simondet Rebuttal) at 7:3-7:11 (hatchery fish lack the predator avoidance skills of wild fish)*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NFMS Issue 2B

Proposed Finding: Passage of anadromous fish via the prescribed fishways presents a low risk of introducing pathogens to resident fish inhabiting the basin above Iron Gate Dam.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings:

2B.1. Prior to construction of the dams, anadromous fish were prevalent in many places above Iron Gate Dam and freely intermingled with resident fish. *HVT-Franklin-Ex. 4, at 4:21-23; Hamilton DT (NMFS/FWS-Issue 6-Hamilton-Ex. 1) at 3:1-3:14; Malone XT (8/24 TR) at 11:1-6; NMFS/FWS-Issue 6-Hamilton-Ex. 10; Steward DT (Yurok Tribe, Issue 8) at 3:18-4:8 (Pacific lamprey); Hamilton XT (8/24 TR) at 273:1-274:8 (Pacific lamprey).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.2. Because of that long history of intermingling, the fish in both upper and lower basins still generally share the same suite of pathogens. In other words, pathogens present in the lower basin are also widely present in the upper basin above Iron Gate Dam. These common pathogens include: *Ceratomyxa shasta, Ichthyophthirius multifilis* (Ich), *Flavobacterius columnaris, Parvicapsula minibicornis* and *Infectious Hematopoietic Necrosis (IHNV). Foott DT (NMFS/FWS-Issue 2B-Foott-Ex. 1) at 4:18-22; Cox DT (CDFG Cox Ex. 1) at 3:8-23 and 4:20-21); NMFS/FWS-Issue 2B-Foott-Ex. 5 at 4 (columnaris outbreaks in Upper Klamath Lake recent years); Cox XT (8/25 TR at 39:1-40:7); Foott XT (8/24 TR) at 199:2-200:1.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.3. The only salmonid pathogen found in the lower basin but not known to occur in the upper basin is *Renibacterium salmoninarum.* It is found, though rarely, in most salmonid populations, and it is therefore likely to be already present in the upper basin; but reliable information on its presence in the upper basin is not available. Since the infection rate is insignificant in the lower basin, and it is reasonable to expect the same outcome in the upper basin as a result of passage. *Foott DT* (*NMFS/FWS-Issue 2B-Foott-Ex. 1) at 2:7-11, 3:13-14; NMFS/FWS-Issue 2B-Foott-Ex. 4 at 8 (R. salmoninarum has only minor impact on salmon health in lower basin).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.4. Generally, with the exception of *F. columnaris* and *Ichthyophthirius multifilis* (Ich), pathogens associated with anadromous fish do not impact non-salmonid fish. Both of these pathogens are already present throughout the upper basin. *Foott DT (NMFS/FWS-Issue 2B-Foott-Ex. 1) at 2:15-17 and 3:25-4:4; NMFS/FWS-Issue 2B-Foott-Ex. 5 at 4 and 21 (fish kills in Upper Klamath Lake due to F. columnaris among other causes).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.5. *Ceratomyxa shasta* (*C. shasta*) primarily affects chinook salmon and has little effect on steelhead or their closely-related resident trout stocks. Most trout populations above Iron Gate Dam have a high natural resistance to *Ceratomyxa shasta. Foott DT (NMFS/FWS-Issue 2B-Foott-Ex. 1) at 4:17-5:3; NMFS/FWS-Issue 2B-Foott-Ex. 7 at 12-13; Hooton DT (NMFS-FWS-Issue 2C-Hooton-Ex. 1) at 5:12-16; Foott XT (8/24 TR 197:15-20).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2B.6. Passage of anadromous fish into the upper basin will probably not introduce pathogens which are absent from the upper basin, or to which the resistance of resident fish is low. *Foott DT (NMFS/FWS-Issue 2B-Foott-Ex. 1) at 4:4-5:4; Cox DT (CDFG-Cox-Ex. 1) at 5:6-9; Franklin DT (HVT-Franklin-Ex. 1) at 6:11-14.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS Issue 2C:

Proposed Finding: Facilitating the movement of wild steelhead above Iron Gate Dam via prescribed fishways is unlikely to result in high levels of residualization. Any residualization which occurs is unlikely to adversely affect resident trout.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings:

2C.1. Wild steelhead use the Klamath River below Iron Gate Dam. *Chesney DT (CDFG Chesney Ex. 1) at 6; PAC-Carl-D-3 (Fish Resources FTR) at 2-16 (Table 2-7-1, showing distribution of fishes in Klamath River).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.2. Steelhead have the genetic ability to recolonize historic habitat made accessible by fishways. Passage over Project dams will reintroduce steelhead to the upper Klamath Basin. *R. Williams DT (NGO Ex. 3) at 12:7-8; NGO Ex. 20 at 91-93.* They also have a behavioral tendency to use unused habitat. *R. Williams DT, supra at 12:13-18; NGO Ex. 20 at 92 (Glacier Bay and the Toutle River in southwest Washington following the 1980 eruption of Mt. St. Helens).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.3. Steelhead and riverine trout are the same species, but they differ in their life histories. *See Proposed Finding 654* After hatching and early rearing in riverine habitat, steelhead juveniles outmigrate to the ocean where they mature into adults before returning to the riverine habitat for spawning. By contrast, redband trout spend all of their life stages in the Klamath River. *Olson DT (PAC-Ols-D-1) at 18:22-23; PAC-Carl-D-3 (Fish Resources FTR) at 2:18.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.4. Resident trout have the genetic capacity to adopt anadromy and outmigrate to the ocean, where passage exists. Following construction of the prescribed fishways, some of the existing redband trout will probably adopt this behavior. *Olson XT (8/23 TR) at 196:16-24 ("... resident [trout] can become steelhead, and steelhead can residualize and try to become resident trout.").*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.5. Conversely, steelhead have the genetic capacity to residualize (remain in freshwater) when introduced into riverine habitat *(R. Williams DT (NGO Ex. 3) at 11:4-5),* although wild steelhead do so to a much lesser extent than hatchery fish. *Id. at 11:5-7; see Olson XT (8/23 TR) at 200:13-14 ("[w]e don't know" whether residualization of steelhead is a problem).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.6. When steelhead and riverine trout occupy the same habitat in a river, they may interbreed. Indeed, resident trout above the site of Iron Gate Dam probably interbred with coastal steelhead prior to Project construction. *R. Williams DT (NGO Ex. 3) at 10:15-18; NGO Ex. 18 at 8 ("the close similarity of rainbow trout from Spring Creek and Trout Creek (which are above Upper Klamath Lake) to Spencer Creek and the Klamath River (which are below Upper Klamath Lake) and to steelhead from Bogus Creek in California [which are below Iron Gate Dam] suggests that some of these lake populations were once associated with runs of anadromous rainbow trout").*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.7. Any residualizing which occurs is unlikely to adversely affect the genetic traits of the resident trout fishery. *R. Williams DT (NGO Ex. 3) at 11:5-7 ("...I was unable to find any instances where naturally-spawning steelhead populations had expressed high levels of juvenile residualization and interacted negatively with resident trout."); Olson XT (8/23 TR) at 208:18-23 ("Q: Is there any scientific studies that – that were conducted which would demonstrate that a reintroduction of steelhead would have a detrimental effect on the genetic makeup of these trout? A: Not specific to the Klamath basin.").*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.8. As shown in other restoration efforts in the Pacific Northwest, wild steelhead and redband trout fisheries are likely to co-exist without adverse consequences in the upper Klamath Basin, following reintroduction of steelhead via the prescribed fishways. *R. Williams DT (NGO Ex. 3) at 11:13-16 (citing to restoration efforts in Deschutes River in Oregon and Yakima River in Washington).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

2C.9. The risk of residualization of redband trout may be minimized through adaptive management. *Huntington DT* (*KTr-Huntington-Ex. 1); R. Williams DT (NGO Ex. 3) at 11:8-12.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 3

Proposed Finding: Inadequate fish passage at J.C. Boyle Dam, and the absence of upstream fish passage at the other project dams, has reduced access to productive spawning and rearing habitat in tributaries such as Spencer Creek. These limitations on the fishery's natural tendency to migrate have impaired genetic diversity and production, even though the fishery from an angling perspective is in excellent condition.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings:

3.1. Resident trout of the Klamath River Basin include resident rainbow and redband trout. *Olson XT (8/23 TR) at 168:18-21; PAC-Carl-D-3 (Fish Resources FTR) at 2:18.* Redband trout were probably the most abundant and widespread. *J. Williams DT (NGO Ex. 2) at 1-2; NGO Ex. 15 at 1201 (redband occupied 77% of the basin).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.2. Before Project construction, resident trout in the Klamath River migrated within the mainstem and between the mainstem and tributaries. *J. Williams DT (NGO Ex. 2) at 20:2-6; NGO Ex. 14 at 103.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.3. Such migration within a basin is a genetic trait of resident trout. *Olson XT (8/23 TR) at 167:16-23 – 168:7.* This trait increases the reproductive success of individual fish. *NGO Ex. 20 at 91-93.* At the population level, the traits helps a fishery survive despite adverse localized changes to some of its riverine habitat. *J. Williams DT (NGO Ex. 2) at 19:15-18; NGO Ex. 15 at 1210; Olson XT (8/23 TR) at 167:11-25, 168:3-7.* Indeed, the genetic mixing between sub-stocks resulting from such migration helps maintain a robust population (*J. Williams DT, supra at 19:7-9)* and improves the odds of survival of a fishery in the face of adverse habitat changes at a watershed scale *(id. at 19:14-15; Olson XT (8/23 RT) at 168:3-6.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.4. Isolation of riverine habitat can impact the health of a resident trout fishery. *NGO Ex. 15 at 1212 ("If watershed disturbances result in loss of corridors or connecting habitats, remaining redband trout populations can be progressively isolated into smaller and smaller patches of productive habitat"); NGO Ex. 14 at 100 ("[g]enetic and evolutionary theory predicts that isolated populations restricted to small areas of habitat have much greater losses of genetic variation and higher rates of extinction than unisolated ones").* Conversely, renewed access to historic habitat may benefit the health of the fishery. *J. Williams RT (NGO Ex. 28) at 2:4-16 (describing the impacts when Goose Lake on the Oregon-California border dried up, then refilled, in the 1990s).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.5. The Project restricts migration of resident fish within the mainstem and into and out of tributaries. *J. Williams DT (NGO Ex. 2) at 19:12-14.* Iron Gate and Copco 1-2 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. The stocks between each of Iron Gate, Copco 1, and Copco 2 Dams are similarly isolated.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.6. J.C. Boyle Dam has a fishway for upstream passage of redband trout. Such passage has declined by 98% since initial operation of the fishway in 1959. *NGO Ex. 17 at 379; J. Williams DT (NGO Ex. 2) at 20:19-20.* A rock cascade which starts at the entry of the fishway and extends downstream may be the cause for such limited use. *See Olson XT (8/23 TR) at 149:22 - 152:15.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.7. Spencer Creek is highly productive spawning and rearing habitat for redband trout. NGO Ex. 16 at 3. The stock of redband trout in the bypassed and peaking reaches below J.C. Boyle Dam is now effectively blocked from Spencer Creek and other suitable habitat upstream.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.8. The Project's limitation on riverine migration may have reduced the genetic diversity of the remaining stocks within the Project reaches. *J. Williams DT NGO Ex. 2) at 13:6-10, 21:1-9; NGO Ex. 14, Figure 3 at 103 (showing that the average heterozygosity and number of polymorphic loci, which measure genetic diversity in redband trout and other fishes, declined in the Klamath River stocks isolated by dams compared to stocks that were not so isolated).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

3.9. Consistent with their genetic traits that favor migration, the remaining stocks of redband trout will recolonize areas that are currently blocked, once effective passage is provided. *J. Williams RT (NGO Ex. 28) at 2:4-16; Olson XT (8/23 TR) at 176:17-24*.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS ISSUE 6:

Proposed Ultimate Finding: A total of 58 miles of suitable habitat, including 28 miles of mainstem and 30 miles of perennial and intermittent tributaries, exists above Iron Gate Dam. Such suitability varies across species, life stages, locations, and time.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings:

6.1. Habitat is suitable for use by anadromous fish if the habitat could be successfully used by at least one life history phase of one fish species for at least one period of the year. *PAC-Mal-D-30, Interrogatory 51 at 55-70 (FWS/NMFS' answer to PacifiCorp's interrogatories); Franklin DT (HVT-Franklin-Ex. 2) at 2:20-2:26; Smith DT (NMFS/FWS-Issue 6-Smith-Ex. 1) at 2:18-2:24; Snedaker XT (8/22 TR) at 197:12 - 197:22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.2. Such suitability varies across species, locations in the mainstem and tributaries, and time at any one location. *Hamilton XT (8/24 RT) at 283:25 – 285:20.* Faced with such variability, an individual fish will move to the extent feasible to more suitable habitat within that tributary or elsewhere. *Id.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.3. Anadromous fish are highly adaptive to differing conditions and typically can readily migrate into and colonize unused habitat. *Garza DT (NMFS/FWS-Issue 2A-Garza-Ex. 1) at 2:8-3:25; see also NMFS/FWS-Issue 2A-Garza-Ex. 6 at 6, col. 2, full para. 1-3; NMFS/FWS-Issue 2A-Garza-Ex. 8 at 13, col. 2, full para. 1; NMFS/FWS-Issue 2A-Garza-Ex. 4 at 3, col. 1, full para. 1 (colonization of Great Lakes); see also Malone XT (8/24 TR) at 11:24-15:9 (wild fish could adapt to conditions above Iron Gate, no studies indicating contrary); HVT-Franklin-Ex. 8 (colonization in NZ); Franklin DT (HVT-Franklin-Ex. 2) at 2:20-2:26; Pisano DT (CDFG-Pisano-Ex. 1) at 8:14-9:7 (Klamath salmonids unusually tolerant of high water temperatures).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.4. Wild steelhead trout, coho salmon, chinook salmon, and Pacific lamprey historically extensively used habitat found above Iron Gate Dam for spawning and other life stages. *See Franklin DT (HVT-Franklin-Ex. 1) at 2:23-3:5; HVT-Franklin-Ex. 4 at 4:21-23; HVT-Franklin-Ex. 6 (Fall Creek); NMFS/FWS-Issue 6-Hamilton-Ex. 1 at 3:1-3:14 and citations therein; NMFS/FWS-Issue 6-Hamilton-Ex. 10 (historical review of data on fish presence, including Pacific lamprey, in upper basin); NMFS/FWS-Issue 8-Hamilton-Exhibit 6 at 6-7 (Pacific lamprey); Cleve Steward Direct (Yurok Tribe, Issue 8) at 3:18-4:8 (Pacific lamprey); Malone XT (8/24 TR) at 11:1-6; Hooton DT (NMFS/FWS-Issue 2C-Hooton-Ex. 1) at 2:1-17 (steelhead); CDFG-Pisano-Ex. 6 (anadromous fish spawned up to Copco prior to Iron Gate Dam); Malone XT (8/24 TR) at 11:1-6.*

RULING: ACCEPTED IN PART, REJECTED IN PART. As for Pacific lamprey, there is insufficient evidence in the record to determine whether that fish was historically 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*).

6.5. Anadromous steelhead in the lower basin are the same species (*O. mykiss*) as upper basin redband or rainbow trout, differing only in life histories. *Franklin RT (HVT-Franklin-Ex. 12) at 3:3-4; Chesney DT (CDFG-Chesney-Ex. 1) at 4:18-22; CDFG-Chesney-Ex. 5 at 1, column 1 and pg. 2, column 1; CDFG-Chesney-Ex. 15; CDFG-Chesney-Ex.17; CDFG-Chesney-Ex. 19 (freshwater O. mykiss can become anadromous even after 70 years landlocked); Garza DT (NMFS/FWS-Issue 2A-Garza-Ex. 1) at 5:8-11; NMFS/FWS-Issue2A-Garza-Ex. 5 at 141 – 142; Williams Direct (NGO Ex. 3) at 9:15-20; NGO Ex. 18 at 8, para. 2 and chart at 9; Hooton DT (NMFS/FWS-Issue 2C-Ex. 1) at 2:19-3:11, 4:12-5:10, and 6:1-3; Olson XT (8/23 TR) at 196:16-24; Olson DT (PAC-Ols-D-1) at 18:16 - 19:11.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

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

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

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

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.8. There are 28 miles of suitable habitat in the mainstem, if suitability is defined as stated in Proposed Findings 6.1-6.2. *NMFS/FWS-Issue 7-White-Ex. 14 (Preliminary Section 18 Prescriptions), Table 3 at A21.* Such habitat includes areas cooled by springs (thermal refugia) in the J.C. Boyle bypass larger than any below Iron Gate Dam. *Snedaker DT (NMFS/FWS-Issue 6-Snedaker-Exh. 1) at 5:18-6:2; Hooton DT (NMFS/FWS-Issue 4-Hooton-Exh. 1) at 3:6-9 (Spencer Creek very good habitat for trout); Dunsmoor DT (KTR-Dunsmoor Direct-Issue 2) at 3:3-9 and 4:3-4:5; Franklin DT (HVT-Franklin-Ex. 2) at 3:9-22; Huntington DT (Issue FWS 6) at 3:15-8:4; KTr-CWH-Ex. 7 at 6-8; Smith DT (NMFS/FWS-Issue 6-Smith-Ex. 1) at 1:19-3:5; CDFG-Pisano-Ex. 6 (anadromous fish spawning to Copco prior to construction of Iron Gate Dam); Belchik XT (8/25 TR) at 98:10-14 and 101:20-102:7 (J.C. Boyles bypass reach thermal refugia many times larger than Blue Creek, the largest known refugia below Iron Gate Dam).* Suitability for spawning assumes that gravels will be placed as required by BLM Condition 4.D.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.9. Coho and chinook salmon may use tributary habitat with a gradient up to 7%. *See Snedaker XT (8/22 RT) at 208:19-21.* Steelhead may use tributary habitat with gradient as high as 15% and could therefore re-colonize areas inaccessible to coho or chinook salmon. *Snedacker XT, supra at 44:1-46:11; KTr-CWH-Ex. 7 Tables at 6-8.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.10. There are at least 12 miles of perennial stream reaches within the Project area that have gradients at or below 15%. *See NMFS/FWS-Issue 7-White-Ex. 14 (Preliminary Section 18 Prescriptions), Table 3 at A-21.* These include: Jenny Creek, Fall Creek, Shovel Creek, and Spencer Creek, presently support spawning by resident salmonids, strongly suggesting they would be suitable for use by anadromous fish. *Smith DT (NMFS/FWS-Issue -Smith-Ex.1) at 2:18-24; Olson DT (PAC-Ols-D-1) at 6:18-20, 7:22-8:11 and 22:19-23; Hamilton DT (NMFS/FWS-Issue 6-Hamilton-Exh. 1) at 4:12-5:9; Hooton DT (NMFS/FWS-Issue 4-Hooton-Exh. 1) at 3:6-9; Malone XT (8/24 TR) at 65:10-15.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.11. There are 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 (Preliminary Section 18 Prescriptions), Table 3 at A-21. See also Simondet RT (NMFS/FWS-Issue 7-Simondet Rebuttal-Ex. 1) at 4:6-11; Franklin DT (HVT-Franklin-Ex. 2) at 2:20-26; Hillemeier DT (Issue 6) at 3:14-5:17 and 6:19-22; Hamilton DT (NMFS/FWS-Issue 6-Hamilton-Exh. 1) at 5:11-7:13; Smith DT (NMFS/FWS-Issue 6-Smith-Ex. 1) at 2:13-16 and 3:7-22; Hamilton DT (NMFS/FWS-Issue 6-Hamilton-Exh. 1) at 5:11-7:13.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

6.12. As defined in Proposed Finding 6.1, an approximate total of 28 miles of suitable habitat exists in the mainstem, and 30 miles in the perennial and intermittent tributaries in the Project area. *PAC-Mal-D-12 at 118, Table 19 (estimates 166.75 miles of suitable rearing habitat above Copco, at least 29.50 miles within the Project, not considering the J.C. Boyle bypass reach or tributaries) and at 120-122, Table 20 (showing good salmon and steelhead habitat in numerous places within the Project); KTr-CWH-Ex. 7 at 6-8 (tables showing 60.62 miles of suitable habitat for fall-winter steelhead within Project, 596.52 miles total suitable habitat above Iron Gate Dam); PAC-Mal-D-30, Interrogatory 51 at 55-70 (NMFS/FWS answers to PacifiCorp's interrogatories); see also Huntington DT 2:5-3:13; KTr-CWH-Ex. 7 at 6-8; Franklin DT (HVT-Franklin-Ex. 3) at 2:5-15 and 3:1-8; Huntington DT (Issue FWS 6) at 2:5-3:13; Smith DT (NMFS/FWS-Issue 6-Smith-Ex. 1) at 1:19-5:24.* As stated in Proposed Finding 6.2, the suitability of such habitat varies across species, life stages, locations, and time.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

USFWS/NMFS Issue 7

Proposed Finding: Access to habitat within the Project will probably benefit coho salmon which are now limited to the lower Klamath Basin. Access to additional and diverse spawning and rearing habitat will probably result in a net increase in the population, better spatial distribution, and improved genetic diversity of this population, which otherwise is at risk of extinction.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

Proposed Supporting Findings:

7.1. The findings under USFWS/NMFS Issue 2A addressing coho salmon stocks and the risks of predation, and the findings under USFWS/NMFS Issue 6 addressing coho salmon habitat are incorporated herein.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.2. The coho salmon stock of the Klamath River is a sub-population of the Southern Oregon/Northern California Coastal "Evolutionarily Significant Unit" ("SONCC ESU"). *NMFS-Issue 7-Simondet Ex. 5 (Coho Status Review) at 117.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.3. The SONCC population has declined 70% over the past 40 years in the ESU, including the Klamath. *NMFS-Issue 7-Simondet Ex. 5 (Coho Status Review) at 117.* Absent access to additional or improved habitat and other recovery efforts, the population decline will probably continue at that rate. *Id. at 117-120; see Olson DT (PAC-Ols-D-1) at 42; Olson XT (8/23 TR) at 247:1-15, 247:21-248:4 (conceding that there is no evidence to show that unused "seeding capacity" exists below Iron Gate); Simondet RT (NMFS/FWS-Issue 7-Simondet Rebuttal Ex. 1) at 2:13-18 (conditions below Iron Gate are likely to get worse over time relative to conditions above, due to development trends) and at 5:18-19.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.4. The reduction in the quantity and quality of suitable habitat since the 1960s has materially contributed to the 70% decline in the SONCC coho population. *NMFS-Issue 7-Simondet Ex. 6 (ESA Listing) at 5-6.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.5. Iron Gate Dam eliminated access to approximately 40% of the historic habitat of coho salmon in the Klamath Basin. *T. Williams DT (NMFS/FWS-Issue 7-Williams Ex. 1) at 6:7-11.*

RULING: REJECTED. The amount of historic habitat eliminated by the dams is unknown because the record evidence is inconclusive as to the extent of the upstream historical distribution of Coho salmon above Iron Gate Dam. The evidence definitively shows that Coho salmon used habitat 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*).

7.6. Suitable habitat for all life stages of coho salmon is available in perennial and intermittent tributaries. *Duffy RT (NGO Ex. 27) at 2:3-3:10, 6, 7 (describing recent site visits and favorable stream temperatures even in August); Simondet RT (NMFS/FWS-Issue 7-Simondet Rebuttal Ex. 1) at 2:22-5:5 (describing August stream temperatures and other favorable habitat characteristics); Franklin DT (HVT, Franklin, Ex. 1) at 3:9-4:6. See PAC-Ols-D-1 at 38:11-39:12; Malone XT (8/24 TR) at 65:10-15.* These include Spencer, Fall, Beaver, Deer, Shovel, Scotch, and Jenny Creeks. The mainstem also has suitable habitat. *Duffy RT (NGO Ex. 27) at 2:3-3:10, 6, 7; Simondet RT (NMFS/FWS-Issue 7-Simondet Rebuttal Ex. 1) at 2:22-5:5; Franklin DT (HVT, Franklin, Ex. 1) at 3:9-4:6.* Indeed, suitable habitat for coho salmon within the Project reaches may exceed 10% of such habitat in the Klamath Basin. *Duffy DT (NGO Ex. 4) at 7:10-14, 8:4-6, 9:3-10:7, 10:18-20, Figures 1-4.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.7. Habitat is "suitable" if it can be used successfully at least some of the time by one or more life stages of a coho salmon. *See Proposed Findings 6.1-6.2.* 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 a given tributary or elsewhere. *Hamilton XT (8/24 RT) at 283:25 – 285:20.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.8. Habitat in the lower Klamath Basin, like the Project reaches, has variable suitability across locations, time and life stages. *Hamilton XT (8/24 RT) at 283:25 – 285:20.* Coho salmon successfully use downstream habitat that is no more favorable than that located above the dam. *Pisano DT (CDFG Pisano Ex. 1) at 4:18-5:1, 7:10-9:7 (coho in other parts of the Klamath system occupy water with temperatures in excess of 26 degrees C), 9:8-10:12 (spawning in degraded streams); Hillemeier DT (Yurok-Hillemeier) at 4:24-5:3.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.9. If upstream passage of spawning adults, and the resulting spawning, are successful in the Project reaches, outmigrating juveniles reaches will face mortality risks in the reservoirs, including predation, in addition to the current risks in the lower basin. *Olson DT (PAC-Ols-D-1) at 39:15-41:2.* Coho salmon have genetic traits that permit individuals to adapt to – and minimize – such risks. *See Proposed Findings 2A.8 and 2A.9. Simondet RT (NMFS/FWS-Issue 7-Simondet Rebuttal Ex. 1) at 6:15-7:11; Franklin RT (HVT, Franklin, Ex. 12) at 3:9-4:17; Malone XT (8/24 TR4) at 14:16-15:9 (acknowledging that there are no studies of wild fish in Klamath River indicating they would not utilize and adapt to conditions above Iron Gate or withstand reservoir mortality).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.10. Further, if predation causes excessive mortality of outmigrating juveniles, management measures (including reservoir drawdowns and pescicides) can reduce that impact. *See NMFS/FWS-Issue 7-White-Ex. 14 at A-10 (stating as a resource objective the mitigation of predation of listed species due to Project operations); id. at B-2 (requiring a monitoring and mitigation plan with specific measures by PacifiCorp to control predators) and B-40 (requiring continued monitoring of predation and corresponding remedial measures, should predation become a concern).*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.11. In restoration efforts elsewhere in the Pacific Northwest, coho salmon and other anadromous juveniles pass through reservoirs under equally if not more difficult circumstances. *R. Williams DT (NGO Ex. 3) at 12:13-13:9; Espinosa DT (KTr-FAE- Ex. 1) at 3:4-12.* Net of mortality losses, such access has tended to increase the overall populations.

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.12. Access to suitable habitat within the Project reaches will likely increase the overall population of coho salmon in the Klamath. *Duffy RT (NGO Ex. 27) at 3:11-4:7 (allowing access to additional habitat could not subtract from existing populations below Iron Gate); Hillemeier DT (Yurok-Hillemeier) at 5:7-8 (access to project area one of the quickest ways to increase population abundance), 6:4-7; Pisano DT (CDFG Pisano Ex. 1) at 12:8-23; Simondet DT (NMFS/FWS-Issue 7-Simondet Ex. 1) at 5:21-6:15; T. Williams DT (NMFS/FWS-Issue 7-Williams Ex. 1) at 6:15-19.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.13. Access to suitable habitat within the Project reaches will protect the coho salmon stock against the impacts of degradation in the habitat in the lower basin. *T. Williams DT (NMFS/FWS-Issue 7-Williams Ex. 1) at 7:15-9:22 (explaining that additional spatial structure reduces species vulnerability to fluctuations in environmental conditions); Hillemeier DT (Yurok-Hillemeier) at 6:11-14; Pisano DT (CDFG Pisano Ex. 1) at 5, 11:18-12:6; Garza XT (8/25 TR at 107:5-20; Olson XT (8/23 TR at 163:1-2.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.

7.14. Over time, access to suitable habitat within the Project reaches will tend to encourage greater genetic diversity in the coho stocks of the Klamath. *Franklin DT (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); Duffy DT (NGO Ex. 4) at 11:15-18; Hillemeier DT (Yurok-Hillemeier) at 6:15-22.*

RULING: ACCEPTED AND INCORPORATED BY REFERENCE.