163 FERC ¶ 62,084

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Deschutes Valley Water District — Project No. 5891-009

ORDER AMENDING LICENSE, APPROVING FISH PASSAGE FACILITIES, AND AMENDING ANNUAL CHARGES

(Issued May 9, 2018)

1. On October 8, 2015, as revised on October 31, 2017, and supplemented on December 14, 2017, Deschutes Valley Water District, licensee for the Opal Springs Hydroelectric Project, filed an application to amend its license to increase the normal maximum reservoir elevation by 3 feet, construct fish passage facilities, and to include provisions contained in a Settlement Agreement regarding these facilities. The project is located on the Crooked River in Jefferson County, Oregon and occupies lands of the United States administered by the Bureau of Land Management (BLM).

I. BACKGROUND

2. As licensed, the project works consist of: (1) a 21-foot-high, 200-foot-long concrete capped rockfill diversion dam creating a pool with a storage capacity of 58 acre-feet and an area of 5.7 acres at normal maximum pool elevation of 2005 feet; (2) a 44-foot by 33-foot rectangular concrete intake structure 32 feet in height located on the left abutment of the diversion dam; (3) two 12.5-foot diameter, 1,157-foot-long buried corrugated metal conduits; (4) a 30-foot-diameter steel surge tank-bifurcator; (5) a 16-foot-diameter, 160-foot-long steel penstock; (6) two existing turbine-driven irrigation pumps, one rated at 175 and the other at 480 horsepower; (7) a powerhouse containing one 4.3 megawatt (MW) generating unit; (8) a 250-foot-long, 20.8-kilovolt (kV) underground transmission line interconnecting to the Pacific Power and Light transmission system; and (9) appurtenant facilities.[1]

3. The licensee requests an amendment to the project license[2] to assist reintroduction of anadromous fish to the upper Deschutes River basin. Fish passage facilities were

[1] As amended in an Order Approving Revised Exhibits A, F, and G. *Deschutes Valley Water District*, 35 FERC ¶ 62,029 (1986).

[2] *Deschutes Valley Water District*, 21 FERC ¶ 62,173 (1982).

installed in 2007 by Portland General Electric Company for the downstream Pelton Round Butte Project (Project No. 2030) making the Opal Springs Project a fish passage barrier on the Crooked River, one of the three major tributaries upstream of the Pelton Round Butte Project. Additionally, multiple agencies and interested organizations have systematically addressed other barriers to fish passage in the Crooked River subbasin upstream of the Opal Springs Project. Providing fish passage at the Opal Springs Project would open passage barriers in the lower Crooked River subbasin.

4. Steelhead and Chinook salmon began returning to the vicinity of the Opal Springs Project in 2012, and bull trout, a species listed under the Endangered Species Act (ESA), is present below the project within critical habitat. In response to a request from the Oregon Department of Fish and Wildlife (Oregon DFW), the licensee has been passing fish above the project through a trap-and-haul effort since 2012, however, the licensee is pursuing a more long-term solution to fish passage at the project with its proposed amendment.

5. In consultation with relevant government agencies and stakeholders, the licensee developed a Settlement Agreement concerning the construction and maintenance of fish passage facilities at the project. The Settlement Agreement, signed by the Parties on October 1, 2015, is included in the revised October 31, 2017 amendment application filed with the Commission.[3]

II. LICENSEE'S PLAN

6. The licensee requests that the Commission amend its license to include provisions agreed to in the Settlement Agreement. These provisions include increasing the normal maximum pool elevation and storage capacity of the reservoir, including new fish passage facilities, and specific details regarding the operation and maintenance of the proposed fish passage facilities.

7. The 2015 Settlement Agreement includes requirements that the licensee: 1) construct a fish ladder to provide passage into the Crooked River for anadromous and migratory fish; 2) raise the maximum operating reservoir elevation; 3) establish a water credit system; 4) implement a monitoring and evaluation program for assessing fish passage performance; 5) adaptively manage the project to meet fish passage performance objectives; 6) implement a Fish Passage and Protection Plan; 7) provide annual reports; 8) provide inspection rights to members of a fish passage work group; and 9) comply with construction requirements. Certain administrative conditions are also proposed by the licensee in its amendment application including revising its project description and

[3] Signatories to the Settlement Agreement include: the licensee; U.S. Fish and Wildlife Service; Bureau of Indian Affairs; Bureau of Land Management; National Marine Fisheries Service; Oregon DFW; and Trout Unlimited.

certain exhibits. Details of the licensee's amendment request are discussed in more detail below.

A. Proposed Modifications

8. As stated above, the licensee intends to construct a fish ladder and to increase the normal maximum pool elevation of the project reservoir. Specifically, the licensee is requesting to increase the normal maximum pool elevation from 2004.21 feet National Geodetic Vertical Datum of 1929 (NGVD 1929) to 2,007.21 feet NGVD 1929. The licensee's application states that the increase would allow for the establishment of a water bank that would be used to facilitate upstream and downstream fish passage. By increasing the maximum normal pool elevation, the reservoir storage capacity would also increase, from 106.4 to 119 acre-feet, with the surface area increasing from 11.1 to 14.4 acres.

9. The increased reservoir elevation would enable the licensee to establish a water bank, which it refers to as the Bypass Flow Accrual Account (BFAA). Management of the BFAA would be the responsibility of the licensee; however, the water bank would be available for use upon request from the Fish Managers,[4] based on a BFAA annual allocation plan that would be developed in consultation with all parties to the Settlement Agreement. When requested by the Fish Managers, the licensee would provide supplemental flows in the project bypass reach.

10. The licensee states that the proposed reservoir level increase and establishment of the associated water bank would better enable it to operate the proposed vertical slot fish ladder,[5] which would be designed to provide passage for endangered bull trout and anadromous summer steelhead populations, although the licensee anticipates use by other anadromous salmonids. The 31.2-foot-high fish ladder would be located on the right abutment of Opal Springs Dam. The ladder entrance location was determined in consultation with the resource agencies, and would be positioned to utilize existing water flow patterns to negate the need for a piped auxiliary water supply. The licensee would supplement attraction flows from the ladder entrance with 20 cubic foot per second (cfs) of spill from Gate No. 4, which is located immediately adjacent to the proposed fish ladder location. The ladder exit would have a single exit pool in the project forebay.

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[4] The Fish Managers include the Oregon DFW and the Confederated Tribes of the Warm Springs Reservation of Oregon.

[5] A vertical slot fish ladder contains slots, or baffles, set at regular intervals along the length of the fish ladder to create a series of pools through which fishes swim up and around an obstacle.

11. The licensee also proposes the use of a temporary adult fish trap to monitor and evaluate the success of the proposed fish ladder and to demonstrate that the Settlement Agreement requirements have been met. The trap would be located within the ladder, in the channel upstream before the exit pool. Additionally, the ladder would be built to accommodate future monitoring and evaluation provisions, including a future fish-counting system, to be designed by the licensee, and potential passive integrated transponder (PIT) tag detectors. These monitoring and evaluation provisions would be developed and reviewed in consultation with a Fish Passage Working Group (FPWG) as specified in the Settlement Agreement.[6]

12. The licensee proposes to amend the project boundary around the reservoir to reflect the increased reservoir elevation, by raising the project boundary to follow the 2,010.21 NGVD 1929 contour. The amended project boundary would accommodate the area necessary for the proposed fish passage facility and increase in reservoir elevation.

13. The licensee would manage the reservoir elevation and water releases via a section of fixed wooden flashboards and one pneumatic crest gate, which together, would span the crest of the dam. The single pneumatic crest gate would be located on the right abutment, adjacent to the proposed fishway. This gate would be used to provide instream flow releases, BFAA releases, and additional fish ladder attraction flows. A concrete-lined spillway chute would be located immediately downstream and would be used to safely deliver fish downstream into the tailwater pool.

14. The project would continue to be operated as a run-of-river facility, and the licensee does not propose any changes to established minimum flow requirements, pursuant to Article 36 of the project license.

15. Upon implementing the proposed modifications, the licensee intends to monitor and evaluate its success. Specifically, the licensee would monitor fish migrating through the project area to assess the fish ladder efficiency, inform adaptive management decisions related to the BFAA, and determine whether additional fish passage measures would be necessary to achieve the biological performance objectives defined in the Fish Passage and Protection Plan, located in Appendix B of the Settlement Agreement and filed with the Commission on December 14, 2017. The plan contains criteria for both upstream and downstream passage, which would be implemented in 5-year monitoring

[6] The Fish Passage Working Group includes representatives from all signatories to the Settlement Agreement: the licensee; U.S. Fish and Wildlife Service; Bureau of Indian Affairs; Bureau of Land Management; National Marine Fisheries Service; Oregon DFW; and Trout Unlimited. The Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) may participate in the FPWG, however, they are not a Party to the Settlement Agreement at this time.

intervals. Monitoring would begin upon the completion of the fish ladder and reservoir elevation increase.

16. As agreed upon in the Settlement Agreement, the licensee's application details upstream passage performance objectives and standards for steelhead, Chinook salmon, and bull trout. The licensee proposes to implement an adaptive management approach in order to meet these objectives and standards working in consultation with the FPWG. The licensee outlines tiered response measures to be implemented throughout the first 15 years, as appropriate, to optimize fish passage efficiency. The licensee notes that Appendix B of the Settlement Agreement also identifies modifications to the use of the BFAA, spill gate operation, and trash rack modifications as potential adaptive management tools that would only be implemented after approval by the FPWG.

17. With the proposed modifications, the project description would be revised as follows:

> Project works consisting of (1) a 21-foot-high, 200-foot-long, concrete-capped, rockfilled diversion dam, controlled with a single, fixed flashboard creating a pool with a storage capacity of 119 acre-feet and an area of 14.4 acres at normal maximum pool elevation of 2,007.21 feet NGVD 29; (2) a 30-cfs vertical slot ladder; (3) a 44-foot by 33-foot, rectangular, concrete intake structure 34 feet tall located on the left abutment of the diversion dam; (4) two 12.5-foot-diameter, 1,157-foot-long, buried, corrugated-metal conduits; (5) a 30-foot-diameter, steel bifurcator in the surge tank; (6) a 16-foot-diameter, 160-foot-long, steel penstock; (7) two existing turbine-driven irrigation pumps, one rated at 175 horsepower and the other at 480 horsepower; (8) a powerhouse containing one 4.3-MW generating unit; (9) a 250-foot-long, 69.5 kV, overhead transmission line interconnecting with the Pacific Power and Light transmission system; and (10) appurtenant facilities.

III. CONSULTATION

18. The licensee followed the consultation process required by section 4.38 of the Commission's regulations.[7] The licensee began discussions with agencies and other interested stakeholders in 2008 regarding fish passage options at the project. In October 2011, the Parties signed a Settlement Agreement, which was subsequently revised on October 1, 2015, to reflect a more current understanding of the proposed facilities and their operation. The Settlement Agreement also specifies actions the Parties undertook to develop the amendment application and to implement the provisions of the Settlement Agreement throughout the term of the amended license.

[7] 18 C.F.R. § 4.38 (2017).

19. On January 19, 2012, Commission staff designated the licensee as its non-federal representative to conduct consultation under section 7 of the Endangered Species Act (ESA) with the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS). On February 7, 2012, the licensee held a public meeting to discuss plans for an amendment to the license to install fish passage facilities. The licensee performed a number of studies to further develop its amendment application. These studies included taking water quality samples from the project forebay and tailrace, fish passage designs, and fish passage studies including downstream fish passage survival and swim speed analyses.

20. The licensee prepared a draft applicant-prepared Environmental Assessment and draft Biological Assessment and requested comments from resource agencies on July 13, 2015. The licensee filed its amendment application with the Commission on October 8, 2015, including and addressing comments it had received from these resource agencies. As discussed in more detail below, after discussions with Settlement Agreement Parties, on October 31, 2017, the licensee filed a revised amendment application that included changes to proposed fish passage facilities and reservoir elevation levels. The licensee further supplemented its application by filing on December 14, 2017, a revised Fish Passage and Protection Plan, as required by the Settlement Agreement to more accurately reflect the revised amendment application.

IV. PUBLIC NOTICE

21. Commission staff issued a public notice of the amendment application on November 5, 2015. Oregon Department of Water Resources (Oregon DWR) filed a motion to intervene in the proceeding on December 22, 2015. Oregon DWR filed the motion and stated that, at the time of public noticing, the licensee was in the process of amending its water rights permit with the agency to be consistent with the license amendment application. On December 29, 2015, the Department of the Interior filed a motion to intervene on behalf of the FWS and the Bureau of Indian Affairs (BIA), given that these bureaus are signatories to the Settlement Agreement.

22. On December 31, 2015, Oregon DFW filed a motion to intervene as well as recommendations pursuant to section 10(j) of the Federal Power Act (FPA). Trout Unlimited filed a motion to intervene in the proceeding on January 4, 2016. Also on January 4, 2016, NMFS and FWS filed motions to intervene and provided preliminary recommendations pursuant to section 10(j) of the FPA as well as preliminary fishway prescriptions pursuant to section 18 of the FPA.

23. Ochoco Irrigation District and the North Unit Irrigation District, through joint counsel, filed motions to intervene in the proceeding on January 4, 2016. Oregon Department of Environmental Quality (Oregon DEQ) filed a motion to intervene on January 5, 2016.

24. On December 19, 2016, the licensee informed the Commission that project cost estimates related to constructing the proposed fish passage facilities were significantly higher than anticipated. It therefore requested the Commission hold its amendment application in abeyance until such time that alternative plans for fish passage could be worked out with the Parties to the Settlement Agreement. On December 21, 2016, Commission staff issued a letter placing the licensee's October 8, 2015 amendment application in abeyance and requiring the licensee to inform the Commission by February 1, 2017, of discussions with the Settlement Agreement Parties regarding the funding matter and its plan for the amendment application.

25. On January 30, 2017, and March 28, 2017, the licensee informed the Commission that it was still working with Settlement Agreement Parties to resolve funding concerns and to negotiate alternative fish passage plans and requested the Commission continue to hold its October 8, 2015 application in abeyance. Commission staff issued letters on February 14, 2017, and April 5, 2017, stating that the October 8, 2015 amendment application would continue to be held in abeyance and requested that the licensee inform the Commission of its plans for the application by December 31, 2017.

26. On October 31, 2017, the licensee informed the Commission of its request to lift the abeyance of the amendment application and for its modified version of the application filed the same day to be considered as its final and complete application. Commission staff issued a public notice of the October 31, 2017 application on December 12, 2017. In the notice, Commission staff stated that the revised application remains a part of the original proceeding; therefore, interveners to the original proceeding need not refile motions to intervene.

27. In response to the notice, FWS filed a revised Biological Opinion on December 27, 2017, and filed, on January 9, 2018, revised comments, recommendations pursuant to section 10(j) of the FPA, and fishway prescriptions pursuant to section 18 of the FPA. On January 9, 2018, the licensee filed a letter dated December 13, 2017, from Oregon DEQ discussing modifications to an October 26, 2016 Water Quality Certificate (WQC) in light of revisions to the licensee's plans to install fish passage facilities. The December 13, 2017 letter included a modified WQC. On January 11, 2018, Oregon DFW filed a motion to intervene and revised section 10(j) recommendations. On January 12, 2018, NMFS filed comments and modified section 10(j) recommendations and section 18 fishway prescriptions. On April 9, 2018 FWS, and on April 10, 2018 NMFS, filed final section 10(j) recommendations and final section 18 fishway prescriptions.

V. ENVIRONMENTAL REVIEW

28. The licensee prepared a draft Environmental Assessment (EA) for the proposed fishway and included it in its October 8, 2015 license amendment application. Commission staff reviewed the draft EA and adopted it as the Commission's EA as described in a public notice issued on April 4, 2016. The licensee subsequently revised

its draft EA and included it in the revised amendment application filed with the Commission on October 31, 2017. Commission staff issued another public notice on January 18, 2018, which again, stated that the licensee's revised draft EA was adopted as the Commission's revised EA.

29. In response to the Commission's public notice adopting the revised EA, Oregon DEQ filed comments with the Commission on February 15, 2018, noting that it had issued a modified WQC on December 13, 2017, for the amendment application. The licensee filed the modified WQC with the Commission on December 13, 2017.

30. On February 2, 2018, FWS filed a statement with the Commission that it had no comments on the revised EA. No other comments were received in response to the Commission's public notice of the revised EA.

31. The proposed amendment to the license for the Opal Springs Project is subject to requirements under the FPA and other applicable statutes. The major applicable regulatory and statutory requirements are described in the following sections.

A. Federal Power Act

1. Section 18 Fishway Prescriptions

32. Section 18 of the FPA[8] states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of the U.S. Department of Commerce (Commerce) or the U.S. Department of the Interior (Interior).

33. On January 4, 2016, FWS and NMFS provided preliminary section 18 fishway prescriptions. On January 9, 2018, and January 12, 2018, respectively, FWS and NMFS filed revised fishway prescriptions in response to the revised amendment application. On April 10, 2018, NMFS filed final section 18 fishway prescriptions. On April 9, 2018, FWS filed a statement that its fishway prescriptions filed January 9, 2018, are its final prescriptions.

34. In their final fishway prescriptions, NMFS and FWS further clarified that the revised Fish Passage and Protection Plan filed with the Commission on December 14, 2017, should be implemented in accordance with the Settlement Agreement's proposed license article 1. The final fishway prescriptions are consistent with the Settlement Agreement. Appendix C and D of this order includes the FWS and NMFS fishway prescriptions, respectively.

[8] 16 U.S.C. § 811 (2012).

35. As part of the fishway prescriptions provided by FWS and NMFS, both agencies request reservation of authority to modify their prescriptions based on new information. Article 55 has been added to the license to reserve this authority.

2. Section 10(j) Recommendations

36. Section 10(j)(1) of the FPA[9] requires the Commission, when issuing a license, to include conditions based on recommendations by federal and state fish and wildlife agencies submitted pursuant to the Fish and Wildlife Coordination Act,[10] to "adequately and equitably protect, mitigate damages to, and enhance fish and wildlife (including related spawning grounds and habitat)" affected by the project.

37. Oregon DFW filed recommendations pursuant to section 10(j) of the FPA on December 31, 2015, as revised on January 11, 2018, due to the revised amendment application. In summary, Oregon DFW recommends the licensee fully implement the fish passage related measures specified in section 4 and Appendices A and B of the Settlement Agreement. Ordering paragraph (K) below, incorporates the proposed license articles for the Settlement Agreement into the license. Therefore, this order is consistent with Oregon DFW's 10(j) recommendations.

38. FWS and NMFS also filed recommendations pursuant to section 10(j) of the FPA on January 9, 2018 and April 10, 2018, respectively. FWS recommends the licensee implement proposed license article 3 from the Settlement Agreement that would establish a Fish Passage Work Group. NMFS's 10(j) recommendation also includes establishing and convening a fish passage working group for the purpose of consulting on all aspects of the Settlement Agreement, associated license articles, and the Fish Passage and Protection Plan. These recommendations are consistent with proposed license article 3 of the Settlement Agreement and adopted as new license Article 46 in this order.

B. Clean Water Act

39. Under section 401(a) of the Clean Water Act (CWA),[11] the Commission may not authorize construction or operation of a hydroelectric project that may result in a discharge from the project unless the state water quality certifying agency either has issued water quality certification for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed one

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[9] 16 U.S.C. § 803(j)(1) (2012).

[10] 16 U.S.C. §§ 661 *et seq.* (2012).

[11] 33 U.S.C. § 1341(a) (2012).

year. Section 401(d) of the CWA provides that the certification shall become a condition of any federal license that authorizes construction or operation of the project.[12]

40. The Oregon DEQ issued a WQC on October 26, 2016, which was revised on December 13, 2017. The WQC contains provisions that the licensee construct, operate, and maintain fish passage facilities, and create a BFAA in accordance with the Settlement Agreement. Additionally, the WQC includes requirements to create a Water Quality Management Plan to include dissolved oxygen, pH, and temperature monitoring conditions. The WQC is attached in Appendix A of this order and incorporated into the license by ordering paragraph (G).

41. The WQC requires plans and reports which should also be filed with the Commission. These plans include the Water Quality Management Plan required by condition 1; annual dissolved oxygen, pH, and temperature monitoring reports required by conditions 4, 5, and 6; and an adaptive management report and plan, required by condition 6, if temperature water quality conditions are exceeded. Within six months of the date of this order, the licensee must file the Water Quality Management Plan with the Oregon DEQ. Within 30 days of approval by Oregon DEQ, the licensee must then file the plan with the Commission for approval. The plan must address parameters specified in the WQC and include: (1) data collection protocols, analytical methods, and laboratory method reporting limits; (2) location and description of monitoring points; (3) compliance monitoring and field audit schedule; (4) data sampling frequency; (5) applicable compliance criteria; (6) instrument calibration procedures and schedule; (7) data validation procedures and quality assurance methodology; and (8) a contingency plan for inoperable or malfunctioning equipment.

42. The Water Quality Management Plan should also detail when annual reports required by WQC conditions 4, 5, and 6 concerning dissolved oxygen, pH, and temperature monitoring data will be filed with the Commission for review. Upon Commission approval, the licensee should implement the Water Quality Management Plan.

C. Endangered Species Act

43. Section 7(a)(2) of the ESA[13] requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of critical habitat. The following listed species could be present at the project: Canada lynx (*Felis lynx Canadensis*), Northern spotted owl (*Strix occidentalis caurina*), and bull trout (*Salvelinus confluentus*).

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[12] 33 U.S.C. § 1341(d) (2012).

[13] 16 U.S.C. § 1536(a) (2012).

Critical habitat is designated and present at the project for Northern spotted owl and bull trout. Middle Columbia River steelhead (*Oncorhynchus mykiss* ssp.) is listed as an experimental population and present at the project.

44. On January 20, 2016, Commission staff issued a Biological Assessment (BA) to the FWS and NMFS and a request to initiate formal consultation under the ESA. The BA concluded that the proposed amendment to construct fish passage facilities is likely to adversely affect federally-listed steelhead and bull trout. However, over time, the licensee's proposal should enhance listed steelhead and bull trout populations and is not likely to jeopardize the continued existence of these populations. The proposed action would have no effect on the Canada lynx and Northern spotted owl or their critical habitats.

45. On June 1, 2016, the FWS filed a Biological Opinion with the Commission for bull trout. The Biological Opinion included an incidental take statement and terms and conditions. On December 27, 2017, in light of the licensee revising its amendment application, the FWS filed a revised Biological Opinion with the Commission (signed December 21, 2017) to capture the changes to the proposed action. In accordance with condition 2 of the Biological Opinion, the licensee must annually file an incidental take report with the FWS by March 1. The licensee should also file this report with the Commission. The terms and conditions of the Biological Opinion are included in Appendix B of this order and made part of the license by ordering paragraph (H) below.

46. Because Middle Columbia River steelhead, listed as threatened under the ESA, have been reintroduced above the Pelton Round Butte Project downstream of the Opal Springs Project, the reintroduced population was designated as a nonessential experimental population under section 10(j) of the ESA since 2013. For the purposes of consultation under section 7 of the ESA, listed species that are designated as a nonessential experimental population, and are located outside of a National Park or National Wildlife Refuge, are treated as a species proposed for listing. As such, NMFS has stated that conferencing is the appropriate procedure for consultation. NMFS filed a conference opinion with the Commission on October 21, 2016. The reasonable and prudent measures contained in the incidental take statement of the October 21, 2016 conference opinion are discretionary agency actions. As NMFS states in their October 21, 2016 letter, this nonessential experimental population designation will sunset on January 15, 2025. When this designation sunsets, the reintroduced steelhead will return to a threatened status. NMFS states that at that time, the Commission may request NMFS adopt the conference opinion as its Biological Opinion, and if NMFS agrees, the reasonable and prudent measures in the conference opinion would become non-discretionary.

47. The conference opinion includes, as part of the discretionary terms and conditions, a requirement to: construct and operate the fish passage facilities agreed to in the Settlement Agreement, implement the Fish Passage and Protection Plan, and implement

the monitoring and adaptive management measures in the Settlement Agreement. These requirements are already being required in this order. The conference opinion also has a discretionary requirement to prepare an annual report to identify any incidental take of steelhead from project activities. We do not adopt the requirement to prepare incidental take annual reports for steelhead. This matter is addressed in more detail in the *Discussion* section below.

D. National Historic Preservation Act

48. Under section 106 of the National Historic Preservation Act (NHPA),[14] and its implementing regulations,[15] federal agencies must take into account the effect of any proposed undertaking on properties listed or eligible for listing in the National Register of Historic Places (NRHP, defined as historic properties), and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on any undertaking. This generally requires the Commission to consult with the SHPO to determine whether and how a proposed action may affect historic properties, and to seek ways to avoid or minimize any adverse effects.

49. No historic or cultural properties will be affected by the proposed amendment. On August 10, 2009, BLM conducted a cultural resources survey of the area of potential effects (APE). The survey results indicated that there are no cultural resources sites or isolates in the APE, therefore no eligibility or protection recommendations were made. By letter dated November 13, 2009, the Oregon SHPO concurred that no cultural or historic properties would be affected by the proposed amendment and the APE has not changed since the cultural resources survey was completed.

E. Magnuson-Stevens Fishery Conservation and Management Act

50. Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA)[16] requires federal agencies to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) identified under the Act. Under section 305(b)(4)(A) of the Magnuson-Stevens Act, NMFS is required to provide EFH Conservation Recommendations for actions that would adversely affect EFH. Under section 305(b)(4)(B) of the Act, an agency must, within 30 days after receiving recommended conservation measures from NMFS or a Regional Fishery

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[14] 54 U.S.C. § 300101 *et seq.* Pub. L. 113-287, 128 Stat. 3188 (2014). The National Historic Preservation Act was recodified in Title 54 in December 2014.

[15] 36 C.F.R. Part 800 (2011).

[16] 16 U.S.C. § 1855(b)(2) (2012).

Management Council, describe the measures proposed by the agency for avoiding, mitigating, or offsetting the effects of the agency's activity on EFH.

51. In a notice dated January 19, 2012, the Commission formally designated the licensee as its non-federal representative for consultation with NMFS under section 305(b) of the MSA. The Pacific Fishery Management Council designated EFH for Pacific salmon in 1999 for the Deschutes River below the Opal Springs Project. The Lower Crooked River was designated as EFH for Chinook salmon in 2008, and the Opal Springs Project is identified as an impassible man-made barrier. The proposed action will result in fish passage at the project and will enable adult migrants to access currently inaccessible habitat upstream of the project. As discussed in the EA issued January 18, 2018, no net adverse effects will result in areas of EFH or Habitat Areas of Particular Concern for the relevant fish species. Therefore, no EFH consultation with NMFS is required. As NMFS stated in its April 10, 2018 filing with the Commission of final fishway prescriptions pursuant to section 18 of the FPA, construction of fish passage at the Opal Springs Project is significant for the overall success of the anadromous reintroduction program for Chinook salmon and steelhead.

F. Wild and Scenic Rivers Act

52. Section 7(a) of the Wild and Scenic Rivers Act[17] provides that the Commission "shall not license the construction of any dam, water conduit, reservoir, powerhouse, transmission line, or other project works . . . on or directly affecting any river which is designated" as a component of the Wild and Scenic Rivers System. The Act requires federal agencies to make a determination as to whether an action would invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the designated river corridor.

53. Segments of the Crooked River have been designated wild and scenic, however, the proposed changes to the Opal Springs Project would not affect these segments. By letter dated October 16, 2015, BLM determined that the pool raise is not likely to result in an adverse effect to the Crooked River's Outstandingly Remarkable Values, and concurred with the licensee's finding that the amendment would not encroach on the Wild and Scenic River boundary. As also discussed in its January 4, 2016 filing, the Department of Interior stated that the proposed pool raise would approach, but not encroach upon, the downstream boundary of the Wild and Scenic River segment of the Crooked River.

[17] 16 U.S.C. § 1278(a) (2012).

G. Coastal Zone Management Act

54. Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA),[18] the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 6 months of its receipt of the applicant's certification.

55. Federal consistency potentially applies to any project having effects on land and water uses or natural resources of the Oregon coastal zone, but reviews by the Oregon Department of Land Conservation and Development (Oregon DLCD), the state agency in charge of implementing the CZMA, are generally only required for projects located west of the Coast Range boundary. The Opal Springs Project is east of the Coast Range boundary and, as confirmed through an e-mail filed with the Commission on May 7, 2018, Oregon DLCD stated that no consistency determination is necessary for the proposed action.

H. Pacific Northwest Power Planning and Conservation Act

56. Under section 4(h) of the Northwest Power Act of 1980, the Northwest Power and Conservation Council develops the Columbia River Basin Fish and Wildlife Program to protect, mitigate, and enhance fish and wildlife adversely affected by the development and operation of hydroelectric projects on the Columbia River and its tributaries. Pursuant to section 4(h)(11) of the same act, all of the federal agencies responsible for managing, operating, and regulating the hydroelectric facilities in the Columbia basin have an obligation to exercise their statutory responsibilities while taking the Council's Fish and Wildlife Program into account at each relevant stage of decision making to the fullest extent practicable.

57. According to sections 4(d) and 4(e) of the Northwest Power Act, the Council also develops and periodically reviews a regional conservation and electric power plan to recommend new conservation and generating resources to be added to the region's power supply. Along with the provisions in the Northwest Power Act linking the Commission to the Council's programs and plans, the Commission has also recognized both the Council's Fish and Wildlife Program and the Council's Power Plan as comprehensive plans for the waterways in each of the four states of the Columbia basin and Pacific Northwest, according to the FPA.

58. With regard to the Opal Springs Project, the Council's Fish and Wildlife Program includes measures and objectives seeking improvements in fish habitat and fish

[18] 16 U.S.C. § 1456(c)(3)(A) (2012).

population status in the Deschutes River and its tributaries, provisions found largely in the program's Deschutes Subbasin Plan. Section 3.5.1 of the Crooked River section of the Deschutes Subbasin Plan in particular calls for certain stakeholders and the Deschutes Valley Water District to work together to reestablish anadromous fish passage at the Opal Springs Project.[19] The licensee's proposed action is consistent with the Fish and Wildlife Program's measures and objectives for habitat and fish populations in the Deschutes River Subbasin.

59. The Council's Fish and Wildlife Program also includes provisions and conditions regarding the development, licensing, and re-licensing of non-federal hydroelectric projects in any subbasin, intended to protect valuable fish and wildlife. A review of the licensee's proposed action against these conditions indicates the proposal is consistent with the protections the program seeks. This portion of the Council's Fish and Wildlife Program also designates certain river reaches in the Pacific Northwest as protected from hydroelectric development. The protected-areas provisions do not apply to existing hydroelectric projects, such as the Opal Springs Project. Finally, the program encourages consultation by project operators and proponents with federal and state fish and wildlife agencies, appropriate Indian tribes, and the Council itself during the study, design, construction, and operation of any hydroelectric development in the basin. The licensee consulted the relevant resource agencies and tribes in developing its amendment application and stated in its application that it had communicated with the Council's staff about the proposal in June 2015.

VI. ADMINISTRATIVE PROVISIONS

1. Project Description

60. The licensee submitted on October 31, 2017, three revised pages of Exhibit A that describes the project with the proposed changes. While the revised Exhibit A pages conform to the Commission's rules and regulations, the licensee must file the entire Exhibit A. In ordering paragraph (B) we are approving the revised pages of the Exhibit A and in ordering paragraph (D) we are requiring the licensee to file a copy of the entire Exhibit A.

2. Exhibit F and G Drawings

61. The licensee included nine exhibit F drawings showing the proposed changes to the project and one Exhibit G drawing showing the revised project boundary. The revised Exhibit G combines two existing drawings: G-2 (P-5891-6) and G-3 (P-5891-7). In this order, we will label the revised Exhibit as Exhibit G-2. The Exhibit F and G

[19] http://www.nwcouncil.org/fw/subbasinplanning/deschutes/plan

drawings filed on October 31, 2017, conform to the Commission's regulations and are approved and made a part of the license as shown in ordering paragraph (B).

62. The Commission requires licensees to file sets of approved project drawings in electronic file format. In ordering paragraph (C), we are requiring the licensee to file the approved drawings in electronic format.

3. As-Built Exhibits

63. Ordering paragraph (M) requires the licensee to file revised exhibits of project features as-built after completion of the construction of project works authorized in this order.

4. Annual charges

64. The proposed work would result in revising the amount of federal lands used by the project from 5.7 acres to 13.9 acres for other than transmission line use. This change would require revising the annual charges for the use of federal lands under article 40 (b) of the license, as shown in ordering paragraph (F) of this order.

5. Start and Completion of Construction

65. Ordering paragraph (N) requires the licensee to start construction of the project works authorized herein within two years from the issuance date of this order and to complete construction within four years.

6. Review of Final Plans and Specifications

66. Our Division of Dam Safety and Inspection (D2SI) has reviewed the proposed modifications and concludes that they would not adversely impact the dam safety of the project when constructed, operated, and maintained in accordance with the Commissions standards and oversight.

67. Ordering paragraph (O) requires the licensee to provide the Commission's D2SI – Portland Regional Engineer with final contract drawings and specifications – together with a supporting design document consistent with the Commission's engineering guidelines. The submittal must include a quality control and inspection program, a temporary construction emergency action plan, and a soil erosion and sediment control plan.

68. Ordering paragraph (P) requires the licensee to provide the Commission's D2SI – Portland Regional Engineer with cofferdam construction drawings if cofferdams will be used for the construction activities authorized or required by this order.

69. Ordering paragraph (Q) requires the licensee to coordinate with the Commission's D2SI – Portland Regional Engineer regarding any modifications resulting from

environmental requirements, if such modifications would affect project works or operation.

VII. DISCUSSION

70. The Settlement Agreement reflects many years of effort by the licensee, resource agencies, and other stakeholders to add fish passage facilities at the Opal Springs Project. The licensee's plan to construct these facilities would open additional habitat to migrating fish and assist in the recovery efforts of bull trout, steelhead, and Chinook salmon. The additional hydraulic head resulting from increasing the elevation of the reservoir would allow the licensee to generate additional power to partially offset the cost of fish ladder construction and operation as well as costs associated with the monitoring and evaluation program. In general, the proposed changes to the project represent a reasonable balance between developmental and non-developmental resources and for these reasons, the amendment to the license should be approved.

71. In its amendment application, the licensee asks the Commission to incorporate its proposed license articles, contained in Appendix A of the Settlement Agreement, into the license. In general, we shall do so in ordering paragraph (K). We note that proposed articles 1-11 concern the long-term operation and maintenance of the fishway. We have made certain minor modifications to these articles, as appropriate, to meet the Commission's specific requirements and to clarify filing expectations. We also corrected an erroneous elevation contained in proposed article 2. Proposed articles 12 through 16 concern construction related matters and Commission-specific exhibits and are revised as ordering paragraphs (M), (O), and (P) below, edited, as appropriate, to reflect specific Commission required filings.

72. In regards to the Conference Opinion issued by NMFS on October 21, 2016 for the nonessential experimental population of steelhead, Commission staff does not adopt the discretionary incidental take statement of the Conference Opinion or condition 2 requiring an annual report identifying associated incidental take. Condition 1 of the Conference Opinion requires the implementation of certain Settlement Agreement conditions which would be required through the license amendment through other means. The steelhead at issue are an experimental population of reintroduced fish. After the designation sunsets in 2025, if FWS and the licensee feel it prudent to revisit this matter, Commission staff would work with the FWS and the licensee to address any such concerns to steelhead.

The Director orders:

(A) The October 8, 2015 application, as revised on October 31, 2017, and supplemented on December 14, 2017, to amend the license to install fish passage facilities filed by Deschutes Valley Water District, licensee, for the Opal Springs Hydroelectric Project, is approved.

(B) The following revised Exhibits A, F, and G are approved and made a part of the license:

1. Exhibit A—Pages 1, 2 and 3 of the amendment of license filed October 31, 2017, is approved and made part of the license, superseding the pages of Exhibit A previously approved as part of the license. However, the licensee must file a copy of the entire Exhibit A, including the revised pages approved in this order, pursuant to paragraph (D) below.

2. Exhibit F and G drawings:

Exhibit	FERC No.	Showing	Superseding
F-5	5891-19	Overall Site Plan	5891-8
F-14	5891-20	Diversion Dam Site Plan	5891-17
F-15	5891-21	Fish Ladder Plan and Profile (1)	----
F-16	5891-22	Fish Ladder Plan and Profile (2)	----
F-17	5891-23	Spillway Chute No. 2 Plan and Profile	----
F-18	5891-24	Spillway Chute No. 1 Plan and Profile	----
F-19	5891-25	Gate No. 1 Spillway Details	----
F-20	5891-26	Spillway Sections	----
F-21	5891-27	Gate No. 1 Sections	----
G-2	5891-28	Project Boundary Map	5891-6 & -7

(C) Within 45 days of the date of issuance of this order, as directed below, the licensee must file two sets of the approved exhibit drawings, Form FERC-587, and geographic information system (GIS) data in electronic file format on compact disks (CDs) with the Secretary of the Commission, ATTN: OEP/DHAC.

(1) The licensee must prepare digital images of the approved exhibit drawings in electronic format. Prior to preparing each digital image, the licensee must add the FERC Project-Drawing Number (i.e., P-5891-19 through P-5891-28) in the margin below the title block of the corresponding approved drawing. The licensee must separate the Exhibit F drawings from the other project exhibits, and identify them as Critical Energy Infrastructure Information (CEII) material under 18 C.F.R. § 388.113 (i.e., two CDs containing the Exhibit G drawing and GIS data, and two CEII CDs containing only Exhibit F drawings). Each drawing must be a separate electronic file, and the file name must include: FERC Project-Drawing

Number, FERC Exhibit Number, Drawing Title, date of this order, and file extension in the following format [P-5891-19, F-5, Overall Site Plan, MM-DD-YYYY.TIF].

Each Exhibit G drawing that includes the project boundary must contain a minimum of three known reference points (i.e., latitude and longitude coordinates or state plane coordinates), arranged in a triangular format for GIS georeferencing the project boundary drawing to the polygon data. The licensee must identify the spatial reference for the drawing (i.e., map projection, map datum, and units of measurement) on the drawing and label each reference point. In addition, a registered land surveyor must stamp each project boundary drawing. All digital images of the exhibit drawings must meet the following format specification:

IMAGERY: black & white raster file
FILE TYPE: Tagged Image File Format, (TIFF) CCITT Group 4 (also known as T.6 coding scheme)
RESOLUTION: 300 dots per inch (dpi) desired, (200 dpi minimum)
DRAWING SIZE: 22" x 34" (minimum), 24" x 36" (maximum)
FILE SIZE: less than 1 megabyte desired

The licensee must file a third set of the digital images (Exhibit G only) and a copy of Form FERC-587 with the Bureau of Land Management office at the following address:

Bureau of Land Management
Lands and Minerals Adjudication Section (OR 936.1)
PO BOX 2965
PORTLAND OR 97208-2965
ATTN: FERC Withdrawal Recordation

Form FERC-587 is available through the Commission's website at the following URL: http://www.ferc.gov/docs-filing/forms/form-587/form-587.pdf. Although instruction no. 3 on Form FERC-587 requires microfilm copies of the project boundary maps in aperture card format, please substitute electronic copies that meet the digital specifications in this ordering paragraph. A hard copy of Form FERC-587 is available by mailing a request to the Secretary of the Commission.

(2) Project boundary GIS data must be in a georeferenced electronic file format (such as ArcGIS shapefiles, GeoMedia files, MapInfo files, or a similar GIS format). The filing must include both polygon data and all reference points shown on the individual project boundary drawings. Each project

development must have an electronic boundary polygon data file(s). Depending on the electronic file format, the polygon and point data can be included in single files with multiple layers. The georeferenced electronic boundary data file must be positionally accurate to ±40 feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. The file name(s) must include: FERC Project Number, data description, date of this order, and file extension in the following format [P-5891, boundary polygon or point data, MM-DD-YYYY.SHP]. The filing must include a separate text file describing the spatial reference for the georeferenced data: map projection used (i.e., UTM, State Plane, Decimal Degrees, etc.), the map datum (i.e., North American 27, North American 83, etc.), and the units of measurement (i.e., feet, meters, miles, etc.). The text file name must include: FERC Project Number, data description, date of this order, and file extension in the following format [P-5891, project boundary metadata, MM-DD-YYYY.TXT].

In addition, for those projects that occupy federal lands, the filing must include a separate georeferenced polygon file(s) that identifies transmission line acreage and non-transmission line acreage affecting federal lands. The file(s) must also identify each federal owner (e.g., Bureau of Land Management, Forest Service, U.S. Army Corps of Engineers, etc.), land identification (e.g., forest name, Section 24 lands, national park name, etc.), and federal acreage affected by the project boundary. Depending on the georeferenced electronic file format, a single file with multiple layers may include the polygon, point, and federal lands data.

(D) Within 60 days from the issuance date of this order, the licensee must file a complete revised Exhibit A to include the three Exhibit A pages approved in ordering paragraph (B)(1).

(E) Ordering paragraph B(2) of the license is revised to read as follows:

(2) Project works consisting of: (1) a 21-foot-high, 200-foot-long, concrete-capped, rockfilled diversion dam, controlled with a single, fixed flashboard creating a pool with a storage capacity of 119 acre-feet and an area of 14.4 acres at normal maximum pool elevation of 2,007.21 feet NGVD 29; (2) a 30-cfs vertical slot ladder; (3) a 44-foot by 33-foot, rectangular, concrete intake structure 34 feet tall located on the left abutment of the diversion dam; (4) two 12.5-foot-diameter, 1,157-foot-long, buried, corrugated-metal conduits; (5) a 30-foot-diameter, steel bifurcator in the surge tank; (6) a 16-foot-diameter, 160-foot-long, steel penstock; (7) two existing turbine-driven irrigation pumps, one rated at 175 horsepower and the other at 480 horsepower; (8) a powerhouse

containing one 4.3-megawatt generating unit; (9) a 250-foot-long, 69.5 kilovolt, overhead transmission line interconnecting with the Pacific Power and Light transmission system; and (10) appurtenant facilities.

(F) *Administrative Annual Charges.* Article 40 (b) of the licensee is revised to read as follows:

(b) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 13.9 acres of its lands, other than for transmission line right-of-way.

(G) The license is amended to incorporate the conditions contained in the Water Quality Certificate (WQC) issued by the Oregon Department of Environmental Quality (Oregon DEQ) on December 13, 2017, as included in Appendix A of this order.

In accordance with WQC condition 1, the licensee must file a Water Quality Management Plan with the Oregon DEQ within 6 months of the date of this order. Within 30 days of approval by Oregon DEQ, the licensee must file the Water Quality Management Plan with the Commission, for approval. The Water Quality Management Plan must address parameters specified in the WQC and include: (1) data collection protocols, analytical methods, and laboratory method reporting limits; (2) location and description of monitoring points; (3) compliance monitoring and field audit schedules; (4) data sampling frequency; (5) applicable compliance criteria; (6) instrument calibration procedures and schedule; (7) data validation procedures and quality assurance methodology; and (8) a contingency plan for inoperable or malfunctioning equipment.

The Water Quality Management Plan must also detail when annual reports required by WQC conditions 4, 5, and 6 concerning dissolved oxygen, pH, and temperature monitoring data would be filed with the Commission for review. Upon Commission approval, the licensee must implement the Water Quality Management Plan.

(H) The license is amended to incorporate the terms and conditions of the Biological Opinion issued by the U.S. Fish and Wildlife Service on December 21, 2017, as included by Appendix B of this order. In accordance with condition 2 of the Biological Opinion, the licensee must file an incidental take report with the U.S. Fish and Wildlife Service and the Commission annually by March 1.

(I) The license is amended to incorporate the terms and conditions of the Fishway Prescriptions filed by the U.S. Fish and Wildlife Service pursuant to

Section 18 of the Federal Power Act, as included by Appendix C of this order.

(J) The license is amended to incorporate the terms and conditions of the Fishway Prescriptions filed by the National Marine Fisheries Service pursuant to Section 18 of the Federal Power Act, as included by Appendix D of this order.

(K) The license is amended to incorporate the following new articles, based on proposed articles from the October 1, 2015 Settlement Agreement:

Article 44: Opal Springs Fish Passage and Protection Plan
The licensee shall implement the Opal Springs Fish Passage and Protection Plan, as included in the Settlement Agreement and filed with the Commission on December 14, 2017.

Article 45: Fish Passage Facilities
The licensee shall provide safe, timely, and effective fish passage at the Opal Springs Hydroelectric Project (Project) through implementation of the amended license.

The licensee shall design, construct, operate, maintain and monitor a volitional upstream fish ladder located at the Project dam structure to provide salmon and steelhead access to historic spawning and rearing habitats in the Crooked River basin and to provide native fish with foraging and migratory opportunities above the project. The fish ladder shall adhere to the National Marine Fisheries Service (NMFS) 2008 Anadromous Salmonid Passage Facility Design Manual.

The licensee shall also design, construct, operate, maintain and monitor facilities at the Project to increase the normal maximum diversion pool elevation up to 2,007.21 feet National Geodetic Datum 1929. The increased diversion pool elevation will make water available for bypassing juvenile fish around the turbine penstock and for attracting adult fish up through the bypass reach to the fish ladder entrance.

The licensee shall develop final design plans and specifications for the installation, operation, maintenance, and monitoring of the fish passage facilities in consultation with and for review by the Fish Passage Work Group (FPWG). Specifically, the detailed fish ladder design phases (50 percent and 90 percent completion stages) will be completed in consultation with the FPWG. Final design plans and specifications shall include: (1) final construction drawings; (2) construction schedule; and (3) a preliminary operation and maintenance (O&M) plan that includes daily, above water visual inspections of all areas within the fish ladder that are accessible to fish and annual dewatered fish ladder inspections. The licensee shall file the final O&M Plan with the Commission within 120 days

after construction is completed, following review and approval of the FPWG. The licensee shall, within 60 days after issuance of the amended license, provide the final design plans and specifications to the appropriate Fish Agencies for their approval pursuant to their statutory authority.

The licensee shall, within 120 days after issuance of the amended license, file the final design plans and specifications with the Commission for approval. When filing final plans and specifications with the Commission, the licensee shall include documentation of consultation with the FPWG, copies of comments and recommendations, and specific descriptions of how comments and recommendations from FPWG members have been accommodated. If the licensee does not adopt an FPWG recommendation, the filing shall include its reasons based on project specific information. If the licensee files final plans and specifications without first obtaining approvals by the appropriate Fish Agencies pursuant to their statutory authorities, the licensee shall include specific reasons for doing so.

The Commission reserves the right to require changes to the final fish facility design plans and specifications. Any such changes required by the Commission may also require additional approvals by the appropriate Fish Agencies pursuant to their statutory authorities.

The licensee shall complete construction of the fish passage facilities within two years of Commission approval.

Article 46: Fish Passage Work Group

The licensee shall, within 30 days after issuance of the amended license, establish and convene a Fish Passage Work Group (FPWG) for the purpose of consulting on all aspects of the Settlement Agreement, associated license articles and the Fish Passage and Protection Plan. The licensee shall convene the FPWG annually, or more frequently if a majority of the FPWG so desire, by no later than February 1 to review the Bypass Flow Accrual Account Allocation Plan and proposed actions for the coming year. The licensee shall bear all costs associated with conducting FPWG meetings.

The licensee shall arrange, administer, and chair all meetings. Upon request of a majority of the FPWG members, the licensee shall provide a meeting facilitator. The facilitator shall be selected by consensus of the FPWG. The licensee shall provide no fewer than 14 days prior notice of any meeting, unless otherwise agreed to by the FPWG or required to meet a license deadline or other emergency circumstance.

The licensee shall, within 30 days of each meeting, provide draft meeting minutes for concurrence by the FPWG prior to final distribution. Meeting minutes will include FPWG action items, a summary of issues discussed, decisions reached, and member concerns.

For fish passage related purposes, consultation or consult means that the licensee shall obtain the views of, and attempt to reach consensus among members of the FPWG. Consultation does not mean consultation under section 7 of the Endangered Species Act or other federal laws requiring consultation unless specifically provided.

Article 47: Bypass Flow Accrual Account

Upon completion of the fish passage facilities, the licensee shall establish a Bypass Flow Accrual Account (BFAA). The BFAA will identify "water credits" (in acre-feet) which will be used to identify water available for aiding upstream and downstream fish passage. Water credits will be accrued in lieu of actual stored water, given that the Project has no storage capacity, and turbine discharge will be reduced when exchanging water credits for actual bypass flows. The licensee shall administer the BFAA for the term of the amended license as follows:

(1) Accumulating Credits

The licensee shall accrue water credits in the BFAA beginning concurrently with the start of Project operations under the new diversion pool elevation and shall continue to accrue water credits in the BFAA for the license Term. Water credits will accrue as a percentage of instantaneous turbine flow (initially 1.53% and hereinafter referred to as the "Accrual Rate") under all flow conditions up to the maximum controlled hydraulic capacity of the Project. The maximum controlled hydraulic capacity of the Project is initially 1,913 cfs [the sum of hydraulic capacity at new head (estimated at 1,600 cfs), the license required bypass flow (50 cfs), and spring water and ground water accreting into the bypass reach (263 cfs)]. Water credits will not accrue at total river discharge greater than the maximum controlled hydraulic capacity of the Project.

The licensee shall, within one year of commencing operations at the new diversion pool elevation, verify all estimates used for determining the maximum controlled hydraulic capacity of the Project. The licensee shall provide this information to the FPWG at least 45 days prior to filing any proposed modifications with the Commission. The licensee shall not file with the Commission any proposed modifications of the information used to calculate water credits until any disputes raised by the FPWG have been addressed under the dispute resolution provisions of the Settlement Agreement. Upon Commission approval of any modifications to

the information used for calculating water credits, the licensee shall calculate all subsequent BFAA credits pursuant to the new information.

The licensee shall periodically reassess spring water and ground water accretion estimates throughout the license term as requested by the FPWG. Any future changes recommended by the licensee pursuant to periodic review of these parameters, will be further approved by the FPWG prior to the licensee submitting the new information to the Commission. Upon Commission approval, the licensee shall calculate all subsequent BFAA credits pursuant to the new information.

The licensee shall calculate all BFAA credits based on: 1) direct measurements of the hourly turbine discharge data and 2) the gage data from USGS Gage No. 14087400, near Culver, Oregon, below Opal Springs.

The licensee shall accrue water credits in the BFAA at a rate of between 50% and 70% ("Allocation Percent") of the increase in power generation attributable to the head increase at the Project. Adjustments to the Allocation Percent will only occur following each successive 5-year Performance Assessment Interval, and only if necessary, pursuant to the Adaptive Management Program. The potential for asynchronous monitoring periods notwithstanding, the BFAA Allocation Percent will not be increased more than one time every five years. Allocation Percent increases above 70% may only occur with the approval of the licensee.

The licensee shall, until the turbine performance calculation is modified, accrue water credits at a rate of 2.89% of instantaneous turbine flow [(50% Allocation Percent) X (6.52% increase in power generation) = 2.89% Accrual Rate]. The licensee shall convert real-time accruals into acre-feet for purposes of developing a BFAA Annual Allocation Plan. The licensee shall develop the BFAA Annual Allocation Plan in consultation with and for approval by the FPWG.

The BFAA Annual Allocation Plan will include a current accounting of BFAA water credits (less any water credits advanced the prior year for emergency purposes); a flow forecast for the upcoming year; and an estimate of the water credits that will be accrued over the coming year.

The licensee shall include the BFAA Annual Allocation Plan in its Annual Reports.

The licensee shall maintain a record of withdrawal requests and actual discharged bypass flows, and shall provide a monthly status of available BFAA water credits to the FPWG within two business days of a request by Oregon Department of Fish and Wildlife and the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) ("Fish Managers") (provided that the CTWS is a signatory to the

Settlement Agreement). Water credits not used within a given year will be carried over from year to year until expended, but will not extend beyond the term of the amended license. The licensee shall include this information in its Annual Reports.

(2) Bypass Flow Releases
The licensee shall provide bypass flows from the BFAA within two business days of receiving a request from the liaison designated by the Fish Managers within the limitations of the approved BFAA Annual Water Plan. The licensee shall make 10% of the forecasted annual accrual in the BFAA available for emergency use if insufficient water credits are available in the BFAA.

Otherwise, only water credits accrued in the BFAA will be available for release. Any water credits advanced to the BFAA by the licensee will be offset by a debit to the BFAA as soon as possible but by no later than one year from disbursement, unless otherwise agreed to by the licensee.

The licensee shall be exempted from providing BFAA flows that would result in a Critical Circumstance, which is potential damage or excess wear and tear to project equipment. The licensee shall, within one year of initial operations at the new diversion pool elevation and periodically during the term of the amended license, in consultation with the FPWG and supported by engineering concerns, determine specific turbine unit loading that would result in a Critical Circumstance. If the licensee determines that a request for flow releases will cause a Critical Circumstance, the Fish Managers may request a lower BFAA flow release that will not cause a Critical Circumstance, or the Fish Managers may request and the licensee shall shut down the powerhouse and direct all river flows into the bypass reach as long as sufficient water credits are available in the BFAA.

The licensee shall not be required to shut down the powerhouse in response to a BFAA flow request more than one time per week.

If the Project shuts down for other operational, safety, or maintenance reasons resulting in spill, water credits will not be removed from the BFAA.

Article 48: Upstream Fish Passage Monitoring, Data Collection, Fish Passage Performance, and Reporting
The licensee shall use accepted scientific practices as approved by NMFS, USFWS, BIA, and ODFW for all data collection and monitoring, and shall ensure that data collection standards are being met. The licensee shall provide raw monitoring data to the FPWG within two business days of a Fish Manager request. The licensee shall include all data in its Annual Reports.

1. Fish Ladder Monitoring
The licensee shall, upon completion of the fish passage facilities, continuously monitor the passage of adult fish >12" in length through the fish ladder for the term of the amended license (Table 1). The licensee shall identify and enumerate fish migrating through the fish ladder using video, electronic counter and/or adult trapping as determined by the FPWG, to identify species, passage date, and passage time. The licensee shall provide this information to the FPWG within two business days of a Fish Manager request and shall include all fish passage information (for example, number by species, passage date, and passage time) in its Annual Reports.

2. Fish Migration Delay
The licensee shall, for the initial five years after the release of adult steelhead or Chinook salmon upstream of the Pelton Round Butte Project, unless otherwise agreed to by the FPWG, implement observational techniques (in addition to radio-telemetry monitoring, as specified in this article) to identify any potential adult fish migration delays in the Project tailrace and bypass reach. The licensee shall make direct observations on foot, by snorkel and/or through hydroacoustic spot-checks of the Project tailrace and bypass reach at least every two to three days, as determined by the FPWG, during the steelhead and Chinook salmon upstream passage seasons and shall provide this information to the FPWG within two business days of a Fish Manager request. The licensee shall include all information from these observations in its Annual Reports. The licensee shall report any indications of fish delay to the FPWG within 24 hours of the observation.

3. Fish Passage Performance
The licensee shall, for the duration of the three 5-year Performance Assessment Intervals identified in the Adaptive Management Program, or until any 5-year Performance Assessment Interval demonstrates that the 97% upstream fish passage Performance Goals have been met for adult steelhead and Chinook salmon, monitor adult steelhead and Chinook salmon passing through the lower Crooked River, Project tailrace, bypass reach, fish ladder, and diversion pool (either as upstream migrants or fish that fall back after passing upstream using the ladder). The licensee shall calculate the percent passage success for adult steelhead and Chinook salmon as the number of fish that passed upstream through the fish ladder and diversion pool, minus any fish killed during fallback, divided by the number that entered the Project tailrace (after subtracting fish known to have exited the Crooked River or to have spawned successfully below the Project).

The licensee shall monitor upstream fish passage performance during the initial 5-year Performance Assessment Interval using radio-telemetry. For radio-telemetry, the licensee shall monitor at least 25 radio-tagged adult salmon (adult steelhead,

adult Chinook salmon, or a combination of adult steelhead and Chinook salmon), annually. Should the FPWG make a determination that fewer than 25 radio-tagged adult steelhead and Chinook salmon are expected to enter the Crooked River from downstream radio-tagging studies during any annual monitoring period, the licensee shall radio tag a sufficient number of adult steelhead and Chinook salmon, if available from a trap located within the Project fish ladder, to make up the anticipated short fall.

The licensee shall release the radio-tagged fish downstream of the Project tailrace within the Crooked River. The licensee shall monitor these radio-tagged adult steelhead and Chinook salmon, and any additional adult steelhead and Chinook salmon that are radio-tagged downstream of the Project by other parties, through an array of fixed-station antennae installed, operated, and maintained by the licensee to record fish movements through the Project tailrace, bypass reach, fish ladder and diversion pool.

The licensee shall assess the fish passage Performance Objectives during the second and third 5-year Performance Assessment Intervals using external tags and a mark and recapture protocol, or, by agreement of the FPWG, through some other appropriate method.

Once the licensee has demonstrated, through the results of any of the 5-year Performance Assessment Intervals, that the 97% upstream fish passage Performance Goals for adult steelhead and Chinook salmon have been met, upstream fish passage performance assessment monitoring shall be limited to a one year fish passage performance monitoring assessment every five years to determine if the goals are continuing to be met. If the upstream fish passage Performance Goals for adult steelhead and Chinook salmon fall below the required fish passage Performance Goals, as determined by a one year fish passage performance monitoring assessment, the licensee shall resume annual monitoring assessments and Adaptive Management as described in this amended license.

The licensee is solely responsible for implementing the upstream fish passage performance monitoring requirements. Costs incurred by the licensee above an annual amount of $50,000 solely for implementation of the monitoring required in section 3 of this license article to assess the fish passage performance standards may be off-set by a reduction in the BFAA annual Allocation Percent under the following conditions: 1) available monitoring information must demonstrate that the 90% upstream and downstream fish passage Performance Standards for steelhead and Chinook salmon are being met, and will continue to be met under the proposed BFAA reduction; 2) reductions in the BFAA annual Allocation Percent may be up to, and shall not exceed 5% in any one year; and 3) the licensee shall provide the FPWG an accounting of the capital, expense, and labor costs

incurred on an annual basis for upstream fish passage monitoring, and a determination of the value of the BFAA Allocation Percent reduction in then current dollars, to account for any reduction of the annual BFAA Allocation Percent.

At a minimum, the licensee shall provide an assessment of the following adult steelhead and Chinook salmon metrics in the applicable Annual Reports: 1) total Project passage; 2) percent passage success, number of fallback fish, and cumulative passage timing of steelhead and Chinook salmon; and, 3) travel time through the bypass reach, fish accumulation (if any) within the bypass reach, variation in rates of ladder passage, and the time elapsed from first entering the Project tailrace until exiting the diversion pool.

For bull trout, the licensee shall provide in its Annual Reports, an assessment of the number, size, and passage timing (diel and seasonal) of bull trout passing through the fish ladder.

Following each 5-year Performance Assessment Interval the licensee shall, in that year's Annual Report, provide a 5-year assessment of its status in meeting the fish passage Performance Objectives.

Table 1: Upstream Monitoring Schedule

Monitoring Term	Monitoring Start Time	
	Upon Completion of Fish Passage Facilities	**Upon Release of Adult Fish at Pelton Round Butte**
Duration of Amended License	Continuous monitoring of fish >12" in length migrating through the fish ladder to identify species, passage date, and passage time.	
Five years		Implement observational techniques to identify any potential adult fish migration delays in the Project tailrace and bypass reach every other day during the steelhead and Chinook salmon upstream passage seasons.
Duration of Adaptive Management Program		Monitor steelhead and Chinook salmon passing through the lower Crooked River, Project tailrace, bypass reach, fish ladder, and diversion pool, through radiotelemetry or other methods as necessary to assess fish passage Performance Objectives.

Article 49: Downstream Fish Passage Monitoring, Fish Passage Performance, Data Collection, and Reporting

The licensee shall use accepted scientific practices as approved by NMFS, USFWS, BIA, and ODFW for all data collection and monitoring and shall ensure that data collection standards are being met. The licensee shall provide raw monitoring data to the FPWG within two business days of a Fish Manager request. The licensee shall include all data in its Annual Reports.

1. Diurnal, Seasonal, and Inter-Annual Variation
The licensee shall, for the initial seven years following fish facility construction, or as otherwise agreed to by the FPWG, monitor by acoustic detection, or other appropriate method as agreed to by the FPWG, diurnal, seasonal and inter-annual variation in the relative abundance and timing of juvenile salmonids (particularly smolts) emigrating downstream through Project facilities.

This information is intended to provide the FPWG sufficient information to manage the BFAA for downstream fish passage and to establish migration trends over time. The licensee shall include annual assessments of juvenile fish relative abundance and emigration timing in its Annual Reports, and shall provide this information to the FPWG within two business days of a Fish Manager request.

2. Fish Passage Performance
The licensee shall, for the duration of the three 5-year Performance Assessment Intervals required by the Adaptive Management Program, monitor at least 25 radio-tagged steelhead smolts annually. The licensee's monitoring program may utilize radio-tagged juvenile steelhead that are radio-tagged upstream by other parties. Should the FPWG make a determination that less than 25 radio-tagged steelhead smolts will pass through the Project by May 1 of any given year, the licensee shall tag a sufficient number of smolts to make up the shortfall. The licensee shall monitor these juvenile steelhead as they enter the diversion pool, enter the turbine penstock or fish ladder, pass over each operable spillway gate, exit the bypass reach, exit the Project tailrace, and exit the lower Crooked River. The licensee shall include this information in its Annual Reports.

The licensee shall install, operate, and maintain fixed-station antennae positioned to record these fish movements. Antennae will be capable of differentiating between individual spillway gates, the turbine penstock, tailrace, and bypass reaches, and exit from the Crooked River into Lake Billy Chinook.

Following each 5-year Performance Assessment Interval the licensee shall, in that year's Annual Report, provide a 5-year assessment of its status in meeting the fish passage Performance Objectives. The licensee shall calculate percent survival estimates for downstream migrants from aggregated 5-year telemetry data as the number of radio-tagged fish that passed through the Project area to reach Lake Billy Chinook (minus any mortalities) divided by the number that originally entered the Project diversion pool, with possible adjustments to this algorithm dependent on agreement by the FPWG.

Table 2: Downstream Monitoring Schedule

Monitoring Term	Monitoring Requirements to Begin Upon Completion of Fish Passage Facilities
Seven Years	Monitor by acoustic detection, or other appropriate method, diurnal, seasonal and inter-annual variation in the relative abundance and timing of juvenile salmonids (particularly smolts) emigrating downstream through Project facilities.
Duration of Adaptive Management Program	Monitor at least 25 radio-tagged steelhead smolts annually.

Article 50: Fish Passage Performance Objectives
The licensee shall strive to achieve the following fish passage Performance Objectives through the implementation of the Adaptive Management Program. The license shall be considered in compliance with this license article so long as the fish passage Performance Objectives are met, or the licensee is working towards meeting the fish passage Performance Objectives through implementation of the Adaptive Management Program.

Upstream Fish Passage Performance Objectives:

Species	Standard	Goal
Steelhead and Chinook salmon adults	≥90% successful upstream passage of migratory adults, with ≥90% of those adults that do successfully pass the Project doing so by a specified date each year (date to be determined by FPWG through project evaluations). Fish that perish when falling-back after dam passage will be considered unsuccessful migrants.	≥97% successful upstream passage of migratory adults destined for areas above the Project. Fish that perish when falling-back after dam passage will be considered unsuccessful migrants.
Bull trout adults and sub-adults	≥90% successful upstream passage, with the standard assumed to be met if the standard for steelhead adults is met at the Project.	≥97% successful upstream passage, with the goal assumed to be met if the goal for steelhead adults is met at the Project.

Downstream Fish Passage Performance Objectives:

Species	Standard	Goal
Steelhead and Chinook salmon adults	≥90% passage survival	≥97% passage survival
Bull trout adults and sub-adults	Assumed to be met if the ≥90% passage survival standard for steelhead smolts is met and levels of upstream passage by bull trout >12" at the Project do not exceed 1,000 fish on an annual basis.	Assumed to be met if the ≥97% passage survival goal for steelhead smolts is met.

Following each 5-year Performance Assessment Interval the licensee shall, in that year's Annual Report, provide a 5-year assessment of its status in meeting the fish passage Performance Objectives.

Article 51: Adaptive Management

The licensee shall implement this Adaptive Management Program for the term of the amended license to help it meet or exceed the fish passage Performance Objectives.

The Adaptive Management Program includes: (1) increases to the BFAA at specified intervals if the fish passage Performance Objectives are not met; (2) two tiers of fish passage improvement measures (Tier 1 and Tier 2) that may be necessary to improve fish passage efficiency or to meet the fish passage Performance Objectives; (3) Monitoring, Data Collection, and Reporting as required in this amended license; and (4) modification of Project turbine intake trash racks if necessary to address adult steelhead turbine mortality.

The licensee shall implement the Adaptive Management Program in three 5-year Performance Assessment Intervals and shall provide an assessment of its status in meeting the fish passage Performance Objectives following each 5-year Performance Assessment Interval. The licensee shall continue upstream and downstream fish passage monitoring for the duration of the three 5-year Performance Assessment Intervals regardless of whether it has met the fish

passage Performance Objectives. If any of the fish passage Performance Goals have not been met by the end of the third 5-year Performance Assessment Interval, additional fish passage improvement measures and related monitoring activities will be determined by the FPWG, and implemented by the licensee. The licensee shall include annual monitoring information and 5-year assessments in its Annual Reports.

(1) Implementation
The licensee shall implement additional fish passage measures based on information collected during project monitoring and the status of achieving the fish passage Performance Objectives.

Additional measures are organized into two tiers (Tier 1 and Tier 2 - see part 3 of this license article). The licensee shall implement specific Tier 1 measures at any time as directed by the FPWG (or as required through Dispute Resolution as defined in the Settlement Agreement) in response to Obvious Fish Passage Problems (for example, indications that upstream or downstream fish migrants are not effectively bypassing the Project) or, in response to any 5-year performance assessment if needed to achieve the applicable fish passage Performance Objective.

If additional Tier 1 measures are directed by the FPWG in response to upstream or downstream Obvious Fish Passage Problems, the licensee shall implement the measures within one year of FPWG approval, unless otherwise agreed to by the FPWG. With the exception of modifications to Project trash racks, implementation of Tier 1 measures will neither re-start nor increase the then current 5-year Performance Assessment Interval. However, any modifications to Project trash racks will automatically restart the then current 5-year Performance Assessment Interval.

If Tier 1 measures are required to meet an applicable fish passage Performance Objective following a complete 5-year Performance Assessment Interval, the licensee shall implement the measures as soon as possible but in no case shall implementation take longer than one year unless otherwise agreed to by the FPWG. The next 5-year Performance Assessment Interval shall begin following implementation of the Tier 1 measures. The licensee shall continue annual monitoring regardless of its status in implementing Tier 1 measures.

The licensee shall implement Tier 2 measures following the third 5-year Performance Assessment Interval if the fish passage Performance Goals have not been met.

(2) Required Actions
Following each 5-year Performance Assessment Interval the licensee shall, in that year's Annual Report, provide a 5-year assessment of its status in meeting the fish passage Performance Objectives. The assessment will rely upon information collected annually from upstream and downstream fish passage monitoring.

2.1 1st 5-year Performance Assessment Interval: The licensee shall, following the first 5-year Performance Assessment Interval, take actions in one of the following categories based on the point estimate of the aggregated annual data:

• 97 percent or greater passage effectiveness or survival. No additional Tier 1 measures and no increase to the BFAA Allocation Percent will occur at this time. The licensee may, at its discretion, develop a study of BFAA effectiveness, for approval by the FPWG, to determine whether the BFAA has been over-allocated (less water is needed to meet fish passage Performance Goals or, for resident species, to ensure safe, timely, and effective passage). If it is determined by the FPWG that the BFAA is overallocated, the Allocation Percent will be reduced consistent with the level of over allocation, upon agreement of the FPWG.

• 90 percent or greater, but less than 97 percent passage effectiveness or survival. The licensee shall implement applicable Tier 1 measures, as required by the FPWG, in an effort to achieve the Fish Passage Performance Standards.

• Less than 90 percent passage effectiveness or survival. The licensee shall implement applicable Tier 1 measures, as required by the FPWG, and shall increase the BFAA Allocation Percent to 60%.

• If more than 1,000 bull trout use the ladder annually, and measured performance of downstream steelhead smolt survival is less than 97%, the licensees shall implement Tier 1 measures as required by the FPWG.

2.2 2nd 5-year Performance Assessment Interval: The licensee shall, following the second 5-year Performance Assessment Interval, take actions in one of the following categories based on the point estimate of the aggregated annual data:

• 97 percent or greater passage effectiveness or survival. No additional Tier 1 measures and no increase to the BFAA Allocation Percent will occur at this time. The licensee may, at its discretion, develop a study of BFAA effectiveness over a range of flow conditions, for approval by the FPWG, to determine whether the BFAA has been over-allocated (less water is needed to meet fish passage Performance Goals or, for resident species, to ensure safe, timely, and effective passage). If it is determined by the FPWG that the BFAA is over-allocated, the

Allocation Percent will be reduced consistent with the level of over allocation, upon agreement of the FPWG.

• 90 percent or greater, but less than 97 percent passage effectiveness or survival. The licensee shall implement all remaining and applicable Tier 1 measures, as required by the FPWG, in an effort to achieve the Fish Passage Performance Standards.

• Less than 90 percent passage effectiveness or survival. The licensee shall implement all remaining and applicable Tier 1 measures, as required by the FPWG, and shall increase the fisheries BFAA Allocation Percent to 70%.

• If more than 1,000 bull trout use the ladder annually, and measured performance of downstream steelhead smolt survival is less than 97%, the licensees shall implement Tier 1 measures as required by the FPWG.

2.3 3rd 5-year Performance Assessment Interval: The licensee shall, following the third 5-year Performance Assessment Interval, take actions in one of the following categories based on the point estimate of the aggregated annual data:

• If all Fish Passage Performance Goals have been met: No additional Tier 1 measures and no increase to the BFAA Allocation Percent will occur at this time. The licensee shall continue monitoring fish passage for the term of the amended license and shall provide summaries of this monitoring information, and other salmonid data that may be available from other sources within the project area, annually.

The licensee may, at its discretion, develop a study of BFAA effectiveness over a range of flow conditions, for approval by the FPWG, to determine whether the BFAA has been over-allocated (less water is needed to meet Fish Passage Performance Goals or, for resident species, to ensure safe, timely and effective passage). If it is determined by the FPWG that the BFAA is over-allocated, the Allocation Percent will be reduced consistent with the level of over allocation, upon agreement of the FPWG.

• If one or more of the Fish Passage Performance Goals have not been met: The licensee shall meet with the FPWG as soon as possible, but by no later than February 1 of the next year, to determine: (1) whether implementation of any remaining Tier 1 measures is likely to meet the applicable Goal; or (2) whether major improvements are required (a "Tier 2 Determination").

  - o If the FPWG determines that additional Tier 1 measures are warranted, the licensee shall implement the relevant measures as

soon as possible and shall resume monitoring as described for upstream and downstream fish passage for a period of 3 years. Following this 3-year monitoring cycle, the licensee shall meet again with the FPWG to determine whether the applicable Goals have been met, or whether additional major improvements are required.

- If the FPWG determines that Tier 2 major improvements are required, the licensee shall, in consultation with and subject to the approval of the FPWG, identify specific Tier 2 measures and a necessary monitoring and evaluation plan for implementation. The licensee shall, within 90 days of this determination, propose an action plan and schedule for implementing the Tier 2 measures. After review and approval by the FPWG, the licensee shall file the action plan with the Commission for its approval.

- The Commission reserves the right to require changes to any Tier 2 measure. Any such changes required by the Commission may also require additional approvals by the appropriate Fish Agencies pursuant to their statutory authorities. The licensee shall implement the Tier 2 measures and the monitoring and evaluation plan upon Commission approval.

• If more than 1,000 bull trout use the ladder annually, and measured performance of downstream steelhead smolt survival is less than 97%, the licensees shall implement additional measures as required by the FPWG.

(3) Tier 1 Measures
Upstream Passage Measures:
• Remove peninsula that currently separates the tailrace from the bypass channel in order to reduce unacceptable adult delay at the powerhouse.
• Construct structures in the bypass channel to concentrate flows and provide necessary cues to help adult migrants reach and find the fish ladder entrance.
• Move rocks and boulders in the bypass reach downstream of the fish ladder entrance to provide for adult passage in most flow conditions.
• Other enhancements to the bypass channel.
• Adjustments or minor ("fit and finish") modifications to the ladder to optimize performance.
• Install and operate behavioral deterrents to fish movement toward and into the Project intake.
• Modify spill gate operations.
• Other measures proposed by the FPWG, and approved by the Licensee.

Downstream Passage Measures:
• Install or modify flow guidance devices on the downstream face of the dam to concentrate flow or otherwise improve smolt survival.
• Other enhancements to the bypass channel.
• Install and operate behavioral deterrents, which could include experimental technologies, to guide fish away from the Project intake.
• Other physical modifications that may be suggested by the FPWG, and agreed to the licensee, in lieu of additional BFAA water.
• Predation control in the impoundment; the need for which will be determined by periodic assessments as agreed to by the FPWG.
• Modify spill gate operations.
• Other measures proposed by the FPWG, and approved by the licensee.

(4) Trash Rack Modifications
If the adult steelhead or the downstream bull trout fish passage Performance Standard is not likely to be met due to high turbine mortality in any two of three years of a 5-year assessment interval, the licensee shall modify its trash racks in an effort to reduce adult turbine mortality, unless the FPWG decides otherwise or identifies an alternative solution. The following guidelines will govern trash rack modifications:
• New racks will be located in the existing stop-log slots and will be supplemental to the existing racks unless otherwise agreed to by the licensee.
• New racks will only be deployed seasonally, during the applicable adult migrations, as determined by FPWG.
• The then current Performance Assessment Interval will restart once the new trash racks are installed.

(5) Tier 2 Measures
• Increase water allocated to the BFAA.
• Modify powerhouse turbines to include a more fish friendly configuration.
• Extend the fish ladder upstream into the forebay.
• Install fish barriers or deterrents in the trailrace.
• Install experimental devices in the Project diversion pool to facilitate guidance of fish downstream past the project.
• Other measures proposed by the FPWG, and approved by the licensee.

The licensee may, at any time, propose to implement Tier 2 measures. After review and approval by the FPWG, the licensee shall develop a plan and schedule in consultation with the FPWG and shall implement the proposed measure following all required approvals.

Implementation of Tier 2 measures will be followed by a continuation of the Adaptive Management Program described above.

Article 52: Annual Report

The licensee shall file Annual Reports for the term of this amended license. The licensee shall, by December 15 annually, provide a draft Annual Report to the FPWG and provide at least 30-days for review and approval. The Annual Report will address all activities within that calendar year and will include: (1) Operations and Maintenance (O&M) relating to the fish passage facilities and planned O&M for the upcoming year; (2) annual BFAA Allocation Plan; (3) Monitoring and Evaluation (M&E) relating to the Adaptive Management Program and the Fish Passage and Protection Plan; (4) description of planned monitoring activities for the upcoming year; (5) status of the Adaptive Management Program and related measures; (6) the 5-year assessments required by the Adaptive Management Program; and (7) any proposed changes to the Fish Passage and Protection Plan. Not every assessment or report is due in each Annual Report. The table below summarizes the reporting frequencies associated with each pertinent license article, to be included in the licensee's Annual Reports.

Requiring Article	Description	Reporting Frequency
Article 47	Bypass Flow Accrual Account Annual Allocation Plan	Every year
Article 48	Upstream fish passage monitoring results (steelhead, Chinook salmon, bull trout)	Every year
Article 48	Fish delay indication survey results	Every year for 5 years, after the release of adult steelhead or Chinook salmon upstream of the Pelton Round Butte Project
Article 49	Downstream fish passage monitoring results	Every year
Article 51	Adaptive management monitoring reports	Every year
Article 51	Adaptive management 5-year assessment	Every 5 years
Articles 48, 49, and 51	Fish Passage Performance Objectives status report	Every 5 years

The licensee shall file Annual Reports with the Commission by March 1. When filing Annual Reports with the Commission, the licensee shall include documentation of consultation; copies of comments and recommendations; and specific descriptions of how comments and recommendations from FPWG members have been accommodated. If the licensee does not adopt a recommendation, the filing shall include its reasons based on Project specific information. If the licensee files an Annual Report without obtaining concurrence from the FPWG, the licensee shall include specific reasons for doing so.
The licensee shall implement planned O&M measures, requests for releases of BFAA accumulated water, M&E measures, and Tier 1 and Tier 2 measures as described in its Annual Reports.

Article 53: Inspection and Notice
The licensee shall permit members of the Fish Passage Work Group, at any reasonable time, access to, through, and across Project lands and works for the purpose of inspecting fish passage facilities and related records pertaining to the operation of the Project and implementation of the amended license. The licensee shall require reasonable notice of such inspections and shall establish reasonable safety and security procedures for parties engaged in such inspections.

Article 54: Abandonment of Anadromous Fish Reintroduction
In the event that the NMFS, U.S. Fish and Wildlife Service, and ODFW, each notify the Commission that all efforts to re-introduce anadromous fish to the Upper Deschutes River Subbasin have failed and have been discontinued, the licensee's responsibilities to achieve steelhead and Chinook salmon performance standards shall cease and any associated monitoring and evaluation responsibilities shall terminate. The licensee shall continue to operate the ladder for use by native resident fish, including bull trout, conduct associated monitoring for native resident fish, and provide water credits to the Bypass Flow Accrual Account for purposes of providing an ongoing benefit to native resident fish. The allocation shall be 25% of the increased hydroelectric potential resulting from the new diversion pool elevation.

The licensee may, at its discretion, develop a study of BFAA effectiveness over a range of flow conditions, for approval by the FPWG, to determine whether the BFAA has been over-allocated (less water is needed) to meet fish passage needs of resident native fish. If it is determined by the FPWG that the BFAA is over-allocated, the allocation rate will be reduced consistent with the level of over allocation, upon agreement of the FPWG.

(L) The following license Article 55 is added to the license:

Article 55: *Reservation of Authority to Prescribe Fishways.* Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or to provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce pursuant to section 18 of the Federal Power Act.

(M) *As-built Exhibits.* Within 90 days of completion of construction of the project works authorized by this order, the licensee must file with the Commission, for approval, revised Exhibits A, F, and G, as applicable, to describe and show those project facilities as built, or make a statement that no revisions are necessary.

(N) *Start of Construction.* The licensee must commence construction of the project works authorized in this order within two years from the issuance date of this order and must complete construction within four years from the issuance date of the order.

(O) *Contract Plans and Specifications.* At least 60 days prior to the start of any construction, the licensee must submit one copy of its final plans and specifications and supporting design document to the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer, and two copies to the Commission (one of these must be a courtesy copy to the Director, D2SI). The submittal to the D2SI-Portland Regional Engineer must also include as part of preconstruction requirements: a Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan. The licensee may not begin construction until the D2SI-Portland Regional Engineer has reviewed and commented on the plans and specifications, determined that all preconstruction requirements have been satisfied, and authorized start of construction.

(P) *Cofferdam and Deep Excavation Construction Drawings.* Should construction require cofferdams or deep excavations, the licensee must: (1) have a Professional Engineer who is independent from the construction contractor, review and approve the design of contractor-designed cofferdams and deep excavations prior to the start of construction; and (2) ensure that the construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of any cofferdams or deep excavations, the licensee must submit one copy to the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer and two copies to the Commission (one of these copies must be a courtesy copy to the Commission's Director, D2SI),

of the approved cofferdam and deep excavation construction drawings and specifications, and the letters of approval.

(Q) *Project Modification Resulting from Environmental Requirements.* If environmental requirements under this license require modification that may affect the project works or operations, the licensee must consult with the Commission's Division of Dam Safety and Inspections-Portland Regional Engineer. Consultation must allow sufficient review time for the Commission to ensure that the proposed work does not adversely affect the project works, dam safety, or project operation.

(R) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the FPA, 16 U.S.C. § 825*l* (2012), and the Commission's regulations at 18 C.F.R. § 385.713 (2017). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Steve Hocking, Chief
Environmental and Project Review Branch
Division of Hydropower Administration
and Compliance

APPENDIX A
Oregon Department of Environmental Quality
Water Quality Certification
Issued December 13, 2017

Upon Federal Energy Regulatory Commission issuance of an amended license for the Opal Springs Hydroelectric Project, the Deschutes Valley Water District shall comply with the following § 401 water quality certification conditions:

1. Water Quality Management Plan

Within six months of receiving an amended FERC license Deschutes Valley Water District shall submit a Water Quality Management Plan to the Oregon Department of Environmental Quality. Upon approval by DEQ, Deschutes Valley Water District shall file the WQMP with FERC and implement the WQMP upon FERC approval. The WQMP must address parameters specified in this § 401 water quality certification and include:

a) Data collection protocol, analytical methods, and laboratory method reporting limits;
b) Location and description of monitoring points;
c) Compliance monitoring and field audit schedule;
d) Data sampling frequency;
e) Applicable compliance criteria;
f) Instrument calibration procedures and schedule;
g) Data validation procedures and quality assurance methodology; and
h) Contingency plan for inoperable or malfunctioning equipment.

2. Biological Criteria; Protection of Beneficial Uses; Instream Flows

a) Bypass Reach Flows
Deschutes Valley shall maintain a minimum continuous instream flow of 50 cfs in the bypass reach below the dam in accordance with Article 36 of the current FERC license.

b) Bypass Flow Accrual Account (BFAA)
Deschutes Valley Water District shall establish, manage, and administer the Bypass Flow Accrual Account in accordance with methodology presented in proposed License Article 4 of the 2015 Amended and Restated Settlement Agreement.

c) Fish Passage
Deschutes Valley Water District shall construct, operate, and maintain fish passage facilities in accordance with the criteria described in proposed License Article 2 of the 2015 Amended and Restated Settlement Agreement.

d) Beneficial Use
If DEQ determines that operation of the fish passage facilities described in Condition 2c of these Conditions extends the range of documented spawning habitat used by salmon, steelhead, or bull trout, the Deschutes Valley Water District must take appropriate actions to comply with the following additional conditions, unless otherwise specified by DEQ:

(1) The seven-day-average maximum temperature may not exceed 12.0 degrees Celsius in stream segments with documented bull trout spawning and juvenile rearing use;
(2) The seven-day-average maximum temperature may not exceed 13.0 degrees Celsius during the period identified by DEQ in stream segments with documented salmon or steelhead spawning use;
(3) Dissolved oxygen may not be less than 11.0 mg/l during the period identified by DEQ in stream segments with documented active spawning use, and if the minimum intergravel dissolved oxygen, measured as a spatial median, is 8.0 mg/l or greater, then the dissolved oxygen limit is 9.0 mg/l.

DEQ will notify Deschutes Valley Water District in writing of its determination that these additional conditions are required, including the corresponding areas and time periods in which each condition applies.

Upon such notification, Deschutes Valley Water District may submit within 90 days an alternative plan that demonstrates compliance with these conditions for DEQ's review. If, after public review and comment in accordance with applicable law, if any, DEQ approves or conditionally approves that plan as consistent with water-quality standards, then DVWD will implement that plan, as conditioned, in accordance with its terms.

3. Narrative Criteria: Objectionable Discoloration, Scum, and Oily Sheens

a) Best Management Practices
Deschutes Valley Water District must employ Best Management Practices when handling, storing, or using materials which may, if spilled, result in adverse or objectionable conditions in violation of this water quality standard.

b) Notification
In the event of a spill or release or threatened spill or release to waters of the state of petroleum or other hazardous substances at or above reportable quantities as specified in applicable state and federal regulations, Deschutes Valley must implement effective spill response procedures, notify Oregon Emergency Response System, and comply with ORS Chapters 466 and 468, as applicable.

c) Recordkeeping
For the term of the amended license, Deschutes Valley Water District shall retain records for the period of time required by law which document: the occurrence of reportable releases; visual observations and/or photographic documentation of hazardous material releases which impact aquatic resources; remedial activities undertaken by Deschutes Valley Water District or a contractor to address hazardous material releases; correspondence and/or conversation records which document agency notification, as warranted regarding hazardous material releases; other records deemed appropriate.

4. Dissolved Oxygen

a) Water Quality Monitoring Plan
The WQMP developed by Deschutes Valley Water District pursuant to Condition 1 of these § 401 Certification Conditions shall incorporate the dissolved oxygen monitoring requirements presented below:

(1) Impoundment

Deschutes Valley Water District shall continuously measure DO at upstream and downstream locations in the diversion pool for a minimum of 30 consecutive days during the first July and August when the diversion pool is maintained at an average elevation of at least 2,006.61 feet MSL (i.e., 80 percent of the proposed increase in elevation).

Beginning no later than May 1, Deschutes Valley Water District shall continuously measure DO at the above referenced locations for at least 15 consecutive days during the first May in which the diversion pool is maintained at an average elevation of at least 2,006.61 feet MSL.

(2) Bypass Reach

Concurrent with the measurements and schedules described in Condition 4a(1) above, Deschutes Valley Water District shall measure DO in the upper bypass reach in the vicinity of the proposed ladder entrance.

b) Duration
Water quality monitoring is required for three consecutive years beginning in the first year following completion of fish passage facilities identified in Condition 2c. If, after the second year of required monitoring, DEQ is reasonably assured the Project will meet applicable water quality standards, DEQ may approve discontinuing further monitoring. Alternatively, DEQ may require additional monitoring and/or adaptive management after the third year of monitoring, as warranted, to demonstrate provide support for all recognized beneficial uses.

c) Reporting
Deschutes Valley Water District shall report DO monitoring data to DEQ by December 31 of each year for which monitoring was performed. The report shall address the requirements in Condition 1 of these Conditions and analyze the effects, if any, of Project operation on the DO water quality standard. Following review and approval of the report by DEQ, Deschutes Valley Water District shall file the report with FERC.

d) Adaptive Management
If monitoring indicates the DO water quality standard is not met, DEQ will require Deschutes Valley Water District to submit a report analyzing the situation and shall require additional monitoring and adaptive management of the Project to ensure Project operation does not contribute to violations of water quality standards. Strategies to achieve this objective may include reducing the operating elevation of the diversion pool, increasing flow in the bypass reach or other operational adjustments to ensure Project operation does not contribute to violations of water quality standards.

5. Hydrogen Ion Concentration (pH)

a) Water Quality Monitoring Plan

The WQMP developed by Deschutes Valley Water District pursuant to Condition 1 of these § 401 Certification Conditions shall incorporate the pH monitoring requirements presented below:

(1) Impoundment

Deschutes Valley Water District shall measure pH at upstream and downstream locations in the diversion pool for a minimum of 30 consecutive days during the first July and August when the diversion pool is maintained at an average elevation of at least 2,006.61 feet MSL.

(2) Bypass Reach

Concurrent with the measurements and schedules described in Condition 5(a)(1) above, Deschutes Valley Water District shall measure pH in the upper bypass reach in the vicinity of the proposed ladder entrance.

b) Duration
Water quality monitoring is required for three consecutive years beginning in the first year following completion of fish passage facilities identified in Condition 2c. If, after the second year of required monitoring, DEQ is reasonably assured the Project will meet applicable water quality standards, DEQ may approve discontinuing further monitoring. Alternatively, DEQ may require additional monitoring and/or adaptive management after

the third year of monitoring, as warranted, to demonstrate provide support for all recognized beneficial uses.

c) Reporting
Deschutes Valley Water District shall report pH monitoring data to DEQ by December 31 of each year for which monitoring was performed. The report shall address the requirements in Condition 1 of these Conditions and analyze the effects, if any, of Project operation on the pH water quality standard. Following review and approval of the report by DEQ, Deschutes Valley Water District shall file the report with FERC.

d) Adaptive Management
If monitoring indicates the pH water quality standard is not met, DEQ will require Deschutes Valley Water District to submit a report analyzing the situation and shall require additional monitoring and or adaptive management of the Project to ensure Project operation does not contribute to violations of water quality standards. Strategies to achieve this objective may include reducing the operating elevation of the diversion pool, increasing flow in the bypass reach, or other operational adjustments to ensure Project operation does not contribute to violations of water quality standards.

6. Temperature

a) Water Quality Monitoring Plan
The WQMP developed by Deschutes Valley Water District pursuant to Condition 1 of these § 401 Certification Conditions shall incorporate the minimum temperature monitoring requirements presented below:

(1) Impoundment

Deschutes Valley Water District shall measure temperature at upstream and downstream locations in the diversion pool from May 1 through September 30 beginning with the first year after completion of activities proposed under the proposed license amendment. Monitoring shall include a minimum of 30 days during the July and August when the diversion pool is maintained at an average elevation of at least 2,006.61 feet.

(2) Bypass Reach

Concurrent with the measurements and schedules described in Condition 6a(1) above, Deschutes Valley Water District shall measure temperature in the upper bypass reach in the vicinity of the proposed ladder entrance.

b) Duration
Water quality monitoring is required for three consecutive years beginning in the first year following completion of fish passage facilities identified in Condition 2c. Based on

the results of the first and second year of required monitoring, DEQ will determine whether monitoring may be discontinued or additional data collection is required. If DEQ determines that additional data collection is required, DEQ will require additional monitoring and adaptive management.

c) Reporting
Deschutes Valley Water District shall report temperature monitoring data to DEQ by December 31 of each year for which monitoring was performed. The report shall address the requirements in Condition 1 of these Conditions and analyze the effects, if any, of Project operation on the temperature water quality standard. Following review and approval of the report by DEQ, Deschutes Valley Water District shall file the report with FERC.

d) Adaptive Management
If monitoring indicates the temperature water quality standard is not met, DEQ will require Deschutes Valley Water District to submit a report analyzing the situation and may require additional monitoring and/or adaptive management of the Project to ensure Project operation does not contribute to violations of water quality standards. Adaptive measures may include altering the timing and/or magnitude of Bypass Flow Accrual Account releases to minimize temperature increases in the bypass reach, lowering the elevation of the diversion pool to decrease retention time, or other measures intended to reduce Project-related thermal impacts. Deschutes Valley Water District must submit the report within six months of identifying temperature exceedances. Upon DEQ approval, Deschutes Valley shall submit the plan to FERC for approval. Upon FERC approval, Deschutes Valley shall implement the plan.

7. General Conditions

a) Certification Modification
DEQ, in accordance with Oregon and Federal law including OAR Chapter 340, Division 48 and, as applicable, 33 USC 1341, may modify this Certification to add, delete, or alter Certification conditions as necessary to address:

(1) Adverse or potentially adverse Project effects on water quality or designated beneficial uses that did not exist or were not reasonably apparent when this § 401 Certification was issued;
(2) TMDLs (not specifically addressed above in these § 401 Certification Conditions);
(3) Changes in water quality standards;
(4) Any failure of these § 401 Certification Conditions to protect water quality or designated beneficial uses as expected when this § 401 Certification was issued; or;

(5) Any change in the Project or its operations that was not contemplated by this § 401 Certification that might adversely affect water quality or designated beneficial uses.

b) Other Federal Permits
Upon applying for any federal license or permit authorizing a discharge to waters of the United States other than the new or amended FERC license, Deschutes Valley Water District shall provide DEQ written notice of such application and of any proposed changes or new activity requested to be authorized under the application since issuance of this § 401 Certification. DEQ will notify Deschutes Valley Water District and the applicable federal agency either that: (1) this § 401 Certification is sufficient for purposes of the federal license or permit; or (2) in light of new information related to the water quality impacts of the activity requested to be authorized under the application, there is no longer reasonable assurance of compliance with state water quality standards. In the latter event, ODEQ will consider the new information, solicit and consider public and agency comment as required by law, and issue a 401 certification determination for purposes of the federal license or permit.

For projects which require in-water work, Deschutes Valley Water District shall obtain, as applicable, a removal-fill permit from Oregon Department of State Lands, a dredge and fill permit from the Corps pursuant to § 404 of the Clean Water Act, and a §401 water quality certification from DEQ.

c) Project Modification
Deschutes Valley Water District shall obtain DEQ review and approval before undertaking any change to the Project that might significantly affect water quality (other than project changes authorized by a new or amended FERC license or required by or considered in this § 401 Certification), including changes to Project structures, operations, and flows.

d) Repair and Maintenance
Deschutes Valley Water District shall obtain DEQ review and approval before undertaking Project repair or maintenance activities that might significantly affect water quality (other than repair or maintenance activities authorized by a new or amended FERC license required by or considered in this § 401 Certification). DEQ may, at Deschutes Valley Water District's request, provide such prior approval effective prospectively for specified repair and maintenance activities.

e) Inspection
Deschutes Valley Water District shall allow DEQ such access as necessary to inspect the Project area and Project records required by these § 401 Certification Conditions and to monitor compliance with these § 401 Certification Conditions, upon reasonable notice and subject to applicable safety and security procedures when engaged in such access.

f) Posting
Deschutes Valley Water District shall post or maintain a copy of these § 401 Certification Conditions at the Opal Springs Hydro Project Office.

8. Project Specific Fees

In accordance with ORS 543.080, Deschutes Valley Water District shall pay project-specific fees, in 2016 dollars adjusted according to the formula in Condition 8c below, to DEQ for costs of overseeing implementation of this Certification.

a) Oregon Department of Environmental Quality
Deschutes Valley Water District shall pay project-specific fees to ODEQ, made payable to State of Oregon, Department of Environmental Quality, according to the following schedule:

FERC License	**Annual Project-Specific Fee Subject to Adjustment**	**Due**
Upon License Amendment	$ 3,500 prorated to June 30	Within 30 days
Years 1 - 5	$ 3,500	July 1

b) Annual Adjustment
Fee amounts shall be adjusted annually, according to the following formula:

AD = D x (CPI-U)/(CPI-U-June 2010)

Where:

AD = Adjusted dollar amount payable to agency.
D = Dollar amount pursuant to Condition 8a above,
CPI-U = the most current published version of the Consumer Price Index-Urban. The CPI-U is published monthly by the Bureau of Labor Statistics of the U.S. Department of Labor. If that index ceases to be published, any reasonably equivalent index published by the Bureau of Economic Analysis may be substituted by written agreement between DEQ and Deschutes Valley Water District.

c) Payment Schedule
Fees shall be paid pursuant to a written invoice from DEQ. Except as provided below, project-specific fees shall be due on July 1 of each year following issuance of the new FERC License. Deschutes Valley Water District shall pay an initial prorated payment to DEQ within 30 days of issuance of the amended FERC license, for the period from the date of license issuance to the first June 30 which follows license amendment issuance.

d) Credits
DEQ will credit against this amount any fee or other compensation paid or payable to DEQ directly or through other agencies of the State of Oregon, during the preceding year (July 1 to June 30) for DEQ's costs of oversight.

e) Expenditure Summary
Upon request, DEQ shall, on a biennial basis, provide Deschutes Valley Water District with a summary of project specific expenditures.

f) Duration
The DEQ fee shall expire 3 years after the first July 1 following the issuance of the new FERC license, unless DEQ terminates it earlier because oversight is no longer necessary. One year before the expiration of the fee, or earlier if mutually agreed, DEQ and Deschutes Valley Water District shall review the need, if any, to modify, extend, or terminate the fee, in accordance with ORS 543.080. Deschutes Valley Water District shall pay any project-specific fee required after such review as provided in ORS 543.080.

APPENDIX B

U.S. Department of the Interior – U.S. Fish and Wildlife Service
Biological Opinion- Terms and Conditions
Issued December 21, 2017

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the Deschutes Valley Water District (DVWD) must comply with the following terms and conditions, which implement the reasonable and prudent measures described in the Biological Opinion and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure 1:
The Commission must require the Project Licensee to construct and operate the Project facilities identified in the 2015 Revised and Restated Settlement Agreement, implement the Agreement's Appendix B Opal Springs Fish Passage and Protection Plan, and other Adaptive Management measures identified in the Agreement, as modified by the licensee's Supplemental Filing dated October 31, 2017.

2. To implement reasonable and prudent measure number 2:
2.1 The Commission must require that the Project Licensee prepare an annual report identifying any incidental take associated with Project activities and describing conservation measures implemented to minimize take. The report shall include information on construction activities, fish passage, and Agreement implementation to ensure take was not exceeded. The report shall include the following:

- Description and results of upstream and downstream passage monitoring.
- Results of any water quality monitoring during construction.
- Description of conservation measures implemented to minimize Project impacts.
- Implementation of the 2015 Revised and Restated Settlement Agreement and its Appendices, as modified by the licensee's Supplemental Filing dated October 31, 2017.

The report shall be submitted annually by March 1 to the Service's Bend Field Office located at 63095 Deschutes Market Road, Bend, Oregon, 97701 (phone 541-383-7146). The report shall summarize the Project Licensee's compliance with the Project's proposed action and conservation measures, and the level of exempted incidental take during the implementation of the Project.

We anticipate that during Project construction up to 40 subadult and adult bull trout may be harassed annually due to brief, non-lethal water quality effects that result from Project construction activities, and which impair essential behavioral patterns such as feeding and

sheltering. We also anticipate that during Project operations up to 33 percent of subadult and adult bull trout that pass upstream of the Project may be killed annually due to downstream passage through the Project turbine or spillways. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Project Licensee must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

The Service is to be notified within three working days upon locating a dead, injured or sick endangered or threatened species specimen. Initial notification must be made to the nearest U.S. Fish and Wildlife Service Law Enforcement Office, located at 9025 SW Hillman Court, Suite 3134, Wilsonville, OR 97070; phone: 503-682-6131. In addition, notification must be made to the Service's Bend Field Office, located at 63095 Deschutes Market Road, Bend, Oregon, 97701; phone 541-383-7146. Notification must include the date, time, precise location of the injured animal or carcass, and any other pertinent information. Care should be taken in handling sick or injured specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

APPENDIX C

U.S. Department of the Interior – U.S. Fish and Wildlife Service
Section 18 Fishway Prescription
Filed January 4, 2016; modified on January 9, 2018 and April 9, 2018

1.0 Reservation of Authority to Prescribe Fishways

The Service has prepared its prescriptions for fishways in response to the proposals being considered by the Commission in this proceeding for the proposed amendment of the Opal Springs Hydroelectric Project license. If any proposal is modified as a result of license amendment, then the Department of the Interior, through the U.S. Fish and Wildlife Service, will require adequate opportunity to reconsider each prescription and make modifications it deems appropriate and necessary for submittal to the Commission. Therefore, the Service requests that the Commission include the following condition in any license amendment order it may issue for Project No. 5891:

Authority is reserved for the Department of the Interior, as delegated to the U.S. Fish and Wildlife Service, to prescribe the construction, operation, and maintenance of fishways at the Opal Springs Hydroelectric Project, Project No. 5891, as appropriate, including measures to determine, ensure, or improve the effectiveness of such fishways, pursuant to Section 18 of the Federal Power Act, as amended. This reservation includes, but is not limited to, authority to prescribe fishways for Chinook salmon, steelhead, bull trout, and any other fish to be managed, enhanced, protected, or restored to the Crooked River Basin during the term of the amended license.

2.0. Modified Prescriptions for Fishways

2.1. Pursuant to the limitations, plans, schedules, and measures prescribed below, the Licensee shall provide for the construction, operation, and maintenance of safe, timely, and effective upstream and downstream volitional fish passage at the Opal Springs Hydroelectric Project as detailed in the Licensee's proposed license amendment, settlement agreement, and Opal Springs fish passage and protection plan. The Licensee's obligation to construct, maintain, and operate such fishways is subject to the review and approval of the U.S Fish and Wildlife Service and the National Marine Fisheries Service in consultation with the Fish Passage Work Group (FPWG). Necessary reviews and approvals shall include, but are not limited to, coordination and consultation on the development and implementation of fish passage protection and operation plans, the implementation of fish passage effectiveness measures, the preparation and review of information, reports, designs, and effectiveness evaluations, and in specific circumstances, decision-making.

2.2. To ensure the immediate and timely contribution of the fishways to ongoing and future fish restoration and management programs in the Crooked River Basin, the following measures, as described in Appendix A of the Opal Springs Settlement Agreement, are prescribed to ensure the effectiveness of the fishways pursuant to Section 1701(b) of the National Energy Policy Act of 1992 (P.L. 102-486, Title XVII, 106 Stat.3008):

2.2.1. Opal Springs Fish Passage and Protection Plan. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement proposed license Article 1 Opal Springs Fish Passage and Protection Plan, as detailed in Appendices A and B of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by Supplemental Filing dated October 31, 2017.

2.2.2. Fish Passage Facilities. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement Article 2 Fish Passage Facilities, as detailed in Appendix A of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by Supplemental Filing dated October 31, 2017.

2.2.3. Bypass Flow Accrual Account. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement Article 4 Bypass Flow Accrual Account, as detailed in Appendix A of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by Supplemental Filing dated October 31, 2017.

2.2.4. Upstream Fish Passage Monitoring, Data Collection, Fish Passage Performance, and Reporting. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement Article 5 Upstream Fish Passage Monitoring, Data Collection, Fish Passage Performance, and Reporting, as detailed in Appendix A of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by Supplemental Filing dated October 31, 2017.

2.2.5. Downstream Fish Passage Monitoring, Fish Passage Performance, Data Collection, and Reporting. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement Article 6 Downstream Fish Passage Monitoring, Fish Passage Performance, Data Collection, and Reporting, as detailed in Appendix A of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by Supplemental Filing dated October 31, 2017.

2.2.6. Fish Passage Performance Objectives. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement Article 7 Fish Passage Performance Objectives, as detailed in Appendix A of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by Supplemental Filing dated October 31, 2017.

2.2.7. Adaptive Management. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement Article 8 Adaptive Management, as detailed in Appendix A of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by Supplemental Filing dated October 31, 2017.

2.2.8. Annual Report. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement Article 9 Annual Report, as detailed in Appendix A of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by Supplemental Filing dated October 31, 2017.

2.2.9. Inspection and Notice. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement Article 10, Inspection and Notice, as detailed in Appendix A of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by Supplemental Filing dated October 31, 2017.

2.2.10. Abandonment of Anadromous Fish Reintroduction. The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement Article 11, Abandonment of Anadromous Fish Reintroduction, as detailed in Appendix A of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015, and as modified by the licensee's Supplemental Filing dated October 31, 2017.

APPENDIX D

U.S. Department of the Commerce – National Marine Fisheries Service
Section 18 Fishway Prescriptions
Filed January 4, 2016; modified on January 12, 2018 and April 10, 2018

1. Final Prescriptions for Fishways
Pursuant to the limitations, plans, schedules, and measures prescribed below, the Licensee shall provide for the construction, operation, and maintenance of safe, timely, and effective upstream and downstream volitional fish passage at the Opal Springs Hydroelectric Project as detailed in the Licensee's revised October 31, 2017 amendment, Settlement Agreement, and fish passage and protection plan. The Licensee shall submit for review and approval of NMFS, the development and implementation of fish passage protection and operation plans, the implementation of fish passage effectiveness measures, the preparation and review of information, reports, designs, and effectiveness evaluations.

2. Opal Springs Fish Passage and Protection Plan
The Licensee shall, for the safe, timely, and effective passage of fish at the Opal Springs Hydroelectric Project, implement the Opal Springs Fish Passage and Protection Plan as detailed in Appendix B of the Opal Springs Settlement Agreement filed with the Commission on October 8, 2015 and as modified by the October 31, 2017, revised license amendment application.

3. Fish Passage Facilities
The Licensee shall provide safe, timely, and effective fish passage at the Opal Springs Hydroelectric Project (Project) through implementation of the Amended License. The Licensee shall design, construct, operate, maintain and monitor a volitional upstream fish ladder located at the Project dam structure to provide salmon and steelhead access to historic spawning and rearing habitats in the Crooked River basin and to provide native fish with foraging and migratory opportunities above the project. The fish ladder shall adhere to the National Marine Fisheries Service (NMFS) 2008 Anadromous Salmonid Passage Facility Design Manual.

The Licensee shall also design, construct, operate, maintain and monitor facilities at the Project to increase the normal maximum diversion pool elevation to 2,007.21 feet. The increased pool elevation will make water available for bypassing juvenile fish around the turbine penstock and for attracting adult fish up through the bypass reach to the fish ladder entrance.

The Licensee shall develop final design plans and specifications for the installation, operation, maintenance, and monitoring of the fish passage facilities

in consultation with and for review by the Fish Passage Work Group (FPWG). Specifically, the detailed fish ladder design will be completed in consultation with the FPWG. Final design plans and specifications shall include: (1) final construction drawings; (2) construction schedule; and (3) a preliminary operation and maintenance (O&M) plan that includes daily, above water visual inspections of all areas within the fish ladder that are accessible to fish and annual dewatered fish ladder inspections. The Licensee shall file the final O&M Plan with the Commission within 120 days after construction is completed, following review and approval of the FPWG. The Licensee shall, within 60 days after issuance of the Amended License, provide the final design plans and specifications to NMFS for approval.

The Licensee shall, within 120 days after issuance of the Amended License, file the final design plans and specifications with the Commission for approval. When filing final plans and specifications with the Commission, the Licensee shall include documentation of consultation with the FPWG, copies of comments and recommendations, and specific descriptions of how comments and recommendations from FPWG members have been accommodated. If the Licensee does not adopt an FPWG recommendation, the filing shall include its reasons based on project specific information. If the Licensee files final plans and specifications without first obtaining approvals by the appropriate Fish Agencies pursuant to their statutory authorities, the Licensee shall include specific reasons for doing so.

The Commission reserves the right to require changes to the final fish facility design plans and specifications. Any such changes required by the Commission may also require additional approvals by the appropriate Fish Agencies pursuant to their statutory authorities.

The Licensee shall complete construction of the fish passage facilities within two years of Commission approval.

4. Bypass Flow Accrual Account

Upon completion of the fish passage facilities, the Licensee shall establish a Bypass Flow Accrual Account (BFAA). The BFAA will identify "water credits" (in acre-feet) which will be used to identify water available for aiding upstream and downstream fish passage. Water credits will be accrued in lieu of actual stored water, given that the Project has no storage capacity, and turbine discharge will be reduced when exchanging water credits for actual bypass flows. The Licensee shall administer the BFAA for the term of the amended license as follows:

Accumulating Credits

The Licensee shall accrue water credits in the BFAA beginning concurrently with

the start of Project operations under the new pool elevation and shall continue to accrue water credits in the BFAA for the License Term. Water credits will accrue as a percentage of instantaneous turbine flow (initially 2.89 percent, hereafter referred to as the Accrual Rate) under all flow conditions up to the maximum controlled hydraulic capacity of the Project. The maximum controlled hydraulic capacity of the Project is initially 1,913 cfs [the sum of hydraulic capacity at new head (estimated at 1,600 cfs), the license required bypass flow (50 cfs), and spring water and ground water accreting into the bypass reach (263 cfs)]. Water credits will not accrue at total river discharge greater than the maximum controlled hydraulic capacity of the Project. The Licensee shall, within one year of commencing operations at the new pool elevation, verify all estimates used for determining the maximum controlled hydraulic capacity of the Project. The Licensee shall provide this information to the FPWG at least 45 days prior to filing any proposed modifications with the Commission. The Licensee shall not file with the Commission any proposed modifications of the information used to calculate water credits until any disputes raised by the FPWG have been addressed under the dispute resolution provisions of the Settlement Agreement. Upon Commission approval of any modifications to the information used for calculating water credits, the Licensee shall calculate all subsequent BFAA credits pursuant to the new information.

The Licensee shall periodically reassess spring water and ground water accretion estimates throughout the license term as requested by the FPWG. Any future changes recommended by the Licensee pursuant to periodic review of these parameters, will be further approved by the FPWG prior to the Licensee submitting the new information to the Commission. Upon Commission approval, the Licensee shall calculate all subsequent BFAA credits pursuant to the new information.

The Licensee shall calculate all BFAA credits based on: 1) direct measurements of the hourly turbine discharge data and 2) the gage data from USGS Gage No. 14087400, near Culver, Oregon, below Opal Springs.

The Licensee shall accrue water credits in the BFAA at a rate of between 50 percent and 70 percent (Allocation Percent) of the increase in power generation attributable to the head increase at the Project. Adjustments to the Allocation Percent will only occur following each successive 5-year Performance Assessment Interval, and only if necessary, pursuant to the Adaptive Management program. The potential for asynchronous monitoring periods notwithstanding, the BFAA Allocation Percent will not be increased more than one time every five years. Allocation Percent increases above 70 percent may only occur with the approval of the Licensee.

The Licensee shall, until the turbine performance calculation is modified, accrue water credits at a rate of 2.89 percent of instantaneous turbine flow. The Licensee shall convert real-time accruals into acre-feet for purposes of developing a BFAA Annual Allocation Plan. The Licensee shall develop the BFAA Annual Allocation Plan in consultation with and for approval by the FPWG.

The BFAA Annual Allocation Plan will include a current accounting of BFAA water credits (less any water credits advanced the prior year for emergency purposes); a flow forecast for the upcoming year; and an estimate of the water credits that will be accrued over the coming year.

The Licensee shall include the BFAA Annual Allocation Plan in its Annual Reports. The Licensee shall maintain a record of withdrawal requests and actual discharged bypass flows, and shall provide a monthly status of available BFAA water credits to the FPWG within two business days of a request by Oregon Department of Fish and Wildlife and the Confederated Tribes of the Warm Springs Reservation of Oregon (hereafter Fish Managers) (provided that the CTWS is a signatory to the Settlement Agreement). Water credits not used within a given year will be carried over from year to year until expended, but will not extend beyond the term of the Amended License. The Licensee shall include this information in its Annual Reports.

Bypass Flow Releases

The Licensee shall provide bypass flows from the BFAA within two business days of receiving a request from the liaison designated by the Fish Managers within the limitations of the approved BFAA Annual Water Plan. The Licensee shall make 10 percent of the forecasted annual accrual in the BFAA available for emergency use if insufficient water credits are available in the BFAA. Otherwise, only water credits accrued in the BFAA will be available for release. Any water credits advanced to the BFAA by the Licensee will be offset by a debit to the BFAA as soon as possible but by no later than one year from disbursement, unless otherwise agreed to by the Licensee.

The Licensee shall be exempted from providing BFAA flows that would result in a Critical Circumstance, which is potential damage or excess wear and tear to project equipment. The Licensee shall, within one year of initial operations at the new diversion pool elevation and periodically during the term of the amended license, in consultation with the FPWG and supported by engineering concerns, determine specific turbine unit loading that would result in a Critical Circumstance. If the Licensee determines that a request for flow releases will cause a Critical Circumstance, the Fish Managers may request a lower BFAA flow release that will not cause a Critical Circumstance, or the Fish Managers may request and the Licensee shall shut down the powerhouse and direct all river flows

into the bypass reach as long as sufficient water credits are available in the BFAA. The Licensee shall not be required to shut down the powerhouse in response to a BFAA flow request more than one time per week.

If the Project shuts down for other operational, safety, or maintenance reasons resulting in spill, water credits will not be removed from the BFAA.

5. Upstream Fish Passage Monitoring, Data Collection, Fish Passage Performance, and Reporting

The licensee shall use accepted scientific practices as approved by NMFS, the US Fish and Wildlife Service, Bureau of Indian Affairs, and the Oregon Department of Fish and Wildlife for all data collection and monitoring, and shall ensure that data collection standards are being met. The Licensee shall provide raw monitoring data to the FPWG within two business days of a Fish Manager request. The Licensee shall include all data in its Annual Reports.

Fish Ladder Monitoring

The licensee shall, upon completion of the fish passage facilities, continuously monitor the passage of adult fish >12 inches in length through the fish ladder for the term of the Amended License (Table 1). The Licensee shall identify and enumerate fish migrating through the fish ladder using video, electronic counter and/or adult trapping as determined by the FPWG, to identify species, passage date, and passage time. The Licensee shall provide this information to the FPWG within two business days of a Fish Manager request and shall include all fish passage information (for example, number by species, passage date, and passage time) in its Annual Reports.

Fish Migration Delay

The licensee shall, for the initial 5 years after the release of adult steelhead or Chinook salmon upstream of the Pelton Round Butte Project, unless otherwise agreed to by the FPWG, implement observational techniques (in addition to radio-telemetry monitoring, as specified in this article) to identify any potential adult fish migration delays in the Project tailrace and bypass reach. The Licensee shall make direct observations on foot, by snorkel and/or through hydroacoustic spot-checks of the Project tailrace and bypass reach at least every two to three days, as determined by the FPWG, during the steelhead and Chinook salmon upstream passage seasons and shall provide this information to the FPWG within two business days of a Fish Manager request. The Licensee shall include all information from these observations in its Annual Reports. The Licensee shall report any indications of fish delay to the FPWG within 24 hours of the observation.

Fish Passage Performance

The Licensee shall, for the duration of the three 5-year Performance Assessment Intervals identified in the Adaptive Management program, or until any 5-year Performance Assessment Interval demonstrates that the 97% upstream fish passage Performance Goals have been met for adult steelhead and Chinook salmon, monitor adult steelhead and Chinook salmon passing through the lower Crooked River, Project tailrace, bypass reach, fish ladder, and diversion pool (either as upstream migrants or fish that fall back after passing upstream using the ladder). The Licensee shall calculate the percent passage success for adult steelhead and Chinook salmon as the number of fish that passed upstream through the fish ladder and diversion pool, minus any fish killed during fallback, divided by the number that entered the Project tailrace (after subtracting fish known to have exited the Crooked River or to have spawned successfully below the Project).

The Licensee shall monitor upstream fish passage performance during the initial 5-year Performance Assessment Interval using radio-telemetry. For radio-telemetry, the Licensee shall monitor at least 25 radio-tagged adult salmon (adult steelhead, adult Chinook salmon, or a combination of adult steelhead and Chinook salmon), annually. Should the FPWG make a determination that fewer than 25 radio-tagged adult steelhead and Chinook salmon are expected to enter the Crooked River from downstream radio-tagging studies during any annual monitoring period, the Licensee shall radio tag a sufficient number of adult steelhead and Chinook salmon, if available from a trap located within the Project fish ladder, to make up the anticipated shortfall.

The Licensee shall release the radio-tagged fish downstream of the Project tailrace within the Crooked River. The Licensee shall monitor these radio-tagged adult steelhead and Chinook salmon, and any additional adult steelhead and Chinook salmon that are radio-tagged downstream of the Project by other parties, through an array of fixed-station antennae installed, operated, and maintained by the Licensee to record fish movements through the Project tailrace, bypass reach, fish ladder and diversion pool.

The Licensee shall assess the fish passage Performance Objectives during the second and third 5-year Performance Assessment Intervals using external tags and a mark and recapture protocol, or, by agreement of the FPWG, through some other appropriate method.

Once the Licensee has demonstrated, through the results of any of the 5-year Performance Assessment Intervals, that the 97% upstream fish passage Performance Goals for adult steelhead and Chinook salmon have been met, upstream fish passage performance assessment monitoring shall be limited to a 1-year fish passage performance monitoring assessment every 5 years to determine

if the goals are continuing to be met. If the upstream fish passage Performance Goals for adult steelhead and Chinook salmon fall below the required fish passage Performance Goals, as determined by a one-year fish passage performance monitoring assessment, the Licensee shall resume annual monitoring assessments and Adaptive Management as described in this Amended License.

The Licensee is solely responsible for implementing the upstream fish passage performance monitoring requirements. Costs incurred by the Licensee above an annual amount of $50,000 solely for implementation of the monitoring required in section 3 of this license article to assess the fish passage performance standards may be off-set by a reduction in the BFAA annual Allocation Percent under the following conditions: 1) available monitoring information must demonstrate that the 90% upstream and downstream fish passage Performance Standards for steelhead and Chinook salmon are being met, and will continue to be met under the proposed BFAA reduction; 2) reductions in the BFAA annual Allocation Percent may be up to, and shall not exceed 5% in any one year; and 3) the Licensee shall provide the FPWG an accounting of the capital, expense, and labor costs incurred on an annual basis for upstream fish passage monitoring, and a determination of the value of the BFAA Allocation Percent reduction in then current dollars, to account for any reduction of the annual BFAA Allocation Percent.

At a minimum, the Licensee shall provide an assessment of the following adult steelhead and Chinook salmon metrics in the applicable Annual Reports: 1) total Project passage; 2) percent passage success, number of fallback fish, and cumulative passage timing of steelhead and Chinook salmon; and, 3) travel time through the bypass reach, fish accumulation (if any) within the bypass reach, variation in rates of ladder passage, and the time elapsed from first entering the Project tailrace until exiting the diversion pool.

Table 1. Upstream Monitoring Schedule

Monitoring Term	Monitoring Start Time	
	Upon Completion of Fish Passage Facilities	**Upon Release of Adult Fish at Pelton Round Butte**
Duration of Amended License	Continuous monitoring of fish >12" in length migrating through the fish ladder to identify species, passage date, and passage time.	
Five years		Implement observational techniques to identify any potential adult fish migration delays in the Project tailrace and bypass reach every other day during the steelhead and Chinook salmon upstream passage seasons.
Duration of Adaptive Management Program		Monitor steelhead and Chinook salmon passing through the lower Crooked River, Project tailrace, bypass reach, fish ladder, and diversion pool, through radiotelemetry or other methods as necessary to assess fish passage Performance Objectives.

6. Downstream Fish Passage Monitoring, Fish Passage Performance, Data Collection, and Reporting

The Licensee shall use accepted scientific practices as approved by NMFS, USFWS, BIA, and ODFW for all data collection and monitoring and shall ensure that data collection standards are being met. The Licensee shall provide raw monitoring data to the FPWG within two business days of a Fish Manager request. The Licensee shall include all data in its Annual Reports

Diurnal, Seasonal, and Inter-Annual Variation

The Licensee shall, for the initial seven years following fish facility construction, or as otherwise agreed to by the FPWG, monitor by acoustic detection, or other appropriate method as agreed to by the FPWG, diurnal, seasonal and inter-annual variation in the relative abundance and timing of juvenile salmonids (particularly smolts) emigrating downstream through Project facilities. This information is intended to provide the FPWG sufficient information to manage the BFAA for downstream fish passage and to establish migration trends over time. The Licensee shall include annual assessments of juvenile fish relative abundance and emigration timing in its Annual Reports, and shall provide this information to the FPWG within two business days of a Fish Manager request.

Fish Passage Performance

The Licensee shall, for the duration of the three 5-year Performance Assessment Intervals required by the Adaptive Management program, monitor at least 25 radio-tagged steelhead smolts annually. The Licensee's monitoring program may utilize radio-tagged juvenile steelhead that are radio-tagged upstream by other parties. Should the FPWG make a determination that less than 25 radio-tagged steelhead smolts will pass through the Project by May 1 of any given year, the Licensee shall tag a sufficient number of smolts to make up the shortfall. The Licensee shall monitor these juvenile steelhead as they enter the diversion pool, enter the turbine penstock or fish ladder, pass over each operable spillway gate, exit the bypass reach, exit the Project tailrace, and exit the lower Crooked River. The Licensee shall include this information in its Annual Reports.

The Licensee shall install, operate, and maintain fixed-station antennae positioned to record these fish movements. Antennae will be capable of differentiating between individual spillway gates, the turbine penstock, tailrace, and bypass reaches, and exit from the Crooked River into Lake Billy Chinook.

Following each 5-year Performance Assessment Interval the Licensee shall, in that year's Annual Report, provide a 5-year assessment of its status in meeting the fish passage Performance Objectives. The Licensee shall calculate percent survival estimates for downstream migrants from aggregated 5-year telemetry data as the number of radio-tagged fish that passed through the Project area to reach Lake Billy Chinook (minus any mortalities) divided by the number that originally entered the Project diversion pool, with possible adjustments to this algorithm dependent on agreement by the FPWG.

Table 2. Downstream monitoring schedule

Monitoring Term	Monitoring Requirements to Begin Upon Completion of Fish Passage Facilities
Seven Years	Monitor by acoustic detection, or other appropriate method, diurnal, seasonal and inter-annual variation in the relative abundance and timing of juvenile salmonids (particularly smolts) emigrating downstream through Project facilities.
Duration of Adaptive Management Program	Monitor at least 25 radio-tagged steelhead smolts annually.

7. Fish Passage Performance Objectives
The Licensee shall strive to achieve the following fish passage Performance Objectives through the implementation of the Adaptive Management program. The License shall be considered in compliance with this license article so long as the fish passage Performance Objectives are met, or the Licensee is working towards meeting the fish passage Performance Objectives through implementation of the Adaptive Management program.

Table 3. Upstream and downstream fish passage performance objectives.

UPSTREAM PASSAGE		
Species	**Standard**	**Goal**
Adult Chinook salmon and steelhead	≥90% successful upstream passage of migratory adults, with ≥90% of those adults that do successfully pass the Project doing so by a specified date each year (date to be determined by FPWG through project evaluations); fish that perish when falling back after dam passage will be considered unsuccessful migrants.	≥97% successful upstream passage of migratory adults destined for areas above the Project; fish that perish when falling back after dam passage will be considered unsuccessful migrants.
DOWNSTREAM PASSAGE		
Species	**Standard**	**Goal**
Juvenile Chinook salmon and steelhead	≥90% passage survival	≥97% passage survival

Following each 5-year monitoring interval, the Licensee shall provide an assessment of its status in meeting these fish passage Performance Objectives in its Annual Reports.

8. Adaptive Management

The Licensee shall implement this Adaptive Management program for the term of the Amended License to help it meet or exceed the fish passage Performance Objectives. The Adaptive Management program includes: (1) increases to the BFAA at specified intervals if the fish passage Performance Objectives are not met; (2) two tiers of fish passage improvement measures (Tier 1 and Tier 2) that may be necessary to improve fish passage efficiency or to meet the fish passage Performance Objectives; (3) Monitoring, Data Collection, and Reporting as required in this amended license; and (4) modification of Project turbine intake trash racks if necessary to address adult steelhead turbine mortality.

The Licensee shall implement the Adaptive Management program in three 5-year Performance Assessment Intervals and shall provide an assessment of its status in

meeting the fish passage Performance Objectives following each 5-year Performance Assessment Interval.

The Licensee shall continue upstream and downstream fish passage monitoring for the duration of the three 5-year Performance Assessment Intervals regardless of whether it has met the fish passage Performance Objectives. If any of the fish passage Performance Goals have not been met by the end of the third 5-year Performance Assessment Interval, additional fish passage improvement measures and related monitoring activities will be determined by the FPWG, and implemented by the Licensee. The Licensee shall include annual monitoring information and 5-year assessments in its Annual Reports.

Implementation

The Licensee shall implement additional fish passage measures based on information collected during project monitoring and the status of achieving the fish passage Performance Objectives. Additional measures are organized into two tiers (Tier 1 and Tier 2). The Licensee shall implement specific Tier 1 measures at any time as directed by the FPWG (or as required through Dispute Resolution as defined in the Settlement Agreement) in response to Obvious Fish Passage Problems (for example, indications that upstream or downstream fish migrants are not effectively bypassing the Project) or, in response to any 5-year performance assessment if needed to achieve the applicable fish passage Performance Objective.

If additional Tier 1 measures are directed by the FPWG in response to upstream or downstream Obvious Fish Passage Problems, the Licensee shall implement the measures within one year of FPWG approval, unless otherwise agreed to by the FPWG. With the exception of modifications to Project trash racks, implementation of Tier 1 measures will neither re-start nor increase the then current 5-year Performance Assessment Interval. However, any modifications to Project trash racks will automatically restart the then current 5-year Performance Assessment Interval.

If Tier 1 measures are required to meet an applicable fish passage Performance Objective following a complete 5-year Performance Assessment Interval, the Licensee shall implement the measures as soon as possible but in no case shall implementation take longer than one year unless otherwise agreed to by the FPWG. The next 5-year Performance Assessment Interval shall begin following implementation of the Tier 1 measures. The Licensee shall continue annual monitoring regardless of its status in implementing Tier 1 measures.

The Licensee shall implement Tier 2 measures following the third 5-year Performance Assessment Interval if the fish passage Performance Goals have not been met.

Required Actions

Following each 5-year Performance Assessment Interval the Licensee shall, in that year's Annual Report, provide a 5-year assessment of its status in meeting the fish passage Performance Objectives. The assessment will rely upon information collected annually from upstream and downstream fish passage monitoring.

- *First 5-year Performance Assessment Interval*: The Licensee shall, following the first 5-year Performance Assessment Interval, take actions in one of the following categories based on the point estimate of the aggregated annual data:
  - **97 percent or greater passage effectiveness or survival.** No additional Tier 1 measures and no increase to the BFAA Allocation Percent will occur at this time. The Licensee may, at its discretion, develop a study of BFAA effectiveness, for approval by the FPWG, to determine whether the BFAA has been over-allocated (less water is needed to meet fish passage Performance Goals or, for resident species, to ensure safe, timely, and effective passage). If it is determined by the FPWG that the BFAA is overallocated, the Allocation Percent will be reduced consistent with the level of overallocation, upon agreement of the FPWG.
  - **90 percent or greater, but less than 97 percent passage effectiveness or survival.** The Licensee shall implement applicable Tier 1 measures, as required by the FPWG, in an effort to achieve the Fish Passage Performance Standards.
  - **Less than 90 percent passage effectiveness or survival.** The Licensee shall implement applicable Tier 1 measures, as required by the FPWG, and shall increase the fisheries BFAA Allocation Percent to 60 percent.
    - If more than 1,000 bull trout use the ladder annually, and measured performance of downstream steelhead smolt survival is less than 97 percent, the Licensees shall implement Tier 1 measures as required by the FPWG
- *Second 5-year Performance Assessment Interval*: The Licensee shall, following the second 5-year Performance Assessment Interval, take actions in one of the following categories based on the point estimate of the aggregated annual data.
  - **97 percent or greater passage effectiveness or survival.** No additional Tier 1 measures and no increase to the BFAA Allocation Percent will occur at this time. The Licensee may, at its discretion, develop a study of BFAA effectiveness over a range of flow

conditions, for approval by the FPWG, to determine whether the BFAA has been over-allocated (less water is needed to meet fish passage Performance Goals or, for resident species, to ensure safe, timely, and effective passage). If it is determined by the FPWG that the BFAA is over-allocated, the Allocation Percent will be reduced consistent with the level of over allocation, upon agreement of the FPWG.

- **90 percent or greater, but less than 97 percent passage effectiveness or survival**. The Licensee shall implement all remaining and applicable Tier 1 measures, as required by the FPWG, in an effort to achieve the Fish Passage Performance Standards.
- **Less than 90 percent passage effectiveness or survival**. The Licensee shall implement all remaining and applicable Tier 1 measures, as required by the FPWG, and shall increase the fisheries BFAA Allocation Percent to 70 percent.
  - If more than 1,000 bull trout use the ladder annually, and measured performance of downstream steelhead smolt survival is less than 97 percent, the Licensees shall implement Tier 1 measures as required by the FPWG.

- *Third 5-year Performance Assessment Interval*: The Licensee shall, following the third 5-year Performance Assessment Interval, take actions in one of the following categories based on the point estimate of the aggregated annual data.
  - **If all Fish Passage Performance Goals have been met**. No additional Tier 1 measures and no increase to the BFAA Allocation Percent will occur at this time. The Licensee shall continue monitoring fish passage for the term of the Amended License and shall provide summaries of this monitoring information, and other salmonid data that may be available from other sources within the project area, annually.

    The Licensee may, at its discretion, develop a study of BFAA effectiveness over a range of flow conditions, for approval by the FPWG, to determine whether the BFAA has been over-allocated (less water is needed to meet Fish Passage Performance Goals or, for resident species, to ensure safe, timely and effective passage). If it is determined by the FPWG that the BFAA is over-allocated, the Allocation Percent will be reduced consistent with the level of over allocation, upon agreement of the FPWG.

  - **If one or more of the Fish Passage Performance Goals have not been met**. The Licensee shall meet with the FPWG as soon as possible, but by no later than February 1 of the next year, to determine: (1) whether implementation of any remaining Tier 1 measures is likely to

meet the applicable Goal; or (2) whether major improvements are required (a Tier 2 Determination).

- If the FPWG determines that additional Tier 1 measures are warranted, the Licensee shall implement the relevant measures as soon as possible and shall resume monitoring as described for upstream and downstream fish passage for a period of 3 years. Following this 3-year monitoring cycle, the Licensee shall meet again with the FPWG to determine whether the applicable Goals have been met, or whether additional major improvements are required.
- If the FPWG determines that Tier 2 major improvements are required, the Licensee shall, in consultation with and subject to the approval of the FPWG, identify specific Tier 2 measures and a necessary monitoring and evaluation plan for implementation. The Licensee shall, within 90 days of this determination, propose an action plan and schedule for implementing the Tier 2 measures. After review and approval by the FPWG, the Licensee shall file the action plan with the Commission for its approval.
- The Commission reserves the right to require changes to any Tier 2 measure. Any such changes required by the Commission may also require additional approvals by the appropriate Fish Agencies pursuant to their statutory authorities. The Licensee shall implement the Tier 2 measures and the monitoring and evaluation plan upon Commission approval.
- If more than 1,000 bull trout use the ladder annually, and measured performance of downstream steelhead smolt survival is less than 97%, the Licensees shall implement additional measures as required by the FPWG.

Tier 1 Measures

Upstream Passage Measures

- Remove peninsula that currently separates the tailrace from the bypass channel in order to reduce unacceptable adult delay at the powerhouse.
- Construct structures in the bypass channel to concentrate flows and provide necessary cues to help adult migrants reach and find the fish ladder entrance.
- Move rocks and boulders in the bypass reach downstream of the fish ladder entrance to provide for adult passage in most flow conditions.
- Other enhancements to the bypass channel.
- Adjustments or minor modifications to the ladder to optimize performance.
- Install and operate behavioral deterrents to fish movement toward and into the Project intake.
- Modify spill gate operations.
- Other measures proposed by the FPWG, and approved by the Licensee.

Downstream Passage Measures

- Install or modify flow guidance devices on the downstream face of the dam to concentrate flow or otherwise improve smolt survival.
- Other enhancements to the bypass channel.
- Install and operate behavioral deterrents, which could include experimental technologies, to guide fish away from the Project intake.
- Other physical modifications that may be suggested by the FPWG, and agreed to the Licensee, in lieu of additional BFAA water.
- Predation control in the impoundment; the need for which will be determined by periodic assessments as agreed to by the FPWG.
- Modify spill gate operations.
- Other measures proposed by the FPWG, and approved by the Licensee.

Trash Rack Modifications

If the adult steelhead or the downstream bull trout fish passage Performance Standard is not likely to be met due to high turbine mortality in any two of three years of a 5-year assessment interval, the Licensee shall modify its trash racks in an effort to reduce adult turbine mortality, unless the FPWG decides otherwise or identifies an alternative solution. The following guidelines will govern trash rack modifications:

- New racks will be located in the existing stop-log slots and will be supplemental to the existing racks unless otherwise agreed to by the Licensee.
- New racks will only be deployed seasonally, during the applicable adult migrations, as determined by FPWG.
- The then current Performance Assessment Interval will restart once the new trash racks are installed.

Tier 2 Measures

- Increase water allocated to the BFAA.
- Modify powerhouse turbines to include a more fish friendly configuration.
- Extend the fish ladder upstream into the forebay.
- Install fish barriers or deterrents in the trailrace.
- Install experimental devices in the Project diversion pool to facilitate guidance of fish downstream past the project.
- Other measures proposed by the FPWG, and approved by the Licensee.

The Licensee may, at any time, propose to implement Tier 2 measures. After review and approval by the FPWG, the Licensee shall develop a plan and schedule in consultation with the FPWG and shall implement the proposed measure following all required approvals. Implementation of Tier 2 measures will be followed by a continuation of the Adaptive Management program described above.

9. Annual Report
   The Licensee shall file Annual Reports for the term of this Amended License. The Licensee shall, by December 15 annually, provide a draft Annual Report to the FPWG and provide at least 30-days for review and approval. The Annual Report will address all activities within that calendar year and will include: (1) Operations and Maintenance (O&M) relating to the fish passage facilities and planned O&M for the upcoming year; (2) annual BFAA Allocation Plan; (3) Monitoring and Evaluation (M&E) relating to the Adaptive Management program and the Fish Passage and Protection Plan; (4) description of planned monitoring activities for the upcoming year; (5) status of the Adaptive Management program and related measures; (6) the 5-year assessments required by the Adaptive Management program; and (7) any proposed changes to the Fish Passage and Protection Plan.

   The Licensee shall file Annual Reports with the Commission by March 1. When filing Annual Reports with the Commission, the Licensee shall include documentation of consultation; copies of comments and recommendations; and specific descriptions of how comments and recommendations from FPWG members have been accommodated. If the Licensee does not adopt a recommendation, the filing shall include its reasons based on Project specific information. If the Licensee files an Annual Report without obtaining concurrence from the FPWG, the Licensee shall include specific reasons for doing so.

   The Licensee shall implement planned O&M measures, requests for releases of BFAA accumulated water, M&E measures, and Tier 1 and Tier 2 measures as described in its Annual Reports.

10. Inspection and Notice
    The Licensee shall permit members of the FPWG, at any reasonable time, access to Project lands and works for the purpose of inspecting fish passage facilities and related records pertaining to the operation of the Project and implementation of the Amended License. The Licensee shall require reasonable notice of such inspections and shall establish reasonable safety and security procedures for parties engaged in such inspections.

Reservation of Authority: NMFS requests that the Commission include in the license, a reservation of authority to modify its fishway prescriptions based on new information, as follows: Authority is reserved for the Department of Commerce, as delegated to NMFS, to prescribe the construction, operation, and maintenance of fishways at the Opal Springs Hydroelectric Project, Project No. 5891, as appropriate, including measures to determine, ensure, or improve the effectiveness of such fishways, pursuant to Section 18 of the Federal Power Act. This reservation includes, but is not limited to, authority to prescribe

fishways for Chinook salmon, steelhead, and any other anadromous fish to be managed, enhanced, protected, or restored to the Crooked River basin during the term of the amended license.