

OPAL SPRINGS

Low Impact Hydropower Institute



9/26/18

Reviewer's Report for Full Certification



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The Opal Springs Hydroelectric Project Full Application for Low Impact Hydropower Institute (LIHI) Certification has been reviewed by an independent third party to determine if it has satisfied the LIHI criteria for certification in accordance to the LIHI Handbook, 2nd Edition (updated 7/20/16). Based upon the information provided in the LIHI Application and further supported in a Supplemental letter (September 14, 2018), the Reviewer recommends the Opal Springs Hydroelectric Project receive LIHI Certification for a term of 5 years, with two PLUS Standards under Recreation and Upstream/Downstream Fish Passage Adaptive Management for an additional 5-year term, for a total of 10 years. The Certification recommendation stipulates that the Opal Springs Hydroelectric Project provide annual documentation on the fish passage program and any adaptive management measures implemented.

OPAL SPRINGS

REVIEWER'S REPORT FOR FULL CERTIFICATION

INTRODUCTION

This report constitutes Camas, LLC's (Camas or the Reviewer) findings as the independent third-party review of the Opal Springs Hydroelectric Project (OSHP or "Project") Full Application for Low Impact Hydropower Institute (LIHI) Certification. The Project is located on the Lower Crooked River, and within a deep gorge approximately 5 miles southwest of Culver, Oregon (Figure 1 and Figure 2). The Project extends from River Mile (RM) 6.9 on Crooked River, less than a mile above Lake Billy Chinook, up to RM 7.8, 0.2 miles downstream of a federally designated Wild-and-Scenic section of the river. The Project currently consists of 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 2,004.21 feet NGVD 29; a 44-foot by 33-foot rectangular concrete intake structure 32 feet in height; two 12.5-foot-diameter, 1,157-foot-long buried corrugated metal conduits; a 30-foot-diameter steel surge tank-bifurcator; a 16-foot-diameter, 160-foot-long steel penstock; two existing turbine-driven irrigation pumps, one rated at 175 horsepower and the other rated at 480 horsepower; a powerhouse containing one 4.3 MW generating unit; a 250-foot-long, 20.8 KV underground transmission line; and appurtenant facilities. The Project is owned and operated by the Deschutes Valley Water District, herein referred to as DVWD or the "Applicant".

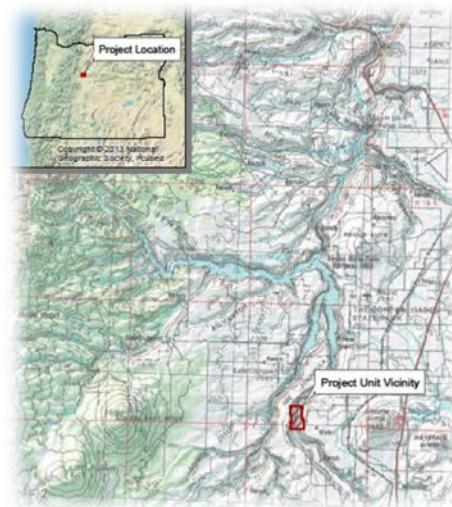


FIGURE 1-PROJECT LOCATION



FIGURE 2-PROJECT FACILITIES

A FERC 50-year major license for the Opal Springs Hydroelectric Project (FERC No. 5891) was issued on November 2, 1982 with an expiry on November 1, 2032. An Oregon Department of Environmental Quality (ODEQ) 401 Water Quality Certificate was issued on October 26, 2016 and was revised and reissued on December 13, 2017 for proposed fish passage measures. The Project has received numerous FERC amendments since 1982. In 2015 the Applicant applied for a non-capacity license amendment for fish passage facilities, which was later put into abeyance and then revised in 2017 to reflect necessary changes based on fish passage design and costing. The need for fish passage at OSHP was driven by a downstream unaffiliated hydroelectric project, Pelton Round Butte, installing fish passage. The Pelton Round Butte fish passage created anadromous fish presence at OSHP. To establish appropriate fish prescriptions, DVWD voluntarily engaged with stakeholders and a multi-party Settlement Agreement was developed in 2015, and later amended in 2017. The 2015 Settlement Agreement was submitted in tandem with the DVWD FERC Application for Non-Capacity Amendment for Opal Springs Fish Passage Project. A revised Project Amendment and Settlement Agreement was filed with FERC in 2017. FERC issued the Non-Capacity Amendment approving the fish passage facilities and supporting adaptive management program on May 9, 2018.

Operations at the Facility are regulated by the terms and conditions in the 1982 FERC License, as amended on May 9, 2018. The revised 2017 ODEQ 401 Water Quality Certificate was issued only for the elements related to the Non-Capacity Amendment which include the construction and operation of the fish passage facility and an increase in pond elevation. It did not evaluate, nor does it include the overall operations of the facility (Pers. Comm., C. Stine, ODEQ, 8/15/2018). The DVWD LIHI Application demonstrated a strong record of working with federal, state and tribal stakeholders to accommodate the 2012 reintroduction of anadromous fish within the Project area. Bull trout, a federally threatened listed species, is also present below the facility. The 2011 Settlement Agreement included five parties and established the construction and maintenance commitments for fish passage. Since 2012, DVWD has voluntarily passed fish above the Opal Springs facility via trap and haul. These specific measures are outlined in the relevant LIHI Criteria in this report. Stakeholders have provided comments commending the DVWD for these efforts and supporting LIHI Certification.

DVWD submitted an Intake Application to LIHI in September 2016. Camas conducted the Intake Application review in January 2017. The filing of the Final LIHI Application was delayed while the Applicant addressed fish passage design modifications to accommodate cost issues. A final Full Application for LIHI Certification was submitted on April 12, 2018. The Full Application presented both the existing operating conditions as well as the projected operations once fish passage construction is completed. Camas conducted a review of this Application and all supporting materials, the Project record on the FERC e-library, and agency comments. The Application review resulted in a request for supplemental information for several elements. On September 14, 2018, the Applicant provided a Letter Supplement addressing all elements. Camas, through its review of the DVWD LIHI Application (April 14, 2018) and their Supplemental response concludes that the OSHP meets LIHI Criteria contained in the 2nd edition LIHI Handbook.

SITE AND FACILITY CHARACTERISTICS

The Project lies within a strongly groundwater influenced section of the Lower Crooked River, and within a deep gorge. The Project extends from River Mile (RM) 6.9 on the Crooked River, less than a mile above Lake Billy Chinook, up to RM 7.8, 0.2 miles downstream of a federally designated Wild-and-Scenic section of the river. No dams are located on the Crooked River downstream of the OSHP, but the Pelton Round Butte Project (FERC No. 2030) owned and operated by Portland General Electric Company is located at RM 100 of the Deschutes River (approx. 9.5 miles downstream from OSHP). Four major dams are located upstream of OSHP that influence the flows through the Project. OSHP does not operate under any agreements made with upstream or downstream facilities but does have a water right for 1,772.5 cfs, which may be fully used when river flows exceed 1,822.5 cfs. Once the powerhouse capacity (1,772.5 cfs) is exceeded, excess stream flows during periods of high runoff are passed over the stoplogs as the impoundment is allowed to rise. Flow has been regulated since 1960 by the Prineville Reservoir, with an active capacity of 152,800 acre-feet, and by the Ochoco Reservoir with an active capacity of 46,500 acre-feet. There are many diversions for irrigation upstream from the OSHP, such that a significant portion of the summertime flow comes from springs within 15 miles of the OSHP. The FERC boundary area is currently 9.3 acres. The boundary included in the 2015 Non-Capacity License Amendment (revised in 2017) is 14.4 acres and includes additional lands for new fish passage facilities and the increased pool elevation.



The Project powerhouse contains one 4.3 MW Siemens-Allis generating unit with a 3-meter Allis Chalmers horizontal tube type turbine. The turbine's maximum hydraulic capacity is 1,772.5 cfs while the minimum is 864.5 cfs. No major equipment upgrades or operational changes have occurred at the Project. The Project produces an average annual generation of approximately 29,509 MWh. The original 6-foot-high diversion dam was built in the 1920s to

power a turbine pump. The dam was raised in 1985 (after obtaining the 1982 Project license). The current OSHP dam is a 21-foot-high by 175.2-foot-long concrete-capped, rockfill diversion dam topped with 6-foot-high flashboards. Under the 2015 Non-Capacity License Amendment (revised in 2017) DVWD proposes to install a single fixed flashback. The Project contains two (2) 12.5-foot-diameter, 1,157-foot-long buried corrugated metal conduits, a 30-foot-diameter steel surge tank-bifurcator, and a 16-foot-diameter, 160-foot-long steel penstock. OSHP currently has a pool with a storage capacity of 106.4-acre-feet and an area of 11.1 acres at normal maximum pool elevation of 2,004.21 feet. Under the revised Non-Capacity License Amendment, DVWD proposes to raise the normal maximum pool elevation by 3 feet to 2,007.21 feet with the installation of a single flashback. The elevated pool level will create a storage capacity of 119 acre-feet and surface area of 14.4 acres. The OSHP discharges water from its powerhouse located approximately 1,500 feet downstream of the dam.



ZONES OF EFFECTS

The Applicant appropriately applied three Zones of Effects:

Zone of Effect #1: Impoundment

The Project currently has an impoundment with a surface area of 11.1 acres at normal pool elevation of 2,004.21 feet NGVD 29. Under the 2015 Non-Capacity License Amendment (revised in 2017), DVWD proposes to raise the impoundment to 2,007.21 feet NGVD 29 and expand the surface area to 14.4 acres at the normal maximum pool elevation.

Zone of Effect #2: Bypass Reach

The Project's 0.26-mile-long bypass reach extends from the Project dam located at RM 7.0 downstream to the Project powerhouse at RM 6.74. This will be unaffected by the proposed modifications, except for beneficial impacts from the Bypass Flow Accrual Account (BFAA, see below).

Zone of Effect #3: Tailrace

The Project's 0.03-mile-long tailrace extends from the powerhouse at RM 6.74 downstream to join with the bypass reach, immediately upstream of a the 240 cfs freshwater spring. This will be unaffected by the proposed modifications.

REGULATORY STATUS: SETTLEMENT AGREEMENT AND PROPOSED PROJECT NON-CAPACITY AMENDMENT

The OSHP presents unique conditions for a Reviewer, as the Applicant has not fully completed implementing measures under the most recent FERC proceeding, an important element within the LIHI Certification standards. Therefore, this report has dedicated a section fully to the proposed fish passage and necessary supporting information to support the recommendation for Certification.

Background: The OSHP was authorized in 1982 and commissioned in 1985. Because anadromous fish had been extirpated from the Upper Deschutes Basin in the 1960s due to construction of the downstream Pelton Round Butte Project (FERC No. 2030), fish passage was not required or provided at the time of licensing of the Project. In 2007, salmon and steelhead were reintroduced in the Upper Deschutes Basin, upstream of the PRB Project following the completion of upstream and downstream

passage facilities at PRB. The reintroduced fish are repopulating three major tributaries to the Deschutes River including the Crooked River where the OSHP is located.

The first salmon and steelhead returning to the PRB Project appeared in 2012 and the species have been in the OSHP vicinity since that time. Located at the lower end of the Crooked River, the OSHP is a barrier to passage into this tributary, which would otherwise provide spawning, rearing, and foraging habitat for these anadromous species. Bull trout, a species listed under the federal Endangered Species Act (ESA), also is present below the OSHP, which is considered critical habitat under the ESA. In response to a request from the Oregon Department of Fish and Wildlife (ODFW), DVWD has been voluntarily passing fish above the OSHP through a trap-and-haul effort since 2012.

Settlement Agreement: To facilitate fish migration across OSHP, DVWD voluntarily engaged with relevant government agencies and non-governmental organizations in 2008 to investigate, discuss, and negotiate a collaborative solution.

In October 2011, DVWD and the following agencies and entities signed a Settlement Agreement for construction and maintenance of fish passage facilities and fisheries management at the OSHP:

U.S. DOI Bureau of Indian Affairs (BIA)	National Marine Fisheries Service (NMFS)
U.S. DOI Bureau of Land Management (BLM)	Oregon Department of Fish and Wildlife (ODFW)
U.S. DOI Fish and Wildlife Service (USFWS)	Trout Unlimited (TU)

The Settlement Agreement was later amended and restated in 2015.

FERC NON-CAPACITY AMENDMENT:

On October 8, 2015, DVWD submitted the Settlement Agreement and an Application for Non-Capacity Amendment for the Opal Springs Fish Passage Project to FERC. The Non-Capacity License Amendment, as recommended in the 2015 Settlement Agreement, provides for upstream and downstream fish passage at the Project, and an adaptive management approach for managing the fish passage facilities throughout the term of the amended license.

In early 2017, construction estimates exceeded the DVWD project budget for construction. As a result, the License Amendment was put in abeyance with FERC through December 2017 to allow for DVWD to review the engineering and seek other sources of funding. DVWD was able to both lower project costs and secure a grant from the Oregon Water Resources Department and other funding partners. The revised License Amendment and updated Project Description were re-filed with FERC on October 31, 2017.¹ On December 14, 2017, DVWD also re-filed Appendix B of the Settlement Agreement to ensure consistent language between the new Project description and what was in Appendix B (Fish Passage Plan).² The consultation record demonstrates that the interested parties are fully supportive of the 2015 Agreement and FERC license amendment.

2017 Non-Capacity License Amendment and Settlement Agreement (revised) Provisions for DVWD:

- Construct a fish ladder to provide passage into the spawning, rearing, and foraging habitats of the Crooked River sub-basin for adult anadromous summer Steelhead, spring Chinook salmon, and migratory bull trout, the latter of which are listed as threatened under the Endangered Species Act (ESA). Additionally, the facilities will reconnect populations of native redband trout upstream and downstream of the Project. Designs and specifications for the fish passage facilities are to be developed in consultation with the Opal Springs Fish Passage Working Group.
- Raise the maximum operating elevation of the Project reservoir from 2,004.21 feet elevation NGVD 29 to 2,007.21 feet NGVD 29, through addition of a fixed flashboard. This new elevation will enable the DVWD to construct alternative downstream passage routes for migrating fish and will enable the establishment of a water credit system to supplement flow into the Project's bypass reach and through the fish ladder.

¹ http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20171031-5322

² <https://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=14777354>

- Modify the existing roughened spillway by creating a single smooth chute to enable safe, timely, and effective downstream fish passage.
- Establish a water credit system known as the Bypass Flow Accrual Account (BFAA). This water would serve as both attraction flow for upstream migrating adult fish that may be holding in the Project's tailrace, and as alternative passage for downstream migrants. Increased head resulting from the pool raise would allow DVWD to generate additional power to partially offset the cost of fish ladder construction and operation as well as costs associated with the ladder's monitoring and evaluation program. Water credits would be accrued in lieu of actual stored water, given that the Project has no usable storage capacity³, and turbine discharge would be reduced when exchanging water credits for actual bypass flows. DVWD would administer the BFAA, but decisions regarding its use would be made by the Fish Managers (ODFW), consistent with Opal Springs Fish Passage Working Group's BFAA Annual Flow Allocation Plan, and any terms and conditions established by the USFWS or NMFS through ESA consultation.
- Implement a monitoring and evaluation (M&E) program for assessing upstream and downstream passage relative to stated performance objectives.
- Adaptively manage the Project to meet the fish passage performance objectives.
- Implement the Opal Springs Fish Passage and Protection Plan.
- Provide annual reports addressing the activities within the calendar year relating to the fish passage facilities, O&M measures, BFAA, M&E program, and other fisheries management activities.
- Provide inspection rights to members of the Fish Passage Working Group.
- Comply with typical FERC requirements regarding construction at a project.

The DVWD non-capacity amendment application includes an updated description of Project works: a 21-foot-high, 200-foot-long concrete capped rockfill diversion dam, controlled with fixed flashboards creating a pool with a storage capacity of 119 acre-feet and area of 14.4 acres at normal maximum pool elevation of 2007.21 feet NGVD 29; a 30 cfs vertical slot ladder; a 44-foot by 33-foot, rectangular, concrete intake structure 34 feet in height; two 12.5-foot-diameter, 1,157-foot-long, buried, corrugated-metal conduits; a 30-foot-diameter steel surge tank-bifurcator; a 16-foot-diameter, 160-foot-long steel penstock; two existing turbine-driven irrigation pumps one rated at 174 horsepower and the other rated at 480 horsepower; a powerhouse containing one 4.3 MW generating unit; a 250-foot-long, 69.5 KV overhead transmission line; and appurtenant facilities. Under the proposed amendment, the Project boundary would also be amended to extend upstream nearly (but not quite) to river mile 8.0, the lower boundary of the Wild-and-Scenic section.

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY-CLEAN WATER ACT CERTIFICATE (SECTION 401)

On October 26, 2016 ODEQ issued a water quality certification pursuant to Section 401 of the federal Clean Water Act and ORS 468B.040 for the FERC Non-Capacity Amendment to install and operate a fish passage facility. On December 13, 2017, the ODEQ issued a modification of the Section 401 Water Quality Certification in response to modifications to the technical aspects of the proposed fish passage facility. Both the 2016 401 Certificate and the 2017 modification address the OSHP Non-Capacity FERC License Amendment. The OSHP Project was not issued a 401 Water Quality Certificate in 1982 when the project was issued its 50-year FERC license.

COMPLIANCE WITH LIHI STANDARDS

OSHP selected the following LIHI Standards per Zone. The Plus Standard was added for Downstream Fish Passage with their September 14, 2018 response for clarification:

³ No storage capacity is based on run-of-river operation. The Project does have storage capacity in the impoundment, currently 106.4 acre-ft and will have 119 acre-ft after the modifications are completed.

Zone #1: Impoundment

CRITERION	ALTERNATIVE STANDARDS				
	1	2	3	4	PLUS
A Ecological Flow Regimes	X				
B Water Quality		X			
C Upstream Fish Passage		X			
D Downstream Fish Passage		X			X
E Watershed and Shoreline Protection	X				
F Threatened and Endangered Species Protection			X		
G Cultural and Historic Resources Protection	X				
H Recreational Resources		X			X

Zone #2: Bypass

CRITERION	ALTERNATIVE STANDARDS				
	1	2	3	4	Plus
A Ecological Flow Regimes		X			
B Water Quality		X			
C Upstream Fish Passage		X			
D Downstream Fish Passage		X			
E Watershed and Shoreline Protection	X				
F Threatened and Endangered Species Protection			X		
G Cultural and Historic Resources Protection	X				
H Recreational Resources		X			X

Zone #3: Tailrace

CRITERION	ALTERNATIVE STANDARDS				
	1	2	3	4	Plus
A Ecological Flow Regimes		X			
B Water Quality		X			
C Upstream Fish Passage		X			
D Downstream Fish Passage		X			
E Watershed and Shoreline Protection	X				
F Threatened and Endangered Species Protection			X		
G Cultural and Historic Resources Protection	X				
H Recreational Resources		X			X

CRITERION A: ECOLOGICAL FLOW

Standard Applied: A1 – Non-Applicable/De Minimis Effect Zone 1

Current Operations

OSHP is currently, and will continue to, operate as a run-of-river facility, which means that the outflow of the facility is within +/- 10% of the inflow to the facility, measured on an hourly basis. As required under the modified 1982 License Article 36, DVWD discharges a continuous minimum flow of 50 cfs or the inflow to the reservoir, whichever is less, for the purpose of protecting and enhancing aquatic resources in the Crooked River. Flow is measured through a rating curve that correlates releases with set valve openings. Once the powerhouse capacity is exceeded (1,772.5 cfs), excess stream flows during periods of high runoff (typically in the spring) are passed over the stoplogs as the impoundment is allowed to rise. The hydro turbine is not operable below 500 cfs, therefore the Project is not hydraulically capable of violating the minimum flow. Total river flows before withdrawals for hydropower or instream flows are measured using USGS gage 14087400 below Opal Springs, less 263 cfs (spring water inputs between dam and gage). The future operations under the FERC Non-Capacity Amendment retain the run-of-river flow regime. Under a voluntary agreement, anadromous salmon and steelhead have been trapped at the Project since 2012 and transported to a release site above the Project. Fish and wildlife habitat within the Impoundment ZOE are not specifically evaluated or managed. The overall health of the Impoundment ZOE is maintained through the facility's run-of-river operations.

Future Operations under Non-Capacity License Amendment

The 2015 Non-Capacity License Amendment (*revised in 2017*) will neither modify run-of-river operations nor the 50 cfs minimum flow requirement. The overall increase in reservoir acre-feet is not anticipated to impact the fish and wildlife species in the impoundment zone based on wetland surveys conducted in 2014, and the steep cliff shoreline. The applicable resource agencies will administer decisions under the BFAA which will ensure species are considered when water credits are utilized.

Standard Applied: A2 – Agency Recommendation: Zones 2 and 3

Current Operations

Under the 1982 License Article 36, DVWD is required to discharge a continuous minimum flow of 50 cfs or the inflow, whichever is less, for the purpose of protecting and enhancing aquatic resources in the Crooked River. Flows are measured through a rating curve that correlates release volumes with gate or valve openings.

On June 14, 2012, FERC approved a short-term modification (for a period not to exceed 5 years) to License Article 36 so that a portion of the 50 cfs bypass flow could be transferred to a downstream release point to aid in attracting upstream migrating anadromous fish to a temporary trap for DVWD's interim trap-and-haul fish passage program. Previously under the License Article 36 modification, DVWD temporarily released a minimum flow of 30 cfs from the Project and no more than 20 cfs downstream at an existing fish hatchery ladder (non-project) for the purposes of attracting upstream migrating adult salmonids and providing the necessary water supply to the fish hatchery pools located approximately 950 feet downstream of the dam.

In response to the reintroduction of migrating steelhead and salmon above the PRB Project in 2011, it was agreed by agencies that the OSHP flow modification was necessary to provide sufficient attraction flow to divert upstream migrating salmonids into the hatchery for transport above the dam. The hatchery has been identified by members of the Opal Springs Fish Passage Working Group⁴ as the preferred interim means of capturing upstream migrants in association with the 2008 Upper Deschutes River Reintroduction Program prior to the installment of a permanent upstream fish passage facility at OSHP. This temporary flow modification was only enacted when the temporary fish collection facility was in operation. The ODFW, NMFS and the USFWS issued letters in support of this temporary modification on April 9, 2012, April 11, 2012, April 12, 2012, respectively.

⁴ A working group whose purpose is to advise the Licensee on fisheries and habitat issues as specified in the 2015 Settlement Agreement and 2015 Non-Capacity License Amendment (*revised in 2017*).

Under this modification, resource agencies are annually given an opportunity to review and comment on the Project's bypass flows during their reviews of the Annual Flow Monitoring Report (Annual Flow Monitoring Reports are submitted to the FERC pursuant to Ordering Paragraph (C) of the June 14, 2012, license Article 36 modification).

Future Operations under Non-Capacity License Amendment

The OSHP will continue to be operated as a run-of-river facility, and the minimum instream flow requirement of the current license (License Article 36) will be maintained. The 2015 Non-Capacity License Amendment (revised in 2017) will neither modify run-of-river operations nor the 50 cfs minimum flow requirement. However, through the BFAA this flow will be supplemented at the request of Fish Managers (ODFW) to serve as both attraction flow for upstream migrating adult fish that may be holding in OSHP's tailrace and as an alternative passage for downstream migrants through the spillway. The minimum bypass flow of 50 cfs will be supplied by the proposed 30 cfs fish ladder flow and 20 cfs of spill flow. Spill flow will normally be supplied by Gate No. 1 adjacent to the proposed fish ladder location. Fish bypass releases will enter a stilling basin adjacent to the proposed fish ladder entrance. The total BFAA volumes are estimated to be in the order of 20,000 to 25,000 acre-feet. In terms of flow releases, this volume will provide a year-round BFAA flow release of 30 to 40 cfs, approximately 9 weeks of flow releases at 200 cfs, or approximately 2 weeks of flow releases at 344 cfs. The Fish Passage Working Group will develop detailed protocols for operating the gates and for using BFAA releases to facilitate fish passage as part of an adaptive management effort. The adaptive management effort will be implemented through a series of three 5-year periods in which fish passage performance will be evaluated against agreed upon performance targets. At the end of each period, monitoring data accumulated over the period will be used to identify possible fish passage problems and to identify remedies from a specified suite of potential actions. Remedies will be selected and applied, where appropriate, prior to the initiation of the next 5-year period.

CRITERION B: WATER QUALITY

Standard Applied: B2 – Agency Recommendation Zone: 1, 2 and 3

Current Operations

On October 7, 1982 DVWD submitted a water quality certificate application to the ODEQ. Because ODEQ concluded that the issuance of a license for the Project, as conditioned, would not be a major federal action that would significantly affect the quality of the human environment, a water quality certification was not issued with the 1982 Project license.

Future Operations under Non-Capacity License Amendment

In accordance with Section 401 of the Clean Water Act (CWA), DVWD applied on February 29, 2016 for an ODEQ Water Quality Certificate (WQC) to accompany the Project's 2015 Non-Capacity License Amendment Application (revised 2017). On October 26, 2016 (re-issued December 13, 2017), the Oregon Department of Environmental Quality issued the Final 401 Water Quality Certificate (Appendix C, DVWD Application). The 401 Water Quality Certificate noted that the Project was not a contributing factor to any of the Water Quality criterion used for evaluation. Within the ODEQ's Approved 2010 Integrated Water Quality Report, the Lower Crooked River is classified as an impaired waterway. The OSHP is embedded within a 51-mile segment of the Crooked River (extending upstream from the mouth) that is on Oregon's 303(d) list of streams with impaired water quality.

Deschutes Valley Water District filed an application for a 2015 Non-Capacity License Amendment (revised 2017) for the OSHP. The Lower Crooked River is identified on DEQ's 303d list of impaired water bodies as exceeding the range of numeric criteria for pH from RM 29.6 to RM 47.9 and for temperature from RM 0 to RM 51. DEQ expects the proposed actions will not contribute to the further impairment of these water quality parameters. To confirm this expectation, DEQ will require DVWD to conduct water quality monitoring once the facility is functional and to engage in adaptive management of the Project, as necessary, to ensure that water quality standards are met. The 303(d) listing is due to elevated summer temperatures, elevated E. coli levels, development of aquatic weeds/algae, ammonia, and high pH in areas well upstream of the OSHP. ODEQ has determined that pathogens, nutrients, temperature, and caustic conditions contribute to the violation. The OSHP is not listed as a contributing factor to the violations per the Application reference to an USEPA 2016 Water Body Assessment Report.

CRITERION C: UPSTREAM FISH PASSAGE

Standard Applied: C2 – Agency Recommendation: Zone 1, 2 and 3

Current Operations

Construction of the downstream Pelton Round Butte Project in the 1960s resulted in the extirpation of the anadromous spring chinook salmon, sockeye salmon, and summer steelhead trout from the Upper Deschutes Basin. As a result, fish passage was neither required nor provided at the OSHP at the time of FERC licensing. In 2011, anadromous fish passage at the Pelton Round Butte Project was established, reintroducing anadromous fish into the Crooked River. That passage has also reintroduced Bull Trout, a species listed under the ESA, to the Crooked River. The OSHP is now acting as a barrier for anadromous species movement and as a barrier for the local movement of Bull Trout as the facility sits within classified Bull Trout critical habitat.

To reduce the impacts of the fish migratory barrier, DVWD has been voluntarily implementing an interim trap and haul effort since 2011. From 2012 to 2014, ODFW utilized an existing non-project hatchery fish ladder located approximately 950 feet downstream of the dam to attract migrating salmon and steelhead to a fish collection chamber. Captured salmon and steelhead are transported via truck and released 325 feet upstream from the OSHP dam.

Bull trout are not currently passed using the existing trap and haul measures per USFWS Federal Fish and Wildlife Permit TE72084A-0. As stated in the Permit, “bull trout are not the focus of the proposed” trap and haul activity. Upstream of Highway 97 the Crooked River experiences low summer flow and high-water temperatures which are unsuitable for bull trout, though these areas may become suitable during winter months. The only section of the Crooked River currently occupied by bull trout is the one-mile-long reach of the river downstream of the Project dam, which is suitable for foraging bull trout all year.

Future Operations under Non-Capacity License Amendment

Under the terms of the 2015 Settlement Agreement, DVWD has agreed to:

- Construct a fish ladder to provide passage into the spawning, rearing, and foraging habitats of the Crooked River;
- Establish a water credit system known as the BFAA that will provide for additional water, when needed, to the bypass reach to assist upstream fish passage and /or to assist downstream fish passage;
- Implement an M&E program for assessing the performance of the fish passage facilities against Performance Standards and adaptively manage the Project to meet fish passage performance objectives;
- Implement the Opal Springs Fish Passage and Protection Plan; and
- Provide annual report addressing the activities within the calendar year relating to the fish passage facilities.

In response to submission of DVWD's 2015 Settlement Agreement and Non-Capacity License Amendment, the ODFW, NMFS, and USFWS issued recommendations, prescriptions, and conditions for the upstream fishway and associated 2015 Settlement Agreement conditions in 2016. The specific conditions listed below are consistent with the 2015 Settlement Agreement.

- Migratory fish (including bull trout) will use the ladder to volitionally migrate upstream of the Project. The fish will be attracted to flows in the bypass reach, where the entrance to the ladder is located.
- Upstream and downstream fish passage monitoring will be implemented in a series of three 5-year Performance Assessment Intervals. Though data from any one year may trigger implementation of the Opal Springs Fish Passage Protection Plan's measures to improve passage effectiveness, assessment of the Performance Objectives will only occur following completion of an entire 5-year Performance Assessment Interval. The Project's compliance with fish passage Performance Objectives will be determined based on point estimates of aggregated data at the end of each 5-year interval.

DVWD will continuously monitor the upstream passage of adult fish > 12 inches (305 mm) in length through the fish ladder for the term of the Amended License, which expires in 2032. Fish using the ladder will be identified and enumerated using video, electronic counter and/or adult trapping to identify species, passage date, and passage time.

CRITERION D: DOWNSTREAM FISH PASSAGE

Standard Applied: D2 – Agency Recommendation: Zone 1, 2 and 3

Current Operations

Under the current License downstream fishway prescriptions were not provided for by resource agencies. Downstream migrants are passed through the facility at either the intake or over the diversion dam. In 1982, CH2M Hill conducted a downstream passage study which estimated annual mortality of 10 salmonid fish from the turbine. Due to the low estimated fish mortality from fish entering the power facilities, no screens or louvers were required. However, to mitigate possible losses, DVWD released hatchery chinook salmon, rainbow trout, and brown trout at Opal Springs from 1985 until 2009. Spring chinook salmon were also released in 1985-86. Since 2009, the hatchery at Opal Springs has been rearing summer steelhead from the Pelton Round Butte Hatchery as part of the anadromous fish reintroduction effort.

Future Operations under Non-Capacity License Amendment

Under the terms of the 2015 Settlement Agreement, DVWD has agreed to:

- Construct a fish ladder to provide passage into the spawning, rearing, and foraging habitats of the Crooked River;
- Establish a water credit system known as the BFAA that will provide for additional water, when needed, to the bypass reach to assist downstream fish passage;
- Implement an M&E program for assessing the performance of the fish passage facilities against Performance Standards and adaptively manage the Project to meet fish passage performance objectives;
- Implement the Opal Springs Fish Passage and Protection Plan; and
- Provide annual report addressing the activities within the calendar year relating to the fish passage facilities.

In response to submission of DVWD's 2015 Settlement Agreement and Non-Capacity License Amendment, the ODFW, NMFS, and USFWS, issued recommendations, prescriptions, and conditions for the downstream fishway and associated 2015 Settlement Agreement conditions in 2016. The specific conditions listed below and are consistent with the 2015 Settlement Agreement.

- Migratory fish (including bull trout) will use the ladder to volitionally migrate upstream of the Project. These fish are expected to be foraging subadults and adults that will remain in the Crooked River upstream of the Project for an unknown period of time before passing back downstream of the Project. The fish will use the downstream smooth chute to re-enter the bypass reach and continue downstream.
- Downstream fish passage monitoring will be implemented in a series of three 5-year Performance Assessment Intervals. Though data from any one year may trigger implementation of the Agreement's Opal Springs Fish Passage Protection Plan's measures to improve passage effectiveness, assessment of the Performance Objectives will only occur following completion of an entire 5-year Performance Assessment Interval. The Project's compliance with fish passage Performance Objectives will be determined based on point estimates of aggregated data at the end of each 5-year interval.
- DVWD will monitor the downstream passage of at least 25 radio-tagged steelhead smolts annually. Data accumulated through annual smolt passage monitoring will be assessed at 5-year intervals to provide a basis for deciding upon needs for additional downstream fish passage improvements at the Project. Percent survival estimates for upstream and downstream migrants will be calculated from the aggregated 5-year telemetry data.

CRITERION D-PLUS: DOWNSTREAM FISH PASSAGE

In the September 2018 LIHI Application Supplement, DVWD selected the PLUS standard for Criterion D, Downstream Fish Passage. The actions supporting the PLUS standard apply to both Criterion C, Upstream Fish Passage and to Criterion D, Downstream Fish Passage. LIHI would only award a single PLUS for a single activity, in this case the fish passage adaptive management plan, so the PLUS could be awarded for either Criterion C or Criterion D but not both.

The OSHP fish passage facilities establish an adaptive management approach to ensure that both upstream and downstream passage meets the required survival criteria of >90 % passage with a goal of >97%. The adaptive management effort will consist of a series of three 5-year periods in which fish passage performance will be evaluated against agreed upon performance targets. Monitoring efforts include adult counts; adult migration timing; real-time adult passage effectiveness; aggregate adult fish passage performance; juvenile relative abundance; juvenile emigration timing; real-time juvenile passage effectiveness; and aggregate smolt passage performance. Monitoring data accumulated will be used to identify possible fish passage issues. Solutions will be selected from a suite of potential actions. The adaptive management program is located in the Fish Passage and Protection Plan, 2017 (Attachment C, Supplemental Letter).

The OSHP Non-Capacity License Amendment contributes significantly towards the success of the 2008 Upper Deschutes River Reintroduction and Conservation Plan for Anadromous fish in the Upper Deschutes Sub-basin.⁵ DVWD's voluntary efforts to promote fish passage prior to their FERC License expiration in 2032 has made accessible approximately 108 miles of spawning habitat above OSHP. The willingness of DVWD to establish permanent fish passage measures a minimum of 14 years prior the FERC relicense issuance is deserving of the PLUS standard.

CRITERION E: SHORELINE AND WATERSHED PROTECTION

Standard Applied: E1 – Non-Applicable/De Minimis Effect: Zone 1, 2 and 3

Current Operations

The Project has a small boundary area that incorporates only lands and facilities necessary for Project operations. Shoreline surrounding the Project is extremely sloped with cliffs and is made up entirely of scrub/shrub land cover and open water. FERC has not required, nor have stakeholders requested a Shoreline Management Plan.

Future Operations under Non-Capacity License Amendment

DVWD conducted wetland surveys which were completed in 2014, as part of the removal fill permitting for Oregon Department of State Lands and US Army Corps of Engineers. The purpose was to determine and establish the presence and location of Jurisdictional Wetlands along the shorelines of the OSHP. It was found that the area of wetlands that would be inundated as a result of the license amendment and increase in reservoir elevation would be 0.018 acre.

CRITERION F: THREATENED AND ENDANGERED SPECIES PROTECTION

Standard Applied: F3 –Recovery Planning and Action: Zone 1,2, and 3

Current Operations

As noted above, the OSHP was licensed by FERC in 1982 and commissioned in 1985. Previous construction of the downstream Pelton Round Butte Project in the 1960s had resulted in the extirpation of the anadromous spring chinook salmon, sockeye salmon, and summer steelhead trout from the Upper Deschutes Basin; consequently, fish passage was neither required nor provided at the OSHP at the time of licensing. Agencies have identified four species of which are classified as federally threatened under the ESA: Canada Lynx, Northern Spotted Owl, steelhead, and the Bull Trout.

In 2011, with the installation of anadromous fish passage at the Pelton Round Butte Project, ESA listed anadromous fish species were reintroduced into the Crooked River. The passage has also reintroduced Bull Trout, a species listed under the ESA, to the

⁵ http://www.winnememwintu.us/wp-content/uploads/2011/09/deschutes_reintro_plan_10-20-08.pdf

Crooked River. The OSHP is now acting as a barrier for ESA anadromous species movement and as a barrier of the ESA listed Bull Trout as the facility sits within classified Bull Trout critical habitat.

The USFWS adopted a 2011 recovery plan for Northern Spotted Owl and a 2015 recovery plan for Bull Trout, and NMFS adopted a 2009 recovery plan for the Middle Columbia River Steelhead.⁶ Additionally, the USFWS completed a Canada Lynx Recovery Plan in 2001 and elected to not update the Recovery Plan in 2017. On January 11, 2018 USFWS announced plans to begin efforts to develop a proposed rule to delist the species, however the species remains listed at this time.

The OSHP is situated within designated critical habitat for Bull Trout and historic habitat for steelhead. DVWD therefore works closely with resource agencies so to comply with these recovery plans. The Project area does not have additional Oregon-listed species that are not otherwise on the Federal list.

Future Operations under Non-Capacity License Amendment

Under the 2015 Non-Capacity License Amendment, DVWD proposes to install upstream fish passage at the dam, enhance downstream fish passage facilities, implement a fish passage and protection plan, conduct fish passage monitoring and data collection, and implement adaptive management strategies. With the implementation of this license amendment and its components, the Project will operate in compliance with the Bull Trout Recovery Plan and Steelhead Recovery Plan goals to restore riverine connectivity/historic habitat, implement monitoring to minimize data gaps, and implement collaborative adaptive management strategies.

The OSHP does not reside within classified Spotted Owl critical habitat and DVWD has not identified Spotted Owl activity in the Project area.

The USFWS May 31, 2016, Biological Opinion concluded that the 2015 Non-Capacity License Amendment consists of conservation measures that benefit or promote the recovery of listed species. The USFWS concluded that the Non-Capacity License Amendment and the cumulative effects of the proposed action is not likely to jeopardize the continued existence of the Bull Trout and is not likely to destroy or adversely modify designated critical habitat.

CRITERION G: CULTURAL AND HISTORIC RESOURCES PROTECTION

Standard Applied: G1 – Non-Applicable/De Minimis Effect: Zone 1, 2 and 3

Current Operations

During the construction of the OSHP, DVWD did not uncover any previously unrecorded archaeological or historical sites and consultation with the State Historic Preservation Office (SHPO) was not required. In 2009, the BLM conducted a cultural resources survey in the OSHP Area of Potential Effects (APE) (Griffin 2009). The survey results indicate that there are no cultural resource sites or isolates in the OSHP area, and as a result, no eligibility or protection recommendations were made by the BLM.

Future Operations under Non-Capacity License Amendment

The DVWD consulted with the SHPO regarding the Non-Capacity License Amendment Application. On November 13, 2009, the SHPO concurred with the BLM's 2009 survey results and the determination of that no historic properties would be affected by the Opal Springs Fish Passage Improvement Project.

⁶

http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/middle_columbia/middle_columbia_river_steelhead_recovery_plan.html

⁷ https://www.fws.gov/oregonfwo/documents/RecoveryPlans/NSO_RevisedRP_2011.pdf

CRITERION H: RECREATIONAL RESOURCES

Standard Applied: H2 – Agency Recommendation: Zone 1, 2, and 3 and PLUS

Current Operations

The segment of the lower Crooked River from RM 17.8 downstream to RM 8 is a federally designated Wild and Scenic River, with identified Outstanding Resource Values that include recreation (USDI 1992). The Crooked River Wild and Scenic area is readily accessible and provides a variety of year-round recreation opportunities. The OSHP lies within an approximately 27-mile segment of the Crooked River used for whitewater kayaking, and recreational fishing also occurs within the OSHP vicinity. A boat ramp is provided in the reservoir and there is an additional boater put-in below the dam as well as gravel paths, picnic tables, and restroom facilities.

There are no specific recreation management plans or license requirements for recreation facilities at OSHP, however the Project is subject to 18 C.F.R. Part 8 requirements and Standard Article 18 of FERC's Terms and Conditions, and therefore, DVWD must provide recreation signage and postings as well as free public access to Project waters and adjacent lands. Absent of specific FERC License requirements for recreation improvements, FERC provides discretion to the Licensee on the best manner to fulfill this obligation. The 2001 and 2006 FERC Environmental Inspection Reports confirm DVWD's compliance with recreation requirements.

Future Operations under Non-Capacity License Amendment

The non-capacity license amendment does not alter recreation resources commitments for the DVWD.

CRITERION H: RECREATIONAL RESOURCES: PLUS STANDARD

The LIHI Certification PLUS Standard for Recreation requires the Applicant to demonstrate the following:

- Document any new public recreational opportunities that have been created on facility lands or waters beyond those required by agencies (e.g., campgrounds, whitewater parks, boating access facilities and trails).
- Document that such new recreational opportunities did not create unmitigated impacts to other resources.

In addition to the 18 C.F.R. Part 8 requirements and Article 18 of FERC's Terms and Conditions, DVWD voluntarily operates and maintains a kayak/canoe boat ramp area located below of the dam which was provided in response to whitewater boating activity and recognition of a need for this amenity. The Applicant also voluntarily operates and maintains a picnic area and restroom facilities downstream from the powerhouse to enhance the public's experience while accessing the river. The Applicant's Supplemental Letter (September 14, 2018) provides additional information on the facilities and their ability to accommodate the public interest.

Per the LIHI Certification PLUS Standard for Recreation, the Applicant has demonstrated that the PLUS standard applies as the 1986 FERC License only requires the Licensee to not restrict access for the public. It does not require provision of other amenities including installation of boater access, picnic facilities and restrooms.

PUBLIC COMMENTS RECEIVED

No public comments were received during the 60-day comment period.

REGULATORY AGENCY COMMENTS RECEIVED

The following regulatory agencies and tribes were contacted requesting their comments on the OSHP LIHI Certification.

US Fish and Wildlife	Oregon Department of Environmental Quality
National Marine Fisheries Service	Confederated Tribes of the Warm Springs
Oregon Department of Fish and Wildlife	USDI, Bureau of Indian Affairs
	USDI, Bureau of Land Management

At the time of preparing the Reviewer's report only Oregon Department of Fish and Wildlife and Oregon Department of Environmental Quality provided a response. Brett Hodgson, Deschutes District Fish Biologist provided this testimonial (Appendix A):

"The Oregon Department of Fish and Wildlife has no concerns with Deschutes Valley Water District receiving LIHI Certification. They have been a valued partner in the development and construction of fish passage facilities at the Opal Springs Hydroelectric Project."

CONCLUSIONS AND RECOMMENDATION

Based on a thorough review of the LIHI Application and supporting documentation, public records, and comments provided by resource agencies, in my opinion the Opal Springs Falls Hydroelectric Project meets the requirements for LIHI certification for one, five-year term AND two PLUS terms, for a total of 10 years with the following recommended conditions:

- 1) Annual Flow Monitoring Reports will be due upon completion of the fish passage improvements in 2019. The Facility Owner shall provide copies of the reports and summaries of flow monitoring activities in the annual compliance statements submitted to LIHI.
- 2) Since the proposed LIHI term will extend beyond the first 5-year review of the fish passage adaptive management program, the Facility Owner shall provide a summary in the annual compliance statements submitted to LIHI of activities related to implementation of the Settlement Agreement's Fish Passage Protection Plan's measures; and shall provide to LIHI a copy of results from the first 5-year Performance Assessment Interval, including any agency recommendations for modifications to fish passage facilities or to the monitoring program. LIHI reserves the right to revoke the PLUS standard for fish passage in the event that agencies determine that fish passage Performance Objectives are not being met.

APPENDIX A: AGENCY COMMUNICATIONS

From: Diane Barr
To: [Maryalice Fischer](#)
Subject: FW: Opal Springs LIHI Application Review, Request for Agency Comment
Date: Wednesday, August 15, 2018 8:24:01 PM
Attachments: [image001.png](#)
[image002.png](#)

Diane M. Barr | Principal Regulatory Specialist



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From: STINE Chris <Chris.Stine@state.or.us>
Date: Wednesday, August 15, 2018 at 2:36 PM
To: 'Diane Barr' <diane@camasllc.com>
Cc: STINE Chris <Chris.Stine@state.or.us>
Subject: RE: Opal Springs LIHI Application Review, Request for Agency Comment

On December 13, 2017, the Oregon Department of Environmental Quality issued a modified section 401 water quality certification to the Deschutes Valley Water District for their Opal Springs Hydroelectric Project (FERC No. 5891) near Madras, Oregon. The certification evaluated impacts to water quality based on actions proposed in Deschutes Valley's application for a non-capacity amendment to their existing FERC license, which included the installation and operation of fish passage facilities at the existing dam.

The Department's evaluation concluded there was reasonable assurance the facility would not violate water quality standards, relevant portions of the Clean Water Act, or other requirements of state law related to water quality. To verify this expectation, the modified certification requires Deschutes Valley to measure for project impacts at prescribed locations. Although project modifications have not yet been implemented, DEQ expects the project will comply with the 401 conditions and, for this reason, supports Deschutes Valley's application for low impact certification through the Low Impact Hydro Institute.

Please contact me should you have any questions on this matter.

Chris

Christopher Stine, PE | Hydroelectric Specialist
Oregon Department of Environmental Quality
165 East Seventh Avenue, Suite 100
Eugene, Oregon 97401 | (541) 686-7810

From: Diane Barr <diane@camasllc.com>
Sent: Thursday, August 9, 2018 11:11 AM
To: STINE Chris <Stine.Chris@deq.state.or.us>
Subject: Opal Springs LIHI Application Review, Request for Agency Comment

Hi Chris,

I am conducting the Opal Springs Low Impact Hydroelectric Institute application for certification. The Deschutes Valley Water District has submitted an Application, which is under final review. As part of the review process, we reach out to the state and federal regulators to establish if the regulator has any specific reasons why the project should or should not receive LIHI certification. Formal agency comments are not a requirement for the Certification, and are solicited as a courtesy. The Applicant is required to demonstrate their capacity to meet the LIHI standards, which can be found here. [LIHI Standards and Criteria](#) The Opal Springs LIHI Application demonstration of meeting the LIHI Certification Standard can be found here. [LIHI Application-Opal Springs](#)

Please let me know if you have any concerns with the Opal Springs Hydroelectric Project being recommended for LIHI Certification that I should express in my reviewers report. An email response is sufficient.

Thank you for your time.

Diane M. Barr | Principal Regulatory Specialist



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From: Diane Barr
To: stine.chris@deq.state.or.us
Subject: FW: Opal Springs LIHI Application Review, Request for Agency Comment
Date: Wednesday, August 15, 2018 2:11:35 PM
Attachments: [image001.png](#)
[image002.png](#)

See below.

Thanks for the great call today on Opal Springs.

Diane M. Barr | Principal Regulatory Specialist



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From: Brett Hodgson <Brett.L.Hodgson@state.or.us>
Date: Thursday, August 9, 2018 at 11:27 AM
To: Diane Barr <diane@camasllc.com>
Subject: RE: Opal Springs LIHI Application Review, Request for Agency Comment

Hi Diane,

The Oregon Department of Fish and Wildlife has no concerns with Deschutes Valley Water District receiving LIHI Certification. They have been a valued partner in the development and construction of fish passage facilities at the Opal Springs Hydroelectric Project.

Brett Hodgson
Deschutes District Fish Biologist
Oregon Department of Fish and Wildlife
61374 Parrel Road, Bend, OR 97702
541-388-6009

From: Diane Barr [mailto:diane@camasllc.com]
Sent: Thursday, August 9, 2018 11:14 AM
To: brett.l.hodgson@state.or.us
Subject: Opal Springs LIHI Application Review, Request for Agency Comment

Hi Brett,

I am conducting the Opal Springs Low Impact Hydroelectric Institute application for certification. The Deschutes Valley Water District has submitted an Application, which is under final review. As part of the review process, we reach out to the state and federal regulators to establish if the regulator has any specific reasons why the project should or should not receive LIHI certification. Formal agency comments are not a requirement for the Certification, and are solicited as a courtesy. The Applicant is required to demonstrate their capacity to meet the LIHI standards, which can be found here. [LIHI Standards and Criteria](#) The Opal Springs LIHI Application demonstration of meeting the LIHI Certification Standard can be found here. [LIHI Application-Opal Springs](#)

Please let me know if you have any concerns with the Opal Springs Hydroelectric Project being recommended for LIHI Certification that I should express in my reviewers report. An email response is sufficient.

Thank you for your time.

Diane M. Barr | Principal Regulatory Specialist



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