

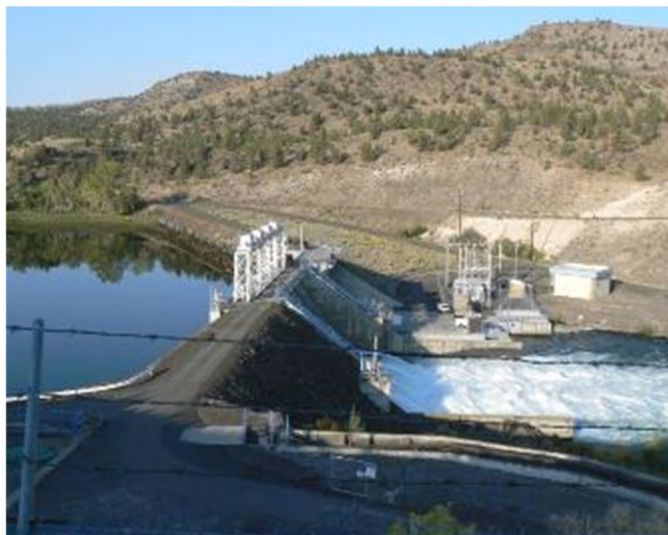
**REVIEW OF APPLICATION FOR RE-CERTIFICATION BY  
THE LOW IMPACT HYDROPOWER INSTITUTE  
OF THE PELTON ROUND BUTTE HYDROELECTRIC  
FACILITY, LIHI #25**



**Pelton Dam**



**Round Butte Dam**



**Re-regulating Dam**

## **TABLE OF CONTENTS**

1.	INTRODUCTION.....	1
2.	RECERTIFICATION PROCESS AND MATERIAL CHANGE REVIEW.....	4
3.	PROJECT’S GEOGRAPHIC LOCATION .....	5
4.	PROJECT AND IMMEDIATE SITE CHARACTERISTICS.....	6
5.	ZONES OF EFFECT AND STANDARDS SELECTED .....	12
6.	REGULATORY AND COMPLIANCE STATUS.....	16
7.	PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI .....	18
8.	DETAILED CRITERIA REVIEW.....	19
A.	ECOLOGICAL FLOW REGIMES.....	19
B.	WATER QUALITY .....	26
C.	UPSTREAM FISH PASSAGE .....	44
D.	DOWNSTREAM FISH PASSAGE AND PROTECTION.....	56
E.	SHORELINE AND WATERSHED PROTECTION.....	65
F.	THREATENED AND ENDANGERED SPECIES PROTECTION .....	69
G.	CULTURAL AND HISTORIC RESOURCE PROTECTION .....	72
H.	RECREATIONAL RESOURCES .....	74
9.	GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION .....	76

## **APPENDICES**

# **REVIEW OF APPLICATION FOR RE-CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE PELTON ROUND BUTTE HYDROELECTRIC FACILITY, LIHI #25**

Prepared by Patricia McIlvaine  
February 17, 2023

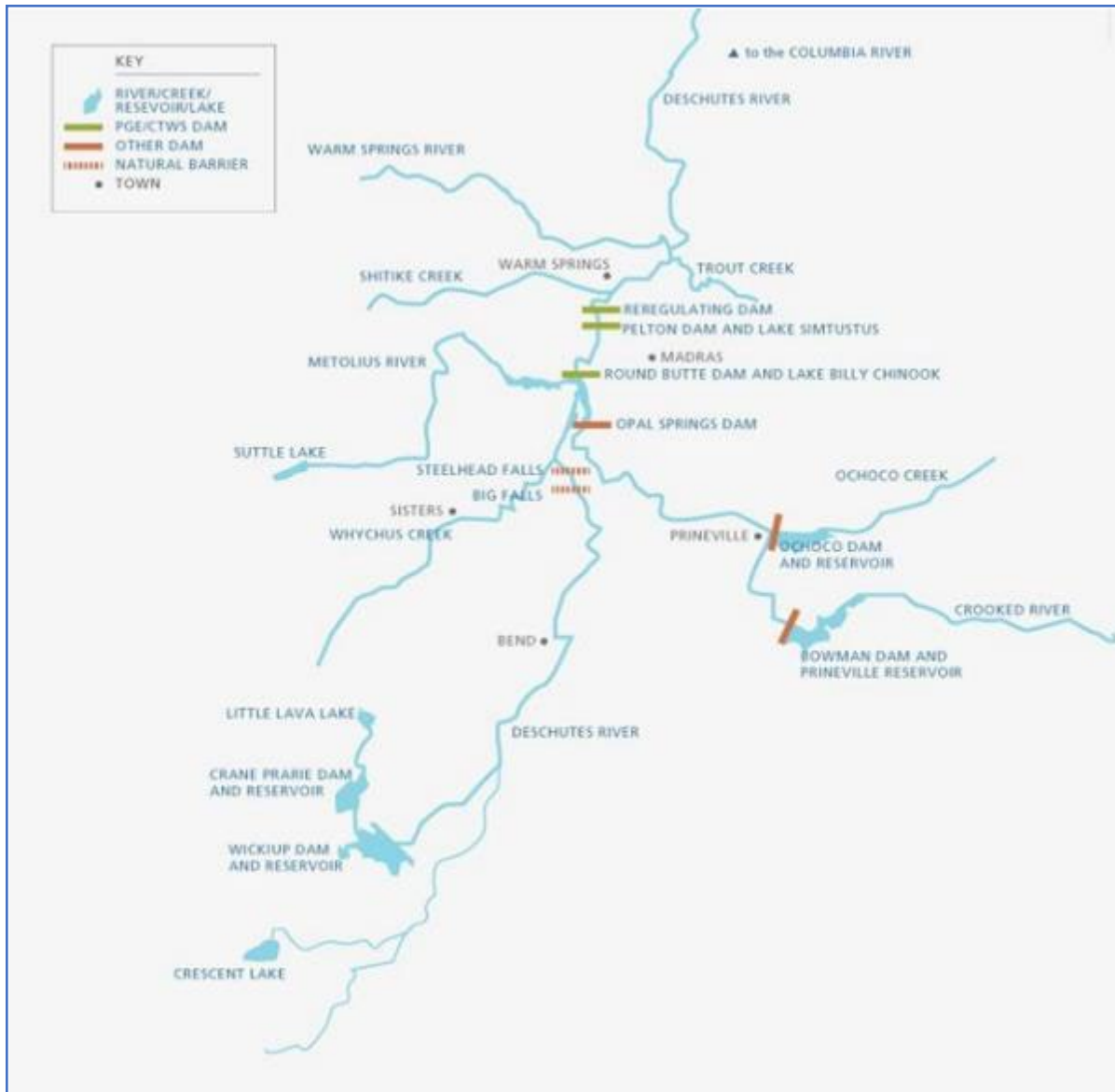
## **1. INTRODUCTION**

This report summarizes the review findings of the recertification application (LIHI application) submitted by Portland General Electric (PGE) to the Low Impact Hydropower Institute (LIHI), for the 445-MW Pelton Round Butte Hydropower Project (Project). It is owned, licensed to, and operated jointly by PGE and the Confederated Tribes of the Warm Springs of Oregon (CTWS or Tribe), collectively the “Applicants”. The Warm Springs Power Enterprises (WSPE) manages the Tribes’ participation in the Project. The Project, completed in 1964, consists of the Round Butte Dam, Pelton Dam and Reregulating Dam, located on a 20-mile stretch of the Deschutes River in Jefferson County, Oregon (see Figure 1). The Project is the largest hydroelectric project completely within Oregon’s boundaries. The Project holds a 50-year term Major License, P-2030, issued by the Federal Energy Regulatory Commission (FERC) in 2005.

Pelton Round Butte was first certified by LIHI in 2007 for an eight-year term, as LIHI #25, and recertified for another eight years, effective October 30, 2014, which was set to expire on October 30, 2022. In both cases, three extra years of certification were awarded due to meeting the PLUS Standard for Shoreline and Watershed Protection. Certification was extended to February 28, 2023 and again to April 30, 2023 to allow for this review.

The last recertification decision was announced preliminarily on October 1, 2015, and appealed on October 28, 2015 by Deschutes River Alliance (DRA), an active non-governmental organization in the region. Following the LIHI appeal process, the Appeals Panel finalized their determination on February 29, 2016, and a final recertification was issued on March 11, 2016. The past reviewer’s reports and appeal documents can be found on the LIHI website.

The Project’s most recent certification had three conditions, which are listed below, along with a brief discussion of their status. See the applicable criterion assessments for more detailed discussion of these conditions and their status.



**Figure 1 - Location of Pelton - Round Butte Project on the Deschutes River**

**Condition 1.** As part of the required annual Compliance Statement to LIHI, the facility owner shall identify any deviations from FERC operating requirements and will include copies of all agency and FERC notifications and reports of flow deviations that have occurred in the previous year, as well as incidents reportable under license Article 405 (i.e., injury/death of ESA or non-ESA fish species). This report shall be submitted by June 1 for the previous year's events. This report shall reference and include copies of all notifications made to the FERC during the previous year, as well as either a copy, or an electronic address to a publicly available copy (preferred), of the annual report of monitoring data that is required under its most recent FERC license. Unless otherwise included in the FERC notifications themselves, the report to LIHI shall describe for each instance:

- The cause of the event/deviation;
- The date, duration and magnitude of the flow deviation. For fish incidents, the date and number / type of species killed;

- Confirmation that the required verbal notices have been made to the applicable agencies based on the type of event (flow deviation or fish kill). This data shall list the date of and to whom all notifications were sent;
- Ways to minimize future repeat occurrences to the extent possible by the licensee;
- Any proposed mitigation measures and a schedule by which such measures will be implemented; and
- Status or confirmation that the previously developed mitigation measures (for the previous year) have been implemented according to the proposed schedule.

The owner shall maintain a proactive approach to reducing the frequency and severity of such deviations and incidents to the extent reasonably possible. The annual compliance report to LIHI will be used as confirmation that the facility owner is conducting the necessary actions to minimize such events and ensure compliance with LIHI's flow, fish passage and endangered species criteria.

**Status:** Review of the filings received by LIHI, compared to information obtained from FERC's eLibrary confirms that all events were promptly reported to LIHI as required. Given this history, the condition is no longer necessary to ensure compliance.

**Condition 2:** The facility owner shall provide LIHI with a description of the current status and use of funds from the General Fund and the Water Rights Fund that were part of the Settlement Agreement and current FERC license for the past year, as part of the Annual Compliance Letter to LIHI. In particular, this description shall identify the lands and waters that are benefiting from the funds and be sufficient to determine if the programs funded continue to achieve the ecological and recreational equivalent of land protection of the buffer zone referred to in Question D.1. This information will be used by LIHI staff to determine if the Pelton Round Butte certification continues to qualify for three additional years in its term. Submission of a copy of the annual report sent to FERC under Article 436, or a link to it on FERC's eLibrary, would satisfy this reporting requirement.

**Status:** PGE regularly provided details required by this condition on a timely basis demonstrating that these funding mechanisms are consistently used in a manner that supports watershed environmental benefits and this condition is no longer necessary.

**Condition 3.** The goal of this Condition is to ensure that all interested stakeholders have access to relevant monitoring data for water quality and fish passage, and that stakeholders have an opportunity to share their concerns about progress toward the Settlement Agreement<sup>1</sup> goals with PGE on at least a regular, annual basis. Such information access shall be coordinated with the Fish Committee that was established in the Settlement Agreement and FERC license. Such information sharing shall include the modeling results and analysis that will come from the Nutrient and Algae Study that PGE started in February 2015, the purpose of which is to understand the complex dynamics of the waters entering and leaving the facilities. The study plan, as well as findings expected in 2018, shall be part of the materials shared with stakeholders. PGE shall establish a means to facilitate sharing of ongoing environmental studies and results from the adaptive management program associated with operations of the selective withdrawal tower with

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<sup>1</sup> A Settlement Agreement was signed in 2004, is linked on LIHI's website, and was incorporated verbatim into the FERC license.

stakeholders who have demonstrated an interest in such Project activities. This information sharing may include newsletters, notices of new study findings, posting of such materials / announcements on PGE's website or other similar methods. Such announcements of new information shall be made at least semi-annually. A method for stakeholders to provide comment to PGE on this information shall also be developed. PGE shall notify LIHI within 60 days of LIHI recertification as to the method(s) by which such information sharing will be accomplished. A summary of information communicated shall be included in the annual compliance reports to LIHI. If PGE misses any deadlines established in their FERC license, the SA or Oregon Department of Environmental Quality (ODEQ)'s Water Quality Certification for reports related to water quality or fish passage, PGE shall notify LIHI within 30 days of that occurrence, explain the reasons for the missed deadline, and define remedial actions they plan to take to get back on schedule.

**Status:** PGE has consistently reported on the many efforts undertaken each year to satisfy this condition. Typical outreach efforts reported on to ensure that all interested stakeholders have access to key environmental information on the Project include regular environmental Facebook group posts which highlight updates, promote events, share "behind-the-scenes" photos and videos; publishing of an email newsletter several times a year to "subscribers"; information updates on PGE's website to provide stakeholders with current information on the Pelton Round Butte fish reintroduction effort such as daily adult fish trap counts; and events and other relevant information. PGE's annual reporting to LIHI also lists all of the meetings and topics discussed with the various Committees and ours and presentations provided throughout the reporting year. Given this history, this condition is no longer necessary.

## **2. RECERTIFICATION PROCESS AND MATERIAL CHANGE REVIEW**

Under the 2<sup>nd</sup> Edition LIHI Handbook, recertification reviews are a two-phase process starting with a limited review of a completed LIHI application, focused on three questions:

- (1) Is there any missing information from the application?
- (2) Has there been a material change in the operation of the certified facility since the previous certificate term?
- (3) Has there been a change in LIHI criteria since the Certificate was issued?

In accordance with the Recertification Standards, all Projects currently applying for renewal must go through a full review unless their most recent certification was completed using the 2<sup>nd</sup> Edition Handbook. Pelton – Round Butte's last review was done under the 1<sup>st</sup> Edition Handbook, thus, this Stage II full report was required for the Project using the 2<sup>nd</sup> Edition Handbook rev 2.05: January 1, 2022

A review of the initial application, submitted on July 26, 2022, resulted in a Stage I Report dated August 20, 2022. The Stage I report noted that data was missing for several criteria that were required to complete a full review. A revised LIHI application and supplemental supporting information were submitted to LIHI on November 16, 2022. This updated information provided clearer descriptions of this complex Project, and detailed discussions of activities and issues important to demonstrating compliance with each criterion. "Material changes" assessed in this review included:

1. A generator rewind of Round Butte Unit 2 (from 82.35 MW to 130.0 MW) was made in June 2014. However, it appears that this change may not have been filed originally with FERC. As noted in their Order dated March 8, 2018, FERC found in their review of an Exhibit A, filed on January 5, 2018 a discrepancy in this unit's reported capacity. (Earlier generator rewinds were made on Round Butte Unit #1 in 2012 and Round Butte Unit #3 in November 2013). The Unit #3 capacity change from 82.35 MW to 130.0 MW, however, was not authorized by FERC until their Order dated March 10, 2015, in response to an application filed by PGE on August 22, 2014. Thus, both changes were approved by FERC before and reviewed by LIHI during the prior recertification review.
2. In an August 3, 2017 filing, PGE denoted a revised FERC Project boundary to enclose the Commission-approved recreation sites. As errors on the filing were found, revised filings were made: Exhibit G on November 27, 2017, Exhibit A on January 5, 2018, and a corrected Exhibit A on February 9, 2018. FERC's March 8, 2018 Order updated the expanded Project boundary to include 140.46 additional acres of federal land for the recreation sites. Consequently, the Project now occupies 3,168.9 acres of federal land, 5.84 acres of which are used for transmission line right-of-way.
3. Starting in 2017, to maximize juvenile fish passage, Round Butte has been operated at a minimum of 4,500 cubic feet per second (CFS) between the hours of 9 p.m. and 4 a.m., between March 15 and June 15, to the extent possible while maintaining compliance with all other license conditions.
4. Starting in June 2021, fish collected by the Selective Water Withdrawal Facility (SWW) have been released into a pond before continuing their journey to the ocean. This is designed to give them time to de-stress after handling and transport, reduce predation and improve fish survival to the ocean.
5. In February 2022, a lead net was installed on the SWW. This net guides fish into the collector.

The first two changes do not significantly affect satisfaction of the LIHI criteria. The improvements to fish passage made possible by the operational change associated with flow releases is discussed under **Criterion D - Downstream Fish Passage and Protection**.

Follow-up consultation with the Applicant included several telephone calls seeking clarification on some issues and their submission of additional information on January 25, 2023 addressing questions identified during the Stage I and II assessments and review of stakeholder comments (See Appendix A). This Stage II assessment reviewed the application package, public records in FERC's eLibrary from 2014 through January 25, 2023, LIHI compliance statements, follow-up communication with the Applicant and stakeholder comments.

### 3. PROJECT'S GEOGRAPHIC LOCATION

The Project is located within the Deschutes River canyon but Lake Billy Chinook, the impoundment behind the uppermost Round Butte Dam, is formed by the confluence of the Crooked, Metolius and Deschutes rivers. Most of the upper Deschutes River and Crooked River flows are diverted during the summer for irrigation, although both river flows are augmented by extensive groundwater recharge as they approach Lake Billy Chinook. The Metolius River has a remarkably uniform flow since it is primarily spring-fed and there is very little diversion for



consumptive uses. The Deschutes River is a tributary to the Columbia River whose watershed drains 10,500 square mile region in north central Oregon. The Project's watershed is 2,705 square miles. The Project, consisting of the Round Butte Dam (located at river mile (RM) 110.4), Pelton Dam (RM 103.4) and Reregulating Dam (RM 100.1), impounds approximately 9 miles of the Deschutes River, 7 miles of the Crooked River, and 13 miles of the Metolius River. The Project boundary occupies a total of approximately 8,300 acres, including approximately 2,480 acres on private lands owned by the licensees and other non-governmental entities, 5,805 acres of land owned by the Tribes, 3,169 acres owned by US Fish and Wildlife Service (USFWS) and Bureau of Land Management (BLM), and 138 acres owned by the State of Oregon.

There are three dams upstream of Pelton Round Butte on the Crooked River and four dams upstream on the Deschutes River, but no downstream dams on either river, as shown on Figure 1 and summarized below. The Reregulating Dam, the most downstream of the three Project dams is approximately 100 miles upstream from the confluence of the Deschutes and Columbia Rivers.

Located on the Deschutes River:

<b>Dam Name</b>	<b>Owner/operator</b>	<b>River Mile Location</b>
Crane Prairie Dam	Bureau of Reclamation	238
Wickiup Dam	Bureau of Reclamation	226
North Canal Dam	Central Oregon Irrigation District	166.2
Haystack Dam	Bureau of Reclamation	off-channel storage Crooked River

Located on the Crooked River

<b>Dam Name</b>	<b>Owner/operator</b>	<b>River Mile Location</b>
Bowman Dam	Bureau of Reclamation	70
Ochoco Dam	Bureau of Reclamation	11 on Ochoco Creek
Opal Springs Dam (LIHI #145)	Deschutes Valley Water District	7.2

Only the Opal Springs Dam is a FERC license hydropower facility, licensed as FERC P-5891. It is also the only upstream dam having downstream fish passage. The Siphon Power Project, owned by Central Oregon Irrigation District, is located on the Deschutes River at river mile 170.9, in the City of Bend, and is licensed as FERC P-3571. However, there is no dam associated with this project. The Siphon Power Project uses the pre-existing Central Oregon Irrigation District's canal system including the Deschutes River diversion and the approximate two miles of water conveyance system downstream which delivers water to the project penstock and powerhouse. Both the Opal Springs Project and the Siphon Power Project are LIHI certified as low impact, as LIHI Projects #145 and #73, respectively.

#### 4. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

Figure 2 is an aerial photo of Pelton Round Butte with each dam and appurtenant structure labeled. A summary and photographs of each of the three developments follows.





Figure 2 – Aerial of Key Features of Each Development

## **Round Butte Development**

The Round Butte Development primarily consists of a 1,382-foot-long, 440-foot-high compacted rock-filled embankment dam; a reservoir (Lake Billy Chinook) with gross storage capacity of 535,000 acre-feet at the normal maximum water surface elevation of 1,945 mean sea level (msl); a powerhouse containing one Francis turbine generating unit with a capacity of 86.25 MW and two 118.9-MW Francis turbines generating units with a total capacity of 324.1 MW. As previously noted, rewinds were made of all three units between 2012-2014. This development also includes three 2,800-foot-long, 230-kilovolt (kV) transmission lines extending from the powerhouse to the Round Butte switchyard; a fish hatchery (Round Butte Hatchery) located adjacent to the dam; and appurtenant facilities.

The average annual generation for 2014-2021 at this facility was 863,617 megawatt hours (MWh).



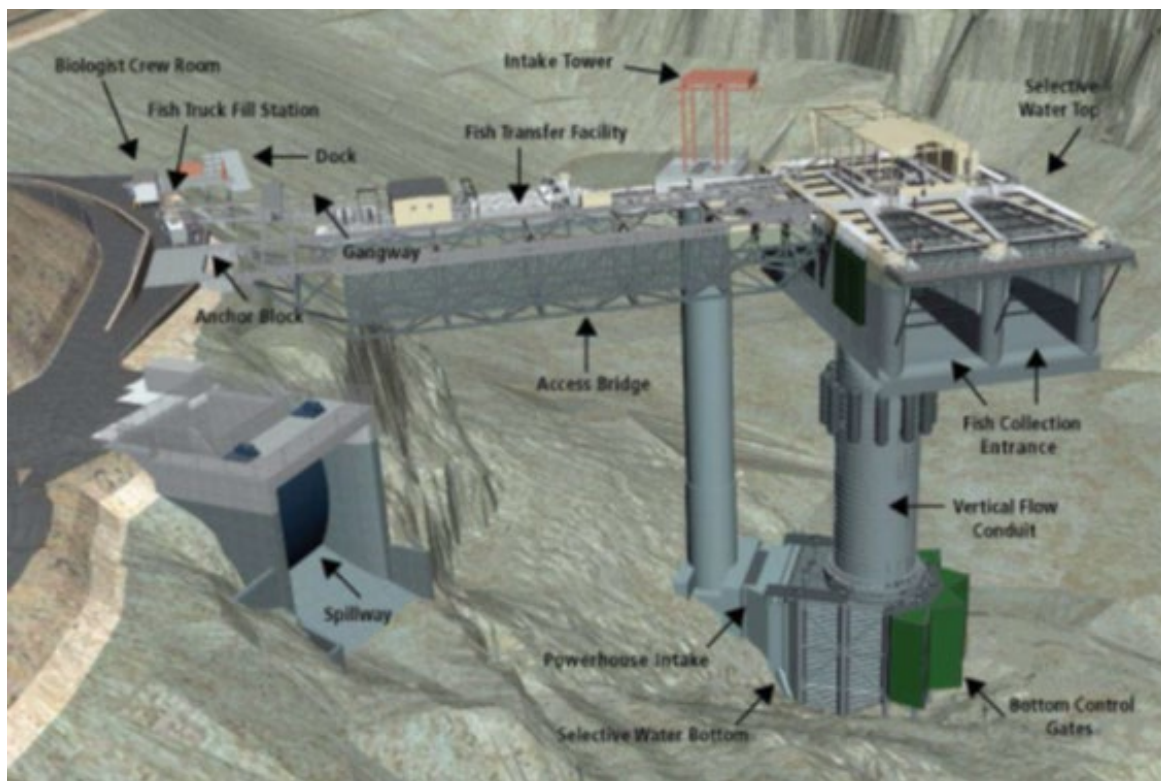
**Figure 3 – Round Butte Development**

A key Project feature that resulted in many of the environmental mitigations sought by the 2004 relicensing Settlement Agreement is the “Selective Water Withdrawal Facility” (SWW) which was constructed in Lake Billy Chinook approximately 700 feet upstream of Round Butte Dam.





**Figure 4 – SWW at the Round Butte Dam**



**Figure 5 – Schematic of the SWW**

The SWW, is a 270-foot-tall tower capped by an intake module that collects migrating fish and separately sends water to the powerhouse generators. The SWW was constructed and became operational in 2009. It can draw and blend a combination of water from the surface and at depth in the impoundment (instead of only at depth, which had been the prior case), to alter the currents in Lake Billy Chinook, and to trap anadromous fish, including salmon and steelhead, migrating downstream. The past inability of fish to find their way downstream from the upper Deschutes, Metolius, and Crooked rivers once they hit the swirling currents of Lake Billy Chinook is suspected as the reason past downstream passage was not highly successful. The SWW was awarded the Edison Award in 2010, by the Edison Electric Institute (EEI) for innovation, as it was the only floating surface fish collection facility, coupled with generation, in the world. It was also awarded the American Council of Engineering Companies Grand Award and the Outstanding Stewards of American Waters Award from the National Hydropower Association for its a high degree of innovation, achievement and value, both in 2011.

### **Pelton Development**

The Pelton Development consists of a 636-foot-long, 204-foot-high concrete arch dam with a crest elevation of 1,585 feet msl; a 7-mile-long, 540-acre reservoir (Lake Simtustus) with a gross storage capacity of 31,000 acre-feet at normal maximum water surface elevation of 1,580 feet msl; a powerhouse with three Francis turbine generating units with a capacity of 37.4 MW each, for a total installed capacity of 112.1 MW, and a 7.9-mile-long, 230-kV transmission line extending from the powerhouse to the Round Butte switchyard.

The average annual generation for 2014-2021 at this facility was 374,014 MWh.



**Figure 6 – Pelton Development**



## Reregulating Dam Development

The Reregulating Dam Development consists primarily of a 1,067-foot-long, 88-foot-high rock-filled embankment dam with a spillway crest elevation of 1,402 feet msl; a 2.5-mile-long, 190-acre reservoir with a gross storage capacity of 3,500 acre-feet and a useable storage capacity of 3,270 acre-feet at a normal maximum water surface elevation of 1,435 feet msl; a non-operating three-mile-long fishway, extending from the tailrace upstream to the forebay of the Pelton Dam; a powerhouse containing one pit bulb-type turbine generating unit with a turbine capacity of 20.3 MW; a 200-foot-long, 6.9-kV primary transmission line extending from the generator to the step-up transformer located adjacent to the powerhouse; and appurtenant structures.

The average annual generation for 2014-2021 at this facility was 73,293 MWh.



**Figure 7 – Reregulating Dam Development**

Adult salmon and trout are passed upstream using a trap-and-haul facility that was constructed at the base of the Reregulating Dam in 1957, with significant upgrades and/or maintenance occurring in 1984, 1996, 2000 and 2021. Fish enter the trap, called the Pelton Adult Trap, and are then trucked around the Reregulating Reservoir and Lake Simtustus and released into Lake Billy Chinook, above the Round Butte Dam, via the adult release facility.

The Project plants are operated as peaking and load-following facilities, typically generating between the hours of 6 a.m. and 11 p.m. daily. One exception is that in the springtime, generation is increased during nighttime hours to improve fish collection efficiency at the SWW. This operation has not changed since the last LIHI recertification. The Settlement Agreement and new license (2005) provided for the licensees to institute a state-of-the-art program of controls for Project operations. These controls allow the licensees to operate Round Butte and Pelton for peak energy and load production, while operating the Reregulating Development to match Project outflows with daily average inflows. More details are provided under **Criterion A - Ecological Flow Regimes**. In addition, there are numerous implementation committees and working groups that provide oversight for the Project as discussed under section **VI - Regulatory and Compliance Status**.

## 5. ZONES OF EFFECT AND STANDARDS SELECTED

Four Zones of Effect (ZOE) were designated as noted below.

ZOE	Name	Upstream RM	Downstream RM
1	Lake Billy Chinook		
	Deschutes River arm	121.4	112.4
	Crooked River arm	6.5	112.4
	Metolius River arm	12.5	112.4
2	Lake Simtustus	112.4	104.6
3	Reregulating Dam Impoundment	104.6	101.9
4	Lower Deschutes River (Downstream Reach)	101.9	101.8

The impoundments behind the Reregulating Dam and Pelton Dam back up to the base of the next upstream dam. The downstream extent of ZOE #4 was selected at the USGS Gaging Station [#14092500 Deschutes River at Madras, OR](#) as it is the point at which the Project ceases to be the only major input to the Deschutes River. Approximately 75 meters downstream of this point, there is a housing community which inputs residential and recreational pressures on the river. Additionally, this specific location was chosen because it's the Project's compliance point for water quality monitoring and flow monitoring. Figure 8 shows this location. Figure 9 shows all ZOE. The Standards table (Table 1) follows Figure 9.



**Figure 8 – Location of ZOE #4**



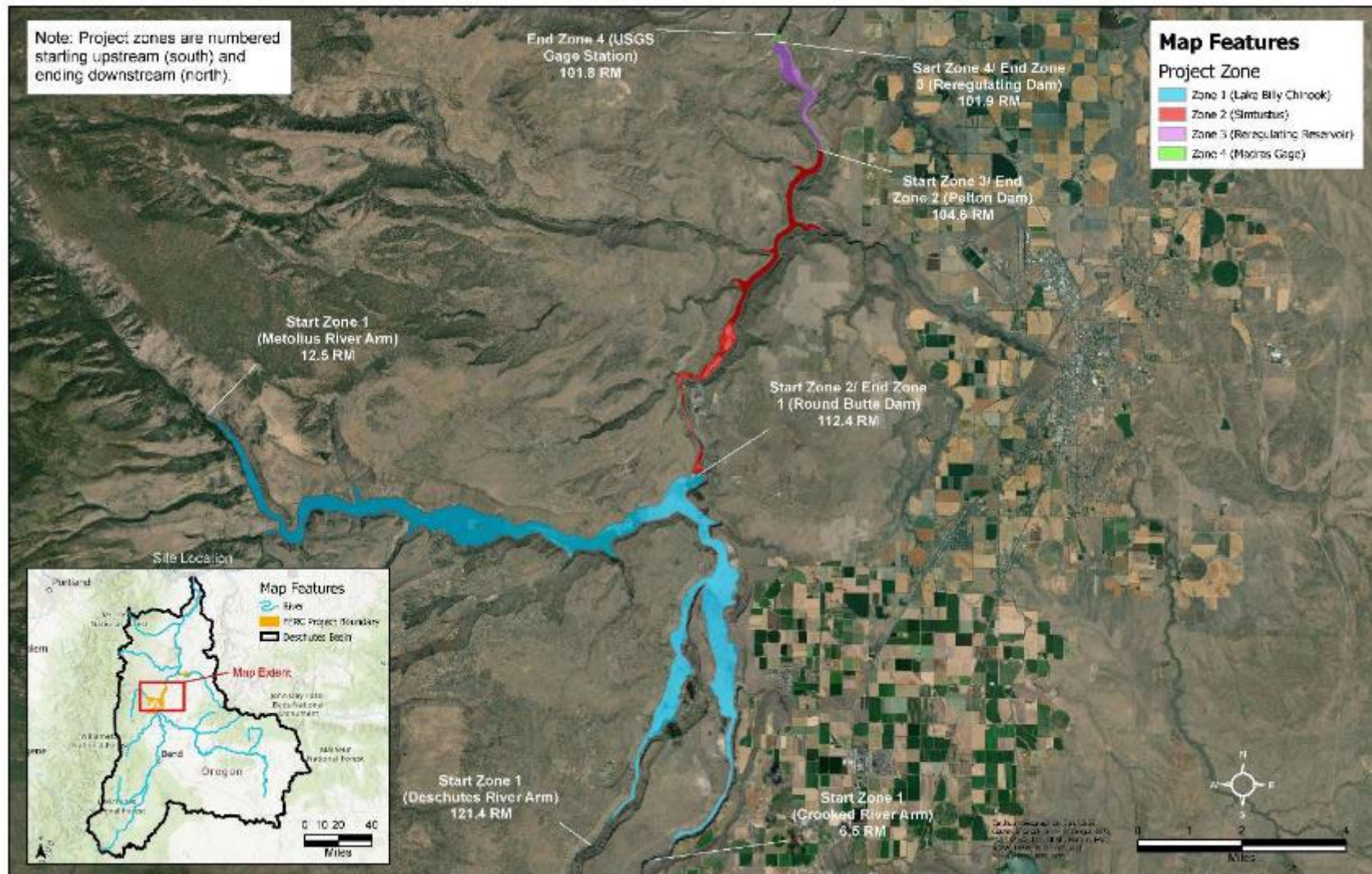


Figure 9 – Zones of Effect

Table 1 – Selected Standards

Zone of Effect:		1: Lake Billy Chinook (Impoundment)	2: Lake Simtustus (Impoundment)	3: Reregulating Dam Impoundment	4: Lower Deschutes River (Downstream Reach)
Criterion		Standard Selected			
A	Ecological Flows	2	2	2	2
B	Water Quality	2	2	2	2
C	Upstream Fish Passage	1	2	2	2
D	Downstream Fish Passage	3 (2) (Plus)	2	2	1
E	Shoreline and Watershed Protection	2 (Plus)	2	2	3
F	Threatened and Endangered Species	3 (2)	3 (2)	3 (2)	3 (2)
G	Cultural and Historic Resources	2	2	2	2
H	Recreational Resources	2	2	2	1

I have recommended that **Standard 2 – Agency Recommendation** is more applicable for two standard selections, as indicated in red. The rationale for this is discussed under the applicable criteria. Details of the standard recommendations and compliance with the criteria are presented in Section VIII.

## 6. REGULATORY AND COMPLIANCE STATUS

### FERC License

The Federal Energy Regulatory Commission (FERC) issued the Project a 50-year license on June 21, 2005. The license incorporated most, but not all provisions of a wide-ranging Settlement Agreement (SA) signed in 2004, among 22 organizations and government agencies. It covers operating conditions and long-term resource protection, mitigation, and enhancement measures at the Project. Many of these organizations and agencies are members of the working groups established by the SA and incorporated into the FERC license, to assist in confirming compliance with the terms of the Agreement. These groups include the Fish Committee (FC), Terrestrial Resources Working Group (TRWG), Recreation Resources Working Group (RRWG), Cultural Resources Working Group (CRWG), Shoreline Management Working Group (SMWG) and the Pelton Round Butte Fund Governing Board. Appendix B to this report identifies the membership makeup of each committee and their meeting frequency. The committees/working groups are consulted in the development and implementation of study plans, reports, facility designs, and operational plans and have a pivotal role in the administration of many post-licensing activities, including changes in protection and enhancement measures related to fish and wildlife, water quality, and recreation. The Pelton Round Butte Fund Governing Board is responsible for making decisions on the use of the Pelton Round Butte Fund. Another group, the Coordinating Committee was established by PGE and is tasked with addressing issues related to the implementation of the SA, including dispute resolution. They meet annually to review major license activities and the Project's Annual Operations Report

The principal elements of the Settlement Agreement are:

- **General provisions** establishing the terms and conditions governing the relationship among the settlement parties, including the establishment of a variety of implementation committees, an adaptive management framework to guide the implementation of untested mechanisms and approaches, and a dispute resolution process.
- **Operating conditions** setting stringent requirements for managing flows and reservoir levels, and monitoring and responding to long term low flow conditions primarily to benefit fishery resources and improve water quality.
- **Aquatic resources requirements** primarily to achieve fish passage and improve water quality, through construction of the Selective Water Withdrawal (SWW). As part of the Fish Passage Plan, the SWW is operated using an adaptive management process. The SWW was designed to improve water quality in Lake Billy Chinook, as well as the lower Deschutes River by combining water from various water levels to improve temperature and dissolved oxygen. It was also designed to improve downstream passage of anadromous and riverine fish by using an optimum blend of surface and deep-water withdrawal that reorients reservoir currents in Lake Billy Chinook to guide downstream migrants to a collection facility prior to transport below the Project.
- **Terrestrial resource management measures** to achieve improvements to wildlife and watershed protection.
- **Recreation, aesthetic, and cultural resource** protection and improvement measures.
- **Lower Deschutes River** aquatic habitat improvements.

- **Establishment of a Pelton Round Butte Fund** to underwrite projects that produce instream flows to improve aquatic habitat and for other mitigation and enhancement projects for fish and wildlife resources and habitats affected by the Project.

It is important to note that the Fish Committee is the technical group that is involved in the water quality and fish management issues for the Project. This Committee meets bimonthly, with conference calls in the interim if needed, to address the issues noted above. This committee has decision-making authority and must approve any operational changes proposed by PGE.

Project requirements include measures intended to achieve upstream passage of fish and their reintroduction to over 200 stream miles of habitat above the Project (contingent in part on installation of a fish ladder at Opal Springs Dam on the Crooked River which was completed in 2019.). The experimental nature of the measures and reliance on adaptive management techniques to drive the evolution and implementation of the fish passage other measures, especially those of the SWW, was recognized by the Settlement Agreement signatories. The current status of water quality conditions and fish passage are discussed under the applicable criteria below. Stakeholder comments raising concerns over some reported changes or problems are incorporated into these discussions.

FERC Orders issued since the last LIHI recertification in October 2015, other than those granting extensions of time for various filings or related to dam safety issues, include:

- Order dated 11/05/2015 approving the Fish Trap and Haul Facilities Monitoring Plan
- Order dated 01/21/2016 approving the revised Large Wood Management Plan Under Article 434
- Order dated 02/17/2016 approving As-Built Recreation Drawings
- Order dated 10/16/2017 granting temporary variance of Stage Change Limits and Control Set Point Value required by Article 409
- Order dated 03/08/2018 approving Revised Exhibits A and G and Revising Annual Charges and Project Description
- Order dated 01/07/2019 approving Updated Terrestrial Resources Management Plan Under Article 422
- Order dated 03/25/2022 approving the Shoreline Management Plan Six -Year Review Report

### **Water Quality Certification**

On June 24, 2002, both the Tribe's Water Board and ODEQ issued water quality certifications (WQCs) for the Project. The Oregon DEQ certification includes 20 conditions and the Water Board's certification includes 16 conditions, which are incorporated into the license (see ordering paragraphs (F) and (G)). The certifications include requirements for water quality management and monitoring (water temperature, dissolved oxygen, pH, total dissolved gases, turbidity, toxic substances, bacteria); nuisance phytoplankton growth control; oil and hazard substances spill prevention and control; ramping rates; reservoir operating levels; minimum flows; Project operations; stream gaging; fish passage; large woody debris management; sediment transport

studies; fish habitat enhancements upstream of the Project area; and compliance and administration. A Water Quality Management and Monitoring Plan (WQMMP) is a key WQC requirement and is discussed in greater detail under **Criterion B - Water Quality**. There have been no amendments to either WQC since issuance. Emails were included in the LIHI application, Appendix B from Marilyn Fonseca of ODEQ - Northwest Region Water Quality dated May 20, 2022, and from Mike McKay, of the CTWS - Branch of Natural Resources, dated June 2, 2022. Both stated that their respective WQCs remain valid and in effect.

## Compliance Summary

In general, Project compliance has been satisfactory over the past ten years. Six deviations from FERC license requirements associated with flows or stage limits were identified from October 15, 2015 through January 25, 2023, based on review of the LIHI application and FERC's eLibrary. Only one was considered a license violation as noted under **Criterion A - Ecological Flow Regimes**. No other exceptions from license requirements were identified although several fish incidents were reported and are discussed under either **Criterion C - Upstream Passage** or **Criterion D - Downstream Fish Passage and Protection**.

A number of extensions to filing deadlines were made to FERC over the course of the past ten years. However, review of FERC's eLibrary did not identify any letters from FERC expressing concern over late filings as was done in the past, such as in a letter dated September 18, 2014.

## 7. PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI

The deadline for submission of comments on the LIHI recertification application was January 15, 2023. Letters submitted by the first three agencies were included in the LIHI application. Letters from CTWS-BNR, CTWS - Water Control Board (CTWS-WCB) and DRA are linked on LIHI's website and are in Appendix C. Comments are discussed under the applicable criteria.

- USFWS
- NOAA, National Marine Fisheries Service (NMFS)
- Oregon Department of Fish & Wildlife (ODFW)
- Confederated Tribes of Warm Springs Reservation of Oregon Branch of Natural Resources (CTWS-BNR)<sup>2</sup>
- Confederated Tribes of Warm Springs Reservation of Oregon Water Control Board (CTWS-WCB)
- Deschutes River Alliance (DRA)

All but DRA submitted supporting letters. DRA's comments focused on water quality impacts and alleged Project effects on declining quality on endangered species in Project waters. Those which I believe are relative to LIHI's review are discussed under the applicable criteria. The DRA also included other comments, which may be meaningful suggestions that could provide resource or data value. Many of DRA's comments are concerns with how the ODEQ has handled certain water quality issues at the Project, which are not something to be addressed by either the licensees or

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<sup>2</sup> It should be noted that Confederated Tribes of Warm Springs of Oregon is a co-licensee of the FERC license and co-applicant on this recertification application.



LIHI. However, I believe these are unrelated to my review for criteria satisfaction, and therefore are not addressed in this report. This report also does not address DRA's comments regarding methane emissions, namely that the Project could have emissions due to eutrophic conditions in the impoundments, and DRA's recommendation that LIHI should consider impacts from methane emissions in low impact certifications. There is great scientific uncertainty over levels of reservoir methane emissions, both in general and at any particular project. LIHI continues to track new information on this topic, but there is no LIHI criterion for methane emissions and no programmatic mechanism to address it at this time.

It is important to note that many of the concerns raised by DRA address what they suggest are not indicative of "low impact". LIHI's criteria and standards were designed with significant stakeholder input, expressly to meet the criteria and support the criteria goals of what would constitute "low impact". It is my interpretation of the LIHI Handbook, that by being in compliance with the existing and still current agency recommendations, and by meeting the LIHI Handbook "science-based or technical basis" requirements, that a Project can satisfy LIHI's requirements for "low impact" certification, despite the fact that there may be some real or perceived impacts. That is, LIHI's certification requires a Project to be "low impact", not "no impact".

Outreach was made to ODEQ and Oregon Parks and Recreation Department (See Appendix C). Neither responded to my inquiries. It is my understanding that the ODEQ, in coordination with the Oregon Department of Justice (DOJ) is actively reviewing the changes requested in the Project's WQMMP, which is associated with compliance with ODEQ's WQC. As a result, the ODEQ is not at liberty at this time, to provide positions about Project compliance in order to ensure impartiality.

## 8. DETAILED CRITERIA REVIEW

### A. ECOLOGICAL FLOW REGIMES

**Goal:** The flow regimes in riverine reaches that are affected by the facility support habitat and other conditions suitable for healthy fish and wildlife resources.

#### Assessment of Criterion Passage

The Applicant appropriately selected **A-2 – Agency Recommendation** for all ZOE's. There have been no changes in flow related requirements since last certified by LIHI.

#### Operation

The Round Butte and Pelton development generating units are operated as peaking and load-following facilities, typically generating between the hours of 6 a.m. and 11 p.m. daily, except during springtime when generation is increased during nighttime hours to improve fish collection efficiency at the SWW. Project operational controls allow the licensees to operate Round Butte and Pelton for peak energy and load production, while operating the Reregulating Development to attenuate high and low peak flows produced by the upstream developments and to match Project outflows with daily average inflows. Lake Billy Chinook provides seasonal storage. Water is drawn down during late fall and winter generally to 1,935 ft msl and is typically refilled during the

months of April and May. During the summer and winter, Lake Billy Chinook and Lake Simtustus are held at a relatively stable pool elevation that does not fluctuate more than one foot and 0.75 feet per day, respectively. However, greater fluctuations of up to about three feet can occur during the transition period to summer to bring the reservoir levels back to the maximum elevations. The Reregulating Dam reservoir can vary up to 21 feet daily but typically changes only about 15 feet per day.

#### Water Management Requirements at the Impoundments

The FERC license incorporates the following requirements relative to the impoundments:

- Article 409 - includes the following limits for stage changes below the Reregulating development: 0.1 foot/hour and 0.4 foot/day from October 16 to May 14, and 0.05 foot/hour and 0.2 foot/day from May 15 to October 15, except during certain extraordinary conditions. (These are detailed in the license.) Compliance is monitored by 1) recording the time and control signal value for all stage change instructions at the Reregulating development and reporting any stage change control signals that are greater than the stage change limitations identified; and 2) reporting measured stage changes at the USGS Madras gage that deviate more than 0.15 ft from the control set-point value.
- Article 411 – requires improvement of the accuracy of inflow monitoring through a combination of improvements at three upstream USGS gages<sup>3</sup> and the installation of additional lake level monitoring stations in Lake Billy Chinook. Estimates of inflow shall be made using a combination of the “Storage Change” and “Average Ungaged” estimating methods as defined in the Project Operating Plan, Exhibit C to the Settlement Agreement. The licensees shall estimate total inflow every 6 hours using the “Storage Change” method. This method shall calculate inflow from measured water levels in the three reservoirs, reservoir storage versus elevation tables, and the [USGS Madras gage](#) hourly flow record.
- Article 414 – identifies the seasonal drawdown of Lake Billy Chinook in the fall of each year followed by refill during the late fall, winter, and spring and fluctuation limits (shown in Table 2 below) of the reservoirs. The reservoir shall be refilled as follows:
  - by May 1 when inflows exceed the target flows specified by Article 412;
  - by May 15 when inflows are below the target flows; and
  - by June 15 in years when the refill allowance is less than 150 cfs as provided in Article 412 (minimum flow requirements, described below).
- Article 415 – required the development of an Operations Compliance Plan describing how the Project will be operated to stay in compliance with all flow and water management license requirements.

The following table shows the license limits for the three impoundments and the current operating operation limits which are essentially guidelines established based on experience, of the levels that are appropriate to allow the Project to adhere to the license limits. The licensed minimum flows are described below.

<sup>3</sup> Upstream gages are [Deschutes River #14076500](#), [Crooked River #14087400](#), and [Metolius River #14091500](#)



Table 2

License Limits vs Operational Values				
	Summer		Winter	
	May 15 to Sept 15		Sept 16 – May 14	
	Minimum Elevation (ft msl)	Maximum elevation (ft msl)	Minimum Elevation (ft msl)	Maximum Elevation (ft msl)
Lake Billy Chinook License limit	1,944.00	1,945.00	1,925.00	1,945.00
Operating limit	1,944.00	1,945.00	1,944.00 Can vary	1,945.00
	June 1 to Aug 31		Sept 1 to May 31	
Lake Simtustus License limit	1,576.00	1,580.00	1,573.00	1,580.00
Operating limit	1,576.50	1,578.50	1,575.00	1,578.50
	Year Round			
	Min Elevation (ft msl)		Max Elevation (ft msl)	
Reregulating Reservoir	1,414		1,435	

#### Water Management Requirements at Tailwater / Regulated Reach (ZOE #4)

The following summarizes the flow requirements at the Project:

- Article 410 – To determine compliance with the minimum flow requirements in Article 412, the development and implementation of a protocol for measuring flows at the [USGS gage at Madras, Oregon #14092500](#), that includes the following elements:
  - The real-time flow release at the gage shall be the most recent 15-minute interval USGS gage reading, converted to flow using the USGS level vs. flow rating table.
  - The daily allowed minimum flow shall be determined each day by the licensees, based on the provisions of the Project Operating Plan, Exhibit C to the Settlement Agreement, including monthly minimum flows, refill allowances, the plus or minus ( $\pm$ ) 10-percent rule, measured inflows and other constraints. The allowed minimum flow shall be calculated and recorded by the licensees before 6 a.m. each day. Adjustment of the flow setpoint for each day shall be completed by 9 a.m. each day.
  - Compliance with the minimum flow requirements is achieved whenever the flow setpoint equals or exceeds the allowed minimum flow. In order to accommodate flow measurement inaccuracies and other variables, non-compliance with the minimum flow requirement is deemed to be any event where the 15-minute measured flow release falls more than 0.10 foot (approximately 260 cfs) below the allowed minimum flow for more than 30 minutes.
- Article 412 – identifies the required minimum flows that must be released below the Reregulating Dam, which is essentially equal to the inflow to the Project on a daily average basis.

**Table 3**  
**Target flow in cubic feet per second, measured at the USGS Madras Gage #14092500.**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Target Flow (CFS)	4,500	4,500	4,571	4,170	4,000	4,000	4,000	3,500	3,800	3,800	4,049	4,500

- Article 412 also:
  - Further defines the “inflow provision” for situations when the inflow is less than the “target” minimum flows.
  - Identifies a “refill allowance” between November 15 and June 15 (the reservoir refill season) to store water in Lake Billy Chinook to ensure it is filled to its summer operating level (minimum elevation 1,944.0 feet msl) by May 15. During these periods, the “refill allowance” shall be 150 cfs less than the lowest daily inflow recorded over the past 7 days, except under specified conditions.
  - Allows for extension of the refill provision.
  - Requires that if inflows fall below 3,000 cfs between September 16 and November 15, the Project shall release up to 200 cfs from storage in Lake Billy Chinook to maintain a daily release of 3,000 cfs. This augmentation is for the benefit of fall Chinook salmon.
  - Requires river flows below the Reregulating development to be held within plus or minus ( $\pm$ ) 10 percent of the measured inflow, except under the specified conditions.
  - Includes a *Fish Emergency Clause* which states that in years in which inflow is expected to be below 3,000 cfs or flow may result in in-river conditions that the Fish Committee believes to be unacceptably poor, the licensees shall consult with the Fish Committee to determine if a deviation from the “Or Inflow” provisions above or a deviation from the flow blending scheme required by the water quality certificates is appropriate to mitigate impacts. Upon agreement of the Committee members and after specified agency consultation, a plan and schedule for acceptable releases shall be submitted for review and approval by FERC.
- Article 413 – requires plan development to track indicators of predicted long-term low flow (LTLF) conditions in the lower Deschutes River throughout the license term, including “trigger points” that indicate LTLF conditions in the river that are lower than historically observed at the USGS Madras gage. The Plan must address how negative environmental effects of reaching trigger points will be identified, consultation required with specified license-mandated Committees and operational changes that may be appropriate to mitigate impacts.
- Article 415 – as noted above, this requires the development of an Operations Compliance Plan describing how the Project will be operated to stay in compliance with all flow and water management license requirements.

Satisfaction of the Ecological Flow Regimes criterion using Standard A-2 requires that agency recommendations regarding minimum flows have a scientific or technical basis. Review of the LIHI application and supporting documents, I believe, demonstrates this need has been met. As

summarized in the LIHI application:

*“One of the main drivers of flow through Pelton Round Butte are the target flows. These flows are based on recommendations from the State of Oregon and CTWS. The State of Oregon recommended flows are known as State Certified Water Right Flows, which are based on the Oregon Wild and Scenic River Act flow requirements or Diack Flows. Diack Flows resulted from Diack v. City of Portland, 759 P.2d 1070 (1998). Diack Flows for the lower Deschutes River were determined by the Oregon Water Resources Department (OWRD) in coordination with Oregon Parks and Recreation Department (OPRD) and the Oregon Department of Fish and Wildlife (ODFW). These flows were based on flow needs for the fish identified in the instream water right, review of river guide logbooks, angler information and other information available for natural, scenic, and recreational values. The State Certified Water Right Flows were adopted as the scenic waterway flow on the basis that they would meet fish needs between the Project and the Warm Springs River, and when added to the flows from the Warm Springs River, would meet recreational flow needs below the Warm Springs River (3/22/01 Letter from J. Zarnowitz, ODFW, available upon request).*

*Additionally, the CTWS recommended target flows for the lower Deschutes River. As described in the Evaluation and Findings Report on the Application for Certification Pursuant to Section 401 of the Federal Clean Water Act (CTWS 2002; available upon request), with certain exceptions, the Tribal Environmental Office recommended that the Water Control Board adopt Q-80 flows based on the entire period of record for the Madras Gage (1925 to 1999). As described in Section 9.2.6.7 of the Evaluations and Findings report (CTWS 2002), the Q-80 flows were recommended because:*

- 1. These flow levels have been present historically (1924-1999) at least 80% of the time and therefore must inherently provide sufficient flows for the ecosystem, as it presently exists.*
- 2. These flows vary on a month-to-month basis providing for a flow regime that mimics the natural hydrograph in the lower river.*
- 3. These flows are higher than mandated by the existing license.*
- 4. These flow levels are only slightly less than the average flows for the Deschutes River below the Reregulating Dam.*
- 5. These flows will allow for the ODFW instream flows to be met at the Moody gauge at the mouth of the Deschutes River as called for in the 1991 water right certificate.*
- 6. These flows allow for higher minimum summer flows thereby protecting water temperatures for the anadromous fishes.”*

The minimum flows recommended by the State of Oregon and CTWS did not always agree. As shown in Table 5 of the LIHI application, the target flows adopted into the FERC license requires the higher of the two recommended flows. The LIHI application also provides a summary of how these flows align with the agency management goals and objectives for fish and wildlife.

### Compliance with Flow / Water Management Requirements

Required flow-related compliance reporting activities are outlined in the Operations Compliance Plan and include:

- Notifications to the fisheries agencies, 401 Certification agencies, FERC, and others promptly (within 48 hours) after the licensees become aware of any deviation from operational requirements related to flows and reservoir levels.
- Maintenance of a Project operation log.
- Issuance of an Annual Project Operations Report and incident reports documenting any events where operations deviated from the operational requirements of the license.
- Conducting an annual Project review meeting with the Coordinating Committee defined in the Settlement Agreement.

Review of FERC eLibrary records from 2015 through January 25, 2023 confirmed that Annual Project Operations Reports are filed with FERC by June 1 and that deviation incident reports are made to both the required resource agencies and to FERC. Each Annual Project Operations Report documents the required review meeting with the Coordinating Committee and includes charts depicting the past year's:

- Calculated daily Project inflows,
- Madras outflow,
- Days of operation "at inflow",
- Days of operation with refill allowance,
- Lake Billy Chinook daily levels,
- Lake Simtustus daily levels, and
- Reregulating Dam daily levels

Based on data provided in the LIHI application and the FERC eLibrary, there were a total of six deviations from flow-related or reservoir level management requirements since the last LIHI recertification in October 2015 through January 25, 2023. Only the June 6, 2017 incident was considered to be a license violation by FERC:

- June 6, 2017 – a 41-minute deviation from the minimum summer operating water surface elevation at the Pelton Development as a result of a miscommunication between different operators while they were balancing load demand and maintaining Bulk Electric System reliability. FERC considered this event a violation of license Article 414(a).
- On January 5, 2018, a 7-minute deviation of the lower river set point resulting from the loss of control signal during equipment replacement.
- On April 8, 2019, a 24-hour exception from stage change resulting from a rapid increase in upper basin stream flow.
- On August 10, 2019, a 30-minute lower river set point deviation resulting from a faulty limit switch which prevented the automated system (SCADA) from closing the spill gate after tripping due to lightning storm.
- On June 11, 2022, over the course of 21 hours, a total stage change of 0.59 ft. occurred,

which exceeded the normal stage change limit of 0.2 ft/day.

- On November 5, 2022, for about six hours, a total stage change of 0.7 ft/day occurred, which exceeded the normal stage change limit of 0.4 ft/day.

Additionally, relevant to all ZoEs, license Article 413 requires an annual evaluation of Project flows against long-term low flow (LTLF) triggers and inclusion of the results in the annual operations reports. Every ten years, the licensees are required to conduct a ten-year review of the Long-Term Low Flow Trigger Plan to address the following issues:

- Significant advances in forecasting or interpretation of climate signals - to be evaluated through a literature search and consultation with a state climatologist.
- Possible long-term flow trends that do not meet the LTLF trigger criteria but might indicate a change in the hydrologic regime - to be evaluated by graphically tracking average inflows as a function of time; occurrence of a possible trend would require a time-series of a difference-of-means test that considers sample size, statistical significance, and confidence limits.
- Implementation issues - to be identified through consultation or processing of inflow data.

The most recent ten-year review of the Long-Term Low Flow Trigger Plan was conducted in 2020. The review included consultation with three regional climatologists to advise on climate conditions and advances in forecasting tools that may aid in the evaluation of secondary LTLF indicators. As summarized on page 36 of the LIHI application, the review concluded:

*“The Project inflows and outflows have exhibited annual to multi-year (~5–10 year) variability in response to normal meteorological conditions, and they have maintained a near-static trend over longer periods. The annual average inflows have remained above the primary and seasonal LTLF indicator thresholds during all years since Project relicensing. As such, the LTLF consultation provision has not been activated. Given the static long-term trends and significant uncertainty in present climate forecasting and modeling, the primary and seasonal indicators continue to remain appropriate criteria for the LTLF Plan.*

*Applicability of the secondary LTLF indicators, however, may require reconsideration due to the general inconsistency found between streamflow and climate indices. As indicated by the regional climatologists, the Deschutes River watershed has a complicated hydrologic system, in which groundwater flows account for a large proportion of the water budget and which limits the effectiveness of typical climate driven runoff models. Continued use of the WSOR projections would appear to be the most effective means of anticipating summer stream flows, while recognizing their potential limitations. Longer-term modeling suggests a useful perspective of possible conditions some decades into the future, chiefly the seasonal shift to earlier snowmelt and runoff, which could eventually affect long-term low flows to a degree that may motivate a re-evaluation of LTLF indicators.”*

The small number of deviations from minimum flows and impoundment water management requirements and adherence to all operational and incident reports clearly indicates the licensees’

attention to these flow and related requirements.

#### Comments, Assessment and Conclusion

Scott J. Carlon, of NOAA Fisheries, in his support letter expressed the agency's appreciation of *"the co-licensees' continued commitment to improve fish passage performance and survival and the maintenance of flow, ramping rates, and water quality downstream of the Project."* Peter Lickwar, of USFWS commented *"We have worked closely with PGE's Pelton Project fisheries, water quality, instream flow, wildlife, recreational, and cultural resources staff for many years. Based on our experiences working with PGE, we believe that they meet all eight of the LIHI's science-based criteria."*

While some deviations from license requirements have occurred, they were minor and responded to quickly. I believe the Project continues to satisfy the requirements of this criterion.

#### *The Project Continues to Pass Criterion A – Ecological Flow Regimes*

## **B. WATER QUALITY**

**Goal:** Water Quality is protected in waterbodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

The Applicant appropriately selected **Standard B-2 Agency Recommendation** for all ZOE's.

#### ODEQ Regulations

Designated beneficial uses of Project waters are identified in Appendix D, which was excerpted from ODEQ's website. In 2004, two years after the Project received its WQCs, Oregon substantially revised its water quality standards, particularly with respect to the temperature and dissolved oxygen (DO) criteria that apply to the river downstream of the Project, and Table 4 below lists the current standards versus those included in the Project's WQMMP.

LIHI research found that ODEQ is proposing to update Bull Trout spawning use to "core cold water use" in several waters based on changes to the ODFW Fish Habitat Database for the spatial extent of the use current or potential habitat based on available data. It appears ODEQ is updating the extent of Bull Trout Spawning use so that it does not include the one mile stretch of the Metolius River upstream of the Lake Billy Chinook reservoir due to lack of suitable habitat. Previous data used in 2003 designated Bull Trout spawning habitat in the area, but better survey data has shifted the influence of this reservoir's reaches approximately one mile further downstream than previously estimated, resulting in this change.

The ODEQ has begun a rulemaking to update the existing aquatic life use subcategory designations relating to the temperature standard, and to designate aquatic life use subcategories relating to the dissolved oxygen (DO) standards.<sup>4</sup> As noted in the LIHI application and confirmed by

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<sup>4</sup> See ODEQ's website at <https://www.oregon.gov/deq/rulemaking/Pages/aquaticlife2022.aspx> for more information.

consultation with ODEQ (see Appendix C), this process is expected to conclude in 2023.

**Table 4 – Comparison of Project WQMMP vs ODEQ Standards**

	Standard in WQMMP	Current DEQ Standard
Temperature	<p>Bull trout standard</p> <ul style="list-style-type: none"> <li>Limit temperature increase in discharge water to no more than 0.25°F (0.14°C) over what would occur if Project were not in place when surface waters exceed 50°F (10°C).</li> </ul>	<p>From June 16 – Oct 14, Core Cold Water</p> <ul style="list-style-type: none"> <li>7-day average max may not exceed 16°C (60.8°F) from June 16-Oct 14 (OAR 340-041-0028(4)(b))</li> </ul> <p>From Oct 15 – June 15, spawning</p> <ul style="list-style-type: none"> <li>7-day average max may not exceed 13°C (OAR 340-041-0028(4)(a))</li> </ul>
Dissolved Oxygen	<ul style="list-style-type: none"> <li>11.0 mg/L salmonid spawning criterion applies year-round</li> <li>If monitoring of IGDO demonstrates that IGDO levels exceed 8.0 mg/L at all times, the alternate water column criterion of 9.0 mg/L will apply</li> </ul>	<p>From Oct 15 – June 15, spawning</p> <ul style="list-style-type: none"> <li>DO may not be less than 11.0 mg/L. However, if the minimum IGDO, measured as a spatial median, is 8.0 mg/L or greater, then the DO criterion is 9.0 mg/L.</li> <li>Where conditions of barometric pressure, altitude, and temperature preclude attainment of the 11.0 mg/L or 9.0 mg/L criteria, DO levels must not be less than 95% of saturation.</li> <li>The spatial median IGDO concentration must not fall below 8.0 mg/L. (OAR 340-041-0016(1)(a-c))</li> </ul> <p>From June 16 – Oct 14, core cold-water</p> <ul style="list-style-type: none"> <li>DO may not be less than 8.0 mg/L as an absolute minimum.</li> <li>Where conditions of barometric pressure, altitude, and temperature preclude attainment of the 8.0 mg/L, DO may not be less than 90% saturation.</li> <li>At the discretion of the Department, when the Department determines that adequate information exists, the DO may not fall below 8.0 mg/L as a 30-day mean minimum, 6.5 mg/L as a seven-day minimum mean and may not fall below 6.0 mg/L as an absolute minimum. (OAR 340-041-0016(2))</li> </ul>



Schedules for development of Total Maximum Daily Loads (TMDLs) for temperature, DO, pH and nuisance phytoplankton growth to resolve Clean Water Act Section 303(d) impairment issues have not yet been defined per this same ODEQ consultation. Both WQCs reference the need to re-evaluate the WQC conditions relative to the Load Allocation (LA) that may be assigned to the Project upon adoption of these TMDLs.

### Impaired Waters

Review of the state's most recent final Section 303(d) impaired waters list, the Section 305(b) Integrated Water Quality Report, and lists of other stressed waters available through the ODEQ website, indicates the following impairments:

#### Lake Billy Chinook:

- impaired for harmful algal blooms and chlorophyll-a at **AU IDs:** OR\_LK\_1707030110\_05\_100081 and OR\_LK\_1707030511\_02\_100117
- impaired for pH and chlorophyll-a at **AU ID:** OR\_LK\_1707030111\_02\_100151

Simtustus Lake: impaired for pH, chlorophyll-a, and temperature-year-round at **AU ID:** OR\_LK\_1707030601\_02\_100118

Deschutes River Pelton Regulating Dam to Warm Springs River: impaired for temperature-spawning; pH; and dissolved oxygen-spawning at **AU ID:** OR\_SR\_1707030603\_05\_102625

In addition, review of state data showed that the following impairments for upstream waters entering the Deschutes River above the Pelton Dam:

Deschutes River at the Pelton Dam: impaired for chlorpyrifos<sup>5</sup>-aquatic life at **AU ID:** OR\_WS\_170703060304\_05\_102508

It is important to note that ODEQ has determined that basin wide, the Deschutes River basin waters, including many tributaries, are impaired for most of these same parameters, due to agricultural runoff, hence the goal to develop parameter-specific TMDLs.

Based on past consultations with ODEQ during the two prior LIHI certification reviews, ODEQ acknowledged that most of the impairments are due to offsite sources. Most recently, during the 2014 review, in a letter dated September 18, 2014<sup>6</sup>, ODEQ stated that the issuance of the WQC essentially made this determination (i.e., the Project would be in compliance with water quality standards provided the WQC conditions are being met). Due to the current rulemaking process and Project review activities being conducted by ODEQ, ODEQ was not in a position to offer more current comment. However, PGE did state in their LIHI application that no agency has commented that the Project is responsible for the known impairments. It is also important to note that agricultural runoff is the key source of nutrients and herbicides entering the watershed.

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<sup>5</sup> Chlorpyrifos is a commonly used organophosphate insecticide, acaricide and miticide used primarily to control foliage and soil-borne insect pests, often in agricultural applications.

<sup>6</sup> See the first letter under Attachment 5 at [https://lowimpacthydro.org/wp-content/uploads/2020/09/PRB-LIHI-Recertification-Application\\_reduced\\_PartB.pdf](https://lowimpacthydro.org/wp-content/uploads/2020/09/PRB-LIHI-Recertification-Application_reduced_PartB.pdf)

## Requirements

Project operations are governed by water quality conditions included in the WQCs issued by the CTWS-WCB and ODEQ, both of which are incorporated into the FERC license. Both agencies confirmed that the 2002 WQCs remain current and in effect. Requirements within the WQCs include water quality management and monitoring (for water temperature, DO, pH, total dissolved gases, turbidity, toxic substances, bacteria) and nuisance phytoplankton growth control. The license also includes Article 416 which requires issuance to FERC of the annual reports resulting from performance of water quality monitoring pursuant to the WQMMP. The WQMMP and subsequent amendments must be approved by the ODEQ, CTWS-WCB and FERC.

The WQMMP is the key document which describes how the Project will be operated to satisfy the requirements of the WQCs, and contains four “sub-plans”:

- Temperature Management Plan (TMP)
- Dissolved Oxygen Management Plan (DOMP)
- pH Management Plan (PHMP)
- Nuisance Phytoplankton Growth Management Plan (NPGMP)

The goal of each of these four Plans is to identify those measures that the licensees will undertake to reduce the Project's contribution to exceedances of water quality standard criteria for temperature, dissolved oxygen and pH<sup>7</sup>. The various sub-plans specify the monitoring reasonably needed to determine (a) whether the parameter-specific criteria continue to be exceeded in waters affected by the Project; (b) the success of the Plan in reducing the Project's contribution to any continued exceedances of the criteria; and (c) any additional measures that may be needed to reduce the Project's contribution to exceedances of the criteria and the applicable standards, and how the Project will be operated to achieve these parameter limits in the waters downstream of the Project. More details of each of these Plans are included in the LIHI application (pp. 42-43).

The method of achieving these goals is the design and construction of a Selective Water Withdrawal (SWW) tower, which began operation in December 2009. This is accomplished by mixing of water drawn from the top and bottom of Lake Billy Chinook, such that the resultant discharge provides water downstream of the Regulation Dam that more closely matches what would be expected in the river if the Project did not exist, and therefore attempts to bring downstream waters into compliance to meet the State standards. The SWW is operated to provide warmer river temperatures during the spring and cooler river temperatures in the late summer and fall, mimicking a more natural temperature regime in the Lower Deschutes River. As the SWW was not built when the WQMMP was adopted, the adaptive management process within the WQMMP was required. The WQCs, and thus the WQMMP, also acknowledge that changes to operation of the SWW must consider all possible impacts, not just potential changes to a single water quality parameter.

The ODEQ WQC also requires that upon adoption of a TMDL for temperature, DO, pH and/or

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<sup>7</sup> As noted by Eric Nigg, ODEQ Water Quality Manager in his April 2018 testimony on Case No. 3:16-cv-01644-SI, since construction of the Project in the 1950s, water quality (e.g., temperature, dissolved oxygen) has been significantly changed in the downstream waters compared to levels of these parameters found in waters upstream.

nuisance phytoplankton growth in the portion of the Deschutes River affected by the Project, ODEQ may reevaluate the Project plans addressing these parameters in light of new information acquired since the issuance of the WQC, and may impose further requirements if additional measures are feasible and necessary to meet a Load Allocation for the Project under the TMDL for that parameter. To date, these TMDLs have not been developed and ODEQ's website does not indicate an expected completion date.

Finally, the WQMMP outlines additional monitoring programs at the Project that address four objectives:

- To determine whether the Project is in compliance with the ODEQ and CTWS-WCB Section 401 WQCs.
- To collect water quality data to aid in the identification and evaluation of adaptive management measures.
- To continue to collect water quality data at sites that have been used in other baseline studies to determine if trends exist related to the Project or other sources.
- To collect water quality data that can be used for other aquatic studies related to reintroduction of anadromous fish.

From 2011 to 2019, a series of separate interim agreements with ODEQ and the CTWS-WCB were signed *"to provide a framework for the Joint Licensees to evaluate management and monitoring measures that may be needed to ensure continued compliance with the temperature and dissolved oxygen standards applicable to the Deschutes River below the Project."*<sup>8</sup> The interim agreements specified the applicable temperature and DO objectives for the river downstream of the Project and contemplated a future revision to the WQMMP's TMP and DOMP to incorporate these objectives and any appropriate management and monitoring measures to achieve them. The 2019 interim agreement expired in January 2021. Since then, PGE has consulted with ODEQ and CTWS-WCB prior to each management season to confirm a common understanding of how the Project should be adaptively managed to address temperature and DO in accordance with the WQCs and WQMMP. In follow-up information, PGE stated that in 2020, ODEQ, the CTWS-WCB, and the licensees agreed to move forward with revising the information in the WQMMP to be consistent with current Oregon Water Quality Standards and the information acquired since the SWW began operating.

In spring 2020, the Applicants submitted proposed WQMMP revisions to the ODEQ. The submittal included non-substantive updates, some additional considerations for SWW operations prior to June 15 each year to improve fish capture and, with certain minor exceptions, revisions that are consistent with the Project's temperature and DO management measures under the interim agreements. In June 2021, ODEQ issued a Draft Evaluation and Findings Report but in October 2021, the agency paused the modification process while the ODEQ Rules Advisory Committee began reviewing the aquatic life use designations for Oregon rivers, including the lower Deschutes River. It is expected that ODEQ will resume the modification process within a few months of the Oregon Environmental Quality Commission adopting the changes to the aquatic life use designations, which is expected in early 2023. In the meantime, the operational measures described

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<sup>8</sup> Per language in the interim agreements

in the most recent agreements are being followed pending approval of the WQMMP changes.

### Compliance

Table 5, excerpted from the LIHI application, shows the water quality monitoring and studies performed at the Project. Five types of monitoring will be conducted for the life of the license while others had a specific study end date. Continuous monitoring data is reported monthly to ODEQ and CTWS-WCB, and an annual report summarizing the data is submitted to ODEQ, CTWS-WCB, and FERC. The results of the last three years of annual reports are discussed below.

**Table 5 -Water Quality Monitoring Studies**

Monitoring Program	Status
Temperature monitoring	Ongoing for life of license
Multi-parameter monitoring (including DO and pH)	Ongoing for life of license
Nutrient and chlorophyll <i>a</i> monitoring	Completed in 2017
<i>E. coli</i> monitoring	Completed in 2012
Zooplankton monitoring	Completed in 2014
Lower Deschutes River macroinvertebrate and periphyton monitoring	Completed in 2015
Total dissolved gas monitoring	Completed 2012; additional monitoring occurs periodically during spill events
Lower River geomorphic monitoring	Ongoing through 2025
Large wood monitoring	Ongoing for life of license
Project operations monitoring <ul style="list-style-type: none"> <li>• Flow monitoring at the USGS Madras Gage</li> <li>• Hourly monitoring of Project inflows</li> <li>• Monitoring minimum flow releases below the Reregulating Development</li> <li>• Monitoring run-of-river operation for lower river flows</li> <li>• Monitoring river stage changes below the Reregulating Development</li> <li>• Monitoring seasonal drawdown and fluctuation limits for Project reservoirs</li> </ul>	Ongoing for life of license

Between 2015-2017, as part of a comprehensive multi-year water quality study, the licensees monitored phytoplankton bio-volume and chlorophyll-*a* concentration in Lake Billy Chinook and Lake Simtustus. The purpose of this study was to document water quality conditions in the Lower Deschutes River (LDR) and Project reservoirs and use modeling to assess how changes in Project operations, basin conditions, and climate change may influence water quality in the LDR. The

report and all the data used to generate the report are available on the PGE website at <https://portlandgeneral.com/about/rec-fish/deschutes-river/water-quality>. The two components of the study were:

1. *A water quality monitoring effort to determine the current status of the LDR and impoundments and to serve as a basis for assessing historical changes in the system. The monitoring was conducted from 2015 to 2017 and included sampling water quality in the three tributaries to Lake Billy Chinook, Lake Billy Chinook, and Lake Simtustus, and numerous sites along the LDR and its tributaries. Monitoring included measuring real-time conditions for temperature, pH, DO, and other parameters with discrete sampling for nutrients (total phosphorus, phosphate, total nitrogen, nitrate and ammonia), algae attached to the substrate (periphyton), and algae present in the water column (seston).*
2. *Developing numerical models of the impoundments and LDR, which enable investigators to forecast possible changes to the LDR that might result from changes in nutrient inputs, Project operations, and other potential measures to mitigate water quality response in the LDR. A two-dimensional (2-D) model, CE-QUAL-W2 (W2), was applied to the impoundments and was used to generate inputs to the one-dimensional (1-D) QUAL2Kw (2Kw) model for the LDR. The models were calibrated to data collected in 2015, and the output was compared to measured water quality data in 2016–2017. The models were used to test 11 hypothetical scenarios involving changes to Project operations, watershed management, and climate.*

Additionally, in 2015, seasonal monitoring was initiated for harmful algae blooms in Lake Simtustus. These data collections are independent of the WQMMP. Key conclusions of these studies are noted below. The full report is linked to the LIHI application.

*“Data collected in this study on the LDR were compared with data from the pre-licensing investigation and with ODEQ data collected on the river since the 1960s. The historical data on the LDR are subject to more uncertainty than the data on the impoundments, but the available data indicate that the river also has become more productive, with higher measurements of daytime pH and DO observed in recent years.*

*The most significant contributor to current conditions in the impoundments and the LDR appears to be associated with nutrient inputs from the three major tributaries. The operation of the SWW has resulted in a greater proportion of the discharge from Round Butte Dam being comprised of water from the Crooked River. Travel time from the Crooked River inlet to the SWW intake structure is about three weeks, which is more than sufficient to have the nitrate contributions from the Crooked River assimilated by phytoplankton. Consequently, the nitrate in Lake Billy Chinook forebay is likely derived from decomposition of algae and oxidation of reduced forms of nitrogen. The nitrogen-rich water appears to promote increased primary production, at least at the locations in the reservoir from which samples were collected, a conclusion supported by the fact that the phytoplankton population has increased in those locations. This highly productive epilimnetic water containing phytoplankton is then transported down the LDR. Primary production has increased in the LDR likely from increased temperature and availability of nitrogen. However, the SWW allows the Project to release water that more closely matches*

*the temperature the river would have just below the Reregulating Dam if the Project were not in place: warmer spring temperatures and cooler late summer, early fall temperatures. This more natural thermal pattern in the LDR is intended to facilitate spawning, emergence, and growth of anadromous fish.*

*The reservoir and river models were linked for analysis of 11 scenarios that explored how potential changes in Project operations, watershed management, and climate might influence water quality in the LDR. The modeling results indicated that water quality in the LDR is a complex function of climate, watershed inputs, and release-induced mixing within the impoundments. Nutrient inputs from the Crooked River into Lake Billy Chinook are transported downstream to the LDR and contribute to the river's productivity. Operational changes to the SWW might improve LDR water quality; however, it is important to preserve the smolt-attraction flows at critical times. Also, cold water in Lake Billy Chinook will become an increasingly scarce resource in late summer if forecasted changes in climate are realized. Increased temperatures in the reservoirs could lead to further changes in water quality within the reservoirs and in the LDR."*

In summary, the study found that summer temperatures that increase nitrate concentrations, pH and DO suggest that algae has likely become more abundant in the lower Deschutes River since SWW operation began. This is likely due to nutrients from the Crooked River being transported to the lower Deschutes River during the spring months, at the time of year when algae can take advantage of them for growth.

In addition to nutrient availability, flow is highly related to algae growth. In 2019, there was a high flow event on the lower Deschutes River and, following this event, a change was observed in the downstream periphyton community composition from the previous year's sampling. The study results suggest that high flow events dislodge certain nuisance algae.

After the studies concluded, the Fish Committee created a subcommittee, the Water Quality Work Group (WQWG), to comprehensively evaluate the details of the Water Quality Study and determine if Project operation or SWW management changes were warranted based on the study results. The WQWG consists of members from PGE, CTWS, USFS, ODEQ, Native Fish Society and Trout Unlimited. Through its review process, a report entitled Recommendations to Fish Committee on Scenarios to Consider to Improve Water Quality in the Lower Deschutes River and Project Reservoirs was developed. In this report, the group identified several areas for additional research but recommended no SWW changes at this time. As noted in this report:

*"This report is a living document intending to capture the WQWG's process/approach in identifying strategies to improve water quality in the Lower Deschutes River and project reservoirs and to provide initial recommendations for FC [Fish Committee] consideration. The Licensees are continuing to conduct further modeling and studies and are gathering additional information to better understand various strategies' impacts on water quality. The recommendations on Project operations to improve water quality will continue to be an iterative process and will be adapted using the best available science."*

In the LIHI application, PGE stated it is working on modeling and collecting data for the additional

SWW scenarios/blends that needed further information/study. Results of the WQWG also included development of a [Water Quality Graphic](#), which shows current and potential influences on water quality, how they impact water quality, metrics to track these issues, what support is most needed and where it might be most impactful to prioritize monitoring and restoration funding efforts. Two examples noted include additional nutrient and periphyton monitoring in the lower Deschutes River to better understand the impacts of a high flow event and focusing future Pelton Fund projects in the Crooked River basin because it is the area with the highest need for habitat improvement, both in terms of fish and water quality.

Finally, the WQWG has convened a lower Deschutes stakeholder working group as a pilot process to build common understanding of the science related to the lower river and discuss desired outcomes for temperature management. This group is professionally facilitated, and is comprised of PGE, CTWS, ODEQ, ODFW, Native Fish Society, Trout Unlimited, Deschutes River Alliance, Freshwater Trust, Wild Steelhead Coalition, The Conservation Angler, Pacific Rivers, Central Oregon Informed Angler, and three lower Deschutes River fishing guides. The group was convened in June 2022 and has met three times to date. The key objectives of this stakeholder group are to:

- Help the group fulfill its purpose in a balanced and fair manner.
- Schedule and coordinate meeting logistics.
- Work with the WQWG to develop agendas and distribute meeting materials.
- Facilitate and document meetings.
- Ensure participants focus on their roles and responsibilities.
- Offer process expertise to support constructive, collaborative, and productive dialogue.

It is hoped that by incorporating various opinions into the discussions, including from stakeholders that often have taken opposing views or questioned certain findings, a better understanding of the challenges PGE faces in meeting the goals of water quality protection and the efforts being undertaken by the licensees will result.

### Ongoing Monitoring

As previously stated, the goal of managing Project water quality effects is to allow water downstream of the Regulating Dam to more closely match what would be expected in the river if the Project did not exist. Given that, this assessment focuses on the results found for these waters, monitoring of which was conducted at the downstream Madras USGS Gage. The annual reports, however, provide significantly more monitoring data done at numerous locations within the Project.

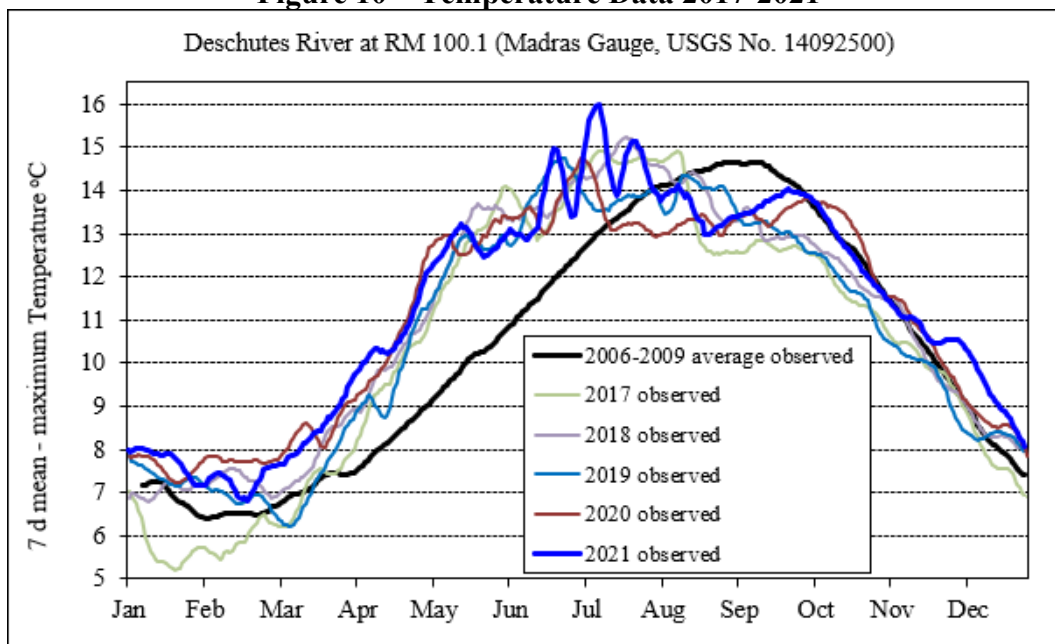
### Temperature

To achieve the goal for temperature, the Project adjusts the blend of surface and deeper water released from the SWW to target a 7-day average of daily maximum temperatures (7dAM) at the discharge from the Reregulating Dam that is no more than 0.3 °C greater than modeled without Project temperature (WPT) when the temperature in the discharge approaches 13.0 °C. During atmospheric cooling events, however, the blending operations at the SWW may target a 7dAM

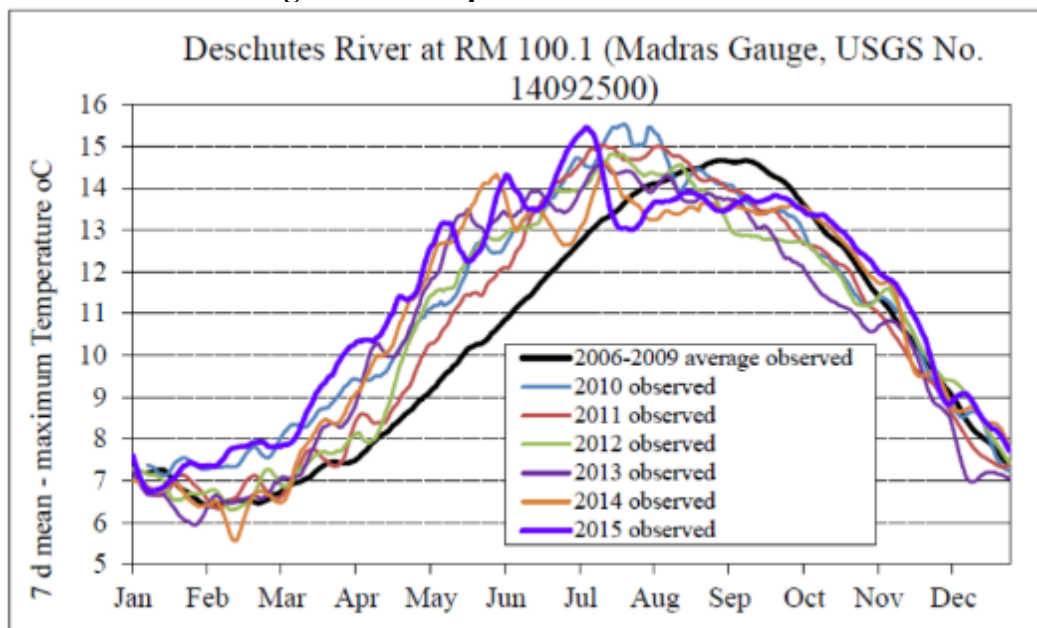


temperature in the discharge from the Reregulating Dam that is up to 0.5 °C greater than the WPT for up to three calendar days. Figure 10 shows the pre-SWW three-year average 7dAM (2006-2009) compared to the 2017-2021 7dAM discharge temperatures, and Figure 11 shows the same information for 2010-2015. These show very similar seasonal results over the years since SWW operation began.

**Figure 10 – Temperature Data 2017-2021**



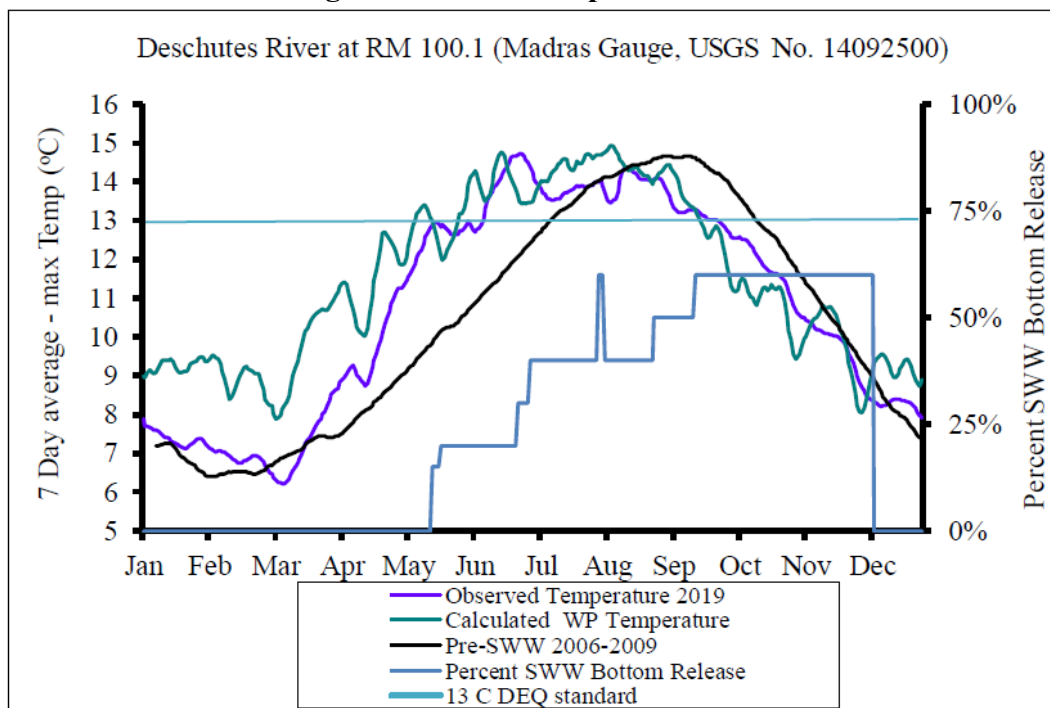
**Figure 11- Temperature Data 2010-2015**



Figures 12, 13 and 14, show for 2019, 2020 and 2021, respectively, the calculated without Project temperatures (as 7dAM) compared to the pre-SWW 4-year average (2006-2009) and observed

2020 7dAM discharge temperatures. These figures also show the percentage of bottom water withdrawal by the SWW intended to meet the temperatures requirements.

**Figure 12 - 2019 Temperature Data**



**Figure 13 - 2020 Temperature Data**

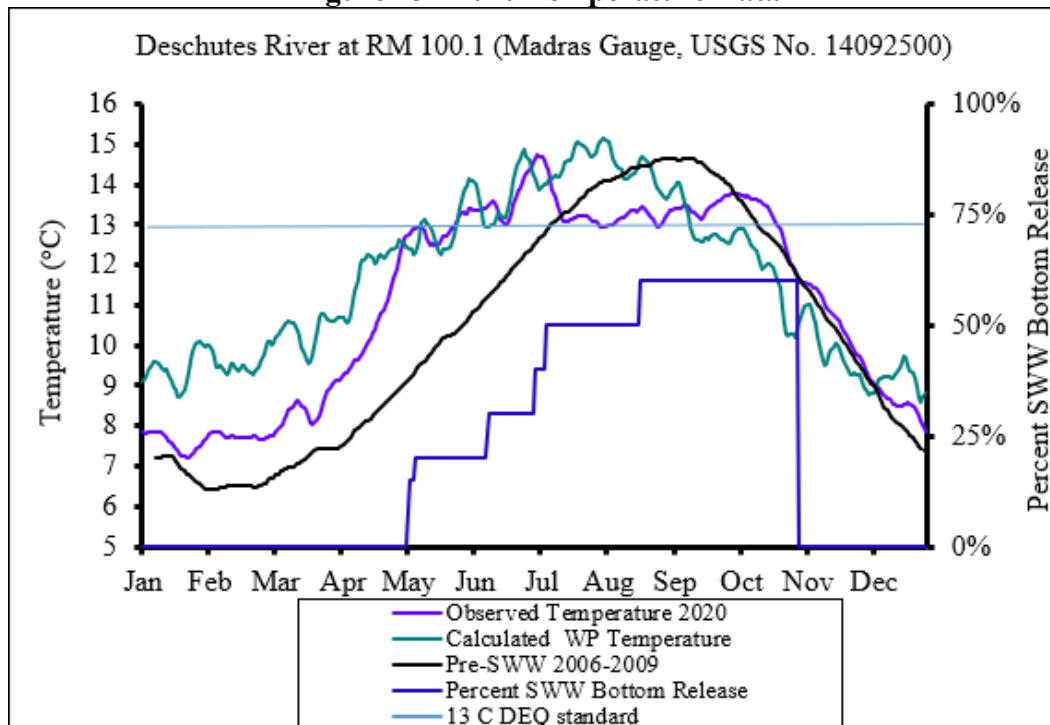
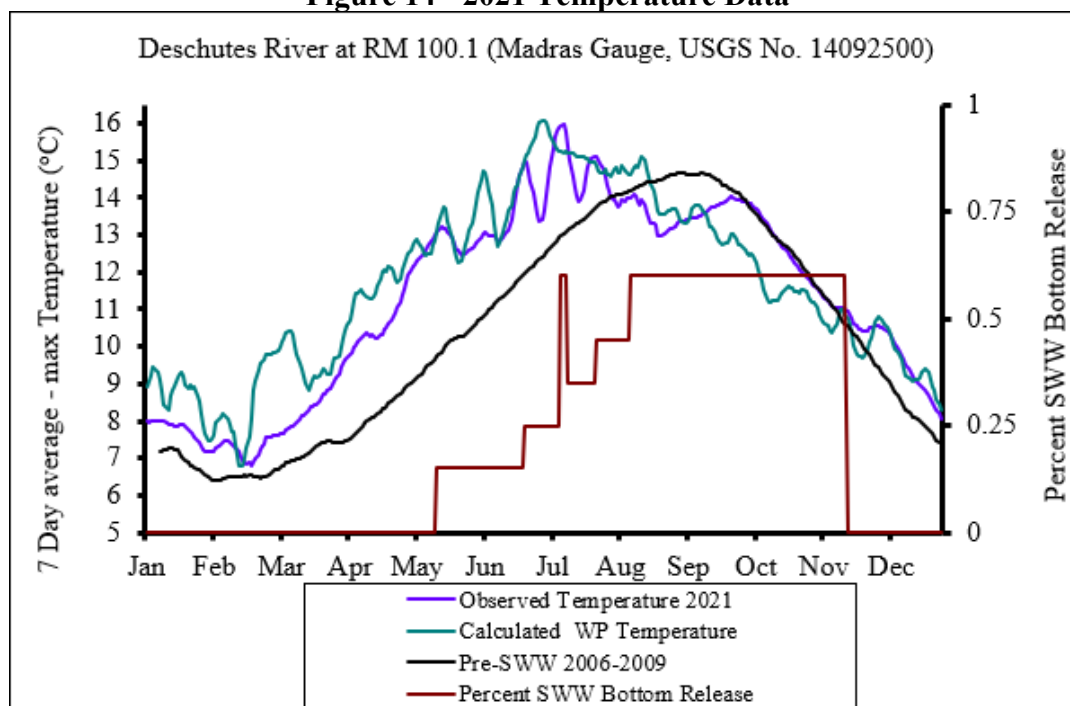


Figure 14 - 2021 Temperature Data



Temperatures in the lower Deschutes River immediately downstream of the Reregulating Dam varied seasonally, with lower temperatures observed between November and April. Historically (pre-SWW), maximum temperatures at the Reregulating Dam tailrace occurred in August and September, whereas in 2017 through 2021 the river immediately below the Project exhibited a shift in timing of seasonal high temperatures to later in the summer and fall. In 2019 through 2021 with operation of the SWW, maximum temperatures at the Reregulating Dam, compared to previous years (through 2009), exhibited an approximate 4-5 week shift of seasonal high temperatures from the end of August back to mid-July. These Figures do show that there were exceedances above the ODEQ Standard of 13 °C.

### Dissolved Oxygen

As typical since operation of the SWW, the Project was operated in accordance with the adaptive management provisions of the WQCs, and as agreed by ODEQ and CTWS-WCB, to address Project DO effects. Pursuant to these provisions, the Project uses spill at the Reregulating Dam to achieve a DO concentration downstream of 8.0 mg/L or more from June 16 - October 14, and 9.0 mg/L (or 95% of saturation) or more from October 15 through June 15. Monitoring results for 2019, 2020 and 2021 of daily minimum DO (mg/L and percent saturation) in the reach downstream are shown on Figures 15, 16 and 17, respectively. Spill events are indicated by the arrows and DO concentration targets are indicated by a dashed line.

Figure 15 - 2019 Dissolved Oxygen Data

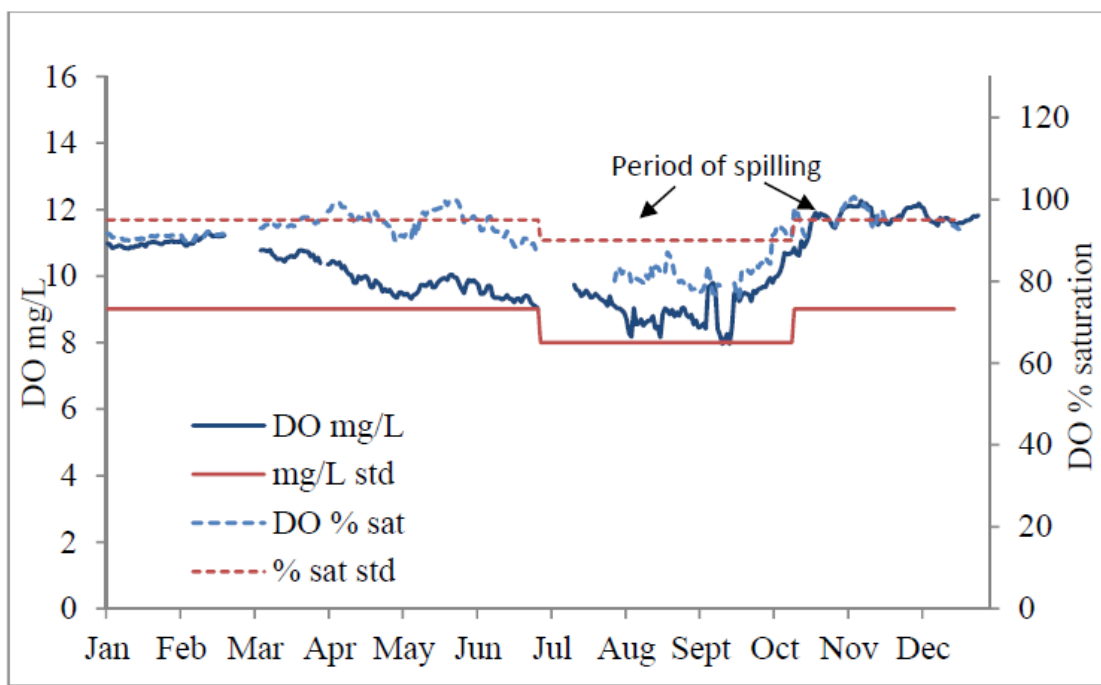


Figure 16 – Dissolved Oxygen 2020 Data

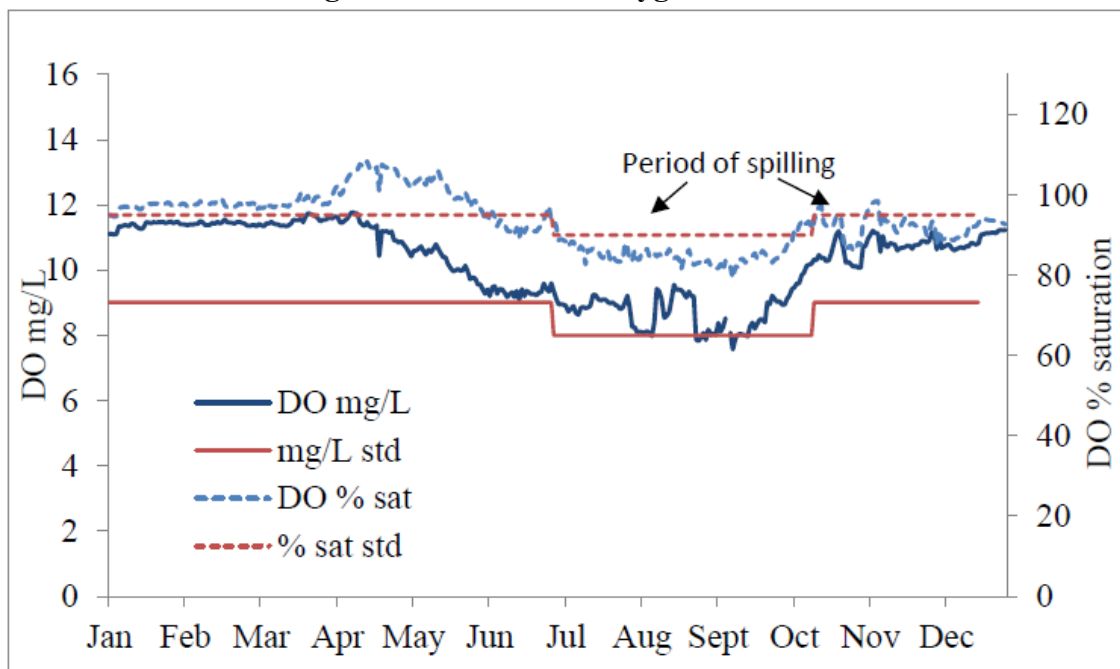
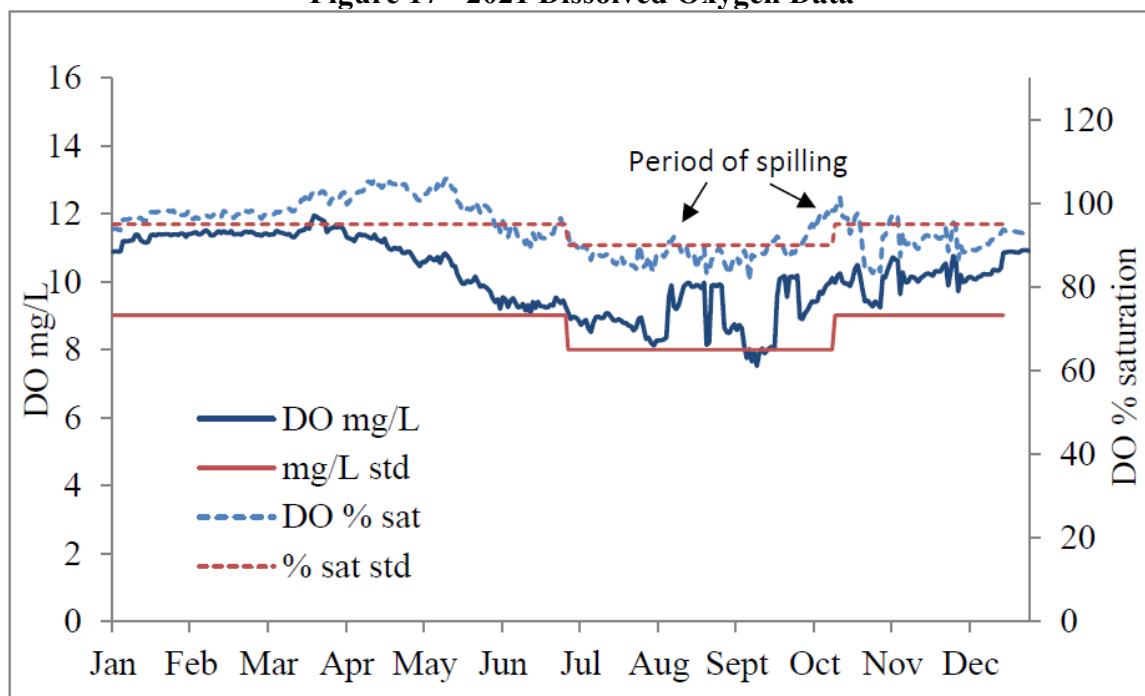


Figure 17 - 2021 Dissolved Oxygen Data



The reports noted that changes in DO through the Project, resulting from surface withdrawal, were less obvious than those observed with temperature. DO concentrations in the Reregulating Dam tailrace were lower during the late summer and early fall months. However, due to spill operations, the 2019 and 2020 annual reports summarized the DO concentration results as remaining above the coldwater criterion and above the salmonid spawning criterion during the spawning season. In 2021, DO concentrations remained above the target concentrations with the exception of seven hourly readings during September, when the concentration dipped just below the 8.0 mg/L target. Review of earlier reports (2015-2018) showed similar results.

### pH

Monitoring of pH is conducted at various frequencies, although continuous monitoring is done at the Round Butte Dam tailrace and in the Deschutes River immediately below the Reregulating Dam. The pH criterion for both ODEQ and the CTWS-WCB is 6.5 - 8.5 standard units/year-round. Figures 18, 19 and 20 show for 2019, 2020 and 2021, respectively, the daily maximum and minimum pH in the Reregulating Dam tailrace as well as the standard for pH incorporated into the WQCs.



Figure 18 - 2019 pH Data

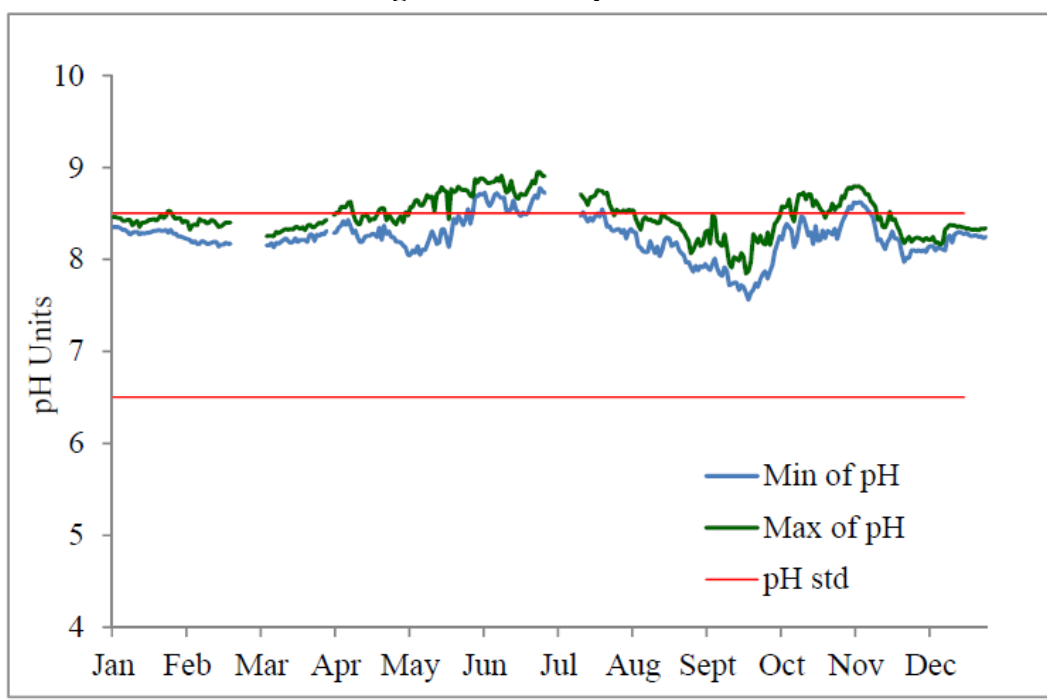


Figure 19 – 2020 pH Data

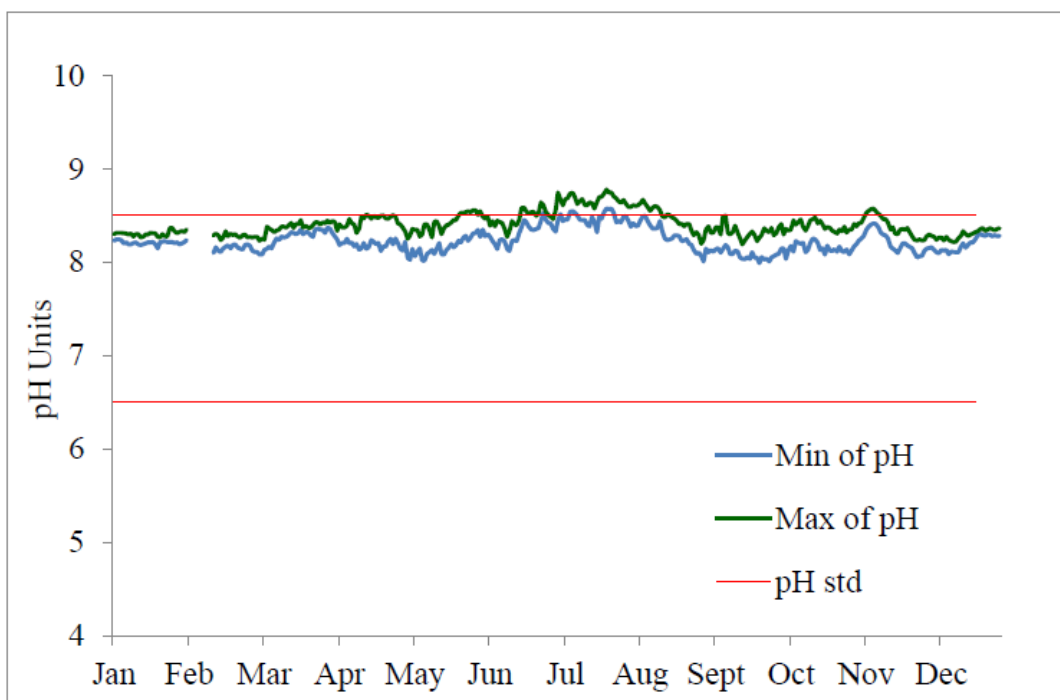
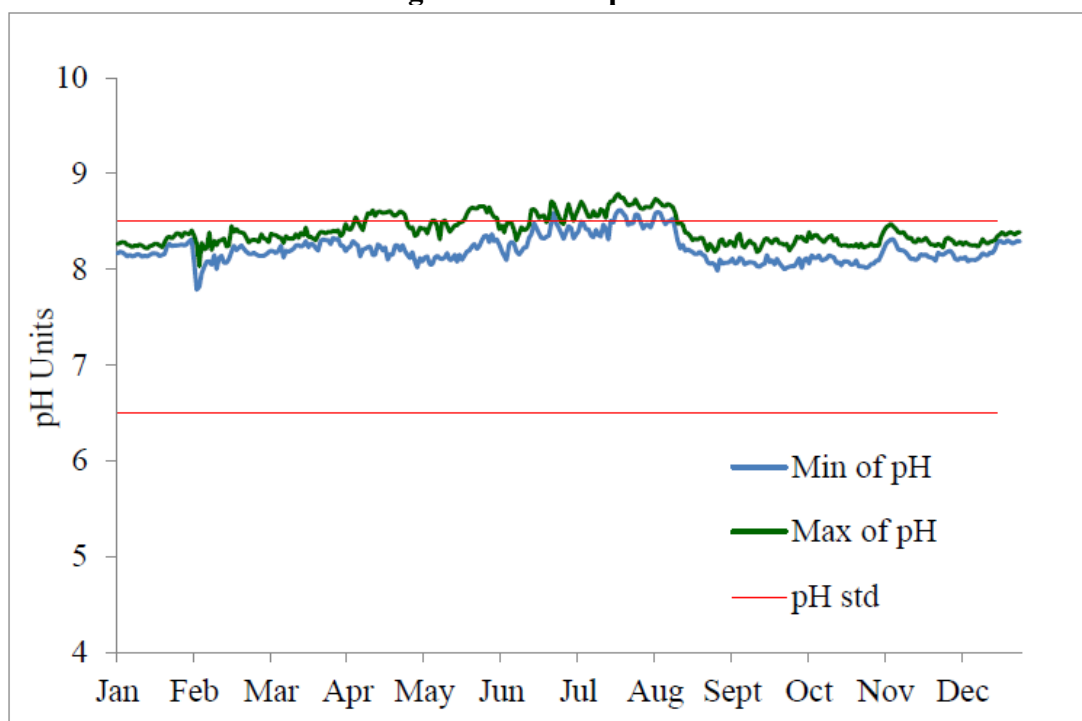


Figure 20 - 2021 pH Data



As noted in the annual reports, in 2019 through 2021, in a pattern also observed by Raymond et al. (1997)<sup>9</sup>, the Reregulating Dam tailrace had pH levels that varied similarly to those recorded at the Round Butte tailrace and were higher than inflow tributary values during spring through fall months. Seasonal patterns of pH were reported to be similar to those of DO and temperature. In all three years, exceedances of the maximum pH were experienced. Review of earlier annual reports (for 2015-2018) showed similar results.

#### Comments, Assessment and Conclusion

DRA's key comments were:

- The decline in water quality of the river and the inability to meet all WQC standard limits at all times is due to the installation and operation of the SWW. A key reason cited is that the SWW cannot be operated allowing 100% bottom water discharged and DRA contends that is a key requirement of the WQC to meet water quality standards.
- That Standard B-2 (Agency Recommendation) for the LIHI water quality criterion is not appropriate because the Project is not in compliance with all WQC conditions.
- Declining water quality is resulting in increased algal growth, changes in timing of insect hatches which are food sources for resident and migrant fish species, and increases in fish disease and parasite prevalence. Fish health is discussed under **Criterion C - Upstream Fish Passage**.
- Consideration of how upcoming changes in water quality regulations should be included in this review. DRA suggested that such changes will result in the need for revisions to the

<sup>9</sup> Raymond, R.B., J. M. Eilers, K. B. Vache, and J. M. Sweet. 1997. Limnology of Lake Billy Chinook and Lake Simtustus, Oregon. Portland General Electric. Portland, Oregon.

Project's WQCs and a subsequent need to revise the WQMMP.

Based on follow-up information from PGE, they reported the following regarding changes in insect hatching and increased algae.

Regarding changing hatch timing, the release of colder water in the spring has changed hatch timing, likely back to historical timing. This was a predictable response as insect hatch timing is highly dependent on water temperature. However, there is no data that this shift is an ecological concern or a fish health concern. ODFW surveys have indicated that the redband trout is comparable to pre-SWW samples in growth, condition factor and population density. A 2023 ODFW presentation made to the Fish Committee noted this data is available on PGE's website. As previously discussed, water quality studies have indicated that summer increases in nitrate concentrations, pH and DO suggest that nuisance algae have likely become more abundant in the lower Deschutes River, most likely due to increased spring nutrient loading from the Crooked River at the time of year when algae can take advantage of them for growth. Also, the region is currently in a third year of drought and is experiencing low-flow conditions in the lower river, which is likely contributing to observations of increased algae growth. However, there is no evidence to suggest that the algae are negatively impacting Deschutes river fish health, as discussed under **Criterion C - Upstream Fish Passage**.

DRA pointed out the recognized deviations from temperature, DO and pH standards, all of which have been reported to applicable agencies as required. In some cases, DRA alleged these are due to "operational decisions" that fail to comply with the WQC limits. As demonstrated by PGE, they have been working closely with ODEQ and ODFW to make adjustments to the SWW operation to best meet the goals of both water quality and fish passage. DRA's letter does not recognize the drought conditions that have been plaguing the region, and how those conditions also play a role in the ability of the lower Deschutes River to meet state standards for temperature, DO and pH. The complex interaction of these parameters and how changes in one affect the others, especially pH, is also not acknowledged in the DRA letter.

As discussed earlier, it appears to be recognized by the authorizing agencies responsible for water quality that 1) compliance with the WQC is met by meeting goals that strive to improve water quality by moving closer to meeting current water quality standards; and 2) ongoing modifications in SWW operation (i.e., adaptive management) is a critical component in understanding how best to meet the standards over time in downstream waters. It is also important to remember that these agencies require that all impacts must be assessed during SWW adjustment, not just fine-tuning for one parameter, which is critical, since the method for managing temperature (discharging colder lower reservoir level water) also exacerbates the usual low DO levels experienced at the same time.

Likewise, SWW operation is critical to improving fish passage, thus those considerations must also be balanced when determining its operational status to promote the best environmental benefits. Because the applicable agencies, especially ODEQ, have essentially determined that the Project is meeting its water quality goals as best as possible, LIHI believes that such agency acceptance is necessary to the Project being in compliance with its WQC. Thus, I believe that the Project has, for the most part, remained in substantial compliance with its requirements.

I followed-up with PGE on the issue of the inability of the Project to discharge 100% from the reservoir bottom (See Appendix A). They noted that the referenced “two sets of blends” were the result of modeling completed by Khangaonkar (2001), and not operational prescriptions. Instead, the SWW is operated with adaptive management provisions. Bottom water releases are managed through adjustment of bottom gates, and there are no gates at the top of the SWW to shut off surface flow through the SWW. When the bottom gates are fully open (sometimes informally and incorrectly referred to as “100 percent bottom withdrawal”) water continues to flow through the top of the SWW, such that the maximum proportion of low-level flow from the bottom gates that can be discharged through the SWW is approximately 60 percent.

While this is different from modeling described in the WQMMP, it is consistent with the Fish Passage Plan. The SWW was designed to always have a component of surface flow, never 100% bottom flow, to support fish passage. Moreover, maintaining surface withdrawals through the SWW provides the reservoir surface attraction flows essential for the collection of downstream migrating fish during these periods. During planning, fishery agencies stressed the need to continue fish passage during the less-used portion of the year to maintain genetic diversity needed to allow fish stocks to evolve. Finally, releasing too much of the colder water from the reservoir bottom early in the season restricts how much is available for release during the hotter summer and early fall.

When contacted, ODEQ stated they were not at liberty to fully respond to my inquiries at this time. However, in an April 2018 deposition<sup>10</sup>, Eric Nugg, Water Quality Manager for ODEQ, concluded his statement with “*In general, though, DEQ believes PGE is operating the project and facilities consistent with the 401 certification and that water quality has improved in demonstrable ways.*” This deposition was relative to a lawsuit brought by DRA against PGE. In 2018, a U.S. District Court ruled in favor of PGE and the CTWS<sup>11</sup>. The judge dismissed the case finding that the undisputed evidence did not support the plaintiff’s allegation that the Project was violating the conditions of ODEQ’s water quality certification.

Also, the CTWS-WCB, which also issued a Project WQC, submitted a letter of support to LIHI as supplemental information. In that letter, Austin Smith Jr., a member of the CTWS-WCB and General Manager of the CTWS-BNR, stated “*Based on robust review and inquiry into the ongoing operation of the Project, WCB is satisfied that the Project meets the recertification water quality criteria as it relates to WCB requirements and supports re-certification of the Project.*”

Finally, it is true that forthcoming changes to the state regulations may result in modified requirements for the Project. However, the need to issue a revised WQC will be determined by the agencies issuing the WQCs. Future WQMMP revisions may also be required. Both modification activities may trigger additional mid-term certification review by LIHI. Thus, I have recommended a condition to address these possible changes.

In summary, my review finds that while the Project may be having some impact, there have been

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<sup>10</sup> Available at

[https://assets.ctfassets.net/416ywc1laqmd/1V84kFDQC3kAzoNZLcufOI/bf653a67877f60c823caf91aa0354e6c/85-3\\_Exhibit\\_Declaration\\_of\\_Eric\\_Nigg.pdf](https://assets.ctfassets.net/416ywc1laqmd/1V84kFDQC3kAzoNZLcufOI/bf653a67877f60c823caf91aa0354e6c/85-3_Exhibit_Declaration_of_Eric_Nigg.pdf)

<sup>11</sup> The court’s opinion and background documents available at <https://portlandgeneral.com/deschutes-river-lawsuit-filings-and-updates>

very few deviations from the license conditions or the water quality certificates and their scientifically based conditions, and the issuing state and Tribal agencies support the licensees' efforts and continued operations. Thus, I believe the Project continues to conditionally satisfy the requirements of this criterion.

*The Project Continues to Conditionally Pass Criterion B – Water Quality*

## C. UPSTREAM FISH PASSAGE

**Goal:** The facility allows for the safe, timely, and effective upstream passage of migratory fish. This criterion is intended to ensure that migratory species can successfully complete their life cycles and maintain healthy populations in areas affected by the facility.

### Assessment of Criterion Passage

The Applicant appropriately selected **C-1 - Not Applicable/De Minimis Effect** for Lake Billy Chinook (ZOE #1) as there are no barriers to upstream passage in this reservoir formed by the Round Butte dam, and **C-2-Agency Recommendation** for the other three ZOEs.

### Species Present

Migratory species in the Lower Deschutes River Project waters include:

- Steelhead trout (*Oncorhynchus mykiss*)
- Chinook salmon (*Oncorhynchus tshawytscha*)
- Sockeye salmon (*Oncorhynchus nerka*)
- Bull trout (*Salvelinus confluentus*)
- Pacific lamprey (*Entosphenus tridentatus*)

Resident/riverine species typically found include:

- Rainbow trout
- Mountain whitefish
- Sculpins (shorthead, torrent, slimy, mottled, prickly)
- Dace (longnose, speckled)
- Suckers (bridgelip, largescale)
- Chiselmouth
- Northern pikeminnow
- Redside shiner
- Brown trout (introduced)
- Smallmouth bass (introduced)
- Goldfish (introduced)
- Black crappie (introduced)
- Brown bullhead catfish (introduced)
- Tui chub (introduced)
- Threespine stickleback (introduced)



### Fish Passage Requirements and Compliance

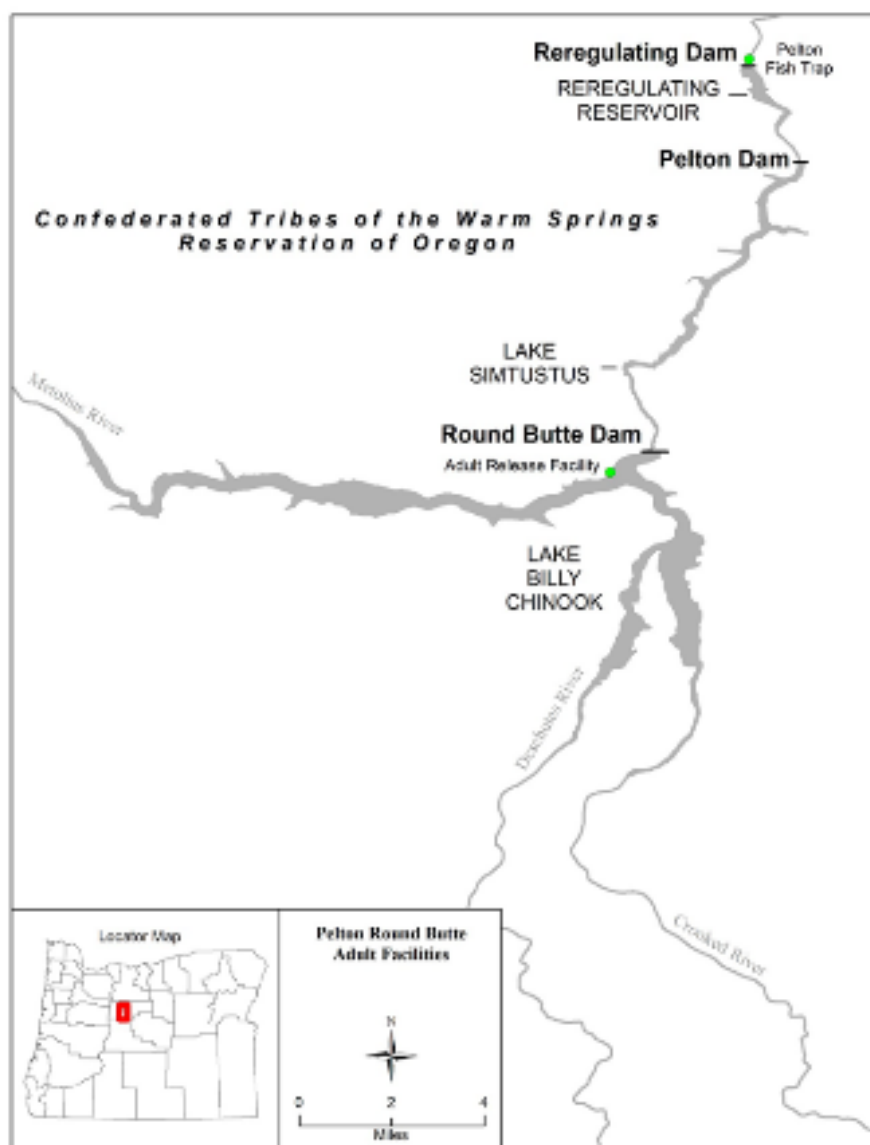
The Project has several upstream passage requirements. USFWS and NMFS each filed preliminary fishway prescriptions for the Project on November 12, 2002, and their final prescriptions on September 30, 2004, and October 27, 2004, respectively. Both final fishway prescriptions, which comprise the Settlement Agreement's fish passage requirements, are set out in Appendices C and D of the FERC license. The fishway prescriptions contemplate unspecified, long-term changes to Project operations or facilities for the purpose of facilitating safe passage for anadromous salmonids past the Project. Because of the complexity of these requirements, both agency prescriptions have been included in Appendix E of this report. Continued use of the trap and haul facilities were approved as part of the Settlement Agreement, incorporated into the USFWS and NMFS Section 18 prescriptions. Goals contained in both prescriptions are upstream passage facility survival (from the lower Deschutes River collection point through the Adult Release Facility) of 95 percent during the first five years of operations and 98 percent thereafter. Both agencies requested reservation of authority to prescribe additional fish passage for the Project.

In summary, the Project is required to continue to operate, maintain and modify as necessary, the Pelton trap and truck facility located at the base of the Reregulating Dam, which has been in operation since 1957<sup>12</sup>. The fish (adult salmon and trout) are then trucked around the Reregulating Reservoir and Lake Simtustus and released into Lake Billy Chinook via the adult release facility which was constructed in the forebay of Lake Billy Chinook. Locations of these facilities are shown in Figure 21.

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<sup>12</sup> Construction of volitional upstream passage is included in the Section 18 prescriptions as well as Settlement Agreement Article 27. Such facilities would be constructed only after reaching the downstream survival targets in the Fish Passage Plan for Lake Billy Chinook. This target has not yet been met as discussed later in this report.

Figure 21 – Upstream Fish Passage Facility Locations



The adult release facility is the best available technology, in that it provides fish with a safe space to recover from transport, allowing for volitional exit when ready. The adult release facility prevents thermal shock of returning salmon by providing cool reservoir water and releasing fish below the surface. It also gives fisheries managers a tool to monitor and control the number and types of species passed above the Project and to allow for disease risk management. Table 6 summarizes the upstream facilities.

PGE was also required to conduct the Upstream Trap-and-Haul and Round Butte Adult Release facility test and verification study, evaluate the timing of adult Chinook salmon from the Deschutes River into the Pelton Adult Fish Trap, and evaluate injury and mortality that may be associated with adult fish capture, processing, loading and transport. Results are summarized in the [2012 Upstream Trap and Haul Annual Report](#), which was filed with FERC on May 31, 2013. While the

test and verification portion was completed, PGE continues to monitor fish survival and injury. Data are reported monthly to the Fish Committee, and on an annual basis in the Fish Passage Annual Reports. The objective (numerical goal) to restore Chinook salmon has not yet been fully achieved, due to low numbers of them returning to the Pelton trap. Hatchery broodstock and reintroduction needs have been prioritized over completion of this study. The [2019 Upstream Trap and Haul Annual Report](#) reported on the 2018 efforts to evaluate this objective, however, the Fish Committee requested the study be repeated in future years to improve the sample size. The study is currently being repeated as 2022 saw record Chinook salmon returns.

The fish passage facilities are operated in compliance with the [Round Butte Adult Release Facility Monitoring and Evaluation Plan](#), the [Pelton Fish Trap Operating Plan](#) and the [Monitoring Plan for the Operation and Maintenance of Trap-and-Haul Fishways at the Pelton Round Butte Project](#). Additionally, fish numbers, survival rates, trap performance and maintenance are summarized in the annual Fish Passage Reports which are reviewed by the Fish Committee and filed with FERC. Links to the past five-year reports (2016 – 2020) were provided in the LIHI application. The report for 2021 was accessed from the FERC eLibrary and also reviewed.

To help guide the efforts undertaken to improve both upstream and downstream passage, The Fish Committee developed a Reintroduction Road Map (Road Map)<sup>13</sup> in 2019. It is a high-level guide to past actions and future considerations that impact the goal of returning “self-sustaining and harvestable runs of spring Chinook, sockeye and summer steelhead” to the Deschutes basin, upstream of the Project. It recognizes that through ongoing scientific studies and operation of fish passage facilities, significant information relevant to future management decisions has been gathered. The Roadmap was developed over a year-long process by a subgroup of Fish Committee members, including the Oregon Department of Fish and Wildlife (ODFW), ODEQ, Native Fish Society, Trout Unlimited, National Marine Fisheries Service (NOAA Fisheries), PGE, and CTWS-BNR. It includes a diagram that identifies the goal of the reintroduction effort, the three objectives that need to be met to accomplish the goal, and key strategies to achieve those objectives. Additional details and other links to complete information on the Roadmap can be found in the LIHI application (p. 62). Table 6 includes the Roadmap Strategy served by the various improvements made for upstream passage enhancement.

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<sup>13</sup> See <https://prbfishcommittee.com/prbfc-roadmap/>. This website is interactive providing more detail by clicking on the various diagram features.

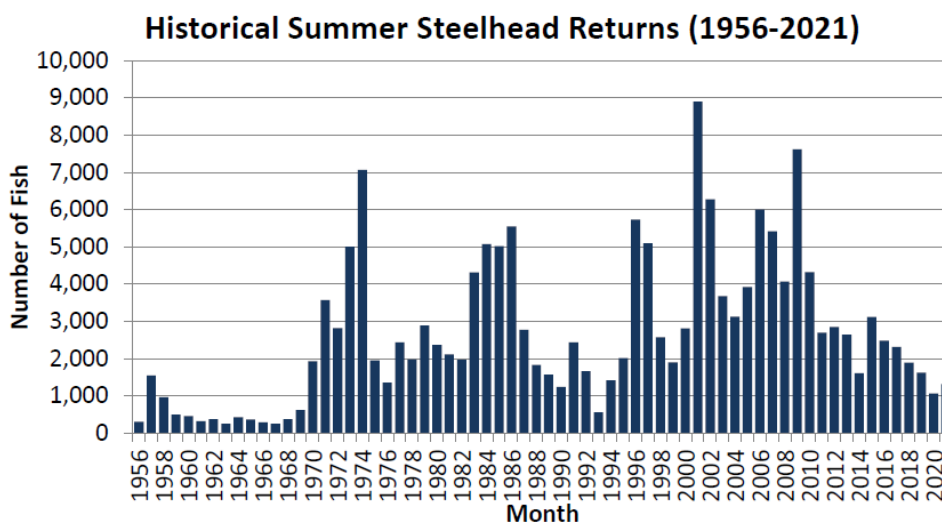
Table 6 – Upstream Fish Passage Features

ZOE	Roadmap Strategy Supported	Feature	Completion Date	Comment
ZOE 4: Lower Deschutes River	Pre-roadmap	Upgrades to Pelton adult fish trap	2010	Major improvements included exclusion gate and mechanical crowder to jump pool, brail floor replacement from wood to aluminum, recovery trough, modifications to water supply, and aluminum sheeting on floor of brail.
	Not identified on the Roadmap	Pelton Fish Trap Replacement	Planned 2024	Currently at 60% design phase. New trap will reduce handling and improve passage efficiency.
ZOE 2 Lake Simtustus	Not a roadmap strategy	Upgrade Round Butte Upstream fish trap	Not constructed	These facilities are only to be built upon request of the Fish Committee. To date, they have not been deemed necessary.
ZOE 1: Lake Billy Chinook	Pre-roadmap	Round Butte Adult Release Facility	2010	Warm surface water is pumped out and replaced with cool hypolimnetic water. Fish volitionally swim out an exit pipe into the cooler water, 30 feet below the surface.
	O. Improve fish passage	The Licensees provided \$1,000,000 in funding from the Pelton Fund to Deschutes Valley Water District for the Opal Springs Fish Passage Project which allows fish to reach spawning grounds in the Crooked River.	2019	
	Q. Direct release of returning upper basin adults into spawning habitat	PGE directly transported a subset of adults to spawning grounds	2022	This will not likely be implemented every year; rather, it was done to help fish reach spawning grounds during extreme drought conditions in the Crooked River.

Both Section 18 prescriptions and the license require an upstream passage survival rate of 98% as measured from capture at the Pelton Fish Trap through release at the new Round Butte Adult Release Facility. Survival through the facility has averaged 99% for spring Chinook salmon, 100% for sockeye and 99% for steelhead, for the past five years. During initial testing, 128 fish (spring Chinook salmon, sockeye salmon, steelhead trout and bull trout) were placed in the adult release facility. All 128 fish left of their own volition (without crowding) within 90 minutes of placement in the facility (see [2012 Upstream Trap and Haul Annual Report](#)). Periodic monitoring of the vault is conducted, and observations affirm the previous studies of fish leaving within several hours.

Figures 22 to 24 show the numbers of steelhead trout and chinook salmon captured annually at the Pelton Fish Trap from 1956/57 through 2021. Sockeye salmon captures from 1972 to 2021 are shown in Figure 25. Discussion of the results is contained in the 2021 Fish Passage Report.

**Figure 22**



**Figure 23**

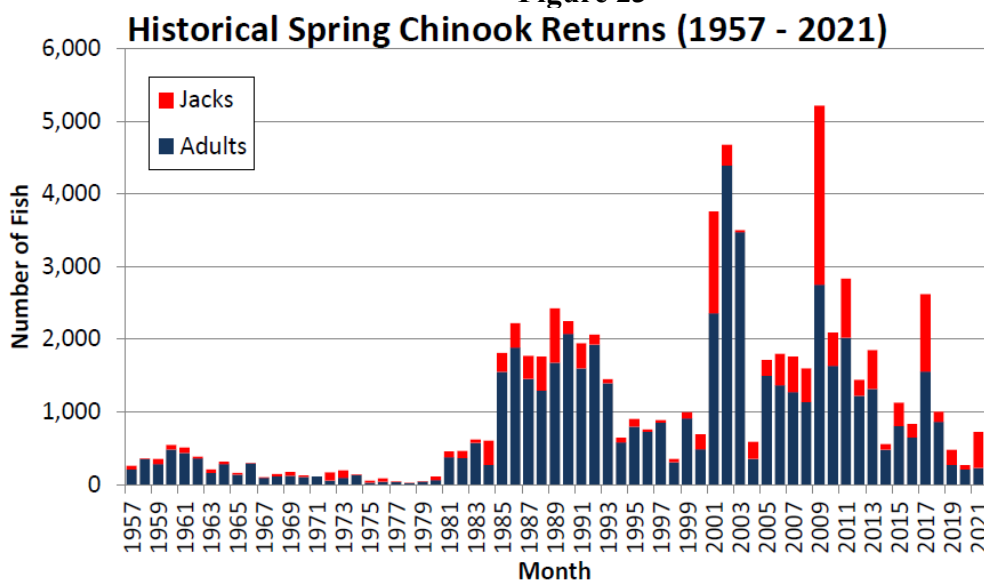




Figure 24

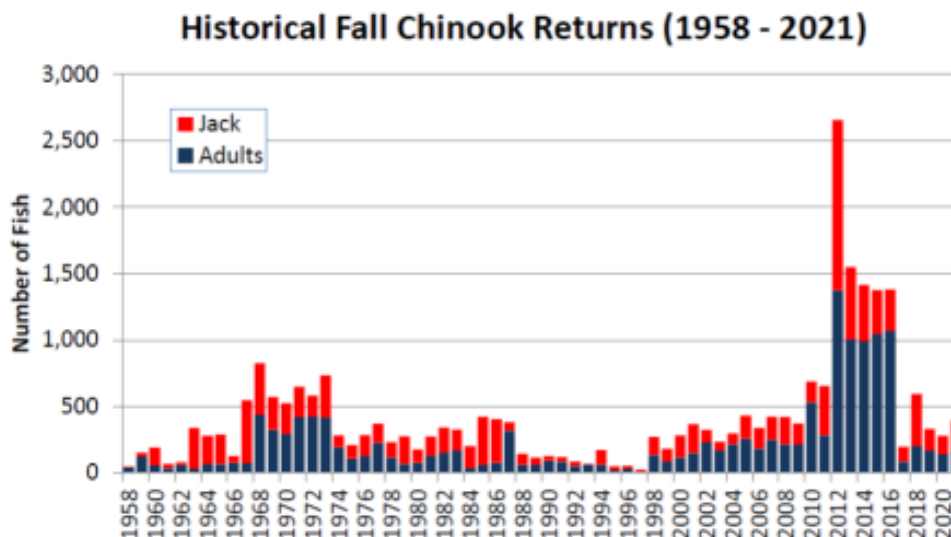
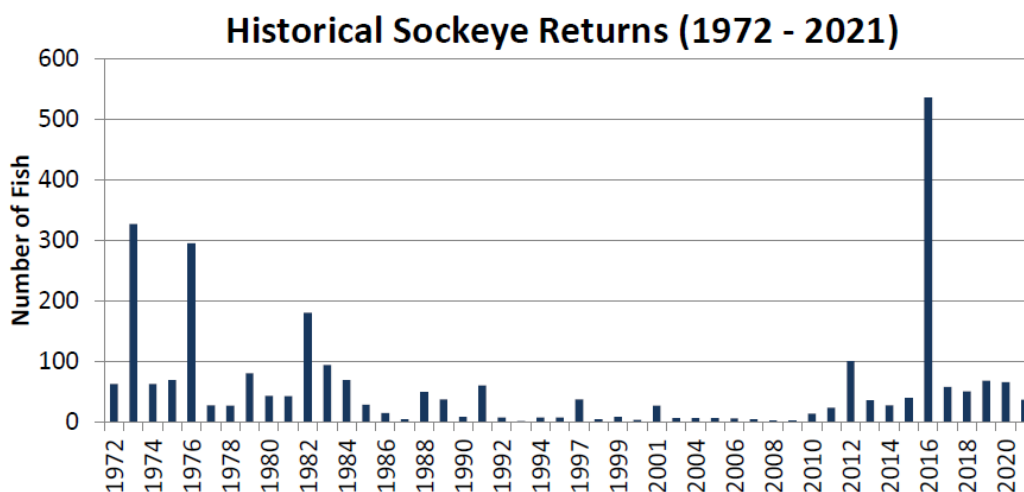


Figure 25



License article 405 requires immediate reporting of fish injury or mortality events to the agencies and FERC (listed in Appendix F). From 2012 to 2022, a total of fourteen fish incidents have been reported, with four involving adult fish<sup>14</sup>. No incidents occurred in 2012, 2013 and 2018; one each in 2016 and 2017; and three in 2014, 2015, 2019 and 2021. As noted, remedial action was taken for each event and FERC did not issue any response to the reports on any of the incidents.

In addition to these requirements, the following Articles address additional measures required for management of healthy sustainable fish populations:

<sup>14</sup> Adult losses occurred on 6/15/2015, 6/7/2016, 1/25/2019 and 2/10/2021. All others involved juvenile fish.

- Article 419. Fish Health Management Program. This requires development of a plan and implementation of a fish health management program to support the fish passage effort and monitor disease incidence in Deschutes River fish populations.
- Article 421 – Native Fish Monitoring Program. This requires annual reports on results of monitoring conducted to evaluate the effects of reintroducing anadromous fish on native resident fish populations.

Regarding Article 419, annual reports have been prepared since 2006, before the SWW was installed, with the most recent dated April 18, 2022 for the 2021 monitoring year. This program includes PGE funding of a full-time fish pathologist and a seasonal experimental biological aide at ODFW. The studies are conducted under ODFW direction. PGE then reviews and submits the completed reports to FERC for license compliance. The ODFW presents the findings to the Fish Committee for review and decisions as to actions that should be taken. The following, provided by PGE in follow-up data, summarizes the latest findings presented to the Fish Committee in January 2023<sup>15</sup> based on 2015-2019 data. The 2020-2022 data are still under review.

### Fish Disease

#### *C. shasta*

*Ceratomyxa shasta* is a freshwater, myxozoan parasite that is native to the Pacific Northwest. It causes enteronecrosis in juvenile salmonids and is associated with potentially population-level impacts in the Deschutes River basin. Transmission occurs through waterborne stages: actinospores released from annelids infect salmonid fishes and develop in the fish's intestine into myxospores which then infect annelids. The parasite proliferates in each host.

In response to the unknown prevalence and severity of *C. shasta* infection in Deschutes salmonids, ODFW developed a parasite monitoring program to track its spatial and temporal abundance. For example, longitudinal water samples were taken from 2015 to 2019. These included grab samples on the same date from the mouth of the Deschutes River to Cline Falls in the upper basin, generally done in June and August of the same year.

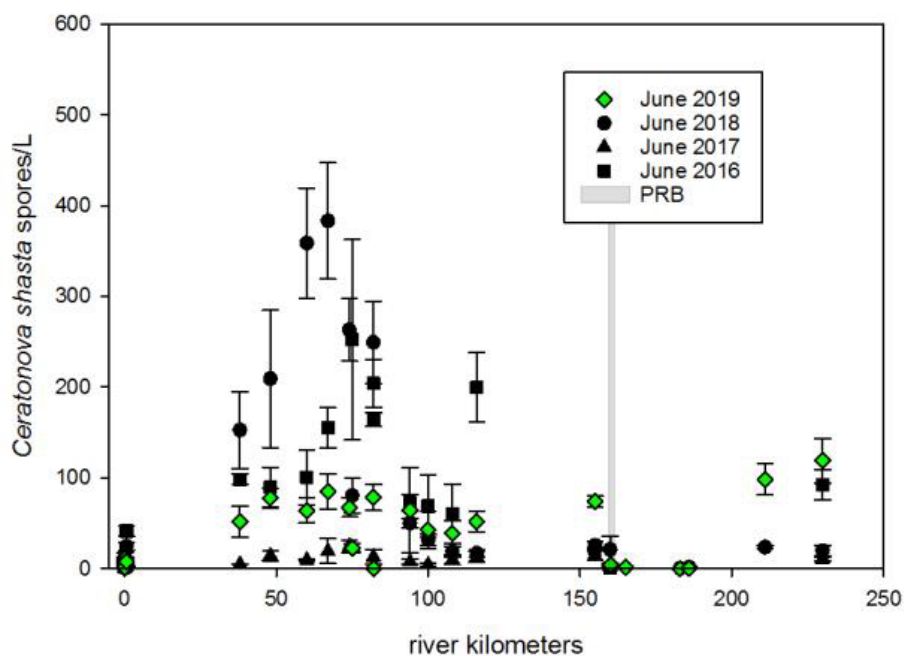
Data from 2015 to 2019 show:

- *C. shasta* prevalence at the Pelton Trap (within ZOE 4) is relatively low compared to other sites sampled within the basin. With a few exceptions, the concentration at the Pelton Trap remains below 10 mg/L which is the level which can cause 40% mortality in spring Chinook juveniles. Figures 26 and 27 show the longitudinal sampling conducted by ODFW and Oregon State University. The samples to the right of the gray line are upstream of Lake Billy Chinook in the upper basin tributaries and therefore, are not influenced by the Project. The samples at the gray line are within ZOE 4. The samples to the left of the line are approximately 160 kilometers downstream of Pelton Round Butte.

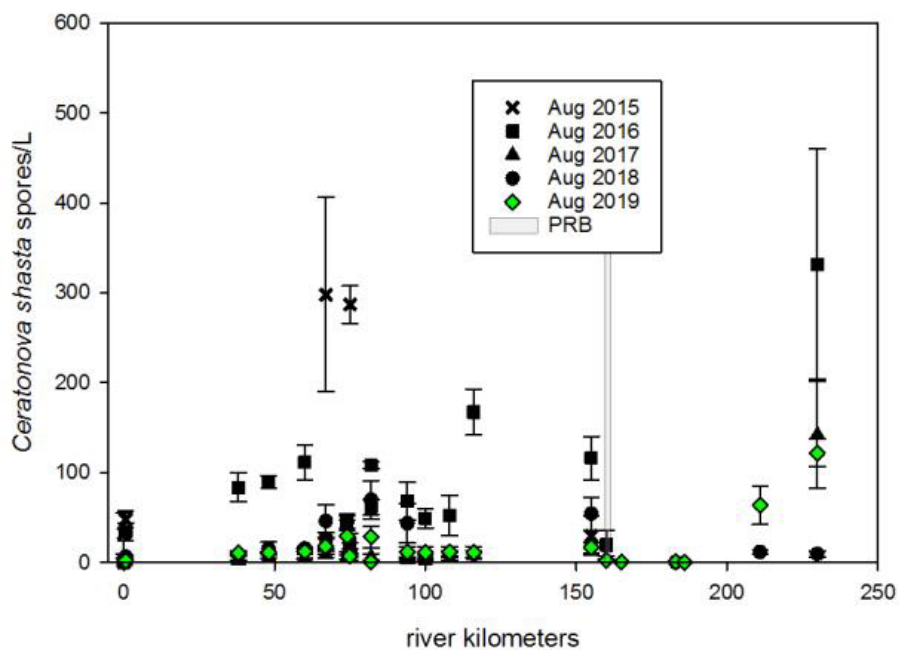
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<sup>15</sup> Presentation may be available through contact with PGE or Maryalice Fischer of LIHI.

**Figure 26 – C. Shasta Prevalence June 2016-2019**  
Deschutes Longitudinal June 2016-2019



**Figure 27 - C. Shasta Prevalence August 2015-2019**  
Deschutes Longitudinal August 2015-2019



- *C. shasta* concentration and annelid (host worm) density appears to be correlated with high flow events. While the time series of data on the Deschutes River is short, there is evidence to suggest that the 11,000 CFS flow in 2019 resulted in decreased *C. shasta* concentrations. The high flow likely decreased *C. shasta* that year by disturbing the host annelid's habitat. This conclusion is supported by data collected in the Klamath basin where artificial high flushing flow events are used to manage *C. shasta*. The Fish Committee is exploring if a similar flushing flow program may be feasible and effective for the Deschutes River.

### *Black spot*

“Black spot” is a parasitic infestation found on freshwater fish across the United States and Canada. It has been documented in many Oregon rivers, including the Metolius, the John Day and the Deschutes (both upstream and downstream of the dams). It was recorded in the Deschutes basin long before the SWW was constructed. ODFW collects data on black spot in the Deschutes and other basins. For example, Fonken and Tattam (2015) studied black spot infestations in spring Chinook salmon in the John Day River. The John Day River is the next large tributary to the Columbia River, entering approximately 13 miles upstream of the Deschutes. Unlike the Deschutes however, the John Day does not have dams or hatcheries. Despite this, black spot has been noted there, sometimes at high levels. Because of this, Fonken and Tattam (2015) examined 6,770 spring Chinook for black spot. Approximately 6% of these fish had black spot. However, there was no correlation between black spot infestation and smolt to adult survival rates. There is no evidence that black spot is affecting the growth or survival of fish in the Deschutes River.

In summary, the ODFW stated “*Fish condition of the fish sampled in 2014 and 2015 was good. Current data is very similar to data reported in Schroeder (1989).*”

As required by license Article 421, reports on the effects of anadromous species reintroduction on native fish populations were submitted annually for the first ten years of the license, and now are submitted every five years. The next update will be filed with FERC by June 1, 2024. Ongoing studies generally have shown limited competition concerns and where some were found, modifications to the release program were initiated. The following are the key findings to date by Article provision:

- 421(a)(1) - A redd count program has been initiated. This license Article requires salmon/steelhead spawning monitoring on an annual basis until the ratio of recruits to spawners (R/S ratio) is  $\geq 1$ . Once reached, with approval by the Fish Committee and FERC, spawning monitoring can be stopped, as long as the R/S ratio remains  $\geq 1$ . The R/S ratio  $\geq 1$  has not been met so the redd count program is ongoing. Low numbers of spawning have been documented by reintroduced fish; however, competition is not a concern at this time.
- 421(a)(2)(i and ii) - Spawning ground surveys continue to be conducted annually. Low spawning activity by reintroduced fish has been documented; however, competition is not a concern at this time.
- 421(a)(2)(iii) - The electrofishing surveys conducted to fulfill this requirement give population estimates but cannot distinguish between resident and anadromous *O. mykiss* (they look identical as juveniles). Therefore, PGE consulted with USFWS to conduct genetics work to better answer this question. This work was summarized in Smith et al

(2018). The report is not available online but can be provided by request to PGE. The report concluded that reintroduced steelhead fry *may be* outcompeting resident redband in Whychus Creek. As a result, the co-managers switched from fry releases to smolt releases. Smolts are expected to out-migrate within weeks of release, compared to fry, which spend 1+ years rearing in a stream before migrating. Because of this reduced time in freshwater, the expectation is that the smolts should have minimal impacts on native fish. During the transition from the fry to smolt based program, no electrofishing or genetics studies were conducted, with a plan to reinstate surveys in 2023 (three years post fry-stocking). These repeat studies are underway now, but the results are not yet available.

- 421(a)(2)(iv) - This work occurs annually. Bull trout redd counts, angler surveys and counts at the Project facilities all show stable bull trout populations. The 2022 bull trout redd counts were the highest on record.
- 421(a)(2)(v) - Spawning ground surveys continue to be conducted annually. Low numbers of spawning by reintroduced fish have been documented; however, the numbers have been low so competition between sockeye and bull trout for spawning grounds and redd superimposition is not a concern at this time. The stable number of bull trout redd counts further support that sockeye competition is not negatively impacting the bull trout population.
- 421(b)(1 and 2) - This Article requires monitoring of the quantity of habitat available and habitat effectiveness and riparian conditions by surveying approximately 20 miles of accessible stream upstream of the Project and using commonly accepted protocols for Chinook salmon, summer steelhead and sockeye salmon. These data are being collected.
- 421(b)(3) - The production capacity estimates for spring Chinook, summer steelhead, and sockeye habitat were last updated in 2018. They will be recalculated based on current habitat conditions (based on the data collected from 2017 to 2022 as part of 421(b)(2)). The results of this five-year data review will be filed with FERC by June 1, 2024.

### Comments, Assessment and Conclusion

Comments received from DRA did not raise direct concerns with upstream fish passage. However, they did comment that the Project caused the extirpation of anadromous species in the Deschutes River, and as a result of declining water quality, changes in benthic conditions, especially increases in algal growth, have occurred causing a decline in fish health.

It is true that construction of the Project prevented anadromous species from migrating further upstream. However, under LIHI's Handbook, this criterion can be met as long as it has been demonstrated that upstream passage provisions are sufficient to support healthy populations of migratory species. Based on all documents reviewed, and especially the comment letters received from the three fishery agencies discussed below, I believe the Project has met this goal with the existing operations and by its ongoing commitment to improve upstream fish passage and support healthy fish populations.

Regarding DRA's on fish health, as noted above, review of the information on fish health suggests changes in water quality, not all related to the Project, may be responsible for increases in algal



growth. However, studies performed by ODFW suggest that the abundance of fish pathogens found in Project waters are not unlike, and in some cases, less prevalent, than those found elsewhere in Oregon rivers, and that flushing events may have effects on some pathogen populations. Nonetheless, ODFW reported that fish health remains good based on the most recent data available.

Four letters from fishery agencies supporting the fish passage efforts of the Project were provided as part of the LIHI application. All four are very knowledgeable of the Project and active on Project committees. In his letter, Jerry George, ODFW District Fish Biologist, stated *“ODFW appreciates PGE engagement in the basin and willingness to test and refine advanced technologies, implement science-based adaptive management programs, and support watershed enhancement and restoration funding.”*

In his letter, Scott J. Carlon, of NMFS West Coast Region, stated *“The National Marine Fisheries Service (NMFS) supports the Pelton Round Butte Hydroelectric Project’s (Project) recertification with the Low Impact Hydropower Institute (LIHI). Since about 1996, the Portland General Electric Company (PGE) and the Confederated Tribes of the Warm Springs Reservation (CTWS), co-licensees for the Project, have worked closely and consistently with NMFS on natural resource matters affecting anadromous fish species. We are particularly appreciative of the co-licensees’ continued commitment to improve fish passage performance and survival and the maintenance of flow, ramping rates, and water quality downstream of the Project.”*

Peter Lickwar, of USFWS, stated *“USFWS supports LIHI’s continued certification of Portland General Electric’s (PGE) Pelton Round Butte Hydroelectric Project (Pelton Project) as a low-impact hydropower facility. We have worked closely with PGE’s Pelton Project fisheries, water quality, instream flow, wildlife, recreational, and cultural resources staff for many years. Based on our experiences working with PGE, we believe that they meet all eight of the LIHI science-based criteria.”*

Finally, Austin Smith, Jr., General Manager of Warm Springs Reservation of Oregon Branch of Natural Resources (CTWS-BNR), stated *“the Co-licensees have committed to adaptive management process and with the continued testing and verification process, we believe is paramount to the success of reintroduction of salmon and steelhead above the project. This framework and the communication with the Fish committee allows the BNR to continue to support the LIHI re-certification”*

Based on my review of the application, FERC eLibrary review, and stakeholder comments, I believe that the Project continues to satisfy this criterion.

### ***The Project Continues to Pass Criterion C – Upstream Fish Passage***

## D. DOWNSTREAM FISH PASSAGE AND PROTECTION

**Goal:** The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from reservoirs and upstream river reaches affected by Facility operations. Migratory species are able to successfully complete their life cycles and maintain healthy populations in the areas affected by the Facility.

### Assessment of Criterion Passage

The Applicant has appropriately selected **D-2–Agency Recommendation** for the Lake Simtustus (ZOE #2) and the Reregulating reservoir (ZOE #3) and **D-1 Not Applicable / De Minimis Effect** for the downstream reach (ZOE #4). **D-3 – Best Practice / Best Available Technology** was selected for Lake Billy Chinook (ZOE #1). However, as Section 18 prescriptive requirements were issued for the Project, I believe **Standard D-2 – Agency Recommendations**, is more appropriate for ZOE #1. Also, the LIHI Handbook suggests using the lowest numbered Standard that would be applicable. The Applicant is also seeking a **PLUS** credit for ZOE #1.

### Fish Passage Requirements and Compliance

The USFWS and NMFS Section 18 prescriptions (see Appendix E) include a number of downstream passage requirements. As all intakes are screened turbine passage is not possible. Juvenile fish passage, focused on steelhead trout, chinook salmon and sockeye salmon, is accomplished via the SWW at the Pelton dam (See Figure 5 for a schematic of the SWW). The SWW creates an attraction flow at the surface to encourage salmonids to enter the fish collection facility, overcoming the reason why the previous downstream passage feature was not successful. It also enables operators to control the temperature of water leaving Lake Billy Chinook by mixing warmer surface water with the colder deep-water intake previously used. The SWW was designed to provide warmer river temperatures during the spring and cooler river temperatures in the late summer and fall, mimicking a more natural temperature regime in the Lower Deschutes River. The warmer spring temperatures support optimal emergence timing and growth conditions for fall Chinook salmon and trout.

Downstream migrating fish are collected, sorted, and marked at the fish transfer facility, loaded onto trucks and released in the lower Deschutes River below the Reregulating Dam. Resident fish are recycled back into the reservoir via pipes which exit below the surface to avoid the warmest surface layer of the reservoir.

Figure 28 shows the major downstream facility locations. Table 7 lists the measures that have been implemented, as well as some improvements planned or delayed for now. One example is the development of a juvenile release facility into Lake Simtustus that was suggested in 2012 by the Fish Committee to take advantage of the lentic habitat it provides. However, as rearing habitat in Lake Billy Chinook does not appear to be a limiting factor, in 2019, the Fish Committee agreed to support a long-term deferral of such fish passage facilities until volitional fish passage is achievable or deemed necessary. As a result of the adaptive management process, other enhancements to improve downstream passage are routinely considered by the Fish Committee and implemented as appropriate.

Another fish passage requirement is license Article 420, which addresses the possible use of the Round Butte Hatchery to support the sockeye salmon restoration program, as specified in section 8 of Appendix B of the Settlement Agreement. This is reviewed every five years. The most recent five-year hatchery review was conducted in 2021, for the period from 2016 to 2020. To date, the Fish Committee has not deemed it necessary to expand hatchery capacity for sockeye salmon. In 2015, Round Butte Hatchery began an experimental program to investigate the feasibility of releasing sockeye pre-smolts into Lake Billy Chinook in order to produce smolts to be captured at the SWW the following year. This experiment was initiated due to interest from the CTWS in producing sockeye smolts. The experimental program was terminated in 2019 because the data needed to characterize the effectiveness of pre-smolt releases in producing out-migrating smolts indicated the program was not successful. Specifically, low outmigration numbers from Lake Billy Chinook indicated low survival of pre-smolt releases, with between 3% and 11% of smolts being captured at the SWW in subsequent years.

**Figure 28 – Major Downstream Fish Passage Facility Locations**

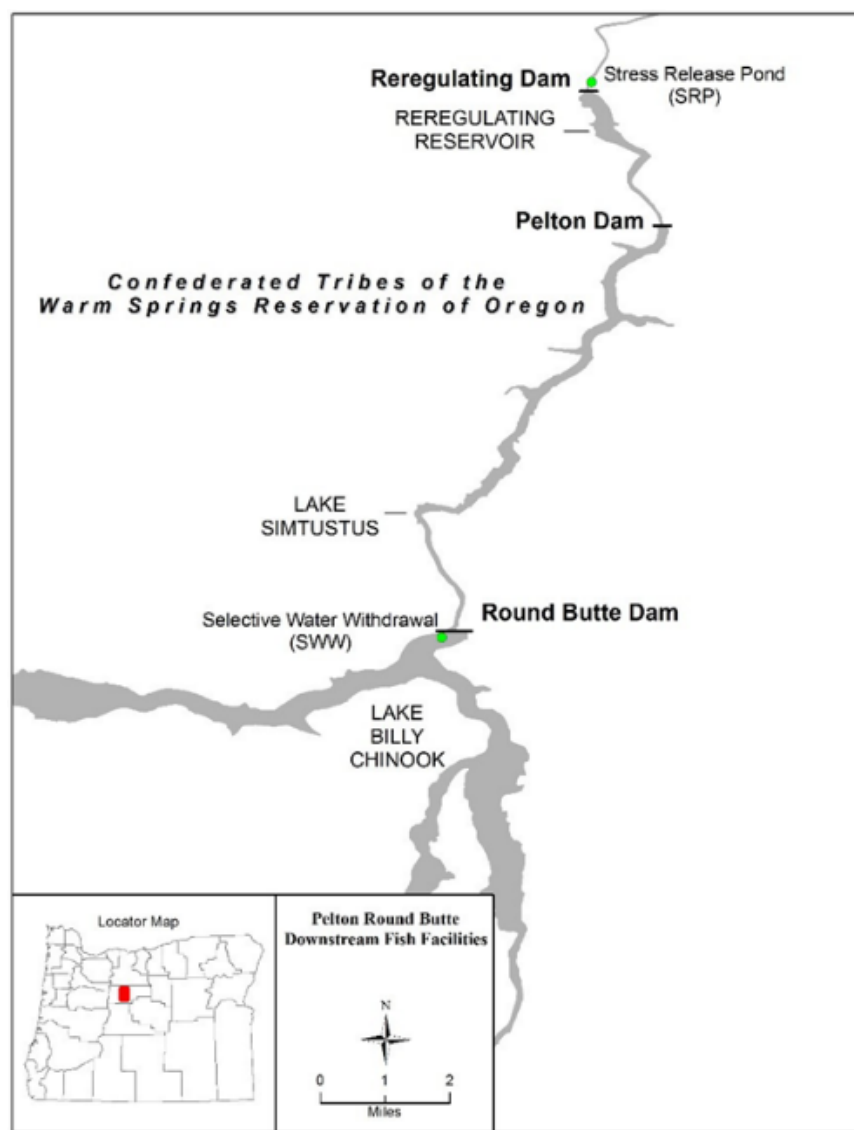


Table 7 – Downstream Fish Passage Features

ZOE	Roadmap Strategy Supported	Feature	Completion Date	Comment
ZOE 1: Lake Billy Chinook	Pre-roadmap	Strobe light fish deterrents in front of Round Butte Dam intake	2007	Removed in December 2007 because of construction. Not re-installed as deep screen monitoring determined strobes were no longer necessary.
	Pre-roadmap	Selective Water Withdrawal and Fish Capture Facilities constructed	2010	SWW and associated fish transfer facilities fully operational in December 2009. The first outmigration to use the facilities was spring 2010.
	B. Modify Round Butte Operations	Selective Water Withdrawal avoidance studies and modifications	2010-2015	Noise evaluation conducted by Bureau of Indian Affairs (BIA) determined noise not likely a deterrent. Lights turned off when the SWW personnel are not present. Experimental sprinklers are installed to break up the surface at the SWW fish entrances. These actions did not significantly improve collection and were discontinued.
	J. Reduce handling stress at the SWW	Various operational changes made to reduce handling stress at the SWW	2010-present	Changes include adding stress coat to fish totes and transport trucks, reducing crowding in the lift baskets, netting raceways, electric predator exclusion fencing, fish handling training for technicians by ODFW pathologists, debris barrier net and night shifts when debris loading is high.
	J. Reduce handling stress at the SWW	Sockeye no longer marked at the SWW	2018-present	Average smolt-to-adult returns of marked sockeye smolts (2010 – 2013) was significantly worse than the average smolt-to-adult returns in the two years (2014 and 2015) when they were not marked. This suggests that stress associated with handling/markings reduced post-release performance.

<b>ZOE</b>	<b>Roadmap Strategy Supported</b>	<b>Feature</b>	<b>Completion Date</b>	<b>Comment</b>
	L. Acclimate smolts in the tributaries	Licensees fund an acclimation program to improve SWW capture efficiency and adult return rates.	2019-present	ODFW begins development of smolt acclimation program using temporary facilities in 2019. Permanent Modutank facilities completed at the Deschutes Land Trust – Camp Polk property in 2020 and at ODFW’s Wizard Falls Hatchery in 2021. The percentage of smolts acclimated in permanent and temporary facilities increased until 2021 when 100% of smolts are acclimated prior to release.
	B. Modify Round Butte Operations	Round Butte Dam operated with minimum generations during nighttime hours to improve fish capture	2017-present	
	A. Install SWW guidance net	Lead net added to SWW to guide fish into the collector.	2022	The average steelhead capture efficiency at the SWW between 2018 – 2021 was 19%. With the lead net in place, capture efficiency of steelhead increased to 37%.
ZOE 2 & 3: Lake Simtustus and Reregulating Reservoir	Not a roadmap strategy	Pelton Skimmer Reactivation	Not constructed	These facilities are only to be built upon request of the Fish Committee. They have not been deemed necessary to date.
	Not a roadmap strategy	Willow Creek Weir	Not constructed	Delayed until the Fish Managers determine the use of Lake Simtustus is needed for anadromous fish (either volitional passage or additional sockeye rearing).
	Not a roadmap strategy	Lake Simtustus Juvenile Release Facility	Not constructed	These facilities are only to be built upon request of the Fish Committee. They have not been deemed necessary to date.
ZOE 4: Lower Deschutes River	G. Modify release strategies in the lower river	Lower Deschutes Juvenile Release Facility	Early 2010	The release pipe was damaged in a high flow event in 2019 and was removed. It’s no longer necessary with the stress relief pond.
	G. Modify release strategies in the lower river	Smolts are trucked and released after sunset to improve survival in the lower river	2017-2021	Construction of the stress relief pond eliminated the need for nighttime trucking

<b>ZOE</b>	<b>Roadmap Strategy Supported</b>	<b>Feature</b>	<b>Completion Date</b>	<b>Comment</b>
	H. Reduce stress of smolts released in the lower river	Temporary Stress Relief Pond constructed	2021	First full season of use was spring 2022

See previously linked Reintroduction Roadmap for details on the noted Roadmap Strategies.



License Article 417 which discusses temporary downstream facilities became moot following construction of the SWW. On March 27, 2007, PGE filed a license amendment request with FERC to forego construction of the temporary facilities and, instead, proceed with the permanent facilities. License Article 418, which discusses the potential infeasibility of permanent downstream facilities, remains in effect but has not been triggered. Implementation of all feasible measures to improve collection efficiencies continue and are demonstrating measurable progress.

### *Downstream Passage Safety*

The Project is required to provide fish survival through the facilities greater than 96 percent. This requirement has been met in all years since the SWW began operations in 2010. The past five years of data are shown in the table below.

**Table 8 - Smolt survival and injury at the SWW from 2017 to 2021.**

	Smolt Survival	Injury*
2021	98.3%	0.2%
2020	98.6%	0.2%
2019	98.3%	2.8%
2018	98.4%	1.4%
2017	98.1%	0.1%

\*Overall survival for Chinook, steelhead, and sockeye

\*Percent of fish with injuries as measured per our long-term monitoring plan

To help understand the passage safety, mortality, injury and descaling, these factors are measured and reported in the annual Fish Passage Reports. Additionally, the Project-funded ODFW fish pathologist examines the majority of mortalities and, whenever possible, recommends changes to the program to prevent injury and mortality. Details on species-specific injury and mortality rates, causes of mortality and level of injury can be found in the annual reports. The licensees also must report fish injury or mortality events to the agencies and FERC immediately as described in Article 405. From 2012 to 2022, nine of the fourteen fish incidents listed in Appendix F involved juvenile fish. The August 24-25, 2014 incident did not actually result in the death of any fish, although the “incident” was reported to FERC anyway as PGE has a provision in their fish incident procedure where “any incident that could result in public interest or inquiry concerning project operations and effects on fish” is reported.

### *Passage Adequacy*

Each year between 37,000 and 471,000 out-migrating smolts pass downstream through the SWW (see Table 9 below). These numbers fluctuate based on natural conditions like drought, as well as the number of hatchery smolts released upstream. In addition to monitoring the number of fish collected, reservoir passage efficiency is measured. The long-term license target is 75% passage<sup>16</sup> through Lake Billy Chinook and into the SWW. The 75% target was based on a modeling effort which, using assumptions on adult return rates and habitat quality, indicated 75% passage

<sup>16</sup> This license target value is based on the NMFS and USFWS Section 18 prescriptions.

efficiency was needed to achieve self-sustaining populations. Based on a call with PGE on February 17, 2023, they noted that habitat assessments under the Native Fish Habitat program are conducted annually and production capacities for steelhead trout and chinook salmon are calculated every five years<sup>17</sup>, and incorporated into the same modeling used to determine the original passage target value. The most recent production capacity assessment was filed with FERC in 2017, with the next one due by June 1, 2024<sup>18</sup>. PGE also stated that this assessment is done internally and discussed with the Fish Committee. Changes to the passage target have not been significant, thus there are no current plans to initiate the activities that would be needed to request a change in the license / Section 18 prescription.

**Table 9 - Number of smolts passed through the SWW from 2010 to 2021.**

Year	Chinook smolts to lower river	Steelhead smolts to lower river	Sockeye smolts to lower river
2010	44,018	7,733	49,095
2011	31,120	10,606	225,565
2012	24,236	7,806	4,955
2013	20,913	2,705	24,708
2014	18,662	2,113	153,730
2015	15,418	3,702	38,702
2016	16,811	4,003	48,519
2017	29,413	10,525	430,986
2018	21,631	8,841	46,402
2019	36,547	11,035	89,896
2020	28,044	16,294	32,355
2021	28,902	12,550	30,523

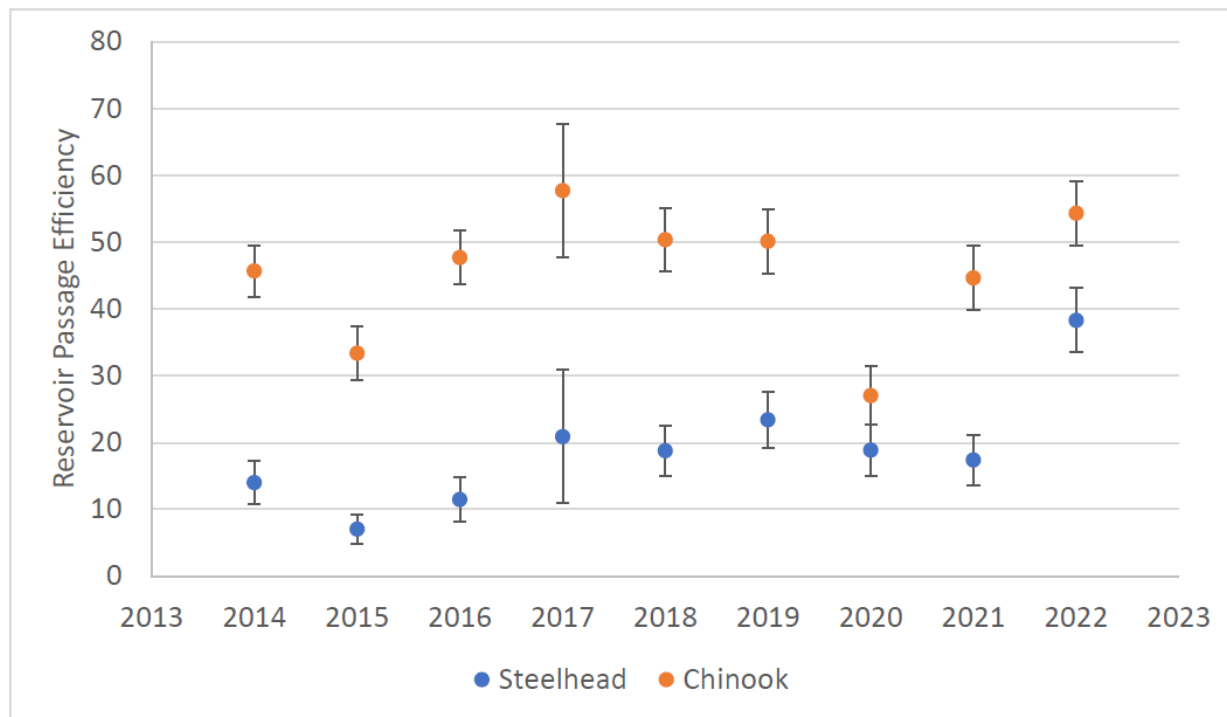
Figure 29 shows the passage efficiency from 2014 to 2022. Passage currently has not met the 75% efficiency criteria to date. However, as a result of the continuing work with the agency representatives and other experts on the Fish Committee, as well as other fishery agency staff as appropriate, the active adaptive management program in place is focused on increasing passage efficiency and recent years have seen significant improvements. The application provides a summary of the numerous studies performed since 2010 to increase passage efficiency. These include annual monitoring of fish collection numbers and injury and mortality, baseline acoustic studies to determine fish behavior in the vicinity of the SWW without the presence of a guidance net, pilot testing of fish passage/flow model using PIT-tagged fish, physical reservoir studies that showed flow zone-of-influence shifts with changing generation, a statistical model relating fish

<sup>17</sup> The production capacities were calculated annually the first ten years of the license and are now assessed every five years.

<sup>18</sup> This was initially due in 2023, but due to COVID, was delayed to incorporate of a five years of data.

passage to generation which showed that more flow at night will likely improve fish passage, and juvenile migration studies using radio tagging to better understand juvenile use of the SWW.

**Figure 29 – Downstream Passage Efficiencies**



As a result of these studies, major recent changes have been made to improve fish passage as shown on Table 7 above. For example, from 2014 to 2016, the median collection efficiency for Chinook was 45%. After beginning major adaptive management changes starting in 2017 average efficiency rose to 50%. Collection efficiency in 2022, after installation of the lead net, was 54%. From 2014 to 2016, the median collection efficiency for steelhead was 12%, while after instituting major changes starting in 2017, average efficiency was 20%. Collection efficiency in 2022, after installation of the lead net, increased to 38%.

However, not all changes can be attributed to management changes. For example, spring tributary flow is a strong driver of smolt collection at the SWW (Shrader 2019). In high run off years, more downstream migrants are collected, and fewer migrants are collected in lower water years. Central Oregon has been in a sustained drought with droughts declared in Deschutes, Crook and Jefferson counties for each of the past three years (2020 to 2022). From 2014 to 2019, drought was only declared for the tri-county area in 2015. These recent low flows are likely suppressing collection efficiencies.

Regarding compliance with agency requirements for Lake Simtustus and the Reregulating Reservoir, per Article 28 of the Settlement Agreement, the licensees transport all migrants directly from the SWW in Lake Billy Chinook to the lower Deschutes River, bypassing Lake Simtustus and the Reregulating Reservoir during the smolt migration season. During other times of the year,

at the request of the Fish Committee, the licensees transport downstream-migrating salmonids into Lake Simtustus to take advantage of the lentic habitat it provides. Utilization of Lake Simtustus for additional rearing would require construction of upstream and downstream fish passage facilities and those designs were submitted to FERC in 2012. However, to date the Fish Committee have not requested these facilities be constructed as rearing habitat in Lake Billy Chinook does not appear to be a limiting factor, based on the following:

- Sockeye salmon populations in Lake Billy Chinook have remained stable following the reintroduction effort, despite passing several thousand fish downstream through the SWW annually, and
- Sufficient habitat is not present. There are only two small tributaries that enter Lake Simtustus and the Reregulating Reservoir: Seekseequa Creek and Willow Creek. Seekseequa Creek is located on the Confederated Tribes of Warm Springs Reservation. Willow Creek flows through the city of Madras and does not support anadromous fish production due to warm temperatures, degraded habitat, and intermittent flow. PGE conducted limited water quality sampling of Willow Creek from 2015 to 2017 which documented a mean temperature of 19.9 °C, and high nutrient loading (Eilers and Vache 2020). The potential loss of fish and delay in migration that would occur with including Lake Simtustus in the passage program, rather than bypassing through trucking outweighs the potential additional production from these small creeks.

The Applicant has stated they are committed to implement any required downstream features upon request by the Fish Committee. Based on the demonstrated adherence to current downstream passage activities, I believe this same level of compliance would be applied should these new facilities be required. However, to ensure LIHI is kept abreast of any Project modifications, a Condition is recommended as a reminder to the Applicant to identify any such requests in annual LIHI compliance submittals.

#### Comments, Assessment and Conclusion

DRA did not comment on downstream passage. All three fishery agencies provided letters of support (see **Criterion C - Upstream Fish Passage** discussion for excerpts). The Project has screening on all intakes and met the Section 18 prescription requirements for passage survival through the facilities of greater than 96 percent since initial operation began in 2010. The long-term passage efficiency target of 75%, however, has not yet been met as shown on Figure 29. However, there are more environmental conditions (e.g., drought flow levels, fish populations, etc.) that are beyond the control of PGE's ability to reach these goals. Implementation of improvements at the SWW to increase passage, based on ongoing PGE-funded research, is showing significant increases in passage numbers.

Both USFWS and NMFS are actively working with PGE and aware that the numerical passage target has not yet been met. Nonetheless, both agencies support recertification of the Project. This suggests to me that they continue to be satisfied with the gains made and feel the Project is complying with their recommendations. Thus, I believe that the "The facility is in compliance with a science-based resource agency recommendation for downstream fish passage and/or fish protection, which may include provisions for appropriate monitoring and effectiveness

determinations” as defined by LIHI for Standard D-2. Based on the data presented and especially given the support of USFWS, NMFS and ODFW, I believe that this Project conditionally satisfies this criterion. My recommended condition deals with regular status reporting to LIHI on progress in meeting the agency target.

PLUS credit was selected for the efforts used to provide downstream passage via the SWW and associated enhancements at Lake Billy Chinook. PGE has documented their extensive efforts in improving their downstream passage efficiency through their adaptive management program, which addresses LIHI’s definition of what must be demonstrated to achieve this credit. However, as the long-term target for passage efficiency have not yet been reached, and additional SWW management operational modifications may be necessary to fully reach the stated target, I am recommending that PLUS credit be granted if certain conditions are met, as identified in Section IX of this report.

***The Project Conditionally Passes Criterion D and meets PLUS credit – Downstream Fish Passage and Protection***

## **E. SHORELINE AND WATERSHED PROTECTION**

**Goal:** The Facility has demonstrated that sufficient action has been taken to protect, mitigate and enhance the condition of soils, vegetation and ecosystem functions on shoreline and watershed lands associated with the facility.

### **Assessment of Criterion Passage**

To pass the Shoreline and Watershed Protection criterion, the Applicant has appropriately selected **Standard E-2 - Agency Recommendation** for the three impoundments (ZOE #1 through #3) and **Standard E-3 - Enforceable Protection** for ZOE #4, the downstream reach. The downstream reach falls outside of the FERC Project Boundary, as confirmed by review of the Shoreland Management Plan, and confirmed by PGE in their follow-up information (see Appendix A). Thus, the various license requirements do not apply. As a result, Standard E-3 was appropriately selected for ZOE #4. PLUS credit was also selected for ZOE #1, Lake Billy Chinook.

### Regulatory Requirements and Compliance

#### Lake Billy Chinook, Lake Simtustus and the Re-regulating Dam Impoundment (ZOEs #1-3)

The shoreline areas of the Project reservoirs encompass areas owned or managed by a variety of jurisdictions, including federal, Tribal, state, local, and private entities. Major land managers are the CTWS, USFS, BLM, OPRD and the licensees. In addition, privately developed recreation facilities exist in the Three Rivers development area adjacent to Lake Billy Chinook and the Lake Simtustus Resort adjacent to Lake Simtustus. Land uses include recreation (camping, day-use, marina, and hiking), conservation land, rangeland, commercial enterprises, vacation homes and residential homes. The lake is within canyonlands largely composed of basalt, welded tuff, talus slopes, and porous soils. The shorelines include riparian, grassland, and shrub-steppe vegetation,

where suitable soils occur.

Much of the area is designated by Jefferson County as big game winter range for mule deer and elk, affording state and local protections around development, land use and seasonal vehicle use within a Travel Management Area (TMA). CTWS lands are governed by the Tribe's Integrated Resource Management Plans. Licensee-owned conservation lands are governed by the Terrestrial Resources Management Plan, required by the FERC license, for the purpose of protecting and enhancing terrestrial resources and sensitive habitats.

Federal lands are governed by the Crooked River National Grassland Forest Plan, Deschutes Forest Plan and Two Rivers Resource Management Plan. The reservoirs include important nesting habitat for bald eagles, golden eagles, peregrine falcons, prairie falcons, and osprey. The licensees have nest site management plans and institute seasonal disturbance buffers for sensitive nests located on Project lands. Additionally, PGE's company-wide Avian Protection Plan provides additional protections around all Project facilities and infrastructure.

Although a dedicated buffer zone is not established for the Project, the federal, state and tribal ownership of a majority of Projects lands including along the shorelines, combined with the numerous Project resource management plans, are considered to provide equal natural resource protection. The following resource management plans are required for the Project, based on the Settlement Agreement and/or license.

- Tribal Resource Management Plans (Article 408) - The Confederated Tribes of Warm Springs have developed two Integrated Resource Management Plans (IRMPs) that pertain to natural resource issues on the Warm Springs Reservation, including those within the Project area. Pursuant to the Settlement Agreement, the licensees have agreed to comply with the IRMPs before undertaking any ground-disturbing activities on Tribal land. These include:
  - IRMP I - provides management direction for the use and/or protection of the natural resources within the forested area of the Reservation, provides for a system of riparian buffers, the practice of leaving snags and live trees after harvest, erosion control, and transportation system management, and
  - IRMP II - pertains to non-forested and rural lands. It addresses numerous resource issues, including the designation of Extensive Management Zones, management of woodlands outside of commercial forestry areas, uplands management, riparian management, transportation system management, and measures to protect, enhance, and reintroduce threatened or endangered species.
- Terrestrial Resources Management Plan (TRMP) (Article 422) - applies to all undeveloped lands currently inside the FERC boundary which was developed in consultation with the Terrestrial Resources Working Group (TRWG). The plan serves as the basis for mitigation and enhancements to reduce or eliminate the continuing effects of Project operations on terrestrial resources during the license term.
- Terrestrial Resource Interim Measures (Article 423) – defined a series of ten measures to



be taken while the TRMP was being developed. Many of them were related to conducting surveys of resources such as waterfowl, osprey nesting, etc. to collect data for use in TRMP development.

- Shoreline Management Plan (SMP) (Article 428)– was developed in consultation with the SMWG to address new development and resource protection on the shorelines of Lake Billy Chinook and Lake Simtustus. The SMP has been integrated with other plans, such as recreation and terrestrial resources management plans, to comprehensively address long term issues.
- Shoreline Erosion Plan (SEP) (Article 429) – was developed in consultation with the Shoreline Management Working Group (SMWG). It serves as the basis for implementing measures to monitor and control stream and impoundment shoreline erosion, discusses the conditions and probable causes of, as well as potential measures to minimize impacts of erosion.
- Law Enforcement Plan (LEP) (SA requirement) - was developed in consultation with Jefferson County and provides annual funding to Jefferson County in order to increase law enforcement in the Project area and thereby ensure that certain measures implemented pursuant to the terms of the Settlement Agreement are effective.

An Aesthetic Resources Protection Plan was also required by license Article 430, but this focuses on aesthetic measures to be taken at Project facilities (e.g., powerhouses) rather than addressing shoreline protection measures.

As discussed in the LIHI application, all of these Plans have a reporting and/or review and updating requirement. Details of the completion of these numerous activities are also included in the LIHI application and were reviewed as part of this assessment. This review indicated all required actions are being fulfilled by the Applicant. The most recent filing, completed after the application was submitted to LIHI was the Six-Year Review of the SMP, which was filed with FERC on January 25, 2023. The SMWG met monthly in 2022 to work on these updates. The initial deadline to file the proposed revisions with FERC was October 31, 2022, but was extended to January 2023.

**PLUS** credit was also selected for Lake Billy Chinook (ZOE #1). The facility does not have a formal site-specific conservation plan protecting a buffer zone of 50% or more of the undeveloped shoreline. However, the federal, state and Tribal ownership of a majority of Project lands in which natural resources are protected, including those along the shoreline, combined with the numerous Project resource management plans and a watershed enhancement fund (i.e., The Pelton Round Butte Fund), I believe achieves the equivalent land protection value of an ecologically effective buffer zone of 50% or more around the undeveloped shorelines required to satisfy this PLUS Standard.

The Pelton Round Butte Fund has two funds: the General Fund and the Water Rights Fund. Per Exhibit H of the Settlement Agreement (SA), General Fund projects are to provide for habitat mitigation and enhancements related to increasing the success of anadromous fish reintroduction at the Project and a sustainable and harvestable fishery in the Deschutes River. The purpose of the

Water Fund is to acquire or lease instream water rights, or participate in water conservation projects, each of which are intended to result in instream flows that benefit aquatic habitat. Projects within both Funds are located in the Deschutes River Basin, including the Middle and Lower Deschutes River, the Crooked River, the Metolius River, and any tributaries to those river segments. Contributions from these funds will be made over the term 50-year of the license and will total \$11.5 million for the General Fund and \$11 million for the Water Rights Fund, in 2003 dollars. As described in Exhibit H to the Settlement Agreement, the fund includes provisions for escalation and interest accumulation. As of December 31, 2021, \$23,576,459 (\$9,231,288 in the Water Fund and \$14,345,171 in the General Fund) has been awarded to 22 Water Fund projects and over 40 General Fund projects to enhance riparian and riverine systems and for acquisition of land, water, and water rights. This is the cumulative total of expenditures since 2005. Project proposals for these funds are submitted and reviewed by a Technical Review Team and approved by the Governing Board. Membership of the Governing Board is noted in Appendix B. The LIHI application includes further discussion of the goals of these fund programs as well as a link to the 2020/2021 report of funding activities.

It appears that projects receiving such funding do provide benefits that are comparable to those that would be achieved by a buffer zone dedicated to conservation. The past two LIHI certifications of the Project determined that extra years of certification were appropriate under this criterion. Based on the evaluation process for funding awards, the level of funding provided, and resource protection offered by federal land ownership, I believe the Project continues to satisfy the PLUS Standard.

#### Downstream Reach (ZOE #4)

ZOE #4 is estimated to be 0.1 miles or about 528 feet long. Land between the Reregulating Reservoir and the lower Deschutes River USGS gage #14092500 is owned by the licensees (east bank) and the CTWS (west bank). Land use supports Project facilities and power generation infrastructure, including a substation, transmission infrastructure, the Pelton fish ladder and adult trap, Project control room, offices, and other supporting infrastructure. No public access is permitted on either shoreline in this area, nor is any development. For these reasons, this ZOE, although within the FERC Project boundary, is not addressed in the SMP. Other nearby land uses include agriculture and rangeland. The area is within canyonland largely composed of basalt, welded tuff, talus slopes, and porous soils. The shorelines include riparian vegetation and upland areas are largely shrub-steppe, juniper woodlands, and agricultural fields.

Protection of resources is achieved in several ways. The Deschutes River is designated as a Wild and Scenic River from the Regulating Reservoir downstream to its confluence with the Columbia River<sup>19</sup>. CTWS lands are governed by the Tribes' IRMPs. Licensee-owned lands are governed by the TRMP, for the purpose of mitigation, protection and enhancement of terrestrial resources and sensitive habitats. PGE's company-wide Avian Protection Plan (APP) provides additional protections around all Project facilities and infrastructure.

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<sup>19</sup> As noted in the FERC license, the Wild and Scenic River corridors of the Middle Deschutes, Lower Crooked, and Metolius Rivers are upstream of the Project and outside of the Project boundary.

ZOE #4 is located within the beginning of Segment 1 of the river addressed in the BLM Lower Deschutes River Management Plan (linked to the LIHI application). The BLM plan does not repeal existing valid rights of public or private owners on these lands. However, the plan was developed in conjunction with many of the same resource agencies involved in the settlement and on the various committees, thus coordination of the goals of these organizations is ensured. A quick review of this plan indicates common goals for the protection of natural resources. Thus, it appears that this Criterion has been met for this ZOE.

#### Comments, Assessment and Conclusion

Compliance concerns with this criterion were not raised by any stakeholder.

I believe the Project continues to satisfy the requirements of this criterion under **Standard E-2** (ZOE #1-3) and **E-3** (ZOE #4). I also believe that the **PLUS** Standard has been met as discussed above.

#### *The Project Continues to Pass Criterion E and PLUS Credit – Shoreline and Watershed Protection*

## **F. THREATENED AND ENDANGERED SPECIES PROTECTION**

**Goal:** The Facility does not negatively impact federal or state-listed species.

#### **Assessment of Criterion Passage**

**Standard F-3 – Recovery Planning and Action** was selected for all ZOEs. However, as Biological Opinions were issued for the Project for endangered and threatened species protection, I believe **Standard F-2 – Agency Recommendations**, is more appropriate. Also, the LIHI Handbook suggests using the lowest numbered Standard that would be applicable.

Based on reviews of data on threatened or endangered species listed by the USFWS (IPaC 2022); plant species listed as threatened or endangered by Oregon Department of Agriculture (Oregon Biodiversity Information Center 2022); and animal species listed as threatened or endangered by the ODFW (Email 05-09-2022), only three species were found to occur at the Project, as shown in Table 10. No species listed by the ODFW or Oregon Department of Agriculture were reported for the Project lands.

**Table 10 – Listed Species**

Common Name	Scientific Name	Status	Source
Bull Trout	<i>Salvelinus confluentus</i>	Federally Threatened	IPaC
Steelhead - MCR summer run	<i>Oncorhynchus mykiss</i> pop. 28	Federally Threatened	ORBIC
Gray Wolf	<i>Canis lupus</i>	Federally Endangered	ODFW

The following excerpts about these species were taken from the LIHI application.

### Steelhead

*“The steelhead in the lower Deschutes River are part of the Mid-Columbia River (MCR) steelhead Evolutionarily Significant Unit (ESU). The MCR steelhead ESU was listed as threatened on March 25, 1999. In 2005, NOAA Fisheries added to this ESU over 100 hatchery populations and resident populations of *O. mykiss*, including the Round Butte Hatchery population, based on NOAA Fisheries’ determination that the hatchery population is genetically no more than moderately divergent from the natural populations. In 2013, NOAA designated the steelhead population upstream of Round Butte dam as a non-essential experimental population under the 10j rule of the Endangered Species Act (ESA). The project was issued a Biological Opinion in November 2004, including incidental take statement and reasonable and prudent measures, through ESA Section 7 consultations with FERC in the course of the relicensing of the project. Since the SWW started operations in December 2009, there have been a total of 1,025 steelhead trout mortalities, out of 98,643 steelhead captured. Two steelhead mortalities have occurred at the Pelton Adult Trap, where 619 steelhead trout have been captured since 2010. This is well below the incidental take statement in the BiOp, which allows for injury and mortality rates up to 8% annually for the juvenile fish facilities, and one percent or less for adult steelhead. PGE promptly reports all steelhead mortalities to NOAA fisheries within six hours of discovery.”*

### Bull Trout

*“Bull trout (*Salvelinus confluentus*) became federally listed as a threatened species throughout Oregon in 1998. Five distinct populations of bull trout have been identified in the Deschutes River basin, including three in the Metolius River basin, upstream of the Project, and two in tributaries to the lower Deschutes River, downstream of the Project. The project was issued a Biological Opinion in November 2004, including incidental take statement and reasonable and prudent measures, through ESA Section 7 consultations with FERC in the course of the relicensing of the project. Since the SWW started operations in December 2009 there have been a total of 94 bull trout mortalities, out of 8,394 bull trout captured. Zero bull trout mortalities have occurred at the Pelton Adult Trap, where 262 bull trout have been captured since 2010. This is well below the incidental take statement in the BiOp which allows for injury and mortality rates up to 8% annually for the juvenile fish facilities and one percent or less for adult bull trout. PGE promptly reports all bull trout mortalities to USFWS within six hours of discovery.*

*In addition, ongoing cooperative research, protective regulations, and habitat protection and enhancement since the mid-1980s have enabled the bull trout population in Lake Billy Chinook to recover from previously low levels, and Lake Billy Chinook currently supports a healthy bull trout population and popular bull trout fishery. Even with the federal listing of bull trout as a threatened species, the USFWS is allowing a consumptive fishery in Lake Billy Chinook to continue under supervision of ODFW because of the overwhelming evidence that this population is robust and productive. Additionally, bull trout from the Metolius basin have been used as donor stock for an experimental reintroduction in the Clackamas basin.”*

## Gray Wolf

*“Gray wolves (Canis lupus) were federally relisted as endangered west of highways 395, 78 and 95 in Oregon on February 10, 2022. Although there is no known established wolf pack and den site occurring on or near Project lands, a new Area of Known Wolf Activity (AKWA) that includes Project habitat lands within the Metolius wolf use area has been identified. The Licensees were notified of this development by ODFW during a TRWG meeting on July 6, 2022. For this reason, the Licensees will be asking USFWS for a Not Likely to Adversely Affect concurrence during consultation planned for 2023. Federal and state databases do not yet reflect this new AKWA; therefore, the species does not occur on the IPaC, ORBIC or ODFW lists.”*

The Gray wolf is a keystone predator and habitat generalist that requires large, natural ecosystems and population connectivity. Specific threats to this species include human-caused mortality (trapping, shooting, poisoning, etc.), reduction in prey (ungulate herd) populations, human disturbance, and habitat fragmentation and loss. The LIHI application summarizes the various measures in the TRMP that help protect against these threats and make it unlikely that gray wolves would be negatively impacted by the Project.

As a result of the occurrence of Steelhead and Bull Trout, Biological Opinions (BOs) were developed and issued by USFWS for Bull Trout in November 2004 and by NMFS for Steelhead in February 2005. Both BOs concluded that the “*extent of anticipated take is not likely to jeopardize the continued existence*” of the respective species. Both also include the following Reasonable and Prudent Measures (RPMs) to minimize takes that are not already part of the description of the proposed action:

1. Carry out all protection, mitigation, and enhancement measures identified in the July 13, 2004, Settlement Agreement and its attachments which avoid or minimize effects to the species.
2. Use the best available science to adaptively manage Project operation, maintenance, and construction activities to avoid or minimize effects to the species during the period of the new Project license.

Recently, revisions to both BOs were issued for supplemental maintenance at Round Butte Dam. These approvals, issued on January 10, 2023 (NMFS) and November 28, 2022 (USFWS), address possible impacts from “uncontrolled spill events” (as defined in the BOs) that include the need to deactivate the SWW temporarily, while releasing water through the spillway into Lake Simtustus to maintain regulated releases and temperatures downstream. To cover activities necessary to maintain Round Butte Dam, the SWW, and the hatchery, various maintenance activities will be necessary throughout the remaining years of the FERC license. Both BOs include the consultation history between PGE and the respective agencies and find that the “*subject action may affect but is not likely to adversely affect critical habitat for Bull Trout*” (USFWS) and “*is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat*” addressing Steelhead.

I reviewed FERC's eLibrary for documents associated with actions taken by PGE associated with protection of endangered and threatened species. That review showed that PGE regularly makes the required contact under license Article 405 (based on the BOs) with USFWS and NMFS for activities that may affect listed species and that both steelhead and bull trout takings are below the incidental take permit limits.

#### Comments, Assessment and Conclusion

In their letter, DRA commented that the Project is failing to meet the terms of the BOs. My review did not show this to be the case as the RPMs are being followed, takes of these species are below the specified limits, and consultation with the NMFS and USFWS have been promptly implemented when a take does occur. By adhering to these requirements, the Project's operations are not expected to jeopardize the continued existence of these species.

DRA also stated that USFWS and NMFS based their original BOs on the assumption that all WQC water quality parameter standards would be met. During this period, both agencies were well aware that operation of the SWW would be based on an adaptive management approach, which included balancing of fish passage flow needs and water quality considerations. If either agency was concerned that the Project is not meeting the conditions of the BOs, then it seems unlikely they would have issued the supplemental BOs.

As previously noted, both agencies responsible for protecting these endangered species provided supporting comment letters. Peter Lickwar, of USFWS, stated in his letter included in the LIHI application, that *"USFWS supports LIHI's continued certification of Portland General Electric's (PGE) Pelton Round Butte Hydroelectric Project (Pelton Project) as a low-impact hydropower facility. We have worked closely with PGE's Pelton Project fisheries, water quality, instream flow, wildlife, recreational, and cultural resources staff for many years. Based on our experiences working with PGE, we believe that they meet all eight of the LIHI science-based criteria."*

In his letter, Scott J. Carlon, of NMFS West Coast Region, stated *"The National Marine Fisheries Service (NMFS) supports the Pelton Round Butte Hydroelectric Project's (Project) recertification with the Low Impact Hydropower Institute (LIHI)".* He goes on to say, *"These ongoing efforts by PGE and CTWS continue to support and promote anadromous fish runs in the Deschutes River basin, including threatened Middle Columbia River steelhead."*

Given my review of the available information and support letters from both USFWS and NMFS, I believe that this criterion continues to be satisfied.

#### ***The Project Continues to Pass Criterion F – Threatened and Endangered Species Protection***

## **G. CULTURAL AND HISTORIC RESOURCE PROTECTION**

**Goal:** The Facility does not inappropriately impact cultural or historic resources that are associated with the Facility's lands and waters, including resources important to local indigenous populations, such as Native Americans.



## **Assessment of Criterion Passage**

The Applicant has appropriately selected **Standard G-2 – Approved Plan** for all ZOE's.

### Regulatory Requirements and Compliance

The Project is required to comply with license Article 432, as well as Exhibit J of the Settlement Agreement which establish the requirements and guidelines for PGE to develop and implement a Programmatic Agreement (PA) and Cultural Resources Management Plan (CRMP) for the Project.

Cultural resources associated with the Project include historic structures such as the powerhouses, dams, fish ladder, and other features that are over 50 years old, as defined by the Manual for Built Resources (MBR). Other cultural resources within the Project boundary include a defined list of archaeological sites that are monitored annually for impacts and any Traditional Cultural Property of significance to the Tribe.

The CRMP was submitted to FERC on July 30, 2004, and approved on November 8, 2004. A link to the FERC correspondence to the licensees implementing the CRMP was included in the LIHI application and key documents were reviewed as part of this assessment. The Oregon State Historic Preservation Officer (SHPO) and FERC's Office of Energy Projects executed the PA on November 8, 2004. Pursuant to the CRMP, a Cultural Resources Working Group (CRWG) consisting of members from the SHPO, Confederated Tribe of the Warm Springs Reservation, and several local, state and federal agencies meets annually to discuss the progress of implementing the CRMP and reports its decisions to FERC in the cultural resources annual report. Also, PGE has developed a MBR in consultation with the SHPO for reviewing impacts from the Project on historic resources. PGE stated that they research and document every minor or major undertaking and assess its impact on documented cultural resources in the area.

Review of the linked documents and others on FERC's eLibrary, especially the annual reports, confirms that the Applicant adheres to its responsibilities to protect the cultural resources at the Project. For example, the 2021 Annual Report, dated May 23, 2022, summarized the results of archaeological site monitoring done in 2021, as well as the investigative measures undertaken to address possible impacts to cultural resources from construction or other ground intrusive activities conducted in 2021 and similar assessments for seven construction projects planned for 2022.

### Comments, Assessment and Conclusion

No stakeholders submitted comments regarding cultural resource issues. Based on my review of the LIHI application materials and FERC eLibrary data, it is apparent that Project operations and onsite activities are performed in compliance with the requirements to ensure protection of onsite archaeological and historical resources. I believe the Project continues to satisfy this criterion.

### ***The Project Continues to Pass Criterion G – Cultural and Historic Resource Protection***

## H. RECREATIONAL RESOURCES

**Goal:** The facility accommodates recreation activities on lands and waters controlled by the facility and provides recreational access to its associated lands and waters without fee or charge.

### Assessment of Criterion Passage

The Applicant appropriately selected **Standard H-2, Agency Recommendation** for the Project impoundments (ZOE #1 through #3). ZOE #4, the downstream reach does not occupy lands or waters for which public access can be granted due to Tribal ownership, Project security and no developed sites or facilities that would require or allow access. Thus, **Standard H-1 – Not Applicable / De Minimis Effect** was appropriately selected for ZOE #4.

### Regulatory Requirements and Compliance

The FERC license incorporated all but two of the recreation-related Settlement Agreement requirements, including the development of a Recreation Resources Implementation Plan (RRIP) (defined in Article 424) and maintenance funding (Article 425) in consultation with a Recreation Resources Working Group (RRWG) of stakeholders. The RRIP defines the roles and responsibilities of the Applicants and other recreation providers in the area for providing, enhancing, and managing recreation resources in the Project area (primarily in and around Lake Billy Chinook and Lake Simtustus), and lists specific recreation measures and protocols for improving accessibility, operations and maintenance, management, and resource coordination over the term of the license.

As contemplated in the Settlement Agreement, the comprehensive recreation improvements provided for in the RRIP are consistent with other resource management plans required by the license without increasing recreation use of Project impoundments. Potential recreation impacts on other resources, such as wildlife, habitat, and cultural resource sites, are controlled through the licensees' law enforcement agreement with Jefferson County, through which funding is provided for County law enforcement officers to patrol all recreation sites and areas at the Project.

In general, planned measures specified under the RRIP included improving recreational resources at existing recreational sites, improving accessibility as required by the Americans with Disabilities Act, partially funding operation and maintenance costs at recreational facilities operated by the state, USFS, and CTWS, evaluating whether navigational hazards in the reservoirs should be marked or removed, studying the need for improvements in emergency communications, improving annual maintenance at certain dispersed recreation sites, and providing funding for additional law enforcement in the Project area. These obligations are formalized by a series of articles in the license. All implementation measures required by the license, or agreed upon replacements, were completed by 2018. Figure 30 shows the recreation sites managed as part of the Project, sites numbered 9 – 14. (Sites numbered 1 – 7 are managed by PGE's Clackamas River Hydroelectric Project, FERC No. 2195.) Each facility is listed below by ZOE.

**Figure 30 - Recreational Features of the Pelton Round Butte Project****Table 11 - Project Recreational Facilities**

Zone of Effect	Name of Facility	Number on Map
ZOE #4 Reregulating Reservoir	Pelton Wildlife Overlook	9
ZOE #2 Lake Simtustus	Pelton Park	10
ZOE #1 Lake Billy Chinook	Round Butte Overlook Park	11
ZOE #1 Lake Billy Chinook	Balancing Rocks Overlook	12
ZOE #1 Lake Billy Chinook	Perry South Campground	13
ZOE #1 Lake Billy Chinook	Monty Campground	14

As part of the Settlement Agreement, but not the license, the licensees also provide financial support for non-Project recreational facilities that serve as alternative destinations away from the Project. Specifically, these include funding to the USFWS for infrastructure maintenance or improvements at Haystack Reservoir, located approximately 12 miles away, and to the BLM to implement site improvement measures at several BLM-managed recreation sites on the lower Deschutes River. Also, as part of the Settlement Agreement, the licensees are funding road maintenance activities on Jefferson County and USFWS roads affected by Project-generated traffic (including recreation-related traffic).

License Article 427 required an Integrated Interpretive and Education Plan, filed with FERC on

June 1, 2007 which FERC approved with modifications on July 1, 2008. The plan was developed in consultation with the RRWG and the SHPO with goals to:

- Facilitate sustainable tourism opportunities, based on the natural and cultural resources, within the Project area that replace existing opportunities or that are not in peak season;
- Increase public awareness of the need for preserving natural resources and protecting cultural resources of the Project area; and
- Increase public awareness and support of Project area resource management actions.

Materials were developed as part of the plan's story-based and stewardship-based themes related to fishery, aquatic, terrestrial, and wildlife resources; cultural and tribal history; project history; and energy production. These included an orientation map, boater's guide, interpretive panels, and displays. It also includes annual funding of up to \$20,000 for projects approved by the RRWG.

Finally, PGE's website<sup>20</sup> provides links to all recreational sites within the Project. Each link goes to a detailed description of the facility and its associated recreational amenities.

The Applicants have provided documentation confirming continued compliance with license-mandated recreational facility requirements as well as continuing contributions to the two funds noted above. The LIHI application includes additional discussion of the recreational endeavors at the Project as well as photographs of some of the facilities.

#### Comments, Assessment and Conclusion

While I contacted the Oregon Parks and Recreational Department to obtain their thoughts on how well the Project's recreational features were being maintained and if they have received any public concerns about these facilities, I did not hear back from them.

Based on my review of support documents provided in the LIHI application or found on FERC's eLibrary, I believe that the Project continues to satisfy this criterion.

#### *The Project Continues to Pass Criterion H – Recreational Resources*

## **9. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION**

Based on my review, I believe that the Pelton Round Butte Project conditionally continues to meet the requirements of LIHI Certification, with the following conditions. I also believe the Project satisfies the requirements for PLUS credit for the **Shoreline and Watershed Protection** criterion, as previously discussed. If the noted Condition 2 is met during the LIHI term, the Project may also be able to satisfy the PLUS credit for **Downstream Fish Passage** and qualify for an additional two years of certification.

Condition 1 – The facility Owner shall notify LIHI within 60 days of any newly adopted state water quality regulations that apply to the Project, draft or final modifications of the Project Water Quality Certifications and/or the need to revise the WQMMP as a result of any such changes. This

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<sup>20</sup> <https://portlandgeneral.com/about/parks-campgrounds>

notification shall include the Owner's plan and anticipated schedule for addressing these changes. LIHI reserves the right to conduct an updated certification review of the Project pursuant to these changes. Updates on activities related to this condition shall be included in the annual compliance submittals to LIHI.

Condition 2 – In annual compliance submittals to LIHI, the facility Owner shall provide updates on downstream fish passage efficiency rates, any studies and/or modifications made to the SWW or other features intended to enhance downstream passage, overall progress toward meeting the long-term downstream passage efficiency target of 75%, and any communications from the USFWS and NMFS as to whether or not the agencies are satisfied with the level/progress being made toward that goal. Should the agencies modify the current downstream passage efficiency target value, the Owner shall notify LIHI within 60 days.

Condition 3 – If prior to six months before the expiration of the Certification term, the 75% passage target has been met with proof of agency concurrence, the Owner can request LIHI's consideration of a PLUS credit. LIHI will review the information provided and determine whether or not to award the PLUS and extend the Certificate term for two additional years.

**Appendix A**  
**Applicant Provided Follow-up Information**



## Follow-up Questions

Issued January 4, 2023

Additional responses submitted January 25, 2023

Follow-up responses submitted February 1, 2023

### Background

**Briefly describe the purpose of the Coordinating Committee.**

The Coordinating Committee is described in Section 4.2 of the Settlement Agreement. The committee is tasked with addressing issues related to the implementation of the Settlement Agreement, including, but not limited to, dispute resolution. Each Settlement Party may designate a member of the Coordinating Committee. The Licensees convene the coordinating committee annually, in the spring, to review major License activities and the Annual Operations Report.

**Please provide a copy of the Charter for the recently created lower Deschutes stakeholder working group developed to help joint understanding of the challenges of meeting water quality standards at the Project. This will help in understanding the role/responsibilities of the organizations making up this working group.**

The charter is included at the end of this document.

### Ecological Flows

- 1. To help me understand the data presented in Table 2 and some statements in the Application, please complete the following table for me, including correcting any errors I may have made. Please confirm if the maximum elevations are license limits (I didn't see them in the license), mandated by another agency or self-imposed limits. As the LIH application states "*the Project operates with reduction in the allowable maximum seasonal drawdown of Lake Billy Chinook*," please enter these "reduced" operating levels for both Lake Billy Chinook and Lake Simtustus, as Table 2 does not differentiate between summer and winter limits for "normal operating conditions." Also, please identify the basis of these reductions (self-limited? Agency directed?)**

Lake Billy Chinook operations has a typical winter drawdown of about three feet to accommodate potential high flows for the coming spring runoff. Once this seasonal drawdown has occurred, the reservoir usually fluctuates less than one foot daily, (in the hundredths to 10ths of a foot/day). In the spring, we refill so that we can be back up to full pool by May 1 for the recreation season. After the lake reaches full pool, daily fluctuations are minimal, less than one foot per day, (again, hundredths to 10ths of a foot). So, while we typically have three feet of change during the transition period, within season, the changes are small. At Simtustus reservoir, our license allows for an additional three-foot drop during the winter; however, we operate within our normal maximum and minimum levels, with slight daily fluctuations, dependent on operational needs. Our operational protocols don't typically utilize the full range of reservoir fluctuations allowable under the License, as we are practically constrained by maintaining compliance with other License articles. For example, it would be difficult to significantly draw down Lake Billy Chinook to the full allowable range while also maintaining run-of-river for the lower Deschutes and meeting our May 1 refill target date.

License Limits vs Operating Values				
	Summer		Winter	
	May 15 to Sept 15		Sept 16 – May 14	
	Minimum Elevation (ft msl)	Maximum Elevation (ft msl)	Minimum Elevation (ft msl)	Maximum Elevation (ft msl)
Lake Billy Chinook License limit	1944.00	1945.00	1925.00	1945.00
Operating limit	1944.00	1945.00	1944.00 (Varies)	1945.00
	June 1 to Aug 31		Sept 1 to May 31	
Lake Simtustus License limit	1576.00	1580.00	1573.00	1580.00
Operating limit	1576.50	1578.50	1575.00	1578.50
	Year-Round			
	Min Elev. (ft msl)		Max Elev. (ft msl)	
Reregulating Reservoir	1,414		1,435	

2. The Application also makes the following two statements: *“Lake Billy Chinook and Lake Simtustus generally experience seasonal fluctuations of less than three feet”* and *“the Reregulating Reservoir experiences large daily fluctuations of up to 27 feet; however, typical fluctuations are about 15 feet daily.”* As the fluctuation is limited to one foot for five months of the year at Lake Billy Chinook, a summer and winter typical value would be more descriptive. Also, is “less than 3 feet” typical for summer and winter at Lake Simtustus? If not, please provide these two estimates. Finally, as the maximum allowable fluctuation at the Reregulating Reservoir is 21 feet (1435 – 1414), please discuss why *“large daily fluctuations of up to 27 feet”* appears to occur with somewhat regularity.

This is a typo. It should read *“the Reregulating Reservoir experiences large daily fluctuations of up to 21 feet; however typical fluctuations are about 15 feet daily.”*

#### Water Quality

1. Your updated LIHI Application states 1) that the WQMMP will be updated upon anticipated 2023 conclusion of the rule-making process by ODEQ. to update the existing aquatic life use designations for temperature and dissolved oxygen and that 2) the conclusions reached by the study “Recommendations to Fish Committee on Scenarios to Consider to Improve Water Quality in the Lower Deschutes River and Project Reservoirs” was to continue further modeling and studies but that no specific SWW changes were recommended. My questions therefore are: 1) what is your target deadline for submitting the WQMMP revisions, expressed in likely number of months after conclusion of the ODEQ rule change adoption and 2) do you expect that specific SWW operational guidelines will be established to meet the new standards or will you again be recommending additional studies?

In spring 2020, the Licensees submitted to DEQ proposed revisions of the WQMMP. The submittal included non-substantive updates, some additional considerations for SWW operations prior to June 15 to improve fish capture and, with certain minor exceptions, revisions that are consistent with the Project’s temperature and DO management measures under the interim agreements. In June 2021, DEQ issued a Draft Evaluation and Findings Report, and in October 2021, the agency paused the modification process while the DEQ Rules Advisory Committee began reviewing the aquatic life use designations for rivers in Oregon, including the lower Deschutes River. We expect DEQ will resume the modification process within a few months of the Oregon Environmental Quality Commission adopting the changes to the aquatic life use designations.

2. **Why haven’t Interim Agreements been implemented with ODEQ and WCB since 2019? Are there benefits to the current process over Interim Agreements? If so, what are they?**

In 2020, rather than going through another year of Interim Agreements, DEQ, the WCB, and the Licensees decided to move forward with revising the information in the WQMMP to be consistent with current Oregon Water Quality Standards and the information acquired since the SWW began operating. However, we have continued to follow the operational measures described in those agreements pending revisions to the WQMMP.

3. **Regarding the impairment status of Project and nearby waters, please elaborate on your Application statement that “The state has not indicated to the Licensees that Pelton Round Butte is responsible (in whole or part) for the impairment.” Please provide any written confirmation of this.**

DEQ addressed this in its comments for the 2006 LIHI certification application and the 2014 recertification application. These remain the most recent documents pertaining to this question. The Licensees continue to comply with the requirements of the 401 certification and regularly consult with DEQ and WCB to achieve the best balance of water quality and fish passage.

4. **Please confirm if discharge of 100% of water of bottom is one of the “two sets of precise blends” prescribed in order to achieve the goals of improving water quality and facilitating downstream fish passage” and whether it’s true that only up to 60% can actually be achieved. If true, how has this discrepancy been addressed with the ODEQ?**

Table 2.1 of the Water Quality Management and Monitoring Plan (WQMMP) describes two blends that were the result of modeling completed by Khangaonkar (2001), as stated in the text of Section 2.4. Blend 13 shows a range of deep withdrawal between 0% to 100%. Blend 16 shows a range of deep withdrawal between 0% and 75%. Importantly, this table is showing modeling results, not operational prescriptions. The two paragraphs following the table describe how the SWW should be operated and adaptive management provisions. It is stated that “The Joint Applicants will work with ODEQ and WCB to determine how to select a withdrawal blend within the limits specified in Table 2.1.” It is true that maximum bottom withdrawal through the SWW is approximately 60%. From the declaration of Lee Cramer (2018): “The position of the bottom gates can be adjusted to change the blend of low-level and surface water discharged downstream through the powerhouse. The blend is controlled only by the bottom gates. There are no gates at the top of the SWW to shut off surface flow through the SWW. When the SWW’s bottom gates are closed, the SWW draws water solely from the surface of the reservoir. When the bottom gates are fully open (sometimes informally and incorrectly referred to as “100 percent bottom withdrawal” or “100 percent bottom flow”), water continues to flow through the top of the SWW, such that the maximum proportion of low-level flow that can be discharged through the SWW is approximately 60 percent.”

While the 60% maximum is different from modeling described in Table 2.1 of the WQMMP, it is consistent with the Fish Passage Plan. As discussed in the declarations of Don Ratliff and Brad Houslet, the SWW was designed to always have a component of surface flow, never 100% bottom flow, to support fish passage. From Ratliff (2018): “During the design of the SWW, no water quality need was identified to withdraw only bottom water by entirely shutting off surface flow. If only bottom water was withdrawn for a significant time during mid-summer, the cold deep water could be depleted, resulting in excessively high discharge temperatures in late summer and early fall—a situation similar to that which the SWW was designed to fix. Moreover, maintaining surface withdrawals through the SWW provides the reservoir surface attraction flows essential for the collection of downstream fish migrants that desire to emigrate during these periods. During planning, fish agencies stressed the need to continue fish passage

during the less-used portion of the year to maintain genetic diversity needed to allow these fish stocks to evolve. Under the terms of the Fish Passage Plan incorporated by reference in DEQ's Clean Water Act section 401 certification for the Project, upstream and downstream fish passage through the Project must be provided throughout the year."

5. **Was it acknowledged / discussed with the NMFS and USFWS during their initial Biological Opinion (BO) development activities, that it might take time to achieve full compliance with these WQC requirements for dissolved oxygen and temperature?**

Yes, it was known and considered that there would be a period of adaptive management as we learned to balance reservoir inflows. For this reason, there is a provision to spill at the Reregulating Dam if DO falls below a certain level. Implementation of releases based on models requires a period of adaptive management and there are changes over time to be expected.

#### Shoreline Protection

**Selection of Standard E-3 and not E-2 for ZOE #4 under Shoreline Protection, suggests that ZOE #4 is not within the Project Boundary and therefore the license requirements for the various resource management plans do not apply to this ZOE. (I could not locate the actual Project Boundary Maps filed with FERC.) Also, the maps contained in the Shoreline Management Plan appear to end resource mapping at the Re-Regulating Dam. Please confirm if this assumption that ZOE is outside the Project Boundary is correct.**

The maps within the Shoreline Management Plan (SMP) end at the Reregulating Dam because there is no public access or shoreline development, even though that ZOE is within the Project boundary. The SMP states that it does not address the Reregulating Dam/reservoir for those reasons, this is why Zone 4 has no protection requirements related to the SMP. See text below:

"The shoreline along the east side is owned by the Licensees and the United States Bureau of Land Management (BLM). No public access is permitted on either shoreline in this area, nor is any development. For these reasons, the Reregulating Reservoir is not addressed further in this SMP."

#### Fish Passage

**Please confirm how many adult fish were killed during the reported fish incidents as the Application states four on page 51 and nine on page 54 between 2012 and 2022. Which of the events on Table 4 are these?**

The text on page 51 states that we reported four fish incidents involving adult fish. This is not the total number of fish, but rather the number of reportable incidents. Those incidents from Table 4 that involved adult fish occurred on 6/15/2016, 6/7/2016, 1/25/2019 and 2/10/21. The text on page 54 is incorrect. It should read that we have reported nine incidents involving juvenile fish, as this is the downstream passage section.

**When were the annual studies on fish health, under Article 419 and 421, initiated and how long will they continue? Please summarize the key findings/trends/conclusions of this program.**

**Article 419:**

In 2006, PGE entered into an agreement with ODFW to implement the fish health program in Article 419. As part of this agreement, the Licensees fund a full-time fish pathologist and a seasonal experimental biological aide. These positions are to support:

- Fish passage.
- Coordination with Round Butte Hatchery for selected adults for hatchery and fish passage purposes.
- Fish population monitoring, fish health monitoring and evaluation of the fish health of emigrating juvenile and reintroduced adult fish.
- Implementing procedures to reduce the risk of loss from fish pathogens and limiting the possibility of the introduction of specific fish pathogens during reintroduction.

These positions have been continuously occupied since 2007. The fish passage program will continue through, at least, 2025 (15 years post-SWW construction) in its current form. In 2021, the Fish Committee added fish health considerations to the Reintroduction Roadmap to highlight the ways in which fish health considerations are being addressed as part of reintroduction. Examples of advances to reintroduction coming from the fish health program are the inoculation of returning fish to reduce pre-spawn mortality and the use of SLICE, an experimental feed, to reduce copepod infections for Chinook entering the SWW. While the Reintroduction Roadmap provides the best high-level summary of the program, more detail can be found in the annual summaries submitted to FERC.

**Please be sure to address the statements from DRA on page 3, paragraph 2 which talks about the suggested "significant uptick in fish disease and parasite prevalence" and the causes, if in fact this trend is occurring. Also discuss if any agencies have raised any questions on your findings and how they were addressed. Be sure to include any information you may have about the suggested shift in fly hatches, increase in a nuisance algae growth, and exacerbation caused by warmer water, as they may be related to fish health."**

**Hatch Timing**

The release of colder water in the spring has changed hatch timing, likely back to historical timing. This was a predictable response as insect hatch timing is highly dependent on water temperature. However, there is no data that this shift is an ecological concern or a fish health concern. ODFW surveys have indicated that the redband trout is comparable to pre-SWW samples in growth, condition factor and population density. See this presentation from ODFW for more details on the resident trout program- [Status of Fish Populations In the Lower Deschutes](#) (pptx).

**Nuisance Algae**

Information about periphyton abundance post-SWW were detailed in the [Water Quality Study](#). In summary, the study found that summer increases in nitrate concentrations, pH and dissolved oxygen



suggest that algae have likely become more abundant in the lower Deschutes River since SWW. This is likely due to nutrients from the Crooked River being transported to the lower Deschutes River during the spring months, providing them at the time of year when algae can take advantage of them for growth.

In addition to nutrient availability, flow is highly related to algae growth. In 2019, there was a high flow event on the lower Deschutes River and, following this event, we saw a change in the periphyton community composition downstream from the previous years when we had sampled. Our study results suggest that high flow events dislodge certain nuisance algae. We are currently in our third year of drought in the Deschutes Basin and are experiencing low-flow conditions in the lower river, which is likely contributing to observations of increased algae growth. However, there is no evidence to suggest that the algae are negatively impacting Deschutes river fish health (see presentation cited above).

### Fish Disease

#### *C. shasta*

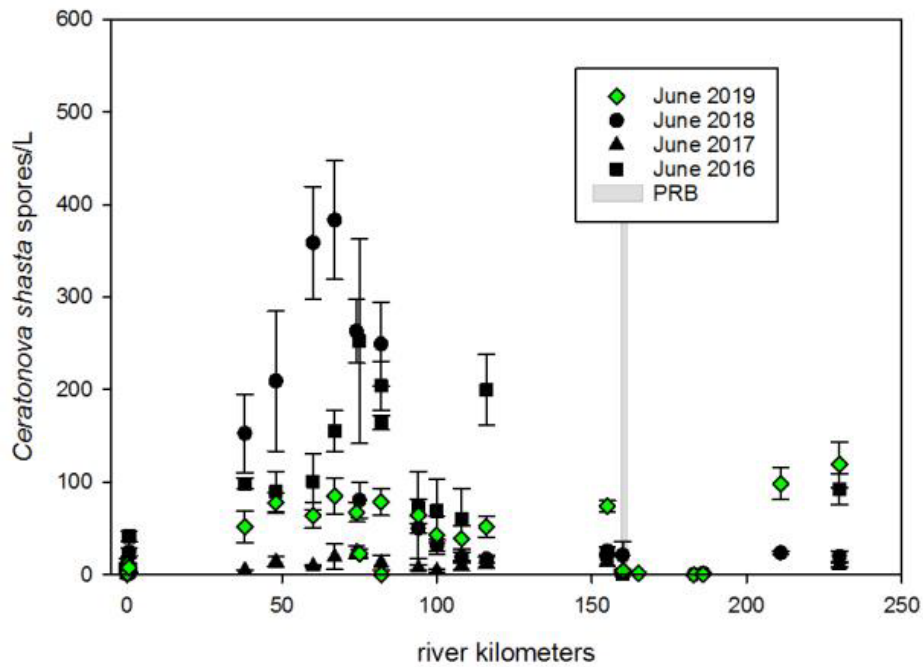
Ceratonova shasta is a freshwater, myxozoan parasite that is native to the Pacific Northwest of North America. It causes enteronecrosis in juvenile salmonids and is associated with potentially population-level impacts in the Deschutes River basin. Transmission occurs through waterborne stages: actinospores released from annelids infect salmonid fishes and in the fish's intestine develop into myxospores which then infect annelids (see the life cycle diagram, left). The parasite proliferates in each host.

In response to the unknown prevalence and severity of *C. shasta* infection in Deschutes salmonids, ODFW developed a parasite monitoring program to track the spatial and temporal abundance of *C. shasta*. For example, longitudinal water samples took place from 2015 to 2019. These included grab samples on the same date from the mouth of the Deschutes River to Cline Falls in the upper basin. Generally, these were done in June and August of the same year.

Data from 2015 to 2019 (2020-2022 data are still in process) show:

- *C. shasta* prevalence at the Pelton Trap (within ZOE 4) is relatively low compared to other sites sampled within the basin. With a few exceptions, the concentration at the Pelton Trap remains below 10 mg/L which is the level at which can cause 40% mortality in spring Chinook juveniles. This graph shows the longitudinal sampling conducted by ODFW and Oregon State University. The samples to the right of the gray line are upstream of Lake Billy Chinook in the upper basin tributaries and therefore, are not influenced by Pelton Round Butte. The samples at the gray line are within ZOE 4. The samples to the left of the line are approximately 160 kilometers downstream of Pelton Round Butte.

### Deschutes Longitudinal June 2016-2019



### Deschutes Longitudinal August 2015-2019

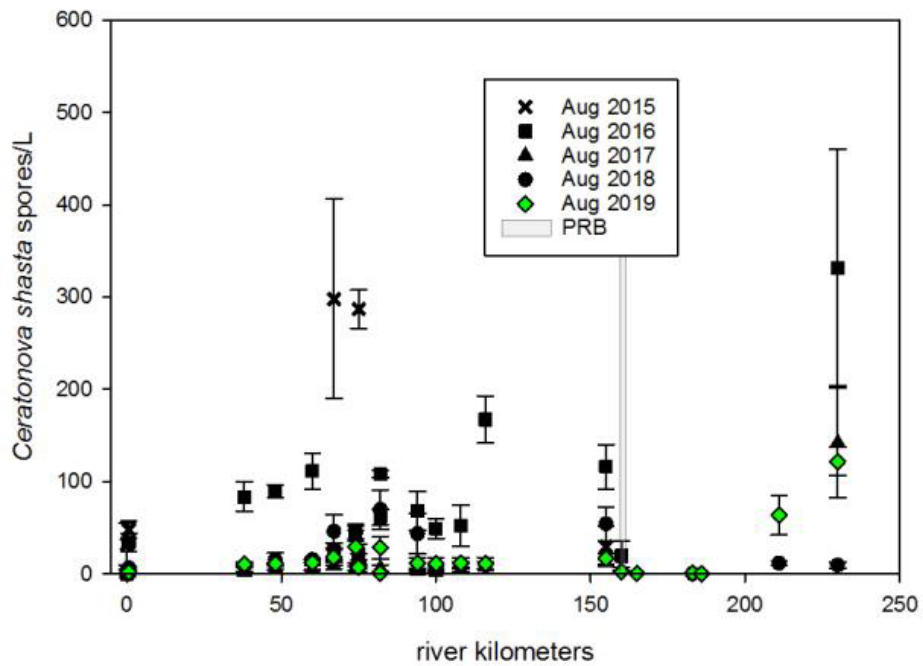


Figure 1. These graphs are from a January 2023 presentation to the Fish Committee by ODFW.

- *C. shasta* concentrations and annelid (host worm) density appear to be correlated with high flow events. While the time series of data on the Deschutes is short, there is evidence to suggest that the 11,000 CFS flow in 2019 resulted in decreased *C. shasta* concentrations. The high flow likely decrease *C. shasta* that year through disturbing the host annelid's habitat. This conclusion is supported by data collected in the Klamath where artificial high flushing flow events are used to manage *C. shasta*. The Fish Committee is exploring if a similar flushing flow program may be feasible and effective for the Deschutes River.

### *Black spot*

"Black spot" is a parasitic infestation found on freshwater fish across the United States and Canada. It has been documented in many Oregon rivers, including the Metolius, the John Day and the Deschutes (both upstream and downstream of the dams). It's been recorded in the Deschutes basin long before the SWW was constructed. ODFW collect data on black spot in the Deschutes and other basins. For example, Fonken and Tattam (2015) studied black spot infestations in spring Chinook salmon in the John Day River. The John Day River is the next large tributary to the Columbia River, entering approximately 13 miles upstream of the Deschutes. Unlike the Deschutes however, the John Day does not have dams or hatcheries. Despite this, black spot has been noted in the John Day, sometimes at high levels. Because of this, Fonken and Tattam (2015) examined 6,770 spring Chinook for black spot. Approximately 6% of these fish had black spot. However, there was no correlation between black spot infestation and smolt to adult survival rate. There is no evidence that black spot is affecting the growth or survival of fish in the Deschutes River

### **Article 421 Native Fish Monitoring Program**

This article outlines several monitoring requirements, both biological and habitat, to evaluate the effects of reintroduction on native fish. Below are the key actions and findings related to each of the requirements. Most of the biological provisions have not yet been fully implemented because adult return rates have not been large enough for the reintroduction to have measurable impacts to native fish on reintroduction. However, below is a summary of the key findings for each provision detail on the methodology, and annual findings can be found in the annual reports filed with FERC.

421(a)(1) - A redd count program has been initiated. We have not met the R/S ratio  $\geq 1$  so the redd count program is ongoing. Low numbers of spawning have been documented by reintroduced fish; however, the numbers have been low so competition is not a concern at this time.

421(a)(2)(i and ii) - Spawning ground surveys continue to be conducted annually. Low numbers of spawning have been documented by reintroduced fish; however, the numbers have been low so competition is not a concern at this time.

421(a)(2)(iii) - The electrofishing surveys conducted to fulfill this requirement give us population estimates but cannot distinguish between resident and anadromous *O. mykiss* (they look identical as juveniles). Therefore, we consulted with U.S. Fish and Wildlife to conduct genetics work to better answer this question. This work was summarized in Smith et al (2018). The report is not available on-line but can be provided by request. The report concluded that reintroduction steelhead fry *may be* outcompeting resident redband in Whychus Creek. As a result, the co-managers switched from fry releases to smolt

releases. Smolts are expected to out-migrate within weeks of release, compared to fry, which spend 1+ years rearing in a stream before migrating. Because of this reduced time in freshwater, the expectation is the smolts should have minimal impacts on native fish. During the transition from the fry to smolt based program, no electrofishing or genetics studies were conducted, with the plan to reinstate surveys in 2023 (three years post fry-stocking). These repeat studies are underway now, but we don't yet have the results.

421(a)(2)(iv) - This work occurs annually. Bull trout redd counts, angler surveys and counts at the project facilities all show stable bull trout populations. The 2022 bull trout redd counts were the highest on record.

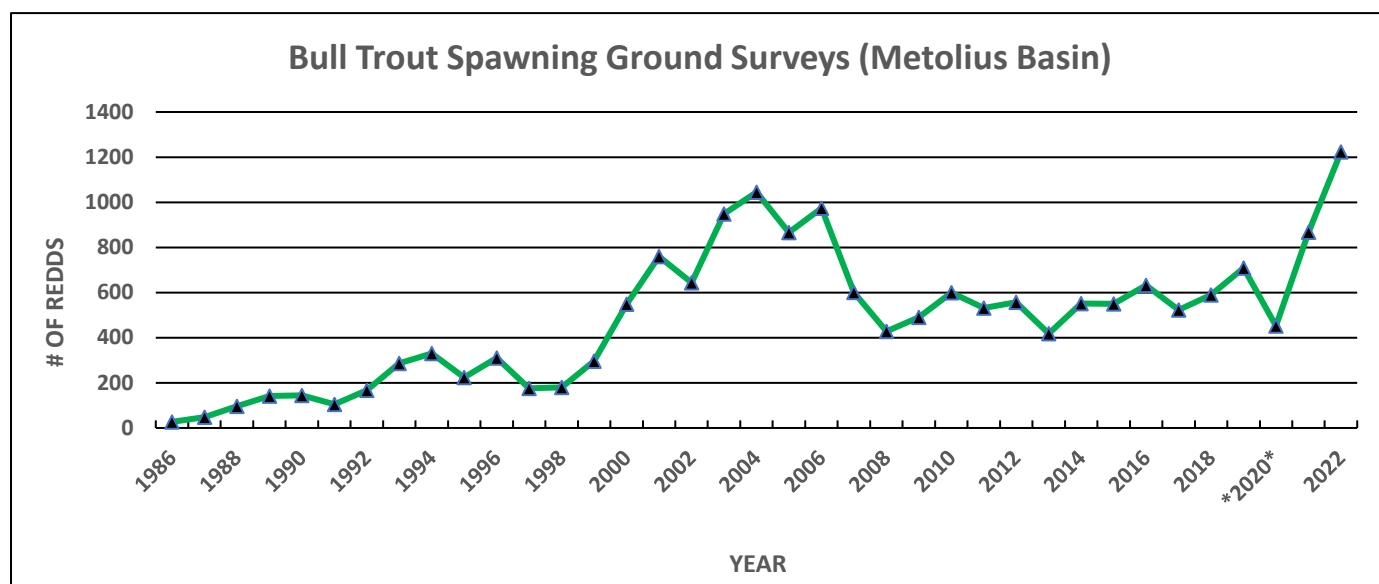


Figure 2. Bull trout redd counts in the Metolius River basin (data courtesy of Oregon Department of Fish and Wildlife)

421(a)(2)(v) - Spawning ground surveys continue to be conducted annually. Low numbers of spawning have been documented by reintroduced fish; however, the numbers have been low so competition between sockeye and bull trout for spawning grounds and redd superimposition is not a concern at this time. The stable number of bull trout redd counts further support that sockeye competition is not negatively impacting the population.

421(b)(1 and 2) - These data are being collected.

421(b)(3) - The production capacity estimates were last updated in 2018. They will be recalculated based on current habitat conditions (based on the data collected from 2017 to 2022 as part of 421(b)(2)). The results of this five-year data review will be filed with FERC by June 1, 2024.

421(b)(4) - The Licensees have not completed riparian restoration projects since the Trout Creek Ranch restoration. The monitoring for that project was completed in 2011. However, the Licensees have funded several habitat projects through the Pelton Fund. These restoration project sites have been considered as priority areas for the surveys described in 421(b)(2) when the Fish Committee has designated the survey reaches for a given year.

**Was the need for sockeye salmon restoration adopted into the Round Butte Hatchery operations per Article 20? If yes, please provide a summary of this effort. If not, why not? When was the most recent five-year review of the hatchery completed and what were the key findings?**

To-date, the Fish Committee has not deemed it necessary to expand hatchery capacity for sockeye salmon, as described in Article 420. In 2015, Round Butte Hatchery began an experimental program to investigate the feasibility of releasing sockeye pre-smolts into Lake Billy Chinook in order to produce smolts to be captured at the SWW the following year. This experiment was initiated due to interest from the Confederated Tribes of Warm Springs in producing sockeye smolts. The experimental program was terminated in 2019 because the data needed to characterize the effectiveness of pre-smolt releases in producing out-migrating smolts indicated the program was not successful. Specifically, low outmigration numbers from Lake Billy Chinook indicated low survival of pre-smolt releases, with between 3% and 11% of smolts being captured at the SWW in subsequent years.

The most recent five-year hatchery review was conducted in 2021, for the period of 2016 to 2020. The report was made available to the public and was presented at the July 22, 2021 Fisheries Workshop. I have included the summary slides, as presented by the independent contractor, Meridian Environmental. Please note that the HGMP (Hatchery Genetics Management Plan) for Chinook and steelhead were completed in 2022.

## Summary and Recommendations

- ♦ In general, hatcheries are operated consistent with BMPs.
  - RBH Spring Chinook recovery program – 79% compliance
  - RBH Spring Chinook harvest program – 75% compliance
  - RBH Steelhead recovery program – 81% compliance
  - RBH Steelhead harvest program – 69% compliance
  - Wizard Falls Steelhead recovery program – 76% compliance
  - Fall River Spring Chinook recovery program – 73% compliance
- ♦ Lower rankings for:
  - M&E – lack of numerical goals for harvest, adult survival, and pHOS
  - Adult Holding – lack of pathogen-free water, natural temperature regime



## Summary and Recommendations

- ♦ The spring Chinook program is consistent with all but 1 of the identified guidance documents and directives
  - Need approved HGMP (ODFW, NMFS policies)
- ♦ The steelhead program is consistent with all but 3 of the relevant guidance documents
  - Need approved HGMP (ODFW, NMFS policies)
  - Does not meet HSRG standard for pHOS
  - Does not meet guidelines in Oregon's Native Fish Conservation Policy



**Please confirm if the requirements of License Article 439 and Article 27 of the Settlement Agreement have been triggered and if they have, provide a summary of these activities.**

Articles 439 and 27 of the Settlement Agreement have not been triggered.

### **Has installation of the SWW essentially made License Articles 417 and 418 moot?**

Article 417 is moot following SWW construction. On March 27, 2007, we filed a license amendment with FERC to forego construction of the temporary facilities and, instead, to proceed with the permanent facilities. Article 418 remains in effect, but has not been triggered, as we continue to implement all feasible measures to improve collection efficiencies and are demonstrating measurable progress.

**Please complete (correct if needed) the table shown on the next page. Data shown now are from a similar table in your 2014 Application. Please add in the Roadmap Strategy supported by the feature, any new measures implemented/planned, such as those denoted in the annual fish passage reports and on Application pg. 56. The Comments column, where appropriate, should include the reason why a measure has been delayed from its original due date and provide a brief reason for the delay. For example, the new planned date and technical reason(s) the Lake Simtustus Juvenile Release Facility has been delayed should be noted. This should also be done where a measure was tried (e.g., strobe lights) but no longer used. Such a table will help demonstrate in one place, all the activities being undertaken, as a result of the adaptive management process for fish passage.**

I have updated the table to include the operational and physical changes to our fish passage facilities.

**More information is needed on the Edison Award mentioned on application page 53 to help demonstrate why the SWW is an “advanced technology”. (E.g., Who was the award from? What year? What justification was provided on which this award was made?)**

The SWW was honored with the Edison Award in 2010, which is awarded by the Edison Electric Institute (EEI). It is the electric utilities’ highest honor and the award is selected by a panel of former electric company chief executives. The SWW was awarded for innovation, as it was the only floating surface fish collection facility, coupled with generation, in the world. Additionally, the collaborative process undertaken by PGE and CTWS was cited by EEI President, Tom Kuhn, when he said, "The effort by PGE to team up with so many parties and gain the support needed to move ahead with the project is almost as spectacular as the finished product itself." He added "The company's outstanding commitment to improving the salmon's habitat resonates, not only with local communities, but with the power industry, which is paying close attention to this great sustainability achievement via PGE's top-notch engineering." The SWW was also awarded the American Council of Engineering Companies Grand Award in 2011 for a high degree of innovation, achievement and value. In 2011, the SWW was awarded the Outstanding Stewards of American Waters Award from the National Hydropower Association “which recognizes significant, innovative projects that serve as models for the hydro industry.”



	ZOE	Passage/ Roadmap Strategy Supported	Feature	Completion Date	Comment
Downstream Passage	ZOE 1: Lake Billy Chinook	Pre-roadmap	Strobe light fish deterrents in front of Round Butte Dam intake	2007	Removed in December 2007 because of construction. Not re-installed as deep screen monitoring determined strobes were no longer necessary.
		Pre-roadmap	Selective Water Withdrawal and Fish Capture Facilities constructed	2010	SWW and associated fish transfer facilities were fully operational December 2009. The first outmigration to use the facilities was spring 2010.
		B. Modify Round Butte Operations	Selective Water Withdrawal avoidance studies and modifications	2010-2015	Noise evaluation conducted by Bureau of Indian Affairs (BIA) determines noise not likely a deterrent. Lights turned off when the SWW personnel are not present. Experimental sprinklers are installed to break up the surface at the SWW fish entrances. These actions didn't significantly improve collection and were discontinued.
		J. Reduce handling stress at the SWW	Various operational changes made to reduce handling stress at the SWW	2010-present	Changes include adding stress coat to fish totes and transport trucks, reducing crowding in the lift baskets, netting raceways, electric predator exclusion fencing, fish handling training for technicians by ODFW pathologists, debris barrier net and night shifts when debris loading is high.
		J. Reduce handling stress at the SWW	Sockeye no longer marked at the SWW	2018-present	Average smolt-to-adult returns of marked sockeye smolts (2010 – 2013; 0.082) was significantly worse than the average smolt-to-adult returns (0.204) in the two years (2014 and 2015) they weren't marked. This suggests that stress associated with handling/markings reduced post-release performance.
		L. Acclimate smolts in the tributaries	Licensees fund an acclimation program to improve SWW capture efficiency and adult return rates.	2019-present	ODFW begins development of smolt acclimation program using temporary facilities in 2019. Permanent Modutank facilities are completed at the Deschutes Land Trust – Camp Polk property in 2020 and at ODFW's Wizard Falls Hatchery in 2021. Percentage of smolts acclimated in permanent and temporary facilities increase until 2021 when 100% of smolts are acclimated prior to release.

		B. Modify Round Butte Operations	Round Butte Dam operated with minimum generations during nighttime hours to improve fish capture	2017-present	
		A. Install SWW guidance net	Lead net added to SWW to guide fish into the collector.	2022	The average steelhead capture efficiency at the SWW between 2018 – 2021 was 19%. With the lead net in place, capture efficiency of steelhead increased to 37%.
		Not a roadmap strategy	Lake Simtustus Juvenile Release Facility	Not constructed	These facilities are only to be built upon request of the Fish Committee. They have not been deemed necessary to-date.
	ZOE 2 and 3: Lake Simtustus and Reregulating Reservoir	Not a roadmap strategy	Pelton Skimmer Reactivation	Not constructed	These facilities are only to be built upon request of the Fish Committee. They have not been deemed necessary to-date.
		Not a roadmap strategy	Willow Creek Weir	Not constructed	Delayed until the Fish Managers determine the use of Lake Simtustus is needed for anadromous fish (either volitional passage or additional sockeye rearing).
	ZOE 4: Lower Deschutes River	G. Modify release strategies in the lower river	Lower Deschutes Juvenile Release Facility	Early 2010	The release pipe was damaged in a high flow event in 2019 and was removed. It's no longer necessary with the stress relief pond.
		G. Modify release strategies in the lower river	Smolts are trucked and released after sunset to improve survival in the lower river	2017-2021	Construction of the stress relief pond eliminated the need for nighttime trucking
		H. Reduce stress of smolts released in the lower river	Temporary Stress Relief Pond constructed	2021	First full season of use was spring 2022
	Upstream Passage	ZOE 4: Lower Deschutes River	Pre-roadmap	Upgrades to Pelton adult fish trap	2010
		Not identified on the Roadmap	Pelton Fish Trap Replacement	Planned 2024	Currently at 60% design phase. New trap will reduce handling and improve passage efficiency.
Simtustus		Not a roadmap strategy	Upgrade Round Butte Upstream fish trap	Not constructed	These facilities are only to be built upon request of the Fish Committee. To date, they have not been deemed necessary.

	ZOE 1: Lake Billy Chinook	Pre-roadmap	Round Butte Adult Release Facility	2010	Warm surface water is pumped out and replaced with cool hypolimnic water. Fish volitionally swim out an exit pipe into the cooler water, 30 feet below the surface.
		O. Improve fish passage	The Licensees provided \$1,000,000 in funding from the Pelton Fund to Deschutes Valley Water District for the Opal Springs Fish Passage Project which allows fish to reach spawning grounds in the Crooked River.	2019	
		Q. Direct release of returning upper basin adults into spawning habitat	PGE directly transported a subset of adults to spawning grounds	2022	This will not likely be implemented every year; rather, it was done to help fish reach spawning grounds during extreme drought conditions in the Crooked River.

# Lower Deschutes River Pilot Stakeholder Working Group Charter

*Updated 10/11/2022*

## Background

The Pelton Round Butte Fish Committee Water Quality Working Group (WQWG) is interested in working with stakeholders to address some of the challenges that the lower Deschutes River faces. The WQWG is convening a stakeholder working group as a pilot process to build common understanding of the science related to the lower river and discuss desired outcomes for temperature management. Depending on what is accomplished during this first year, we envision that it could be the first stage of a longer-term process.

## Objectives

The objectives of this process are as follows:

- Hear stakeholder issues and interests related to the lower river.
- Share science and information about the lower river that has informed the current PRB operation, including regulatory requirements and other constraints.
- Discuss desired outcomes for temperature management on the lower river.
- Explore the potential for a water release scenario that could meet the regulatory requirements and desired ecological outcomes for the lower river that has not already been considered.
- Build trust among participants.

## Roles and Responsibilities

### Water Quality Working Group (WQWG)

The WQWG which consists of representatives from Portland General Electric (PGE), The Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSO), U.S. Forest Service, Oregon Department of Environmental Quality, Trout Unlimited, Oregon Department of Fish and Wildlife, and Native Fish Society, is convening this pilot working group. The WQWG will work with the facilitation team to develop agendas and meeting materials.

### Process Facilitation

The WQWG will provide an impartial facilitator to support the work of the group. The facilitation team will work with process participants to:

- Help the group fulfill its purpose in a balanced and fair manner.
- Schedule and coordinate meeting logistics.
- Work with the WQWG to develop agendas and distribute meeting materials.
- Facilitate and document meetings.
- Ensure participants focus on their roles and responsibilities.
- Offer process expertise to support constructive, collaborative, and productive dialogue.

## Stakeholder Participants

Participants will be asked to attend up to six meetings between May 2022 and April 2023. It is expected

that participants will meet deadlines and be available for scheduled meetings, established by the group through the facilitator. Participants may also be contacted periodically for interim check-ins with members of the WQWG or facilitation team. Between meetings, members may also be asked to review materials, comment on specific topics, and identify potential priorities.

## Dam Licensees

Any dam operation decisions will remain the responsibility of PGE and the CTWSRO. The operators will keep stakeholders informed, listen to their concerns, and provide feedback on how their input influenced their decisions on the topics discussed by the working group.

## Operation

### Principles for Working

All participants of this effort will strive to be open, transparent, inclusive, and accountable in their actions. They will adhere to the highest ethical standards in their work and deliberations and are committed to using informed judgment and thoughtfulness in their participation.

### Membership

The convening team has invited the following stakeholders to provide one member to represent them on the working team. If the primary member is unable to attend, they may designate an alternate to attend in their place. The primary member is responsible for coordinating with their alternate to keep them up to date on the group's efforts.

Stakeholder Type	Organization
Licensee	Portland General Electric (PGE)*
Licensee	The Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO)*
NGO/Advocacy	Native Fish Society*
NGO/Advocacy	Trout Unlimited*
NGO/Advocacy	Deschutes River Alliance
NGO/Advocacy	The Freshwater Trust
NGO/Advocacy	The Conservation Angler
NGO/Advocacy	Pacific Rivers
NGO/Advocacy	Central Oregon Informed Angler
NGO/Advocacy	Wild Steelhead Coalition
Fishing Guide	Western Fishing Adventures
Fishing Guide	Renton River Adventures
Fishing Guide	Fish the Swing
Fishing Guide	Belozer's Whitewater Fishing
Agency	Oregon Department of Fish and Wildlife (ODFW)*
Agency	Oregon Department of Environmental Quality (DEQ)*
Agency	Bureau of Land Management (BLM)*

*\*Part of the convening group*

### Non-member Participation

Additional individuals may be invited by the WQWG to present information and serve as a resource to the group. Otherwise, meeting attendance is limited to one representative from each of the member groups.

## Meeting Ground Rules

- Honor the agenda and time frames.
- Be respectful, candid, and constructive.
- Provide balanced speaking time.
- Test assumptions by asking questions.
- Provide explanations for views and interests.
- Strive for transparency. Limit side conversations.
- Commit to good faith efforts towards achieving substantive progress.

## Documentation

The facilitation team will prepare meeting summaries capturing key discussion points and action items. Meeting summaries will not be transcripts of the meeting. Draft summaries will be circulated to participants for review and comment. The facilitation team will incorporate comments as appropriate into the final summaries. Meeting summaries and materials will be made available to non-member participants upon request.

## Communication

Group members may not speak to the media on behalf of the group unless consent has been agreed to by the group. Use of recording, video recording or social media during meeting times is not permitted to respect the privacy of other group members. From time-to-time photography may be required to capture meeting outcomes and process, but members may choose to abstain from photographs. This process is subject to public disclosure.

## Appendix B

### Project Committees and Working Groups

COMMITTEE	MEETING FREQUENCY	REPRESENTATION
Fish Committee	Every other month	Licensees, NOAA Fisheries, USFWS, USFS, BIA, BLM, CTWS-BNR, CTWS-WCB, ODFW, ODEQ, NGO representative
Recreation Resources Working Group (RRWG)	Semi-annual meeting	Licensees, USFS, BIA, BLM, CTWS-BNR, ODFW, OPRD
Terrestrial Resources Working Group (TRWG)	Semi-annual meeting	Licensees, USFWS, USFS, BIA, BLM, CTWS-BNR, ODFW
Shoreline Management Working Group (SMWG)	Annual meeting	Licensees, USFS, BIA, BLM, CTWS-BNR, ODFW, OPRD, Jefferson County
Cultural Resources Working Group (CRWG)	Annual meeting	Licensees, SHPO, OPRD, CTWS-BNR, BLM, USFS
Coordinating Committee	Annual meeting	Licensees, OWRD, USFWS, NGO, ODFW, USFS, ODEQ, Jefferson County, NOAA
Pelton Fund Governing Board	Annual meeting	Licensees, CTWS-BNR, CTWS-WCB, USFWS or BLM, NOAA Fisheries, BIA, ODFW, ODEQ, OWRD, NGO



**Appendix C**  
**Stakeholder Outreach Emails and Responses Received**

From: PBMwork@maine.rr.com  
To: "Smita.mehta@deq.state.or.us" <Smita.mehta@deq.state.or.us>  
Cc:  
Bcc:  
Priority: Normal  
Date: Tuesday January 3 2023 10:36:00AM  
Requesting your input on Pelton Round Butte Hydropower Project LIHI Application

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Good morning

I am the independent review assigned to review the application made by Portland General Electric (PGE) and the Confederated Tribes of the Warm Springs of Oregon (CTWS) for recertification of the Pelton Round Butte Project by the Low Impact Hydropower Institute (LIHI). I would like to get some feedback from you on several water quality related issues. Without your input, my data is primarily that included in the LIHI application and records available on FERC's website, or comments that stakeholders may issue via the public comment process implemented by LIHI. Here are the following questions that I have:

- What is the anticipated completion date for the rule-making process by ODEQ to update the existing aquatic life use subcategory designations relating to Oregon's temperature standard, and to designate aquatic life use subcategories relating to Oregon's dissolved oxygen standards?
- Has a TMDL for dissolved oxygen, temperature, pH or nuisance phytoplankton for waters affected by the Pelton Round Butte Project been developed/approved yet? If not, is there a target date for them?
- It is my understanding that the last Interim Agreement for Pelton-Round Butte addressing dissolved oxygen and temperature goals expired in January 2021. Given the sensitivity of the Project in the eyes of some NGOs, related to water quality and other issues, why are these no longer being developed and "consultations with PGE" being conducted instead? Are there benefits to the current process and if so, what are they?
- Do you believe that PGE is operating the Project within compliance with the 401 Water Quality Certification. Please elaborate on why you feel the way you do. Do you believe that water quality, in general, is improving despite the apparent pH, dissolved oxygen and temperature exceedances over WQC standards which have occurred?

I would also be happy to receive any additional feedback you would like to share with me about PGE and their operation and management of the facility.

The public comment period for the Project closes on January 15, 2023. If you would prefer to send your input to my questions as part of a letter you plan on submitting directly to LIHI, please let me know that and I will await those comments.

Thank you very much for your time.

Pat McIlvaine

From: PBMwork@maine.rr.com  
To: "steve.bifano@opr.oregon.gov" <steve.bifano@opr.oregon.gov>  
Cc:  
Priority: Normal  
Date: Tuesday January 3 2023 10:35:47AM

## Pelton Round Butte Project Application for Low Impact Recertification

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Good morning Mr. Bifano

I am the independent review assigned to review the application made by Portland General Electric (PGE) and the Confederated Tribes of the Warm Springs of Oregon (CTWS) for recertification of the Pelton Round Butte Project by the Low Impact Hydropower Institute (LIHI). I would like to get some feedback from you, as a member of the Recreation Resources Working Group, regarding how you think the Project's owners are managing the recreational resources at the Project. Without your input, my data is primarily that included in the LIHI application and records available on FERC's website, or comments that stakeholders may issue via the public comment process implemented by LIHI.

In general, I am interested in knowing if you believe they are satisfactorily maintaining these facilities and appropriately responding to concerns from stakeholders that may raise issues, if you are aware of any such communications.

Please feel free to respond directly to my email, or if you prefer, you can send your comments directly to LIHI (See their website for further information: <https://lowimpacthydro.org/pending-applications/> ). Selecting the Pelton Round Butte link will take you to the current application as well as past reviews on the Project.

Comments must be provided by January 15, 2023.

Thank you for your time

Pat McIlvaine

# **DEQ Rulemaking – Aquatic Life Use Updates 2022 – Notice of Schedule Change**

## **Schedule Change**

DEQ is postponing the public comment opportunity and public hearing for this rulemaking. On Oct. 31, 2022, DEQ published advanced notice of a public hearing for Dec. 15, 2022; however, this hearing has been cancelled.

DEQ will reconvene the Rulemaking Advisory Committee to discuss changes to rule amendments for designating active resident trout spawning areas. DEQ will send another advance notice for the public hearing when it is rescheduled, which is expected for early 2023.

## **Summary**

The Oregon Department of Environmental Quality will propose amendments to its water quality standards to protect aquatic life in Oregon Administrative Rules OAR-340-041-0002 and OAR-340-041-0101 to OAR-340-041-0340. These rules update and clarify Oregon's Aquatic Life Use Subcategory designations based on newly available data.

The designated use subcategories of aquatic life determine which of the criteria in Oregon's temperature and dissolved oxygen standards are necessary to protect aquatic life in particular places and times. The current fish use and salmon and steelhead spawning use maps associated with the temperature criteria will be updated based on up-to-date data. The use subcategories associated with the dissolved oxygen criteria will be designated in rule for the first time. These updates make use of the best available scientific information about habitat distribution, life stages, and timing of use by sensitive species.

## **Additional Information**

For additional information about this rulemaking, you can view the rulemaking web page at: [Fish and Aquatic Life Use Updates rulemaking webpage](#).

If you are not already signed up to receive email notices about this rulemaking, you may sign up at: [GovDelivery](#).

You can also obtain more information about this rulemaking by contacting:

James McConaghie  
503-229-5619  
[james.mcconaghie@deq.oregon.us](mailto:james.mcconaghie@deq.oregon.us)

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You can also obtain more information about this rulemaking by contacting:

James McConaghie  
503-229-5619  
[james.mcconaghie@deq.oregon.us](mailto:james.mcconaghie@deq.oregon.us)

From: "FONSECA Marilyn \* DEQ" <Marilyn.FONSECA@deq.oregon.gov>  
To: "PBMwork@maine.rr.com" <PBMwork@maine.rr.com>  
Cc: "FONSECA Marilyn \* DEQ" <Marilyn.FONSECA@deq.oregon.gov>, "Marriott Anika E" <anika.e.marriott@doj.state.or.us>, "MRAZIK Steve \* DEQ" <Steve.MRAZIK@deq.oregon.gov>  
Bcc:  
Priority: Normal  
Date: Wednesday January 25 2023 12:37:55PM  
RE: Requesting your input on Pelton Round Butte Hydropower Project LIHI Application

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Good morning Ms. McIlvaine – I received your email, however, while DEQ anticipates reviewing proposed modifications to operations of the Pelton Round Butte project and their impacts on water quality compliance later this year, DEQ is not carrying out such work at this time. Accordingly, DEQ has no additional response to your request at this time.

Thank you,

Marilyn Fonseca

Oregon Department of Environmental Quality

Northwest Region Water Quality

Marilyn.Fonseca@deq.oregon.gov

Cell: 503-348-9705 (currently teleworking)

Office: 503-229-6804

---

**From:** PBMwork@maine.rr.com <PBMwork@maine.rr.com>  
**Sent:** Monday, January 23, 2023 9:39 AM  
**To:** FONSECA Marilyn \* DEQ <Marilyn.FONSECA@deq.oregon.gov>  
**Subject:** re: Requesting your input on Pelton Round Butte Hydropower Project LIHI Application

Hi Marilyn

Sorry to bother you again, but I was really hoping you would be able to share your thoughts on PGE's efforts to minimize impacts to water quality. I understand you work closely with them on setting interim goals while the Selective Water Withdrawal system is still being fine tuned, especially given the changing conditions Mother Nature is causing.

In 2018, Eric Nigg, a Water Quality Manager with ODEQ stated in his concluding paragraph in a deposition in April of that year that "

"Ongoing studies conducted by the Licensees will provide a better, more precise

understanding of the operations of the project, reservoir dynamics and effects on the Lower Deschutes River. DEQ is mindful that conditions below the project have changed; some intended and others perhaps unintended. We expect these studies will give us greater insight into improved management options. In general, though, DEQ believes PGE is operating the project and facilities consistent with the 401 certification and that water quality has improved in demonstrable ways."

Would you, in general, believe that this is still ODEQ's position?

Your input would be very helpful for my assessment of the Project for the Low Impact Hydropower Institute.

Thank you very much. I have attached a copy of that deposition for your convenience.

Patricia McIlvaine

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From: "FONSECA Marilyn \* DEQ"  
To: "PBMwork@maine.rr.com"  
Cc: "FONSECA Marilyn \* DEQ", "MEHTA Smita \* DEQ", "MRAZIK Steve \* DEQ"  
Sent: Thursday January 5 2023 7:22:19PM  
Subject: re: Requesting your input on Pelton Round Butte Hydropower Project LIHI Application

Good afternoon Mr. McIlvaine – Smita Mehta forwarded your email to me regarding the Pelton Round Butte project LIHI application. An update to the rulemaking schedule is attached. Also attached is DEQ's response to PGE's request for an agency letter for the LIHI certification.

Thank you,

Marilyn Fonseca

Oregon Department of Environmental Quality

Northwest Region Water Quality

Marilyn.Fonseca@deq.oregon.gov

Cell: 503-348-9705 (currently teleworking)

Office: 503-229-6804



**THE CONFEDERATED TRIBES OF THE WARM SPRINGS RESERVATION OF  
OREGON**

**BRANCH OF NATURAL RESOURCES  
P.O. Box C, Warm Springs, Oregon 97761  
Phone (541) 553-2001**



November 8, 2022

Low Impact Hydropower Institute ("LIHI")  
P.O. Box 194  
Harrington Park, NJ 07640

Re: Pelton Round Butte (PRB) Hydroelectric Project (FERC No. 2030) ("Project")

Dear Members of the Low Impact Hydropower Institute Review Committee:

The Confederated Tribes of the Warm Springs Reservation of Oregon Branch of Natural Resources ("BNR") supports the Low Impact Hydropower Institutes (LIHI) recertification for the Pelton Round Butte Project. The BNR has worked closely with the Co-licensees and the Oregon Department of Fish and Wildlife regarding fish reintroduction and other natural resource issues identified in the License.

The Co-licensees have committed to adaptive management process and with the continued testing and verification process we believe is paramount to the success of reintroduction of salmon and steelhead above the project. This framework and the communication with the Fish committee allows the BNR to continue to support the LIHI re-certification.

Sincerely,

Austin Smith Jr.  
General Manager, Branch of Natural Resources  
Confederated Tribes of Warm Springs



**THE CONFEDERATED TRIBES OF THE WARM SPRINGS RESERVATION OF  
OREGON**

**BRANCH OF NATURAL RESOURCES  
P.O. Box C, Warm Springs, Oregon 97761  
Phone (541) 553-2001**



November 8, 2022

Low Impact Hydropower Institute ("LIHI")  
P.O. Box 194  
Harrington Park, NJ 07640

Re: Pelton Round Butte (PRB) Hydroelectric Project (FERC No. 2030) ("Project")

Dear Members of the Low Impact Hydropower Institute Review Committee:

The Confederated Tribes of the Warm Springs Reservation of Oregon ("CTWS" or "Tribe") Water Control Board ("WCB") expresses its support for the LIHI re-certification of the Project. The Project is in compliance with the tribal water quality requirements as outlined in the Recertification Questionnaire.

Clean Water Act Section 401 certification was issued by the WCB in June of 2002 ("WCB Certification"). The Project is in compliance with the WCB 401 Certification and related requirements. The Operator, Portland General Electric, regularly convenes stakeholders, settlement parties and regulators, such as the Deschutes River Stakeholder Group, the Fish Committee, Department of Environmental Quality, the WCB and the Water Quality Work Group to share, review and discuss monitoring data related to water quality and fish passage as well as ongoing environmental studies and results from the adaptive management program associated with operations of the selective withdrawal tower.

Based on robust review and inquiry into the ongoing operation of the Project, WCB is satisfied that the Project meets the recertification water quality criteria as it relates to WCB requirements and supports re-certification of the Project.

Sincerely,

Member, Water Control Board



January 12, 2023

Shannon Ames  
Executive Director  
Low Impact Hydropower Institute  
1167 Massachusetts Ave, Office 407  
Arlington, MA 02476

Re: DRA comments on Pelton Round Butte's Low Impact recertification application

On behalf of the Deschutes River Alliance and the Wild and Scenic Deschutes River, we submit these comments on the Pelton Round Butte Hydroelectric Project's application for recertification of its Low Impact status. Pelton Round Butte's (PRB or the "Project") operations directly cause and contribute to ongoing violations of state water quality standards and operational license requirements. This, then, directly harms and harasses threatened and endangered species, impacting their ability to recover. While these two facts alone should prevent PRB's recertification, many other issues exist that further weigh against recertification. Considering all of this, the Deschutes River Alliance (DRA) urges the Low Impact Hydropower Institute (LIHI) to deny PRB's application for recertification as a Low Impact facility.

The Deschutes River Alliance is a science-based advocacy organization seeking collaborative solutions to the threats facing the Wild and Scenic Deschutes River and its tributaries. We advocate for cooler, cleaner water, a healthy ecosystem, and the recovery and protection of robust populations of resident and anadromous fish. In support of our mission, we work to provide science-based facts about the current conditions of the lower Deschutes River (LDR) and their causes. As such, we provide these comments to alert LIHI of the impacts from PRB's current mode of operations.

We ask the Low Impact Hydropower Institute to take a long-term view – both past and future – of the impacts from Pelton Round Butte. Fish health and water quality are worse now than when PRB received its first "Low Impact Certification." No indications exist for improving these situations. For the sake of the lower Deschutes River and for all who rely on it – insect, fish, human, small business, and rural community – we strongly urge you to prevent PRB's recertification.

#### I. Recent History and Impacts

Over the last 12 years of operations, it has become clear that conditions in the lower Deschutes River are not only not improving but are declining. River temperatures

are warmer both overall and for a longer period of time, dissolved oxygen (DO) levels do not support native fish's biological needs, and the river's pH levels exceed basin standards, which provide a numeric indication of increased nutrient loading and the nuisance algal growth it causes. All of this leads to less usable habitat and creates significant imbalances in the aquatic ecosystem.

This decline in water quality is directly attributable to the installation and operation of the Selective Water Withdrawal (SWW) Tower at Round Butte Dam. These measurable shifts in water quality align with the Project's current mode of operation. Likewise, the prevalence of nuisance algae throughout the lower Deschutes only began following the SWW Tower's installation and operation. Despite these known issues, the dam operators continue to use "adaptive management considerations" as a justification to avoid making minor and allowable changes that would improve water quality and fish habitat while also maintaining hydropower operations.

Despite these known issues and a clear understanding that the agreed-to terms of operation are not being met, both dam operators and state regulators have avoided making or mandating needed and required changes. Rather, they have ignored the predetermined mechanisms established in the Project's state-issues water quality certification for modifying operations. Instead, the operators and state regulators pursued a decade of legally dubious "interim agreements." These agreements have materially changed how the dam is operated and what water quality standards are enforced. Worse, these agreements were non-public actions with no opportunity for stakeholders to review or give feedback. After years of settlement negotiation to find mutually acceptable operating conditions, those operating terms were almost immediately thrown out in favor of these non-scrutinized interim agreement. While intended to be temporary agreements, they were renewed annually from 2011 through 2019. Over that time, water quality in the waterbodies directly affected by the Project continued to violate both state standards and the Project's water quality certification and, at time, even the interim agreements themselves.

As a result of declining water quality, the lower Deschutes River's aquatic ecosystem, and in particular its aquatic invertebrates, has begun to shift. The traditional hatches of stoneflies, mayflies, and caddisflies are less prevalent and have shifted their emergence timing. Beginning to outcompete these traditional hatches are worms and snails. This shift is an indication of pollution, as the fly hatches are less pollution-tolerant while worms and snails are more pollution-tolerant. As a result, the resident and anadromous fish of the lower Deschutes River, who have adapted to survive alongside the fly hatches, have had to shift their diets. Snail in particular are much less

advantageous for the fish who cannot easily digest their shells. In addition, the lowered prevalence of flies is likely impacting the birds and bats – causing ripples throughout both the aquatic and terrestrial ecosystem supported by the river.

A direct result of both the changed aquatic and benthic environments and the declining water quality in the lower Deschutes River is a significant uptick in fish disease and parasite prevalence. As noted, aquatic insect populations have shifted to more pollution-tolerant species of worms and snails. Many of these species are the intermediate hosts of the fish diseases *C. shasta*, which plagues the lower Deschutes and its tributaries. In addition, black spot disease and copepod parasites are common issues with resident and out-migrating salmonids. Warmer water temperatures exacerbate the problem, as these diseases increase in virulence as temperatures rise.

All of these changes align with operational changes at the Pelton Round Butte Project. Despite clear data showing a decline in many parameters of the aquatic environment, any efforts up to this point aimed at limiting or eliminating that impact have clearly fallen short. The result is a lower Deschutes River that is in worse condition now than it was in 2009.

## II. Criterion B – Water Quality

The clearest instance of the significant impacts stemming from Pelton Round Butte's (PRB) operations can be seen in the water quality context. After more than a decade of operations and attempted adjustments, it is unclear if the SWW Tower will ever be able to meet the operating conditions promised by the operators in their application materials and expected to be achieved by FERC in decision to relicense PRB. Instead, annual and months-long violations of both those license terms and of the State of Oregon water quality standards are now the norm. Applying LIHI's recertification review criterion for water quality to these facts makes one thing clear – PRB's operations are not "low impact." As a result, LIHI cannot recertify Pelton Round Butte as a Low Impact facility.

The stated goal of Criterion B is to ensure "[w]ater quality is protected in water bodies directly affected by the facility," which includes downstream waters.<sup>1</sup> The introduction to the standard further clarifies that "if any water body affected by the facility has been defined as being water quality limited...the applicant must demonstrate that the facility has not contributed to the impairment in that waterbody."

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<sup>1</sup> LIHI. 2022. LIHI Handbook 2<sup>nd</sup> Edition – Revision 2.05. At page 7 (17/91).



Standard B-2 further requires that the facility must be “in compliance with all water quality conditions contained in a recent Water Quality Certification.” These provide clear measures by which a facility’s impact should be judged.

Under these measures, PRB fails to meet the ‘low impact’ requirements in the water quality context. As noted above, water quality in the lower Deschutes River (LDR) is suffering and has declined as a result of facility operations. The lower Deschutes River, which is immediately downstream of PRB and within its zone of affect, has been designated as water quality impaired in each of Oregon’s Clean Water Act Integrated Reports since 1998.<sup>2</sup> The parameters for which the LDR has been listed have consistently included, among others, temperature, dissolved oxygen, and, most clearly, pH. These issues were known during PRB’s most recent FERC relicensing process, and the resulting requirements found in the State of Oregon’s Clean Water Act Section 401 Water Quality Certification (“401 Cert”) and through the construction of the SWW Tower were expected to improve water quality in the LDR.

Unfortunately, rather than improve, water quality has worsened since PRB’s relicensing. The clearest and most persistent violations happen in the pH context. During the summer months, the State of Oregon standard of 8.5 is regularly exceeded for weeks at a time, with some exceedances starting as early as April.<sup>3</sup> In addition, river temperatures exceed the 401 Cert’s 12°C maximum months earlier than pre-Tower operation and maintain those high temperatures through the late summer and early fall.<sup>4</sup> Finally, dissolved oxygen levels regularly fall below the 401 Cert’s year-round minimum of 9.0 mg/L.<sup>5</sup> The 401 Cert’s standards were the result of years of negotiation and state and federal approvals. Continued non-achievement of these standards shows that Pelton Round Butte does not comply LIHI’s review Standard B-2.<sup>6</sup>

This declining water quality is not surprising when considering that the 401 Cert’s operating conditions have never been fully achieved by PRB’s operators. This is seen most clearly in the prescribed mixing requirements for the SWW Tower. Two sets of precise “blends” were prescribed in order to achieve the goals of improving water quality and facilitating downstream fish passage.<sup>7</sup> Since the Tower became operational,

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<sup>2</sup> More information available at: <https://www.oregon.gov/deq/wg/tmdls/Pages/TMDLs-Deschutes-Basin.aspx>

<sup>3</sup> See *example* PGE. 2022. Project No. 2030 – Pelton Round Butte Hydroelectric Project – Article 416 – 2021 Water Quality Monitoring Report. At pages 32-33 (41-42/65).

<sup>4</sup> *Id.* At pages 10-11 (19-20/65).

<sup>5</sup> *Id.* At pages 26-27 (35-36/65).

<sup>6</sup> LIHI. 2022. LIHI Handbook 2<sup>nd</sup> Edition – Revision 2.05. At page 7 (17/91).

<sup>7</sup> CTWS and PGE. 2002. Pelton Round Butte Project Water Quality Management and Monitoring Plan. At page 5 (6/30).

however, it has become clear that these blends are impossible to achieve in practice. While the blends, at times, call for 100% bottom water to be discharged, the operators have made clear that the actual maximum amount of bottom water that can be “blended” and discharged through the Tower is 60%. This is an enormous change in expectations and clearly shows that PRB’s operations are not complying with the requirements of the applicable Water Quality Certification, as required by LIHI Standard B-2.

Beyond the failures to achieve the prescribed blends, PRB’s operators have also failed to comply with a number of water quality standards set by the Water Quality Certification. Specifically, the minimum standards for pH, temperature, and dissolved oxygen, are all clearly defined and continually violated. The maximum pH levels allowed for the LDR match Oregon’s 8.5 maximum levels.<sup>8</sup> The temperature standard was set at a 12°C maximum to protect the Endangered Species Act-listed bull trout, who are known to use the lower Deschutes.<sup>9</sup> And for dissolved oxygen, operating requirements call for a 9.0 mg/L minimum in order to protect the spawning salmonids who, collectively, use the lower river year-round.<sup>10</sup>

Oregon, in approving PRB’s continued operations, required the operators to meet these elevated protections for temperature and dissolved oxygen. This was likely to ensure the already water quality limited lower Deschutes River is given enough protections to allow it to be restored in order to support its beneficial uses. FERC, along with the US Fish and Wildlife Service and the National Marine Fisheries Service, then relied on the assumption that these standards would be achieved in making their own important relicensing and biological opinions decisions, respectively. Annual and ongoing water quality violations highlight that these expected outcomes are not being met.

Based on years of post-SWW Tower water quality data, Pelton Round Butte’s operations do not meet LIHI’s review criterion standards for water quality. Operational decisions are further contributing to the already water quality limited lower Deschutes River, further impairing the waterbody. In addition, PRB regularly fails to comply with multiple conditions set out in its most recent Water Quality Certification. Either of these shortcomings, alone, is enough to prevent recertification. Combined, the true impacts to the lower Deschutes River from PRB’s continued operations are clearly presented.

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<sup>8</sup> *Id.* at page 12 (13/30).

<sup>9</sup> *Id.* at page 4 (5/30).

<sup>10</sup> *Id.* at page 9 (10/30).



Because Pelton Round Butte does not meet Criterion B for Water Quality, LIHI cannot recertify the Project as “low impact.”

### III. Criterion F – Threatened and Endangered Species Protection

Pelton Round Butte’s negative impact to threatened and endangered species, likewise, should call its low impact status into serious question. Beyond its history of extirpation, listed species impacted by PRB are not having their biological needs met. By failing to adhere to the terms and conditions set out in the Project’s pair of biological opinions, these suffering species are not receiving the full range of protections expected by the approval federal agencies. And despite more than a decade of efforts, reintroduction efforts have essentially remained stagnant – far below sustainable, self-supporting, and harvestable runs. As a result, LIHI cannot recertify Pelton Round Butte as a Low Impact facility.

The Project and its operators bear a heavy burden in the impacts to currently-listed bull trout and steelhead. While the PRB operators’ current efforts to support these listed species are a welcomed outcome, it was preceded by decades of failed and abandoned efforts that blocked off hundreds of miles of historically-used spawning and rearing grounds above the dam complex. In doing so, PRB caused the extirpated numerous salmonid species in the Upper Deschutes and Crooked River basins. After more than a decade of “experimenting” and efforts to get it right, the current reintroduction effort is still far from its goals of creating sustainable, self-supporting, and harvestable runs of Chinook, sockeye, and steelhead. As such, PRB’s impact to endangered species is questionable at best and is a net harm overall.

The stated goal of Criterion F is to ensure the “facility does not negatively impact federal, or state listed species.”<sup>11</sup> Listed species are those that are either in danger of extinction in a significant portion of their range or are likely to near that same danger in the foreseeable future.<sup>12</sup> In order to assess a facility’s impact on these listed species, LIHI looks to state and federal agencies’ formal assessments of environmental impact, the operators’ compliance with any relevant operating conditions and requirements, and, when appropriate, allows for vetted mitigation options. These are reflected in Standards F-2, F-3, and F-4, respectively.

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<sup>11</sup> LIHI. 2022. LIHI Handbook 2<sup>nd</sup> Edition – Revision 2.05. At page 11 (21/91).

<sup>12</sup> *Id.* At page 44 (54/91).

Two biological opinions (BiOp) exist for PRB's operations – one from each of the two federal services tasked with consulting on species-related issues. The U.S. Fish and Wildlife Service's (USFWS) BiOp addresses bull trout.<sup>13</sup> Meanwhile, the National Oceanic and Atmospheric Agency (NOAA) Fisheries' BiOp addresses steelhead.<sup>14</sup> While there are slight differences between these two BiOps, they have very similar mechanisms for ensuring species protections through reasonable and prudent measures and terms and conditions, among others.

Most relevant to bull trout and steelhead are the reasonable and prudent measures and accompanying terms and conditions that require PRB and its operations comply with and implement all of the Settlement Agreement's protection, mitigation, and enhancement measures.<sup>15</sup> While the BiOps do not go into any greater detail about which specific measures this includes, PGE's cover letter and certificate of service for transmitting the Settlement Agreement includes a list of included exhibits and appendices.<sup>16</sup> It is fair to assume that these documents are, at minimum, what USFWS and NOAA Fisheries intended to be fully implemented by PRB operators in support of their approval of continued dam operations.

Among these listed documents are the Water Quality Certifications and the Water Quality Management and Monitoring Plan for Pelton Round Butte. As noted above in our review of LIHI's water quality review criterion, PRB's operations are not achieving these requirements. And as such, PRB is failing to achieve Standard F-3, which requires compliance with relevant conditions in, among others, biological opinions.<sup>17</sup> By not fully implementing the expectations of the 401 Cert and accompanying Water Quality Management and Monitoring Plan, PRB's operators are failing to comply with the terms and conditions and the reasonable and prudent measures of these two Biological Opinions. As a result, PRB does not achieve LIHI Standard F-3.

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<sup>13</sup> USFWS. 2004. Endangered Species Act – Section 7(a)(2) – Biological Opinion and Concurrence on the Issuance of a New License for the Pelton Round Butte Hydroelectric Project – Deschutes, Crook, Jefferson, Marion, and Wasco Counties, Oregon.

<sup>14</sup> NOAA Fisheries. 2005. Endangered Species Act – Section 7(a)(2) Consultation – Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Consultation – Pelton Round Butte Hydroelectric Project, FERC Project No. 2030, Deschutes River, Jefferson County, Oregon.

<sup>15</sup> See USFWS BiOp at page 43-44 (48-49/68). See also NOAA Fisheries BiOp at pages 9-3 and 9-4 (76-77/92).

<sup>16</sup> FERC. 2004. Project No. 2030 – Offer of Settlement and Joint Explanatory Statement In Support of Settlement Agreement, and Request for Technical Conference.

<sup>17</sup> LIHI. 2022. LIHI Handbook 2<sup>nd</sup> Edition – Revision 2.05. At page 11 (21/91).

Likewise, PRB's operations do not meet any of LIHI's other Threatened and Endangered Species review standards. Standard F-1 applies only when there are not listed species in the facility's areas. Standard F-2 applies only if relevant state and federal agencies make a finding of no significant impact stemming from the facility's operations. The existence of biological opinions makes this standard inapplicable. And finally, Standard F-4 allows for acceptable mitigation efforts to comply with the LIHI Review Criterion. However, mitigation is only allowed "[i]f a newly listed species" has been found at the facility, "and no incidental take permit or statement, biological opinion, habitat conservation plan, or similar government document relevant to the facility exists."<sup>18</sup> Again, with two applicable biological opinions for PRB, full compliance with their terms and conditions is the proper way to assess compliance with LIHI's review standards.

Pelton Round Butte's failure to comply with the two biological opinions for bull trout and steelhead must prevent LIHI from recertifying the Project as "low impact." Both USFWS and NOAA Fisheries chose to include all of the protections agreed to in the Settlement Agreement. By their inclusion, these federal entities expected all of the terms to be achieved in making their ultimate decision of whether PRB could continue operation in compliance with the Endangered Species Act. By failing to achieve the expected operation outcomes, especially in the fundamentally important water quality context, PRB's operations call into question whether these listed species are actually being protected. Without compliance with the biological opinions, LIHI's review criterion for threatened and endangered species is not be met, and Pelton Round Butte cannot be recertified.

#### IV. Methane Emissions

Emerging science is bringing a new impact of hydroelectric dam operations to the attention of operators, regulators, and conservationists – methane emissions. Inextricably linked to dam operations, these emissions call hydroelectric generation's "low impact" status into further – especially considering methane's enormous warming potential. While this emerging issue and its impacts do not neatly fit neatly into any current review criteria, LIHI should seriously consider the resulting impacts from methane emissions before facilities like Pelton Round Butte receive a "low impact" certification.

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<sup>18</sup> *Ibid.*

Research out of Washington State University shows that hydropower reservoirs are a major source of human-caused methane emissions.<sup>19</sup> Studies of dams in Oregon and Washington have found that reservoirs with eutrophic conditions or high chlorophyll-a levels have heightened methane production and are likely to have significant methane emissions.<sup>20</sup> Globally, reservoir-originating methane emissions are a top-6 source of methane – on par with biomass and biofuel burning or global rice cultivation.<sup>21</sup>

While hydroelectric generation is often touted as a greenhouse gas emission-free source of electricity generation, the reservoirs necessary for that generation are serious contributors of methane emission around the world. Methane is a potent greenhouse gas, with its impact being multiple times stronger than carbon dioxide's, especially over the short-term. The US Environmental Protection Agency (EPA) states that methane's warming potential is 25x more than carbon dioxide.<sup>22</sup> MIT points out that this EPA measure is methane's impact over a 100-year period.<sup>23</sup> Due to methane's relatively short life in the atmosphere, that 100-year timeframe dilutes methane's true warming impact in the short-term. Over its first 20 years in atmosphere, methane's impact is at least 80x that of carbon dioxide. Regardless of measurement methodology, methane is a significant contributor to global warming and climate change, and sources of methane emissions have significant impacts not just locally but globally.

Pelton Round Butte's reservoirs seem to fit the necessary conditions to be considered a significant emitter of methane. Its two largest reservoirs – Lake Billy Chinook and Lake Simtustus – both face eutrophic conditions.<sup>24</sup> Likewise, both of these reservoirs have such high chlorophyll-a levels that they are listed as impaired for that parameter in Oregon's most recent Integrated Report.<sup>25</sup> The water quality conditions in these reservoirs, in light of the growing understanding methane production and

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<sup>19</sup> See <https://news.wsu.edu/press-release/2021/06/01/greenhouse-gas-emissions-reservoirs-higher-previously-expected/> among other sources.

<sup>20</sup> American Rivers (webinar). Jan 2022. "Understanding Greenhouse Gas Emissions from Reservoirs: Insights from Field Studies and a Global Model." Presented by Prof. John Harrison (Washington State University).

<sup>21</sup> *Ibid.*

<sup>22</sup> <https://www.epa.gov/gmi/importance-methane>

<sup>23</sup> <https://climate.mit.edu/ask-mit/why-do-we-compare-methane-carbon-dioxide-over-100-year-timeframe-are-we-underrating>

<sup>24</sup> Eilers, Joseph and Kellie Vache. 2021. Water Quality Study for the Pelton Round Butte Project and the Lower Deschutes River: Monitoring & Modeling. At page ii (35/623). See also page 321 (358/623) for LBC, and page 323-24 generally (360-61/623) for Lake Simtustus.

<sup>25</sup> DEQ submitted its 2022 Integrated Report to EPA in May 2022. It is current pending final EPA approval. See DEQ website for more information - <https://www.oregon.gov/deq/wq/Pages/proposedIR.aspx>

emission, raise serious questions about PRB's contributions to global warming and the true range of its impacts.

Before recertifying PRB as a "low impact" facility, LIHI must factor in these likely methane emissions. One of the major benefits of a facility receiving LIHI's Low Impact Certification is that its generated electricity is able to receive renewable energy credits (RECs) and can count that production towards the generator's renewable portfolio standard (RPS) requirements.<sup>26</sup> Like many, LIHI assumes that these dams are "pollution-free" sources of energy.<sup>27</sup> Unfortunately, if that initial assumption is incorrect, as these recent studies have noted, many other assumptions fall apart. Is a hydroelectric project (and the electricity it produced) "low impact" if it is producing similar amount of methane as non-renewable energy sources? And, when combined with other environmental impacts, should electricity from these dams be given RECs and counted towards RPSs if they are directly and significantly contributing to greenhouse gas emission and global warming? The DRA does not think so, and we urge LIHI to carefully consider this issue in Pelton Round Butte's recertification process.

As one potential path forward, we ask that LIHI include a Condition on PRB's recertification that delves further into this issue. Most urgently needed are data about methane emissions from Lake Billy Chinook and Lake Simtustus. The extent of methane emissions from a facility falls squarely within the question of a facility's operational impacts, and determining whether a facility is a methane emitter should be step one. This Condition could require the dam operators to set up monitoring devices and collect data on methane emission from PRB's reservoirs. Once data have been collected, this Condition can further spell-out next steps – such as determining whether more monitoring is needed, processing the data through independent reviewers, establishing reduction strategies, or, if need be, revoking PRB's Low Impact Certification. It is absolutely vital that LIHI require some Condition for PRB's continue Low Impact Certification that determine the true extent of these methane-related impacts.

LIHI must carefully consider Pelton Round Butte's "low impact" status in light of the developing scientific understanding around methane emissions from hydropower reservoirs. Methane is one of the most potent sources of global warming. If a LIHI-certified facility is a significant contributor of methane emissions, its "low impact" status must seriously be considered. We ask that LIHI look further into this question and determine the true extent of the issue at Pelton Round Butte.

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<sup>26</sup> OAR 330-160 *et seq.* <https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=1116>

<sup>27</sup> <https://lowimpacthydro.org/about-us-2/>

## V. Forthcoming changes to governing laws and certifications

Beyond the actual impacts from Pelton Round Butte's continued operations detailed above, changes to both Oregon water quality laws and to the PRB's operating documents are expected within the next year. With these looming changes, the DRA urges LIHI to carefully consider how it assesses PRB's ongoing ability to comply with LIHI review criteria, to set Conditions that will operate independent of potentially changing standards, and to ensure that all of the waters and species affected by the Project are impacted as little as possible.

The first change will be to the State of Oregon's fish and aquatic life use maps.<sup>28</sup> DEQ is in the process of developing a proposed rulemaking that will both update the current designations and create new use subcategories to better support beneficial uses related to fish and aquatic life.

The fish and aquatic life map updates will mainly focus on two water quality standards – temperature and dissolved oxygen. The temperature-related updates will maintain the current system of subcategorization of various segments of Oregon's many water bodies. Existing categories for temperature are set based on how waters are used by salmonids and other native fishes. DEQ is using this opportunity to incorporate over a decade's worth of data into the maps to ensure that actual fish uses are being protected where and when they are known to use those waters.

The changes likely for dissolved oxygen, on the other hand, will be more involved than the temperature changes. This is because DEQ is proposing to create new subcategorizations for establishing applicable dissolved oxygen levels. As currently proposed, DEQ will rely on temperature use designations in their subcategorizations. The approach will also attempt to more precisely define when spawning activities occur in specific water bodies and, in response, provide heightened protections during those periods.

In addition to these use designation changes, DEQ is also proposing to relax pH standards in two of the lower Deschutes' tributary streams – the Crooked River and Trout Creek. Of these, the Crooked River's relaxation would be the most impactful, as it

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<sup>28</sup> DEQ. Fish and Aquatic Life Use Updates 2022 webpage. Available at: <https://www.oregon.gov/deq/rulemaking/Pages/aquaticlife2022.aspx>

contributes over 80% of the nitrogen entering the lower Deschutes River<sup>29</sup> and more than half of the dissolved phosphorous entering into Lake Billy Chinook.<sup>30</sup> By proposing a shift from 8.5 to 9.0, it is very likely that these upstream water bodies will lower in quality – directly impacting downstream waters. The Crooked River, compare to the Metolius and Middle Deschutes, is a major source of nutrient pollution and heightened pH levels for both Lake Billy Chinook’s surface water and for the lower Deschutes.<sup>31</sup> Due to the frequency of 100% surface water withdrawal through the SWW Tower, any reduction in Crooked River water quality will be directly passed on to the lower Deschutes River, where the pH standard is not changing and is already being exceeded for months each year. As a consequence of worsening upstream water quality, operational decisions will play an enormous role in lower river water quality. Any failure to anticipate or respond to these changes from PRB’s operators will result in direct contributions to growing pH violations and worsening habitat conditions for ESA-listed and State of Oregon species of concern.

The rulemaking is expected to be submitted to the Oregon Environmental Quality Commission in Spring 2023, after which it will be submitted to the EPA for final review and approval.

The second forthcoming change that will impact PRB and its waters is a formal revision to its Clean Water Act Section 401 Certification. While revisions to the 401 Cert have been known to be necessary since at least 2013,<sup>32</sup> formal efforts only began in recent years. In PRB’s last interim agreement, DEQ required PRB’s operators to request and actively seek revisions to the 401 Cert,<sup>33</sup> and in 2020, PRB’s operators requested those revisions.<sup>34</sup> Following the request, DEQ began its Findings and Evaluation process. However, it has since paused the process and is waiting for the fish and aquatic life updates to finish. As noted, this will not likely occur until Summer 2023 at the earliest. With at least a 45-day comment periods likely to precede a months-long review, it is likely that the 401 Cert revision will not be completed into Fall or Winter 2023.

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<sup>29</sup> Eilers and Vache. 2021. Water Quality Study for the Pelton Round Butte Project and Lower Deschutes River: Monitoring & Modeling. At page 296 (333/623).

<sup>30</sup> Eilers and Vache. 2019. Water Quality Study for the Pelton Round Butte Project and Lower Deschutes River: Monitoring & Modeling. At page ii (37/606).

<sup>31</sup> *Id.* at pages 51-54 (90-93/606)

<sup>32</sup> Declaration of Eric Nigg. 2018. At page 10 (¶ 28). *See also* DEQ clarification. 2018. At page 3 (¶ 2).

<sup>33</sup> DEQ and PGE. 2019. Section 401 Interim Agreement for the Pelton Round Butte Hydroelectric Project. At page 3 (Agreement § 3).

<sup>34</sup> DEQ. 2021. Draft Evaluation and Findings Report – Clean Water Act Section 401 Water Quality Certification Modification – Pelton Round Butte Hydroelectric Project (FERC No. 2030). At page 1.



Third, and finally, a direct result of the revisions to the 401 Cert and the Water Quality Management and Monitoring Plan will be the reinitiation of Endangered Species Act consultation and the issuance or potential revocation of PRB's biological opinions. Both the USFWS<sup>35</sup> and NOAA Fisheries<sup>36</sup> BiOps specifically include the regulatory requirement<sup>37</sup> that consultation be reinitiated in certain conditions. Among these, modification to these State of Oregon-issued operational requirements is a "subsequent[] modif[ication]...that causes an effect to the listed species or critical habitat not considered in [the original] Opinion."<sup>38</sup> The new water quality standards and operating requirement likely to result from a new 401 Cert and Management and Monitoring Plan will certainly cause effects to bull trout and steelhead that were not considered in the nearly two-decade old BiOps for PRB. As such, those biological opinions, which constitute the basis of compliance for LIHI Review Criterion F, will be at best altered and at worst revoked.

These three upcoming revisions to Oregon law and Pelton Round Butte operational documents will result in significant changes in operational requirements, protections for water quality and listed fish species, and whether the Project is continued to be permitted at all. To ensure that environmental and ecological baselines do not shift, we urge LIHI to carefully consider how it can ensure that Pelton Round Butte's operations are truly "low impact" and, as necessary, establish Conditions to preserve water quality and listed species protections.

## VI. Conclusion

The Deschutes River Alliance calls on the Low Impact Hydropower Institute to reject the recertification of the Pelton Round Butte Hydroelectric Project as a Low Impact Facility. The Project fails to comply with two separate LIHI review criteria – water quality and threatened and endangered species protection. Failure to comply with either of these criteria alone is enough to prevent recertification. In addition to these shortcomings, there are serious concerns that Pelton Round Butte's operation result in significant methane emissions. Before certifying the Project as low impact, LIHI must ensure that the facility is not emitting these potent greenhouse gasses and negatively impacting global warmings. Considering these shortcomings, we oppose any action to recertify Pelton Round Butte as a low impact facility.

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<sup>35</sup> USFWS BiOp. At page 45 (50/68).

<sup>36</sup> NOAA Fisheries BiOp. At page 11-1 (79/92).

<sup>37</sup> 50 CFR § 402.16. (<https://www.law.cornell.edu/cfr/text/50/402.16>)

<sup>38</sup> 50 CFR § 402.16(a)(3).

Sincerely,

A handwritten signature in blue ink, consisting of a stylized 'S' followed by a 'C' and a 'D'.

Sarah Cloud  
Executive Director  
Deschutes River Alliance

## **Appendix D**

### **Designated Beneficial Uses of the Deschutes River Basin**

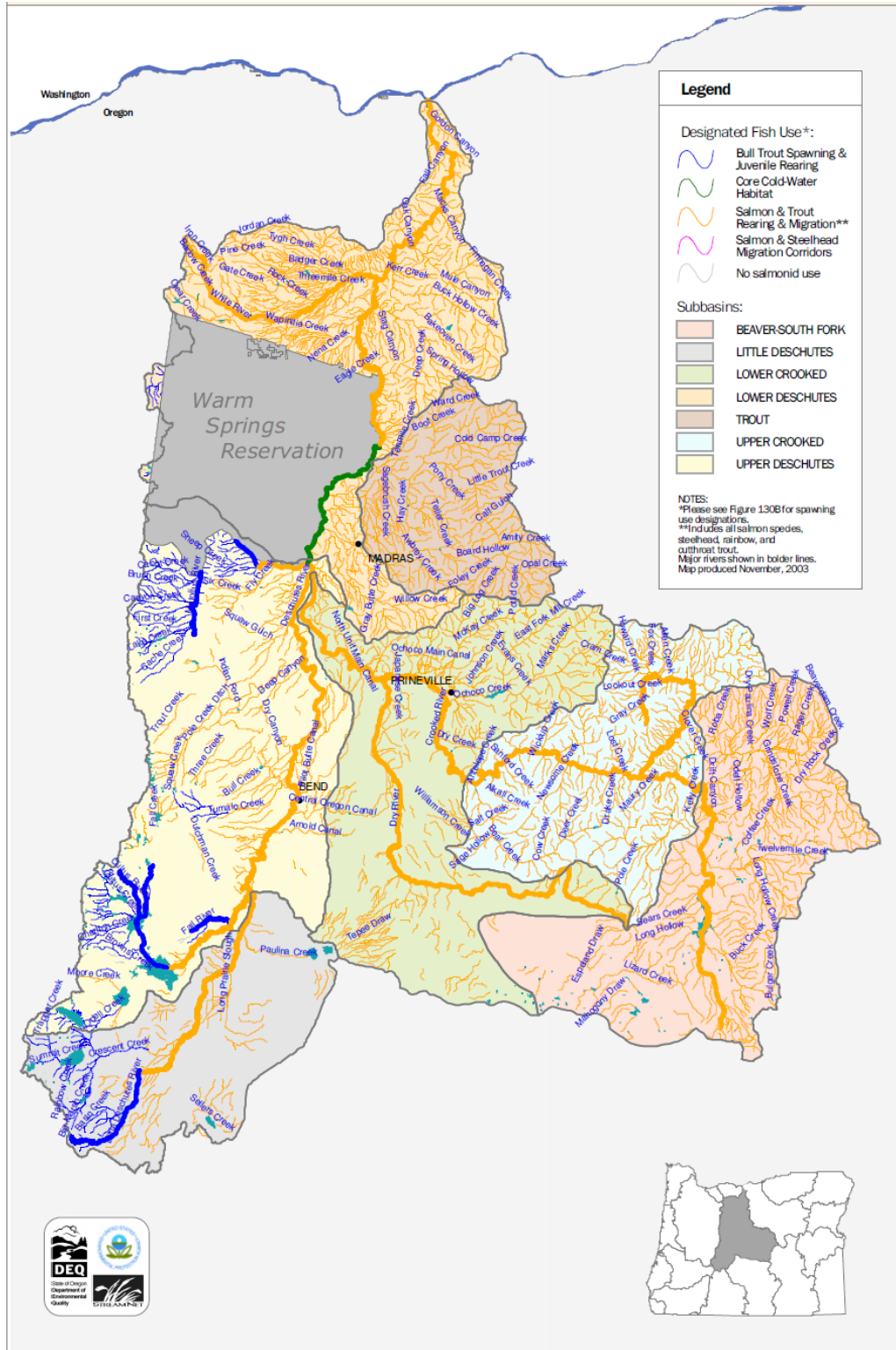
**OAR 340-041-0130**  
**Table 130A**  
**Designated Beneficial Uses**  
**Deschutes Basin**

<b>Beneficial Uses</b>	<b>Deschutes River Main Stem from Mouth to Pelton Regulating Dam</b>	<b>Deschutes River Main Stem from Pelton Regulating Dam to Bend Diversion Dam and for the Crooked River Main Stem</b>	<b>Deschutes River Main Stem above Bend Diversion Dam &amp; for the Metolious River Main Stem</b>	<b>All Other Basin Stems</b>
Public Domestic Water Supply <sup>1</sup>	X	X	X	X
Private Domestic Water Supply <sup>1</sup>	X	X	X	X
Industrial Water Supply	X	X	X	X
Irrigation	X	X	X	X
Livestock Watering	X	X	X	X
Fish & Aquatic Life <sup>2</sup>	X	X	X	X
Wildlife & Hunting	X	X	X	X
Fishing	X	X	X	X
Boating	X	X	X	X
Water Contact Recreation	X	X	X	X
Aesthetic Quality	X	X	X	X
Hydro Power		X		
Commercial Navigation & Transportation				

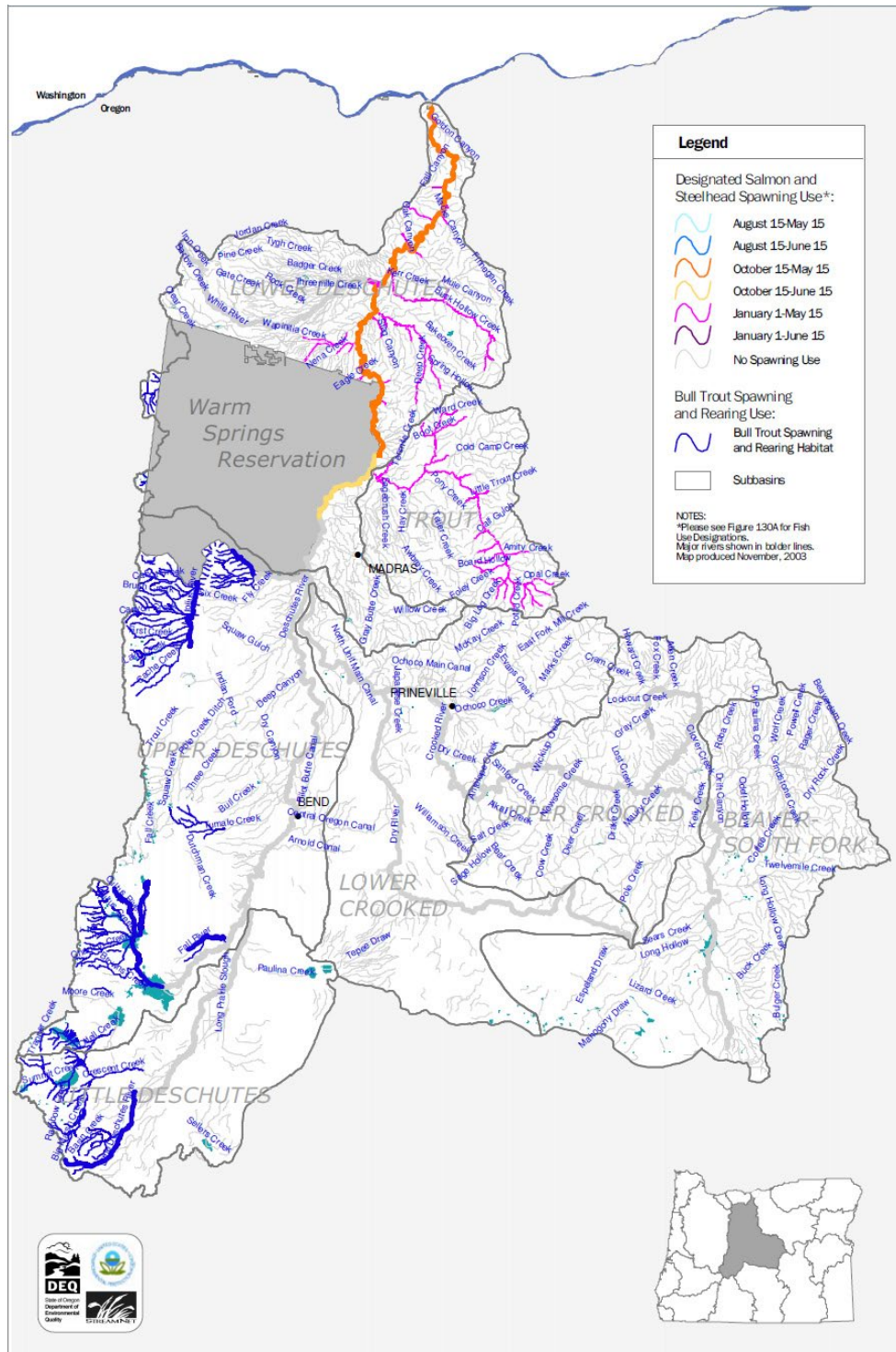
<sup>1</sup> With adequate pretreatment (filtration and disinfection) and natural quality that meets drinking water standards.

<sup>2</sup> See also Figures 130A and 130B for fish use designations for this river.

# OAR 340-041-0130 – Figure 130A Fish Use Designations Deschutes Basin



# OAR 340-041-0130 – Figure 130B Salmon and Steelhead Spawning Use Designations Deschutes Basin



## **Appendix E**

### **Fish Passage Requirements FPA Section 18 Prescriptions**

## FERC LICENSE - APPENDIX C

### U.S. Fish and Wildlife Service Section 18 Fishway Prescriptions

The fishway prescriptions are identical to Proposed Articles 17-33 and 38 of Exhibit A of the Settlement Agreement. For ease of reference, we include the numbering system used in the Settlement Agreement.

#### **1. Fish Passage Plan (Proposed Article 17)**

The Licensees shall implement the Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)], including but not limited to the measures described in paragraphs (a) through (d) of this article.

(a) The Licensees shall implement the Fish Passage Plan to establish self-sustaining harvestable anadromous fish runs of Chinook, steelhead and sockeye above the Project. The anadromous fish that are reintroduced shall pose acceptable minimal risks of fish disease agent introduction. The target population sizes to be used for self-sustaining harvestable runs of each species will be those developed by the Oregon Department of Fish and Wildlife (ODFW) and Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR), in conjunction with the Licensees and the Fish Committee, based on historic information, modeling, habitat production capacity estimates, and research results.

(b) The Licensees shall provide for safe, timely and effective upstream and downstream fish passage of adult and juvenile life stages of spring and fall Chinook, summer steelhead, sockeye salmon, bull trout, rainbow trout, and mountain whitefish.

(c) The Licensees shall implement a three-phase fish passage program, including sequential step-by-step implementation with clearly stated targets, accomplishments, consultation, and prerequisite requirements for each phase. The three phases are Experimental, Interim, and Final.

(i) The Experimental Passage Phase is the current stage of fish passage at the Project and includes but is not limited to modeling of currents in and water withdrawal from Lake Billy Chinook, conceptual designs for downstream passage facilities at Round Butte Dam, Pelton Fish Trap improvements, juvenile migration studies in Lake Billy Chinook, fish health monitoring, approval of the Fish Health Management program and stock selection of species.



(ii) The Interim Passage Phase shall include investigations of fish passage methods and construction of selective water withdrawal (SWW) facilities and temporary and permanent downstream passage facilities at Round Butte Dam. Actions and adaptive management studies for this phase shall include but are not limited to:

- (1) Evaluation of the Round Butte Dam SWW system;
- (2) Hydraulic and biological evaluation of the Round Butte Dam temporary and permanent downstream collection and fish handling facilities;
- (3) Biological evaluation of the adult fish release facility;
- (4) Modification and reactivation of the Pelton Dam historical downstream migrant facility;
- (5) Conducting predation studies in Lake Billy Chinook; and
- (6) Conducting fish health monitoring and evaluation.

(iii) The Final Passage Phase shall include actions and adaptive management studies for feasibility determination, development and construction of permanent upstream fish passage facilities, contingent on the achievement of successful downstream passage at the Project. These actions and studies shall include:

- (1) Reactivation and evaluation of the Pelton Fish Ladder for volitional upstream fish passage;
- (2) Construction of new ponds or facilities to rear juvenile spring Chinook or construction of a new ladder to retain or replace existing spring Chinook rearing capacity;
- (3) Construction of a new fish ladder, or other volitional upstream fish passage facility, at Round Butte Dam; and
- (4) Continued monitoring of the success, and improvement if necessary, of fish passage for all species.

(d) The Licensees shall conduct effectiveness monitoring, annual work plans, and a phased approach that includes:

- (i) A specific schedule of timelines, including Testing and Verification studies, study results, and decisions;
- (ii) Analysis of self-sustaining harvestable anadromous fish runs with the use of life cycle models and evaluation of passage efficiencies and survival estimates for the different life history stages of each species;
- (iii) Establishment of performance measures and monitoring success towards achieving performance measures;
- (iv) Evaluation of spawning and rearing and movement of re-introduced fish species;
- (v) Evaluation of movement of native resident fish species upstream and downstream through Project facilities and reservoirs;
- (vi) Trap and haul of adult fish subject to the long-term goal of volitional upstream fish passage, which will eventually require construction, evaluation, and monitoring of upstream collection facilities, if determined to be feasible;
- (vii) During initial implementation, capturing and marking out migrating smolts from above the Project so that they may be differentiated from other returning adults in subsequent years;
- (viii) Continued reservoir and drogue studies to refine operations and implementation of structural changes that will assist juvenile migration through Lake Billy Chinook;
- (ix) Annual evaluation of stock performance success via outmigrant escapement and adult returns, including periodic evaluation and validation of the model results to determine the efficacy of the passage program;
- (x) Preparation of design specifications for fish passage facilities in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities; and
- (xi) Fish passage standards and monitoring, evaluation and reporting requirements.

## **2. Fish Passage Criteria and Goals (Proposed Article 18)**

- (a) The Licensees shall provide that upstream and downstream passage facilities will be functional during all months of the year to provide safe, timely and effective passage

for resident and anadromous fish.

(b) The following table summarizes the criteria and goals for safe, timely and effective downstream and upstream passage for fish.

<b>Criteria And Goals For Safe, Timely And Effective Downstream And Upstream Passage</b>	
<b>Item</b>	<b>Criteria and Goals</b>
1. Screen Hydraulic Criteria	NOAA Fisheries smolt criteria (as provided in Article 22)
2. Downstream Passage Facility Survival (from Round Butte collection to lower Deschutes River release point)	93 percent smolt survival for temporary facility during first five years of operations.  96 percent smolt survival for permanent facility.
3. Upstream Passage Facility Survival (from lower Deschutes River collection point through Adult Release Facility)	95 percent during first five years of operations.  98 percent after five years.
4. Round Butte Reservoir Downstream Passage Associated with Temporary Passage Facilities	>50 percent of a statistically significant sample of tagged steelhead or spring Chinook outmigrants from any Project tributary averaged over four years of study.
5. Round Butte Reservoir Downstream Passage Associated with Permanent Collection Facilities	>75 percent survival of PIT-tagged smolts calculated as a rolling 4-year average during the first 12 years.

### **3. Fish Passage Schedule (Proposed Article 19)**

The Licensees shall implement the comprehensive schedule for design, construction, operations and monitoring of upstream and downstream passage facilities included in the Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)].

### **4. Phased Construction of Selective Water Withdrawal and Downstream Fish Passage Facilities (Proposed Article 20)**

(a) The Licensees shall prepare, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, and file with the Commission a design and schedule to construct the selective water withdrawal and downstream passage facilities in the following two phases in accordance with the approved schedule: (1) construction of the selective water withdrawal structure, which shall include a temporary downstream passage facility and (2) construction of the permanent downstream passage facility. The temporary and permanent facilities shall both include a sampling area to support biological evaluation of the fish screens and fish bypass facilities, and a mechanical screen cleaner or some other suitable device to prevent the accumulation of sediment and debris that might otherwise impair screen function and cause the delay, injury, or mortality of downstream migrating

fish at Round Butte Dam. Upon Commission approval, the Licensees shall construct the selective water withdrawal (“SWW”) and downstream passage facilities.

(b) The Licensees shall install and operate a permanent downstream fishway that meets National Marine Fisheries Service smolt criteria within the forebay at the Round Butte Dam, including fish screens, guidance devices, and fish bypass facilities as described in the Fish Passage Plan. The Licensees shall construct permanent downstream passage facilities after determining, in consultation with the Fish Committee, Oregon Department of Environmental Quality, and CTWS Water Control Board, that the blend of surface/deep water withdrawal through the selective water withdrawal facility will:

(a) satisfy the criteria for safe, timely and effective downstream passage associated with temporary passage facilities set forth in Article 18; and (b) currently meet water quality criteria set forth in the 401 certificates, or likely meet the water quality criteria within a reasonable time through continued iterative adjustments of the SWW system as constructed with permanent downstream passage facilities and/or through implementation of other water quality management strategies. The Licensees shall evaluate downstream movement as described in the Fish Passage Plan.

(c) The Licensees shall notify the Fish Committee in writing when the downstream fishways are fully operational. Operation, maintenance, and monitoring of downstream fishways shall be conducted in accordance with the Downstream Fishway Operation and Maintenance Plan and Downstream Fishway Monitoring Plan, which the Licensees shall file with the Commission after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon Commission approval and coincident with the initiation of downstream fishway operations, the Licensees shall begin implementation of the plans.

## **5. Downstream Passage Facilities At Round Butte Dam (Proposed Article 21)**

The Licensees shall submit for the review by the Fish Committee, and for approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the results of all downstream fishway design investigations, preliminary design plans and specifications, and final design plans and specifications for the construction and operation of temporary and permanent downstream fishways at Round Butte Dam to meet National Marine Fisheries Service smolt criteria. To the extent not otherwise completed as Interim Measures as described in Exhibit B to the Settlement Agreement and reported to the Commission pursuant to Article 41, the Licensees shall complete the following modeling and design steps prior to the construction of the selective water withdrawal (SWW) facilities and the downstream fish passage facilities:

(a) ***Constructability and Feasibility:*** Constructability/feasibility design is the first step needed to select a design option and facility location.

(b) **Design Consultation:** After the constructability/feasibility design is complete and a preferred option is selected, the Licensees shall consult with the Fish Committee, Oregon Department of Environmental Quality, and the Confederated Tribes of the Warm Springs Water Control Board prior to starting detailed design.

(c) **Modeling:** If the constructability/feasibility studies do not result in a clear cut recommended design selection, then computational fluid dynamics (CFD) modeling may be used to provide additional input into the selection.

(d) **Design selection:** If the CFD modeling is not required to make the design selection, CFD modeling and the progression to the 25% design stage will be conducted concurrently. The CFD modeling results will be used to optimize facility geometry and to review design features to provide the best attraction currents in the forebay and around the facility.

(e) **Physical Model:** After the 25% design stage and the CFD modeling have been completed, the results will be used to construct a physical model of the structure. The primary purpose of the physical modeling is to investigate the internal hydraulics of the structure and to evaluate entrance hydraulic conditions. Concurrently, the design will progress to the 50% stage.

(f) **Design Consultation and Review:** After the physical modeling is complete and the design has progressed to 50%, consultation with the Fish Committee (and with the Commission for dam safety purposes) will be undertaken prior to proceeding with further design.

(g) **Final Consultation:** After consultation is complete, the design will progress to 90%, and then to final status. The Licensees shall file the final design with the Commission after consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon Commission approval, the Licensees shall construct the SWW and temporary downstream passage facilities.

## **6. Criteria for Downstream Passage Screen Design (Proposed Article 22)**

(a) The downstream passage facilities at Round Butte Dam shall meet the National Marine Fisheries Service (NOAA Fisheries) smolt criteria; however, the facilities' exclusion plates do not have to meet the NOAA Fisheries criteria for sweeping velocity and contact time.

(b) The smolt criteria include, but are not limited to, a maximum approach velocity perpendicular to the screens and exclusion plate of 0.80 feet per second (fps), screen openings no larger than 0.25 inches, a screen sweeping velocity component no less than 0.80 fps, and a screen contact time no greater than 60 seconds. Due to the size of the structure and the experimental nature of safely attracting and capturing juvenile migrants from Lake Billy Chinook, some components of the fish screen and bypass system may require flexibility to design and construct to NOAA Fisheries smolt criteria, and the Licensees shall design the fish screening and collection facilities in consultation with the Fish Committee based on the best available scientific information.

(c) The Licensees shall design screening facilities to screen less than 14,000 cfs only if water quality modeling verifies that flows above 9,000 cfs can be routed through the deep intake without impact to the Project's ability to meet water quality standards and without detrimental impact to the flow pattern and fish attraction in Lake Billy Chinook.

## **7. Round Butte Deep Exclusion Screen (Proposed Article 23)**

(a) The Licensees shall design the Round Butte deep exclusion screen to meet National Marine Fisheries Service (NOAA Fisheries) smolt criteria except for the criteria for sweeping velocity and contact time. In addition, outmigrant collection facilities will not be required at the deep exclusion screen. The Licensees shall evaluate hydraulic performance as soon as possible after the deep exclusion screen has been installed. If the screen does not meet applicable NOAA Fisheries smolt criteria at full hydraulic capacity, the Licensees shall take any necessary measures to meet applicable NOAA Fisheries smolt criteria. The Licensees shall continuously monitor differential pressure through the deep exclusion screen while the lower withdrawal system is in operation.

(b) The Licensees shall conduct studies of fish impingement at the Round Butte deep exclusion screen. Monitoring will be conducted during the first year after installation of the deep exclusion screen when deepwater withdrawal has been initiated, and when deepwater withdrawal is maximized. The duration of monitoring will depend on the monitoring method selected, but must be for a period sufficient for evaluating the possibility of impingement.

(c) The Licensees shall monitor the hydrodynamic and biological effects of Project operations during the first season after installation of permanent screens for the Round Butte downstream fish passage facility, and at least once every five years thereafter. The Licensees shall, in consultation with the Fish Committee, evaluate the need for additional monitoring based on the previous monitoring data.

(d) If the monitoring indicates that there is impingement of fish at the Round Butte deep exclusion screen, the Licensees shall consult with the Fish Committee to determine if impingement is significant because it impedes the Licensees' ability to achieve the objectives for Interim and Permanent Downstream Passage. If the Fish Committee determines that the effects are significant, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective authorities, take any feasible measures or implement modifications within their control that are necessary to reduce impingement below the level of significance. These measures include but are not limited to operations modifications, cleaning system modifications, louver adjustments, and deterrent systems such as strobe lights or sound to keep fish away from the exclusion screening. The Licensees shall re-evaluate the facility the next time deepwater withdrawal has been initiated or maximized. If there are no feasible structural or operational measures within the Licensees' control that will reduce impingement below significant levels, the Licensees shall, in consultation with the Fish Committee, investigate and implement alternative mitigation measures.

#### **8. Downstream Passage Facility Pumped Attraction (Proposed Article 24)**

The Licensees shall design the permanent downstream collection facility at Round Butte Dam to include the ability to add pumps with a total capacity of 3,000 cfs and all appurtenant devices. The Licensees shall, before construction of the permanent downstream collection facility, prepare and provide the Fish Committee a report on the need to add pumped attraction flow. The report shall be based on information gathered during the Testing and Verification studies pursuant to Article 29 and prepared in consultation with the Fish Committee. If the Fish Agencies conclude that it is necessary to add pumped attraction flow, the Licensees shall, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, develop a plan to design, construct, and operate pumps to provide appropriate attraction flow to the permanent downstream collection facilities. Upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall submit the plan to the Commission for approval. Upon Commission approval, the Licensees shall implement the plan.

#### **9. Trap and Haul Facilities (Proposed Article 25)**

(a) The Licensees shall provide upstream passage using trap and haul until volitional upstream passage is implemented pursuant to provisions of the Fish Passage Plan.

(b) The Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a final monitoring plan for the operation and

maintenance of trap-and-haul fishways at the Pelton Round Butte Project. The plan shall provide for the submission of an annual monitoring report to the Fish Committee for the duration of the operation of the interim trap-and-haul fishways. Upon Commission approval, the Licensees shall implement the plan.

(c) The Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan for conducting tests of upstream passage facility survival using standard methodology for evaluation of direct injury and mortality, and other factors. The plan shall provide that, in consultation with the Fish Committee the Licensees shall take any feasible measures or implement modifications within their control that are necessary to meet the 95 percent survival standard during the first five years of operations, and the 98 percent survival standard after five years. This survival standard applies to collection at the Pelton Trap, transportation to the adult release facility, and release through the adult release facility. After correcting any deficiencies, the Licensees shall re-test the facilities to ensure compliance with the applicable upstream passage facility survival standard. After compliance with the upstream passage facility survival standard is verified, additional re-testing will only be required if deficiencies are observed. The plan will identify the methods of observation used to detect deficiencies through long-term monitoring. Upon Commission approval, the Licensees shall implement the plan.

#### **10. Adult Release Facility (Proposed Article 26)**

(a) ***Design and Construction of Adult Release Facility.*** The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with the Commission preliminary design, final design, and construction plans for an Adult Release Facility at the Round Butte forebay. Upon Commission approval, the Licensees shall implement the plans.

(b) ***Operation of Adult Release Facility.*** The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with the Commission an operation and maintenance plan for the Adult Release Facility for the safe, timely and effective upstream passage of anadromous fish when Lake Billy Chinook is thermally stratified. Upon Commission approval, the Licensees shall implement the plan.

(c) ***Monitoring and Evaluation of Adult Release Facility.*** The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with the Commission a monitoring and evaluation plan for the Adult Release Facility. Upon Commission



approval, the Licensees shall implement the plan.

**(d) *Modifications to Adult Release Facility.*** The Licensees shall prepare and provide the Fish Committee reports in accordance with the monitoring and evaluation plan for the Adult Release Facility. The reports shall be based on monitoring of the Adult Release Facility, shall describe any possible need to modify the Adult Release Facility, and shall be prepared in consultation with the Fish Committee. If the Fish Agencies conclude that the Adult Release Facility must be modified to ensure safe, timely, and effective upstream passage, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop a plan to modify the Adult Release Facility to ensure safe, timely, and effective upstream passage, which plan may include, but need not be limited to, measures or modifications required to meet the survival standard applicable to collection at the Pelton Fish Trap, transportation to the Adult Release Facility, and release through this facility into Lake Billy Chinook. Upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall submit the plan to the Commission for approval. Upon Commission approval, the Licensees shall implement the plan.

#### **11. Volitional Upstream Passage (Proposed Article 27)**

(a) Following the installation of the permanent downstream passage facilities at Round Butte Dam and within 24 months of when the downstream survival targets in the Fish Passage Plan for Lake Billy Chinook have been achieved, the Licensees shall conduct a study and provide the Fish Committee a report on the feasibility of volitional upstream passage. The scope of the feasibility study shall be determined in consultation with the Fish Committee. Factors to be addressed in the study, shall include, but not be limited to:

- (i) Engineering feasibility;
- (ii) Biological effectiveness, including but not limited to risk of disease transfer and stray rate for out-of-basin fish;
- (iii) Cost;
- (iv) Performance, including efficiency, of the existing trap-and-haul operation.

(b) Following submission of this report to the Fish Committee, the Licensees shall prepare a plan to implement volitional upstream passage at the Project, which plan shall include appropriate testing and verification studies, unless the appropriate Fish Agencies determine pursuant to their respective statutory authorities that volitional upstream passage facilities should not be installed because:

(i) Oregon Department of Fish and Wildlife (ODFW) and Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR) have determined that the risk of disease transfer is too great,

(ii) The stray rate for out of basin fish is not acceptable,

(iii) Volitional upstream passage is infeasible, as determined utilizing the results of the feasibility study, or

(iv) It is preferable, due to concerns with the state of the art for volitional upstream passage facilities combined with high efficacy of trap and haul operations, to continue the trap-and-haul operation for some additional specified period of time.

The plan shall be completed within 24 months of the Fish Agencies' determination that volitional upstream passage should proceed, and shall be prepared in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon approval by the Fish Agencies, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

(c) Upon any determination pursuant to paragraph (b) that volitional upstream passage should not be installed for the reasons specified in paragraph (b), the Licensees shall, within six months of such determination, and in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan to continue trap-and-haul operations for a specified number of years and to conduct a future feasibility investigation as provided in paragraph (a). During any such continued trap-and-haul operation, the Licensees shall continue to monitor survival as required by Article 25 and shall take any feasible measures or implement modifications within their control to the trap-and-haul facilities that are necessary to comply with the survival standard in Article 25. Upon Commission approval, the Licensees shall implement the plan.

## **12. Passage at Pelton Dam (Proposed Article 28)**

(a) The Licensees shall transport all juvenile salmonids captured at the Round Butte downstream passage facility during the primary emigration period (February 1 through July 31) to the lower Deschutes River, bypassing Lake Simtustus and the Reregulating Reservoir. During the remainder of the year (August 1 through January 31), the Licensees shall, at the request of the Fish Committee, transport downstream-migrating salmonids into Lake Simtustus to utilize the lentic habitat it provides.

(b) If downstream-migrating salmonids are transported into Lake Simtustus, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan to upgrade the Round Butte Dam east side upstream fish trap at the head of Lake Simtustus, and operate it annually for part or all of the period May 1 through September 30 to capture and transport maturing adult resident salmonids upstream for release into Lake Billy Chinook. Upon Commission approval, the Licensees shall implement the plan.

(c) If downstream-migrating salmonids are transported into Lake Simtustus, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan to install a guidance net system at the Pelton Dam and shall operate the Pelton downstream passage facility (Pelton Skimmer) during part or all of the primary migration season (February 1 through July 31) to transport downstream migrants to the lower Deschutes River. Upon Commission approval, the Licensees shall implement the plan.

### **13. Testing and Verification Studies (Proposed Article 29)**

(a) The Licensees shall, within one year of license issuance, file with the Commission a schedule for the development of plans for Testing and Verification studies as described in this Article and in Appendix III of the Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)]. The Licensees shall develop the schedule in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities.

(b) Upon Commission approval of the schedule, the Licensees shall develop the Testing and Verification study plans in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. The study plans shall provide that the Licensees shall conduct these studies with continued involvement of the Fish Committee through the annual work planning and reporting process. Each study plan will include objectives, tasks and evaluation/decision criteria. Where appropriate, study plans will be designed to evaluate the effectiveness of individual fish passage facilities in achieving the criteria and goals set forth in Articles 18 and 22. Such effectiveness evaluations shall include, at a minimum, the number of fish, by species and life stage, captured and released by the facility and a record of observations on the physical condition of the fish using the facility fishways. The Licensees shall develop Test and Verification study plans for the following study areas:

(i) Facility Evaluation;

(ii) Physical Reservoir Changes with Selective Water Withdrawal;  
(iii) Juvenile Salmonid Studies – Reintroduction of Anadromous Stocks Upstream of the Project;

(iv) Juvenile Salmonid Studies – Rearing, Juvenile Densities, Habitat;

(v) Juvenile Salmonid Studies – Juvenile Migration;

(vi) Juvenile Salmonid Studies – Reservoir Survival/Predation, Fishery, Disease;

(vii) Juvenile Salmonid Studies – Round Butte Dam Juvenile Collection, Downstream Transportation and Release;

(viii) Adult Salmonid Studies – Adult Upstream Trap-and-Haul and Adult Release Facility; and

(ix) Adult Salmonid Studies – Adult Migration/Survival/Spawning.

Study plans for multi-year studies shall provide that the Licensees may implement minor modifications to the study methodology in consultation with the Fish Committee. The need for any such minor modifications to the study methodology will be described in the annual progress report and will be based on the results of the study to date. Following approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall file the study plans with the Commission. Upon Commission approval, the Licensees shall implement the plans.

(c) Based on results of the individual Testing and Verification studies, the Licensees shall, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file plans with the Commission for making any modifications to the facilities needed to ensure safe, timely and effective fish passage. Upon Commission approval, the Licensees shall implement the plans.

#### **14. Modification of Downstream Facilities (Proposed Article 30)**

The Licensees shall, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, develop plans for measures or modifications to the existing facilities needed to achieve the criteria and goals for safe, timely and effective fish passage set forth in Articles 18 and 22. The Licensees shall file such plans with the Commission and upon approval implement the measures or modifications.

**15. Long-Term Monitoring of Downstream Collection Facilities (Proposed Article 31)**

Within one year after activating the permanent downstream collection facilities at Round Butte Dam, the Licensees shall file with the Commission, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, a plan for a long-term program to monitor downstream fish passage performance, as described in Appendix IV of the approved Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)]. The plan shall provide that the Licensees shall begin the long-term monitoring of the downstream passage facilities as soon as practicable after the Testing and Verification studies have demonstrated that the permanent downstream collection facilities are meeting the survival criteria and goals set forth in Article 18. Upon Commission approval, the Licensees shall implement the plan.

**16. Annual Work Plans and Reports (Proposed Article 32)**

(a) The Licensees shall utilize annual work plans to document actions to be implemented, develop monitoring and evaluation studies, and propose management, monitoring and evaluation strategies for the coming year consistent with the Fish Passage Plan. The annual work plans shall include separate study plans for each Testing and Verification study being conducted. The Licensees shall issue a draft annual work plan to the Fish Committee for review by no later than January 1, and based on consultation with the Fish Committee shall issue to the Fish Committee a final annual work plan by April 1.

(b) The Licensees shall also file an annual report with the Commission before June 1 of each year, documenting the activities of the previous year. The annual report will follow the format of the previously approved annual work plan. The annual report will include, but not be limited to:

- (i) Numbers of fish by species moved upstream and downstream.
- (ii) Upstream and downstream passage survival rates.
- (iii) Estimates of fish mortality by species associated with the fish passage facilities.
- (iv) A description and evaluation of any supplementation programs.
- (v) Any changes in the work plan from adaptive management

recommendations to the fish passage program that might resolve problems that have been identified.

**17. Fishway Maintenance (Proposed Article 33)**

The Licensees shall keep all fishways in proper order and shall keep all fishway areas clear of trash, sediment, logs, debris, and other material that would hinder passage. The Licensees shall perform maintenance in sufficient time before a migratory period such that fishways can be tested and inspected and will operate effectively prior to and during the migratory periods.

**18. Pacific Lamprey (Proposed Article 38)**

The Licensees shall, within one year of license issuance, file with the Commission, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, a Pacific lamprey passage evaluation and mitigation plan as described in the approved Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)]. Upon Commission approval, the Licensees shall implement the plan.

## FERC LICENSE - APPENDIX D

### National Marine Fisheries Service Section 18 Fishway Prescriptions

The fishway prescriptions are identical to Proposed Articles 17-33 of Exhibit A of the Settlement Agreement. For ease of reference, we include the numbering system used in the Settlement Agreement.

#### **1. Fish Passage Plan (Article 17)**

The Licensees shall implement the Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)], including but not limited to the measures described in paragraphs (a) through (d) of this article.

(a) The Licensees shall implement the Fish Passage Plan to establish self-sustaining harvestable anadromous fish runs of Chinook, steelhead and sockeye above the Project. The anadromous fish that are reintroduced shall pose acceptable minimal risks of fish disease agent introduction. The target population sizes to be used for self-sustaining harvestable runs of each species will be those developed by the Oregon Department of Fish and Wildlife (ODFW) and Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR), in conjunction with the Licensees and the Fish Committee, based on historic information, modeling, habitat production capacity estimates, and research results.

(b) The Licensees shall provide for safe, timely and effective upstream and downstream fish passage of adult and juvenile life stages of spring and fall Chinook, summer steelhead, sockeye salmon, bull trout, rainbow trout, and mountain whitefish.

(c) The Licensees shall implement a three-phase fish passage program, including sequential step-by-step implementation with clearly stated targets, accomplishments, consultation, and prerequisite requirements for each phase. The three phases are Experimental, Interim, and Final.

(i) The Experimental Passage Phase is the current stage of fish passage at the Project and includes but is not limited to modeling of currents in and water withdrawal from Lake Billy Chinook, conceptual designs for downstream passage facilities at Round Butte Dam, Pelton Fish Trap improvements, juvenile migration studies in Lake Billy Chinook, fish health monitoring, approval of the Fish Health Management program and stock selection of species.

(ii) The Interim Passage Phase shall include investigations of fish passage methods and construction of selective water withdrawal (SWW) facilities and temporary and permanent downstream passage facilities at Round Butte Dam. Actions and adaptive management studies for this phase shall include but are not limited to:

- (1) Evaluation of the Round Butte Dam SWW system;
- (2) Hydraulic and biological evaluation of the Round Butte Dam temporary and permanent downstream collection and fish handling facilities;
- (3) Biological evaluation of the adult fish release facility;
- (4) Modification and reactivation of the Pelton Dam historical downstream migrant facility;
- (5) Conducting predation studies in Lake Billy Chinook; and
- (6) Conducting fish health monitoring and evaluation.

(iii) The Final Passage Phase shall include actions and adaptive management studies for feasibility determination, development and construction of permanent upstream fish passage facilities, contingent on the achievement of successful downstream passage at the Project. These actions and studies shall include:

- (1) Reactivation and evaluation of the Pelton Fish Ladder for volitional upstream fish passage;
- (2) Construction of new ponds or facilities to rear juvenile spring Chinook or construction of a new ladder to retain or replace existing spring Chinook rearing capacity;
- (3) Construction of a new fish ladder, or other volitional upstream fish passage facility, at Round Butte Dam; and
- (4) Continued monitoring of the success, and improvement if necessary, of fish passage for all species.

(d) The Licensees shall conduct effectiveness monitoring, annual work plans, and a phased approach that includes:

(i) A specific schedule of timelines, including Testing and Verification studies, study results, and decisions;



(ii) Analysis of self-sustaining harvestable anadromous fish runs with the use of life cycle models and evaluation of passage efficiencies and survival estimates for the different life history stages of each species;

(iii) Establishment of performance measures and monitoring success towards achieving performance measures;

(iv) Evaluation of spawning and rearing and movement of re-introduced fish species;

(v) Evaluation of movement of native resident fish species upstream and downstream through Project facilities and reservoirs;

(vi) Trap and haul of adult fish subject to the long-term goal of volitional upstream fish passage, which will eventually require construction, evaluation, and monitoring of upstream collection facilities, if determined to be feasible;

(vii) During initial implementation, capturing and marking out migrating smolts from above the Project so that they may be differentiated from other returning adults in subsequent years;

(viii) Continued reservoir and drogue studies to refine operations and implementation of structural changes that will assist juvenile migration through Lake Billy Chinook;

(ix) Annual evaluation of stock performance success via outmigrant escapement and adult returns, including periodic evaluation and validation of the model results to determine the efficacy of the passage program;

(x) Preparation of design specifications for fish passage facilities in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities; and

(xi) Fish passage standards and monitoring, evaluation and reporting requirements.

## **2. Fish Passage Criteria and Goals (Article 18)**

(a) The Licensees shall provide that upstream and downstream passage facilities will be functional during all months of the year to provide safe, timely and effective passage for resident and anadromous fish.

(b) The following table summarizes the criteria and goals for safe, timely and effective downstream and upstream passage for fish.

<b>Criteria And Goals For Safe, Timely And Effective Downstream And Upstream Passage</b>	
<b>Item</b>	<b>Criteria and Goals</b>
1. Screen Hydraulic Criteria	NOAA Fisheries smolt criteria (as provided in Article 22)
2. Downstream Passage Facility Survival (from Round Butte collection to lower Deschutes River release point)	93 percent smolt survival for temporary facility during first five years of operations.  96 percent smolt survival for permanent facility.
3. Upstream Passage Facility Survival (from lower Deschutes River collection point through Adult Release Facility)	95 percent during first five years of operations.  98 percent after five years.
4. Round Butte Reservoir Downstream Passage Associated with Temporary Passage Facilities	>50 percent of a statistically significant sample of tagged steelhead or spring Chinook outmigrants from any Project tributary averaged over four years of study.
5. Round Butte Reservoir Downstream Passage Associated with Permanent Collection Facilities	>75 percent survival of PIT-tagged smolts calculated as a rolling 4-year average during the first 12 years.

### **3. Fish Passage Schedule (Proposed Article 19)**

The Licensees shall implement the comprehensive schedule for design, construction, operations and monitoring of upstream and downstream passage facilities included in the Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)].

### **4. Phased Construction of Selective Water Withdrawal and Downstream Fish Passage Facilities (Proposed Article 20)**

(a) The Licensees shall prepare, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, and file with the Commission a design and schedule to construct the selective water withdrawal and downstream passage facilities in the following two phases in accordance with the approved schedule: (1) construction of the selective water withdrawal structure, which shall include a temporary downstream passage facility and (2) construction of the permanent downstream passage facility. The temporary and permanent facilities shall both include a sampling area to support biological evaluation of the fish screens and fish bypass facilities, and a mechanical screen cleaner or some other suitable device to prevent the accumulation of sediment and debris that might otherwise impair screen function and cause the delay, injury, or mortality of downstream migrating fish at Round Butte Dam. Upon Commission approval, the Licensees shall construct the selective water withdrawal (“SWW”) and downstream passage facilities.

(b) The Licensees shall install and operate a permanent downstream fishway that meets National Marine Fisheries Service smolt criteria within the forebay at the Round Butte Dam, including fish screens, guidance devices, and fish bypass facilities as described in the Fish Passage Plan. The Licensees shall construct permanent downstream passage facilities after determining, in consultation with the Fish Committee, Oregon Department of Environmental Quality, and CTWS Water Control Board, that the blend of surface/deep water withdrawal through the selective water withdrawal facility will:

(a) satisfy the criteria for safe, timely and effective downstream passage associated with temporary passage facilities set forth in Article 18; and (b) currently meet water quality criteria set forth in the 401 certificates, or likely meet the water quality criteria within a reasonable time through continued iterative adjustments of the SWW system as constructed with permanent downstream passage facilities and/or through implementation of other water quality management strategies. The Licensees shall evaluate downstream movement as described in the Fish Passage Plan.

(c) The Licensees shall notify the Fish Committee in writing when the downstream fishways are fully operational. Operation, maintenance, and monitoring of downstream fishways shall be conducted in accordance with the Downstream Fishway Operation and Maintenance Plan and Downstream Fishway Monitoring Plan, which the Licensees shall file with the Commission after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon Commission approval and coincident with the initiation of downstream fishway operations, the Licensees shall begin implementation of the plans.

## **5. Downstream Passage Facilities At Round Butte Dam (Proposed Article 21)**

The Licensees shall submit for the review by the Fish Committee, and for approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the results of all downstream fishway design investigations, preliminary design plans and specifications, and final design plans and specifications for the construction and operation of temporary and permanent downstream fishways at Round Butte Dam to meet National Marine Fisheries Service smolt criteria. To the extent not otherwise completed as Interim Measures as described in Exhibit B to the Settlement Agreement and reported to the Commission pursuant to Article 41, the Licensees shall complete the following modeling and design steps prior to the construction of the selective water withdrawal (SWW) facilities and the downstream fish passage facilities:

(a) ***Constructability and Feasibility:*** Constructability/feasibility design is the first step needed to select a design option and facility location.

(b) ***Design Consultation:*** After the constructability/feasibility design is complete and a preferred option is selected, the Licensees shall consult with the Fish Committee, Oregon Department of Environmental Quality, and the Confederated Tribes of the Warm Springs Water Control Board prior to starting detailed design.

(c) ***Modeling:*** If the constructability/feasibility studies do not result in a clear cut recommended design selection, then computational fluid dynamics (CFD) modeling may be used to provide additional input into the selection.

(d) ***Design selection:*** If the CFD modeling is not required to make the design selection, CFD modeling and the progression to the 25% design stage will be conducted concurrently. The CFD modeling results will be used to optimize facility geometry and to review design features to provide the best attraction currents in the forebay and around the facility.

(e) ***Physical Model:*** After the 25% design stage and the CFD modeling have been completed, the results will be used to construct a physical model of the structure. The primary purpose of the physical modeling is to investigate the internal hydraulics of the structure and to evaluate entrance hydraulic conditions. Concurrently, the design will progress to the 50% stage.

(f) ***Design Consultation and Review:*** After the physical modeling is complete and the design has progressed to 50%, consultation with the Fish Committee (and with the Commission for dam safety purposes) will be undertaken prior to proceeding with further design.

(g) ***Final Consultation:*** After consultation is complete, the design will progress to 90%, and then to final status. The Licensees shall file the final design with the Commission after consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon Commission approval, the Licensees shall construct the SWW and temporary downstream passage facilities.

## **6. Criteria for Downstream Passage Screen Design (Proposed Article 22)**

(a) The downstream passage facilities at Round Butte Dam shall meet the National Marine Fisheries Service (NOAA Fisheries) smolt criteria; however, the facilities' exclusion plates do not have to meet the NOAA Fisheries criteria for sweeping velocity and contact time.

(b) The smolt criteria include, but are not limited to, a maximum approach velocity perpendicular to the screens and exclusion plate of 0.80 feet per second (fps), screen openings no larger than 0.25 inches, a screen sweeping velocity component no less than

0.80 fps, and a screen contact time no greater than 60 seconds. Due to the size of the structure and the experimental nature of safely attracting and capturing juvenile migrants from Lake Billy Chinook, some components of the fish screen and bypass system may require flexibility to design and construct to NOAA Fisheries smolt criteria, and the Licensees shall design the fish screening and collection facilities in consultation with the Fish Committee based on the best available scientific information.

(c) The Licensees shall design screening facilities to screen less than 14,000 cfs only if water quality modeling verifies that flows above 9,000 cfs can be routed through the deep intake without impact to the Project's ability to meet water quality standards and without detrimental impact to the flow pattern and fish attraction in Lake Billy Chinook.

## **7. Round Butte Deep Exclusion Screen (Proposed Article 23)**

(a) The Licensees shall design the Round Butte deep exclusion screen to meet National Marine Fisheries Service (NOAA Fisheries) smolt criteria except for the criteria for sweeping velocity and contact time. In addition, outmigrant collection facilities will not be required at the deep exclusion screen. The Licensees shall evaluate hydraulic performance as soon as possible after the deep exclusion screen has been installed. If the screen does not meet applicable NOAA Fisheries smolt criteria at full hydraulic capacity, the Licensees shall take any necessary measures to meet applicable NOAA Fisheries smolt criteria. The Licensees shall continuously monitor differential pressure through the deep exclusion screen while the lower withdrawal system is in operation.

(b) The Licensees shall conduct studies of fish impingement at the Round Butte deep exclusion screen. Monitoring will be conducted during the first year after installation of the deep exclusion screen when deepwater withdrawal has been initiated, and when deepwater withdrawal is maximized. The duration of monitoring will depend on the monitoring method selected, but must be for a period sufficient for evaluating the possibility of impingement.

(c) The Licensees shall monitor the hydrodynamic and biological effects of Project operations during the first season after installation of permanent screens for the Round Butte downstream fish passage facility, and at least once every five years thereafter. The Licensees shall, in consultation with the Fish Committee, evaluate the need for additional monitoring based on the previous monitoring data.

(d) If the monitoring indicates that there is impingement of fish at the Round Butte deep exclusion screen, the Licensees shall consult with the Fish Committee to determine if impingement is significant because it impedes the Licensees' ability to achieve the objectives for Interim and Permanent Downstream Passage. If the Fish Committee determines that the effects are significant, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their

respective authorities, take any feasible measures or implement modifications within their control that are necessary to reduce impingement below the level of significance. These measures include but are not limited to operations modifications, cleaning system modifications, louver adjustments, and deterrent systems such as strobe lights or sound to keep fish away from the exclusion screening. The Licensees shall re-evaluate the facility the next time deepwater withdrawal has been initiated or maximized. If there are no feasible structural or operational measures within the Licensees' control that will reduce impingement below significant levels, the Licensees shall, in consultation with the Fish Committee, investigate and implement alternative mitigation measures.

## **8. Downstream Passage Facility Pumped Attraction (Proposed Article 24)**

The Licensees shall design the permanent downstream collection facility at Round Butte Dam to include the ability to add pumps with a total capacity of 3,000 cfs and all appurtenant devices. The Licensees shall, before construction of the permanent downstream collection facility, prepare and provide the Fish Committee a report on the need to add pumped attraction flow. The report shall be based on information gathered during the Testing and Verification studies pursuant to Article 29 and prepared in consultation with the Fish Committee. If the Fish Agencies conclude that it is necessary to add pumped attraction flow, the Licensees shall, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, develop a plan to design, construct, and operate pumps to provide appropriate attraction flow to the permanent downstream collection facilities. Upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall submit the plan to the Commission for approval. Upon Commission approval, the Licensees shall implement the plan.

## **9. Trap and Haul Facilities (Proposed Article 25)**

(a) The Licensees shall provide upstream passage using trap and haul until volitional upstream passage is implemented pursuant to provisions of the Fish Passage Plan.

(b) The Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a final monitoring plan for the operation and maintenance of trap-and-haul fishways at the Pelton Round Butte Project. The plan shall provide for the submission of an annual monitoring report to the Fish Committee for the duration of the operation of the interim trap-and-haul fishways. Upon Commission approval, the Licensees shall implement the plan.

(c) The Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan for conducting tests of upstream passage facility survival using standard methodology for evaluation of direct injury and mortality, and other factors. The plan shall provide that, in consultation with the Fish Committee the Licensees shall take any feasible measures or implement modifications within their control that are necessary to meet the 95 percent survival standard during the first five years of operations, and the 98 percent survival standard after five years. This survival standard applies to collection at the Pelton Trap, transportation to the adult release facility, and release through the adult release facility. After correcting any deficiencies, the Licensees shall re-test the facilities to ensure compliance with the applicable upstream passage facility survival standard. After compliance with the upstream passage facility survival standard is verified, additional re-testing will only be required if deficiencies are observed. The plan will identify the methods of observation used to detect deficiencies through long-term monitoring. Upon Commission approval, the Licensees shall implement the plan.

#### **10. Adult Release Facility (Proposed Article 26)**

(a) ***Design and Construction of Adult Release Facility.*** The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with the Commission preliminary design, final design, and construction plans for an Adult Release Facility at the Round Butte forebay. Upon Commission approval, the Licensees shall implement the plans.

(b) ***Operation of Adult Release Facility.*** The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with the Commission an operation and maintenance plan for the Adult Release Facility for the safe, timely and effective upstream passage of anadromous fish when Lake Billy Chinook is thermally stratified. Upon Commission approval, the Licensees shall implement the plan.

(c) ***Monitoring and Evaluation of Adult Release Facility.*** The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with the Commission a monitoring and evaluation plan for the Adult Release Facility. Upon Commission approval, the Licensees shall implement the plan.

(d) ***Modifications to Adult Release Facility.*** The Licensees shall prepare and provide the Fish Committee reports in accordance with the monitoring and evaluation plan for the Adult Release Facility. The reports shall be based on monitoring of the Adult Release Facility, shall describe any possible need to modify the Adult Release Facility, and shall

be prepared in consultation with the Fish Committee. If the Fish Agencies conclude that the Adult Release Facility must be modified to ensure safe, timely, and effective upstream passage, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop a plan to modify the Adult Release Facility to ensure safe, timely, and effective upstream passage, which plan may include, but need not be limited to, measures or modifications required to meet the survival standard applicable to collection at the Pelton Fish Trap, transportation to the Adult Release Facility, and release through this facility into Lake Billy Chinook. Upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall submit the plan to the Commission for approval. Upon Commission approval, the Licensees shall implement the plan.

#### **11. Volitional Upstream Passage (Proposed Article 27)**

(a) Following the installation of the permanent downstream passage facilities at Round Butte Dam and within 24 months of when the downstream survival targets in the Fish Passage Plan for Lake Billy Chinook have been achieved, the Licensees shall conduct a study and provide the Fish Committee a report on the feasibility of volitional upstream passage. The scope of the feasibility study shall be determined in consultation with the Fish Committee. Factors to be addressed in the study, shall include, but not be limited to:

- (i) Engineering feasibility;
- (ii) Biological effectiveness, including but not limited to risk of disease transfer and stray rate for out-of-basin fish;
- (iii) Cost;
- (iv) Performance, including efficiency, of the existing trap-and-haul operation.

(b) Following submission of this report to the Fish Committee, the Licensees shall prepare a plan to implement volitional upstream passage at the Project, which plan shall include appropriate testing and verification studies, unless the appropriate Fish Agencies determine pursuant to their respective statutory authorities that volitional upstream passage facilities should not be installed because:

- (i) Oregon Department of Fish and Wildlife (ODFW) and Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR) have determined that the risk of disease transfer is too great,



- (ii) The stray rate for out of basin fish is not acceptable,
- (iii) Volitional upstream passage is infeasible, as determined utilizing the results of the feasibility study, or
- (iv) It is preferable, due to concerns with the state of the art for volitional upstream passage facilities combined with high efficacy of trap and haul operations, to continue the trap-and-haul operation for some additional specified period of time.

The plan shall be completed within 24 months of the Fish Agencies' determination that volitional upstream passage should proceed, and shall be prepared in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon approval by the Fish Agencies, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

- (c) Upon any determination pursuant to paragraph (b) that volitional upstream passage should not be installed for the reasons specified in paragraph (b), the Licensees shall, within six months of such determination, and in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan to continue trap-and-haul operations for a specified number of years and to conduct a future feasibility investigation as provided in paragraph (a). During any such continued trap-and-haul operation, the Licensees shall continue to monitor survival as required by Article 25 and shall take any feasible measures or implement modifications within their control to the trap-and-haul facilities that are necessary to comply with the survival standard in Article 25. Upon Commission approval, the Licensees shall implement the plan.

## **12. Passage at Pelton Dam (Proposed Article 28)**

- (a) The Licensees shall transport all juvenile salmonids captured at the Round Butte downstream passage facility during the primary emigration period (February 1 through July 31) to the lower Deschutes River, bypassing Lake Simtustus and the Reregulating Reservoir. During the remainder of the year (August 1 through January 31), the Licensees shall, at the request of the Fish Committee, transport downstream-migrating salmonids into Lake Simtustus to utilize the lentic habitat it provides.

- (b) If downstream-migrating salmonids are transported into Lake Simtustus, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan to upgrade the Round Butte Dam east side upstream fish trap at the

head of Lake Simtustus, and operate it annually for part or all of the period May 1 through September 30 to capture and transport maturing adult resident salmonids upstream for release into Lake Billy Chinook. Upon Commission approval, the Licensees shall implement the plan.

(c) If downstream-migrating salmonids are transported into Lake Simtustus, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan to install a guidance net system at the Pelton Dam and shall operate the Pelton downstream passage facility (Pelton Skimmer) during part or all of the primary migration season (February 1 through July 31) to transport downstream migrants to the lower Deschutes River. Upon Commission approval, the Licensees shall implement the plan.

### **13. Testing and Verification Studies (Proposed Article 29)**

(a) The Licensees shall, within one year of license issuance, file with the Commission a schedule for the development of plans for Testing and Verification studies as described in this Article and in Appendix III of the Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)]. The Licensees shall develop the schedule in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities.

(b) Upon Commission approval of the schedule, the Licensees shall develop the Testing and Verification study plans in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. The study plans shall provide that the Licensees shall conduct these studies with continued involvement of the Fish Committee through the annual work planning and reporting process. Each study plan will include objectives, tasks and evaluation/decision criteria. Where appropriate, study plans will be designed to evaluate the effectiveness of individual fish passage facilities in achieving the criteria and goals set forth in Articles 18 and 22. Such effectiveness evaluations shall include, at a minimum, the number of fish, by species and life stage, captured and released by the facility and a record of observations on the physical condition of the fish using the facility fishways. The Licensees shall develop Test and Verification study plans for the following study areas:

- (i) Facility Evaluation;
- (ii) Physical Reservoir Changes with Selective Water Withdrawal;
- (iii) Juvenile Salmonid Studies – Reintroduction of Anadromous Stocks Upstream of the Project;

- (iv) Juvenile Salmonid Studies – Rearing, Juvenile Densities, Habitat;
- (v) Juvenile Salmonid Studies – Juvenile Migration;
- (vi) Juvenile Salmonid Studies – Reservoir Survival/Predation, Fishery, Disease;
- (vii) Juvenile Salmonid Studies – Round Butte Dam Juvenile Collection, Downstream Transportation and Release;
- (viii) Adult Salmonid Studies – Adult Upstream Trap-and-Haul and Adult Release Facility; and
- (ix) Adult Salmonid Studies – Adult Migration/Survival/Spawning.

Study plans for multi-year studies shall provide that the Licensees may implement minor modifications to the study methodology in consultation with the Fish Committee. The need for any such minor modifications to the study methodology will be described in the annual progress report and will be based on the results of the study to date. Following approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall file the study plans with the Commission. Upon Commission approval, the Licensees shall implement the plans.

(c) Based on results of the individual Testing and Verification studies, the Licensees shall, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file plans with the Commission for making any modifications to the facilities needed to ensure safe, timely and effective fish passage. Upon Commission approval, the Licensees shall implement the plans.

#### **14. Modification of Downstream Facilities (Proposed Article 30)**

The Licensees shall, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, develop plans for measures or modifications to the existing facilities needed to achieve the criteria and goals for safe, timely and effective fish passage set forth in Articles 18 and 22. The Licensees shall file such plans with the Commission and upon approval implement the measures or modifications.

**15. Long-Term Monitoring of Downstream Collection Facilities (Proposed Article 31)**

Within one year after activating the permanent downstream collection facilities at Round Butte Dam, the Licensees shall file with the Commission, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, a plan for a long-term program to monitor downstream fish passage performance, as described in Appendix IV of the approved Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)]. The plan shall provide that the Licensees shall begin the long-term monitoring of the downstream passage facilities as soon as practicable after the Testing and Verification studies have demonstrated that the permanent downstream collection facilities are meeting the survival criteria and goals set forth in Article 18. Upon Commission approval, the Licensees shall implement the plan.

**16. Annual Work Plans and Reports (Proposed Article 32)**

(a) The Licensees shall utilize annual work plans to document actions to be implemented, develop monitoring and evaluation studies, and propose management, monitoring and evaluation strategies for the coming year consistent with the Fish Passage Plan. The annual work plans shall include separate study plans for each Testing and Verification study being conducted. The Licensees shall issue a draft annual work plan to the Fish Committee for review by no later than January 1, and based on consultation with the Fish Committee shall issue to the Fish Committee a final annual work plan by April 1.

(b) The Licensees shall also file an annual report with the Commission before June 1 of each year, documenting the activities of the previous year. The annual report will follow the format of the previously approved annual work plan. The annual report will include, but not be limited to:

- (i) Numbers of fish by species moved upstream and downstream.
- (ii) Upstream and downstream passage survival rates.
- (iii) Estimates of fish mortality by species associated with the fish passage facilities.
- (iv) A description and evaluation of any supplementation programs.
- (v) Any changes in the work plan from adaptive management recommendations to the fish passage program that might resolve problems that have been identified.

**17. Fishway Maintenance (Proposed Article 33)**

The Licensees shall keep all fishways in proper order and shall keep all fishway areas clear of trash, sediment, logs, debris, and other material that would hinder passage. The Licensees shall perform maintenance in sufficient time before a migratory period such that fishways can be tested and inspected and will operate effectively prior to and during the migratory periods.

**Appendix F**  
**Fish Incidents from 2012 to 2021**

Date	Event	Cause	Corrective Action	ZOE	Links to documentation
4/8/2014	Dead fish found on top of exclusion net over fish holding raceway	Exclusion net was protruding into the fishway, leading to the holding raceway, and fish got stranded on top of the net	Modifications made to net attachment points; staff briefed about procedure and importance of proper installation of net	1	<a href="#">Report of April 8, 2014 fish incident</a>  <a href="#">Letter from FERC</a>
5/3/2014	Dead fish found among debris on top of fish separator bars located within the headworks of the fish transfer facility	Debris passed under the debris boom and inner debris skirt, then through the SWW intake channels, where it accumulated on and blocked the medium fish separator	Debris was removed and monitoring was increased. Staff were briefed and required to increase monitoring efforts during times of increased debris accumulation	1	<a href="#">Report of May 3, 2014 fish incident</a>  <a href="#">Letter from FERC</a>
8/24 – 8/25/2014	Spill at Pelton, reduces water clarity downstream	Lightning strike that resulted in loss of a transmission line	Transmission line repaired and power restored	4	<a href="#">Report of Aug 25, 2014 fish incident</a>  <a href="#">Letter from FERC</a>
2/18/2015	Dead fish observed immediately following maintenance	South fish channel gate did not fully close during maintenance and fish were impinged	Revised procedure to ensure visual verification that gates close fully and eliminate surface flows through SWW during	1	<a href="#">Report of Feb 18, 2015 fish incident</a>

Date	Event	Cause	Corrective Action	ZOE	Links to documentation
			maintenance.		<a href="#">Letter from FERC</a>
5/31/2015	Power disturbance at SWW headworks and associated fish passage facilities causing dewatering	Lightning strike	SWW and fish passage facilities were restarted and returned to normal operation	1	<a href="#">Report of May 31, 2015 fish incident</a>  <a href="#">Letter from FERC</a>
6/15/2015	Two spring Chinook found dead in pump chamber when pump was removed for maintenance	There was a gap between the pumping and main chamber	A cover was installed over the water pump to prevent fish from being able to access this location in the future and additional training was provided to staff		<a href="#">Report of June 15, 2015 fish incident</a> <a href="#">Letter from FERC</a>
6/7/2016	Dead fish observed near the upstream end of ladder where water supply is split to supply Round Butte Hatchery	Fish were stranded in the ladder when the water supply was turned off	This has never happened before so no known cause was determined	1	<a href="#">Report of June 7, 2016 fish incident</a> No letter received from FERC
4/30/2017	Fish jumped out of sorting trough	Divider was not properly positioned	Fish will be held in holding raceways or other tanks	4	<a href="#">Report of April 30, 2017 fish incident</a> No letter received from FERC



Date	Event	Cause	Corrective Action	ZOE	Links to documentation
1/25/2019	Round Butte Hatchery fish found dead at the Pelton adult trap	The hopper at the trap was not lowered to the correct level after maintenance was performed	Maintenance to be avoided when fish are present in hopper; when maintenance is conducted, biologist will be present to make sure hopper is left in correct position; evaluate the feasibility of an indicator placed on the hopper to show it's at the correct level		<a href="#">Report of Jan 25, 2019 fish incident</a> No letter received from FERC
5/7/2019	Increased number of fish mortalities noticed at the SWW in a four- day period	Possible debris blockage in the fish transfer pipe and an increase in pump operation as a result	The SWW was shut down to reset the pump to its normal operation level and flush debris out of the pipe. An alarm was added, as well as a flushing routine as part of normal maintenance		<a href="#">Report of May 7, 2019 fish incident</a> No letter received from FERC
6/26/2019	Power outage at juvenile fish capture facility associated with SWW/FTF; resulted in fish mortalities	The switchyard was undergoing system upgrades and during the course of the work, power was lost	Coordinated maintenance to avoid future power outages; daily job briefings held, as well as weekly communications meetings	1	<a href="#">Report of June 26, 019 fish incident</a> No letter received from FERC

Date	Event	Cause	Corrective Action	ZOE	Links to documentation
2/10/2021	Fish trapped in hopper well	Boards between the brail and hopper pool failed	Boards were replaced with steel and additional maintenance was performed	4	<a href="#">Report of Feb 10, 2021 fish incident</a> No letter received from FERC
4/18/2021	Decrease in flow through transfer pump and over headworks	Debris build-up	Remove debris and check facility operation every two hours on day of incident	1	<a href="#">Report of April 18, 2021 fish incident</a> No letter received from FERC
11/1/2021	Failure of spillway exclusion net	RCA filed with FERC dam safety	Removal of failed net; modify design of replacement net to be installed 11/2022	1	<a href="#">Report of Nov 1, 2021 fish incident</a> No letter received from FERC