

Application for Low Impact Hydropower Institute Recertification

North Umpqua Hydroelectric Project (FERC No. P-1927; LIHI Certificate No. 69) Douglas County, Oregon



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LIST OF ATTACHMENTS
(Provided under separate cover)

1. FERC Letter of May 1, 2014 RE: PacifiCorp’s proposed reduction of normal maximum water surface elevation of Toketee Reservoir
2. FERC Letter of July 16, 2014 RE: PacifiCorp’s clarifications on Toketee Reservoir water surface elevations
3. Flow Monitoring Plan Annual Report for Water Year 2022
4. Report of Lemolo No. 2 Bypassed Reach Ramping Compliance Event on December 15, 2015
5. SA Section 8.2 Slide Creek Bypassed Reach Monitoring Report for 2022
6. Report of Slide Creek Bypassed Reach Ramping Compliance Event on June 22, 2023

7. Report of Slide Creek Bypassed Reach Ramping Compliance Event on August 7, 2024
8. ODFW Response to PacifiCorp's Ramping Compliance Event Report for August 7, 2024
9. SA Section 6.2 Slide Creek Full-flow Reach Interim Monitoring Report (February 2021)
10. Gravel Augmentation Monitoring Report for 2017-2021
11. SA Section 8.3 Spawning Habitat Annual Report for 2023
12. Report of Soda Springs Bypassed Reach Ramping Compliance Event on January 29, 2024
13. ODFW Response to PacifiCorp's Ramping Compliance Event Report for January 29, 2024
14. Report of Wild and Scenic Reach Ramping Compliance Event on December 15, 2015
15. Modified Water Quality Certification for Fish Creek Pumped Storage Amendments (December 13, 2022)
16. ODEQ Email Response to PacifiCorp RE: Request for Stay of Water Quality Monitoring Requirements of the Modified Water Quality Certification
17. Soda Springs Water Quality Station Annual Report for 2023
18. Lemolo No. 1 Forebay pH Monitoring Report (2018)
19. ODEQ Letter Response RE: Lemolo No. 1 Forebay pH Monitoring Report
20. Lemolo No. 2 Flume 12 Resource Impact Analysis (December 2016)
21. Clearwater No. 2 Total Dissolved Gas Monitoring Report (July 2015)
22. DEQ Letter RE Interim Agreement for Operation of Clearwater No. 2 Powerplant at Low Output
23. Soda Springs Fish Passage Facilities Hydraulic and Biological Evaluation Report (October 2016)
24. Soda Springs Fish Passage Operations and Maintenance Annual Report for 2023
25. SA Section 19.2 Long-Term Monitoring and Predator Control Study Annual Report for 2023
26. Fish Creek Fish Screen Hydraulic Evaluation Report
27. Letter of Concurrence from FWS RE: Determination of Effects to Revised Critical Habitat for Northern Spotted Owl (May 2013)
28. ESA Annual Report for Calendar Year 2023
29. PacifiCorp Letter to FERC Submitting the HPMP Annual Report for 2023
30. Letter from ODEQ RE: Validity of Water Quality Certification Conditions
31. Letter of Concurrence from FWS RE: Determination of Effects to Franklin's Bumble Bee (October 2024)

ACRONYMS AND ABBREVIATIONS

7DAM—7-day, rolling average of 24-hour, maximum water temperatures
ac.—acre
ADA—Americans with Disabilities Act
BIOP—Biological Opinion
BLM—Bureau of Land Management
Certification Modification—Water Quality Certification Modification
CFR—Code of Federal Regulations
cfs—cubic feet per second
COPCO—California Oregon Power Company
DO—dissolved oxygen
EPA—Environmental Protection Agency
FEB—Fish Evaluation Building
FERC—Federal Energy Regulatory Commission
fps—feet per second
Forest Service—United States Department of Agriculture, Forest Service
ft.—feet
FWS—Fish and Wildlife Service
hp—horse-power
HPMP—Historic Properties Management Plan
HUC—Hydrologic Unit Code
IFIM—instream flow incremental method
in.—inches
ITS—Incidental Take Statement
kcmil—thousands of circular mils
kVA—kilovolt amps
kW—kilowatts
L—liters
LIHI—Low Impact Hydropower Institute
m.—meters
mg—milligrams
mi.—miles
MW—megawatts
MWh—megawatt hours
NMFS—National Marine Fisheries Service
NOAA—National Oceanic and Atmospheric Administration
NTU(s)—nephelometric turbidity unit(s)
NUR—North Umpqua River
OAR—Oregon Administrative Rules
OC—Oregon coast
ODEQ—Oregon Department of Environmental Quality
ODFW—Oregon Department of Fish and Wildlife
ORS—Oregon Revised Statutes
OWRD—Oregon Water Resources Department
pH—power of hydrogen ions
PHABSIM—physical habitat simulation

PLC—programmable logic controller
PM&E(s)—protection, mitigation, and enhancement (measures)
Project—North Umpqua Hydroelectric Project
RM—river mile
rpm—revolutions per minute
RRMP—Recreation Resources Management Plan
SA—Settlement Agreement
SCADA—Supervisory Control and Data Acquisition
SHPO—State Historic Preservation Office
TDG—total dissolved gas
TMDL—Total Maximum Daily Load
TWG—Technical Working Group
UNF—Umpqua National Forest
USDA—United States Department of Agriculture
USGS—United States Geological Survey
WQC—water quality certification
WUA—weighted useable area
ZOE(s)—Zone(s) of Effect

1.0 PROJECT DESCRIPTION

PacifiCorp is the licensee, owner, and operator of the North Umpqua Hydroelectric Project (Project; Federal Energy Regulatory Commission (FERC) Project No. 1927) located on the west side of the central Cascade Mountain range in eastern Douglas County, Oregon, approximately 60 miles east of the city of Roseburg, Oregon. The Project, constructed between 1947 and 1956, consists of a series of dams and waterways on the North Umpqua River and two of its tributaries, Clearwater River and Fish Creek, that divert water to eight power developments (Figure 1). The watershed supplying Project waters (Figure 2) is completely within the Umpqua National Forest (UNF) administered by the United States Department of Agriculture (USDA) Forest Service. The current, 35-year FERC Project license, which adopts the terms and conditions of the June 13, 2001 Settlement Agreement (SA) between PacifiCorp and various federal and state regulatory agencies with jurisdiction over resources affected by the Project, was issued by FERC on November 18, 2003 and expires on November 1, 2038¹.

The Project is certified by the Low Impact Hydropower Institute (LIHI) with Certificate Number 69. The current LIHI certification, issued on December 7, 2014, expired on December 7, 2022. LIHI granted PacifiCorp with two, one-year extensions of the certification term, expiring on December 7, 2024, while PacifiCorp engaged in the FERC license amendment process to add proposed pumped storage additions to the existing Project. Though FERC issued a license amendment to PacifiCorp on December 1, 2023², PacifiCorp is continuing to evaluate the value of the proposed pumped storage additions to PacifiCorp's system and whether implementation of such is prudent. Therefore, PacifiCorp is proceeding with application for recertification by LIHI considering the current Project conditions (i.e., without pumped storage). As LIHI's previous certification of December 7, 2014 was issued prior to the March 2016 issuance of the 2nd edition of the *Low Impact Hydropower Certification Handbook*, as revised in January 2022, PacifiCorp's application for recertification is subject to LIHI's comprehensive Stage II evaluation. Therefore, this recertification application includes information on the Project facilities, history, setting, operations, compliance during the certification term, zones of effect, and compliance with LIHI's standards for each criterion in each zone of effect.

1.1 PROJECT FACILITIES

A summary of Project facilities is provided below in Tables 1 and 2 in the format of LIHI's Table B-1.1. Additional narrative descriptions of the facilities are provided in the following subsections. Photos of the Project facilities are provided in Appendix A, and relevant map sheets from FERC Exhibit G are provided in Appendix B.

The Project consists of eight powerplants, eight dams, 21.7 miles of canal, 9.8 miles of flume, and 5.8 miles of penstock and tunnels, for a total waterway length of 37.3 miles. Three major reservoirs, Lemolo Reservoir, Toketee Reservoir, and Soda Springs Reservoir, provide water storage (Figure 2).

¹ The Project license, SA, management plans, rolling action plans, and annual reports are available on PacifiCorp's Project website at <https://www.pacificorp.com/energy/hydro/north-umpqua-river.html>

² https://elibrary.ferc.gov/eLibrary/filelist?accession_num=20231201-3050

Figure 1. Project vicinity

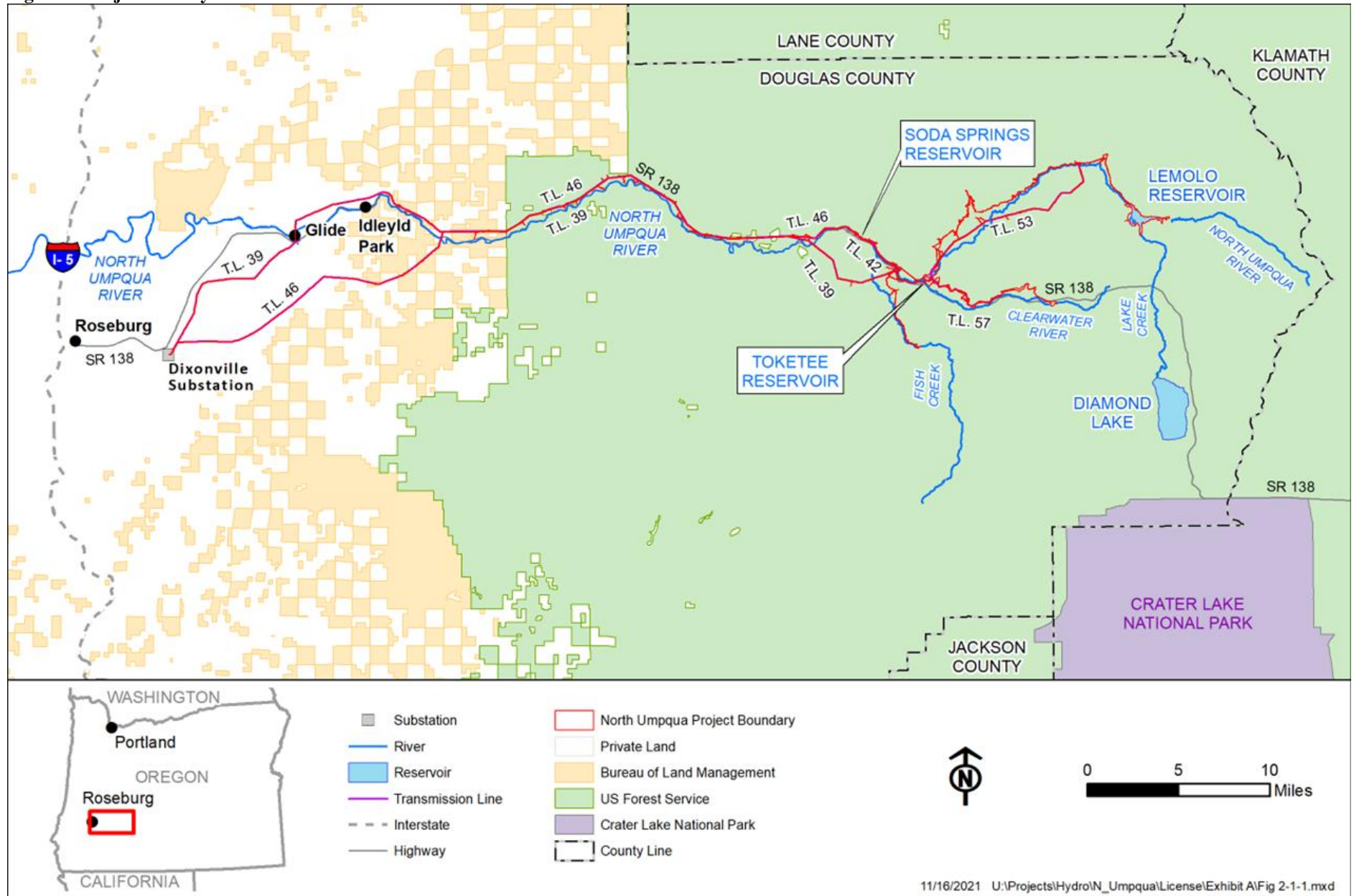


Figure 2. Project watershed, generating units, and major reservoirs

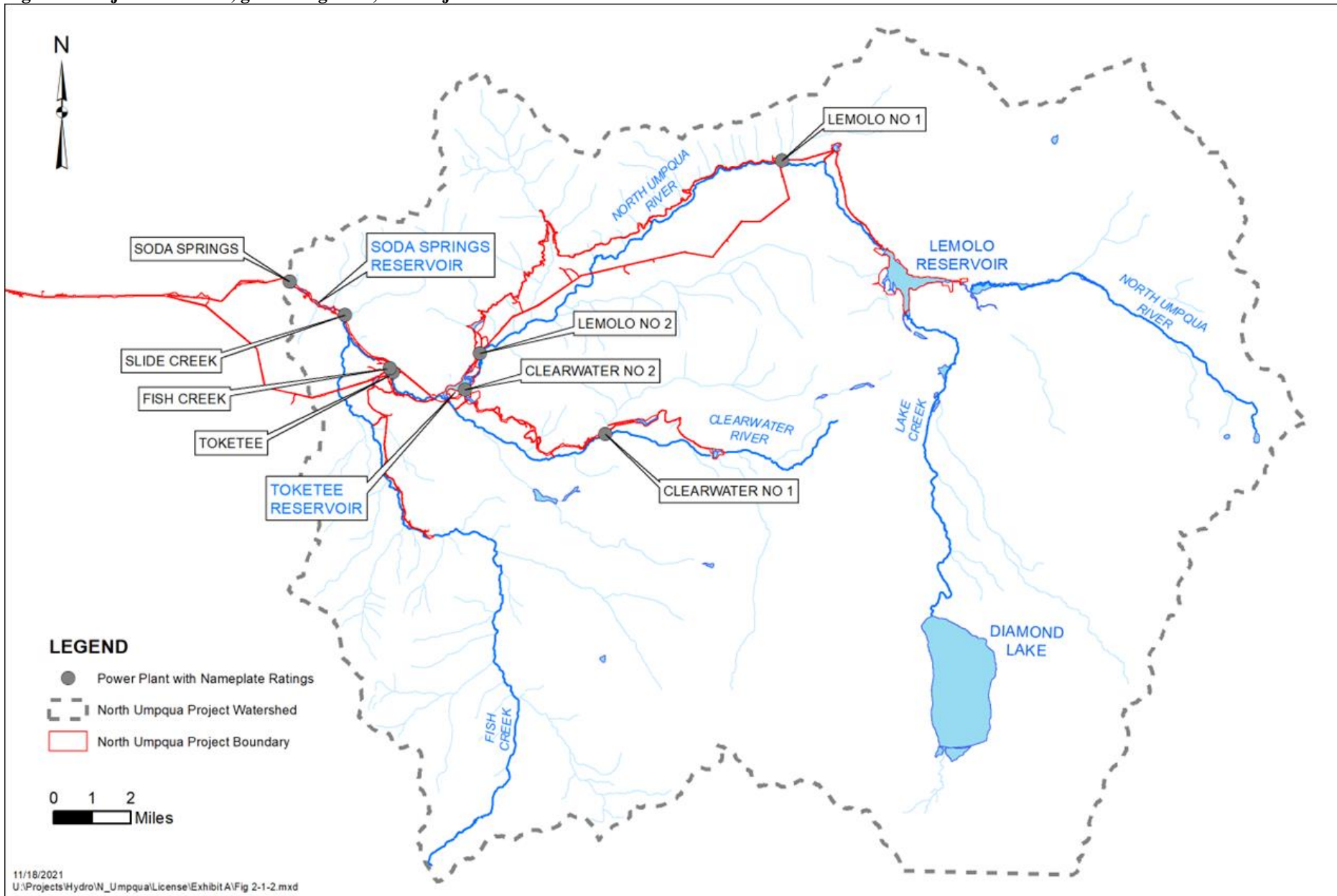


Table 1. Facility information table for multiple Project developments on the North Umpqua River

Item	Information Requested	Response				
		Lemolo No. 1	Lemolo No. 2	Toketee	Slide Creek	Soda Springs
Name of the Facility	Facility name (use FERC project name or other legal name)	Lemolo No. 1	Lemolo No. 2	Toketee	Slide Creek	Soda Springs
Reason for applying for LIHI Certification	1. To participate in state RPS program	X	X	X	X	X
	2. To participate in voluntary REC market (e.g., Green-e)					
	3. To satisfy a direct energy buyer's purchasing requirement					
	4. To satisfy the facility's own corporate sustainability goals					
	5. For the facility's corporate marketing purposes					
	6. Other (describe)					
	If applicable, amount of annual generation (MWh and % of total generation) for which RECs are currently received or are expected to be received upon LIHI Certification	100%	100%	100%	100%	100%
Location	River name (USGS proper name)	North Umpqua River	North Umpqua River	North Umpqua River	North Umpqua River	North Umpqua River
	Watershed name - Select region, click on the area of interest until the 8-digit HUC number appears. Then identify watershed name and HUC-8 number from the map at: https://water.usgs.gov/wsc/map_index.html	North Umpqua 17100301	North Umpqua 17100301	North Umpqua 17100301	North Umpqua 17100301	North Umpqua 17100301
	Nearest town(s), county(ies), and state(s) to dam	Idleyld Park, Douglas County, Oregon	Idleyld Park, Douglas County, Oregon	Idleyld Park, Douglas County, Oregon	Idleyld Park, Douglas County, Oregon	Idleyld Park, Douglas County, Oregon
	River mile of dam above mouth	93	88.5	75.4	73.2	69.8
	Geographic latitude and longitude of dam	43.32262546, -122.19436182	43.35536512, -122.24929439	43.26447346, -122.42105889	43.27511855, -122.44872813	43.30284228, -122.49474158

Item	Information Requested	Response				
		Lemolo No. 1	Lemolo No. 2	Toketee	Slide Creek	Soda Springs
Facility Owner	Application contact names (Complete the Contact Form in Section B-4 also)	PacifiCorp c/o Steve Albertelli	PacifiCorp c/o Steve Albertelli	PacifiCorp c/o Steve Albertelli	PacifiCorp c/o Steve Albertelli	PacifiCorp c/o Steve Albertelli
	Facility owner company and authorized owner representative name. For recertifications: If ownership has changed since last certification, provide the effective date of the change.	PacifiCorp c/o Steve Albertelli N/A	PacifiCorp c/o Steve Albertelli N/A	PacifiCorp c/o Steve Albertelli N/A	PacifiCorp c/o Steve Albertelli N/A	PacifiCorp c/o Steve Albertelli N/A
	FERC licensee company name (if different from owner)	N/A	N/A	N/A	N/A	N/A
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	P-1927, November 1, 2003, November 1, 2038	P-1927, November 1, 2003, November 1, 2038	P-1927, November 1, 2003, November 1, 2038	P-1927, November 1, 2003, November 1, 2038	P-1927, November 1, 2003, November 1, 2038
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	Major	Major	Major	Major	Major
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments. Include links or copies.	Issued June 28, 2002 by Oregon Department of Environmental Quality; Amended December 13, 2022 for pumped storage license amendment. Available on-line at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/North_Umpqua_Project_License.pdf	Issued June 28, 2002 by Oregon Department of Environmental Quality; Amended December 13, 2022 for pumped storage license amendment. Available on-line at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/North_Umpqua_Project_License.pdf	Issued June 28, 2002 by Oregon Department of Environmental Quality; Amended December 13, 2022 for pumped storage license amendment. Available on-line at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/North_Umpqua_Project_License.pdf	Issued June 28, 2002 by Oregon Department of Environmental Quality; Amended December 13, 2022 for pumped storage license amendment. Available on-line at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/North_Umpqua_Project_License.pdf	Issued June 28, 2002 by Oregon Department of Environmental Quality; Amended December 13, 2022 for pumped storage license amendment. Available on-line at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/North_Umpqua_Project_License.pdf
	Hyperlinks to key electronic records on FERC e-library website or other publicly accessible data repositories (or provide a separate list)	https://www.pacificorp.com/energy/hydro/north-umpqua-river.html	https://www.pacificorp.com/energy/hydro/north-umpqua-river.html	https://www.pacificorp.com/energy/hydro/north-umpqua-river.html	https://www.pacificorp.com/energy/hydro/north-umpqua-river.html	https://www.pacificorp.com/energy/hydro/north-umpqua-river.html
Powerhouse	Date of initial operation (past or future for pre-operational applications)	7/7/1955	11/1/1956	12/26/49	7/18/1951	3/21/1952
	Total installed capacity (MW)	31.99	38.5	42.5	18	11

Item	Information Requested	Response				
		Lemolo No. 1	Lemolo No. 2	Toketee	Slide Creek	Soda Springs
	For recertifications: Indicate if installed capacity has changed since last certification	No change	No change	No change	No change	No change
	Average annual generation (MWh) and period of record used (1994-2023)	132,800	155,800	217,800	76,500	54,700
	For recertifications: Indicate if average annual generation has changed since last certification	-8,000	-12,100	-11,100	-12,300	-7,600
	<u>Mode of operation</u> (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.)	Run-of-river with diurnal cycle	Run-of-river	Run-of-river	Run-of-river	Run-of-river
	For recertifications: Indicate if mode of operation has changed since last certification	No change	No change	No change	No change	No change
	Number, type, and size of turbine/generators, including maximum and minimum hydraulic capacity and maximum and minimum output of each turbine and generator unit	1x vertical-shaft, Francis-type. Rated capacity: 31,999 kW @ 565 cfs and 735' net head. Minimum of less than 1,000 kW @ 66 cfs	1x vertical-shaft, Francis-type, 51,696 hp @ 720' head. Rated capacity: 38,500 kW @ 715 cfs. Minimum of less than 1,000 kW @ 90 cfs.	3x vertical-shaft, Francis-type, 21,200 hp each @ 440' head. Rated capacity: 42,500 kW combined at 1,530 cfs. Minimum of less than 1,000 kW @ 80 cfs	1x vertical-shaft, Francis-type, 25,000 hp @ 169' head. Rated capacity: 18,000 kW @ 1,500 cfs. Minimum of less than 1,000 kW @ 190 cfs.	1x vertical-shaft, Francis-type, 16,000 hp @ 107' head. Rated capacity: 11,000 kW at 1,500 cfs. Minimum of less than 1,000 kW @ 190 cfs.
	Trashrack clear spacing (inches) for each trashrack	Sluice outlet: 5"; Penstock intake: 2"	Waterway intake: 3.8"; Penstock intake: 2"; Re-route pipeline intake: 6"; Re-route pipeline discharge: 8"	Waterway intake: 0.5"	Penstock intake: 2"	North intake: 2"; Fish screen trashrack: 4" - 10"; Fish screen: 0.0689"
	Approach water velocity (ft/s) at each intake if known	Unknown	Unknown	0.8 fps	Unknown	0.4 fps
	Dates and types of major equipment upgrades	None	None	Unit 2 overhaul in-progress	None	None
	For recertifications: Indicate only those since last certification					
	Dates, purpose, and type of any recent operational changes (<i>or provide a separate list</i>)	Daily forebay flushing cycle beginning in 2012. See narrative description in Section 2.2.3.	None	Reservoir elevation restriction since 2014 and prior to implementation of dam safety modifications	None	None
	For recertifications: Indicate only those since last certification					

Item	Information Requested	Response				
		Lemolo No. 1	Lemolo No. 2	Toketee	Slide Creek	Soda Springs
	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments (or provide a separate list)	None	None	Pumped storage license amendment (December 1, 2023). On-hold pending PacifiCorp financial analysis. Plant selected for Department of Energy Hydroelectric Efficiency Upgrades for unit overhauls. Negotiations in progress with DOE.	None	None
Dam or Diversion	Date of original dam or diversion construction and description and dates of subsequent dam or diversion structure modifications	1954-1955	1955-1956	1948-1949	1950-1951	1951-1952
	Dam or diversion structure length, height including separately the height of any flashboards, inflatable dams, etc. and describe seasonal operation of flashboards and the like	885'-long, 120'-high	350'-long, 25'-high	1,381'-long, 58'-high	183'-long, 30'-high	309'-long, 77'-high
	Spillway maximum hydraulic capacity	16,300 cfs at 4,155'	13,000 cfs at 3,330'	28,000 cfs at 2,438'1,	23,000 cfs at 1,900.6'	10,000 cfs at 1,814'
	Length and type of each penstock and water conveyance structure between the impoundment and powerhouse	2,042' of concrete flume, 14,176' of concrete canal, 7,328' of steel penstock	9,931' of concrete flume, 6,465' of concrete and rock flume, 49,252' of gunite-lined canal, 486' of inverted siphon, 3,755' of steel flume, and 3,975' of concrete and steel penstock	1,664' of woodstave flowline, 4,080' of unlined tunnel, 1,250' of concrete-lined tunnel, 1,067' of upper steel penstock, and 158' of trifurcated steel penstock	3,396' of concrete flume, 4,336' of concrete canal, 1,921' of concrete and rock flume, and 374' of steel penstock	2,112' of steel flowline and 168' of steel penstock
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	Power	Power	Power	Power	Power
Impoundment and Watershed	Authorized maximum and minimum impoundment water surface elevations For recertifications: Indicate if these values have changed since last certification	4,148.5' max., 4,123.5' min. No change	3,330' max. No change	2,430' max., 2,424' min. No change	1,982.0' normal water surface elevation No change	1,807' max., 1,793' min. No change
	Normal operating elevations and normal fluctuation range For recertifications: Indicate if these values have changed since last certification	Minimum pool of 4,145' June-August and 4,123.5' September-May; 0.5' per day ramping No change	3,325', N/A No change	2,428' current normal operating elevation, with 4' of fluctuation, due to dam safety constraints Dam safety restriction is new since last certification	1,982.0', minimal fluctuation due to no storage capacity No change	Same as above, 14' of fluctuation for re-regulation of flows from upstream developments No change

Item	Information Requested	Response				
		Lemolo No. 1	Lemolo No. 2	Toketee	Slide Creek	Soda Springs
	Gross storage volume and surface area at full pool For recertifications: Indicate if these values have changed since last certification	11,752 ac-ft, 419 ac No change	0 ac-ft, 1.4 ac No change	1,051 ac-ft, 96.9 ac No change	43.0 ac-ft, 2.0 ac No change	576 ac-ft, 31.5 ac No change
	Usable storage volume and surface area For recertifications: Indicate if these values have changed since last certification	11,079 ac-ft No change	0 ac-ft, 1.4 ac No change	491.4 ac-ft No change	0 No change	432 ac-ft, 31.5 ac No change
	Describe requirements related to impoundment inflow and outflow, elevation restrictions (e.g., fluctuation limits, seasonality) up/down ramping and refill rate restrictions.	Minimum flow outlet to bypassed reach: 50 cfs Nov.-Mar., 60 cfs Apr., 70 cfs May, 80 cfs Jun.-Oct.; other restrictions described above	Minimum flow outlet to bypassed reach: 50 cfs Nov.-Mar., 60 cfs Apr., 70 cfs May-Jun., 80 cfs Jul.-Oct.; other restrictions described above	Minimum flow outlet to bypassed reach: 60 cfs Nov.-May and 80 cfs Apr.-Oct.	240 cfs, year-round	275 cfs year-round
	Upstream dams by name, ownership (including if owned by an affiliate of the applicant's company) and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	N/A	Lemolo No. 1 (see left column)	Lemolo No. 1 and Lemolo No. 2* (see left columns)	Lemolo No. 1, Lemolo No. 2*, and Toketee* (see left columns)	Lemolo No. 1, Lemolo No. 2*, Toketee*, Clearwater No. 1, Clearwater No. 2, Fish Creek*
	Downstream dams by name, ownership (including if owned by an affiliate of the applicant's company), river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Lemolo No. 2*, Toketee*, Slide Creek, and Soda Springs* owned by PacifiCorp (* indicates fish passage; see other columns in this table for additional information). Winchester Dam at river mile 7 is privately-owned and operated.	Toketee*, Slide Creek, and Soda Springs* owned by PacifiCorp (* indicates fish passage; see right columns in this table for additional information). Winchester Dam at river mile 7 is privately-owned and operated.	Slide Creek and Soda Springs* owned by PacifiCorp (* indicates fish passage; see right columns in this table for additional information). Winchester Dam at river mile 7 is privately-owned and operated.	Soda Springs* owned by PacifiCorp. Winchester Dam at river mile 7 is privately-owned and operated.	Winchester Dam at river mile 7 is privately-owned and operated.
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	N/A	N/A	N/A	N/A	N/A

Item	Information Requested	Response				
		Lemolo No. 1	Lemolo No. 2	Toketee	Slide Creek	Soda Springs
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control. Indicate locations and acres of flowage rights versus fee-owned property.	Land: approx. 681 ac.; Water: approx. 476 ac.	Land: approx. 394 ac.; Water: approx. 23 ac.	Land: approx. 234 ac.; Water: approx. 84 ac.	Land: approx. 75 ac.; Water approx. 2 ac.	Land: approx. 65 ac.; Water approx. 33 ac.
Hydrologic Setting	Average annual flow at the dam, and period of record used	369 cfs (Oct 2013 - Sep 2023)	443 cfs (Oct 2013 - Sep 2023)	897 cfs (Oct 2013 - Sep 2023)	930 cfs (Oct 2013 - Sep 2023) *Including Fish Creek turbine flow.	1214 cfs (Oct 2013 - Sep 2023)
	Average monthly flows (cfs) and period of record used	Jan 358, Feb 379, Mar 384, Apr 418, May 482, Jun 404, Jul 331, Aug 310, Sep 298, Oct 361, Nov 353, Dec 354. (Oct 2013-Sep 2023)	Jan 431, Feb 465, Mar 458, Apr 490, May 571, Jun 496, Jul 402, Aug 359, Sep 397, Oct 436, Nov 395, Dec 415 (Oct 2013-Sep 2023)	Jan 910, Feb 1048, Mar 1045, Apr 1183, May 1180, Jun 926, Jul 730, Aug 666, Sep 698, Oct 767, Nov 757, Dec 851 (Oct 2013-Sep 2023)	Jan 947, Feb 1103, Mar 1097, Apr 1274, May 1273, Jun 959, Jul 733, Aug 666, Sep 698, Oct 768, Nov 767, Dec 877 (Oct 2013-Sep 2023)	Jan 1326, Feb 1554, Mar 1535, Apr 1720, May 1685, Jun 1197, Jul 872, Aug 785, Sep 817, Oct 899, Nov 977, Dec 1205
	Location and name of closest stream gaging stations above and below the facility	USGS 14313200 N. UMPQUA R ABV WHITE MULE CK, NR TOKETEE FALLS, OR; USGS 14313700 N. UMPQUA R BLW WARM SPRINGS CK NR TOKETEE FALLS, OR	USGS 14313700 N. UMPQUA R BLW WARM SPRINGS CK NR TOKETEE FALLS, OR; USGS 14315500 NORTH UMPQUA RIVER AT TOKETEE FALLS, OR	USGS 14313700 N. UMPQUA R BLW WARM SPRINGS CK NR TOKETEE FALLS, OR; USGS 14315500 NORTH UMPQUA RIVER AT TOKETEE FALLS, OR	USGS 14315500 NORTH UMPQUA RIVER AT TOKETEE FALLS, OR; USGS 14315700 N. UMPQUA R BLW SLIDE CK DAM NR TOKETEE FALLS, OR	USGS 14315700 N. UMPQUA R BLW SLIDE CK DAM NR TOKETEE FALLS, OR; USGS 14316455 N. UMPQUA R BLW SODA SPGS RESV, NR TOKETEE FALLS, OR
	Watershed area at the dam (in square miles). Identify if this value is prorated from gage locations and provide the basis for proration calculation.	173 sq. miles upstream of Lemolo Dam Based on USGS StreamStats at the downstream of the facility gauge location	181 sq. miles upstream of Lemolo No. 2 Diversion Dam Based on USGS StreamStats at the downstream of the facility gauge location	335 sq. miles upstream of Toketee Dam, including area upstream of Clearwater Reconnect (76 sq. miles). Based on USGS StreamStats at the downstream of the facility gauge location	337 sq. miles upstream of Slide Creek Diversion Dam Based on USGS StreamStats at the downstream of the facility gauge location	435 sq. miles upstream of Soda Springs Dam Based on USGS StreamStats at the downstream of the facility gauge location
	Other facility specific hydrologic information (e.g., average hydrograph)	N/A	N/A	N/A	N/A	N/A
Designated Zones of Effect	Numbers and names of each zone of effect (e.g., "Zone 1: Impoundment")	Zone 1: Lemolo Reservoir, Zone 2: Lemolo No. 1 Bypassed Reach of North Umpqua River (NUR), Zone 3: Lemolo No. 2 Impoundment	Zone 3: Lemolo No. 2 Impoundment, Zone 4: Lemolo No. 2 Bypassed Reach of NUR, Zone 5: Toketee Reservoir	Zone 5: Toketee Reservoir, Zone 6: Toketee Bypassed Reach of NUR, Zone 7: Slide Creek Impoundment	Zone 7: Slide Creek Impoundment, Zone 8: Slide Creek Bypassed Reach of NUR, Zone 9: Full-flow reach of NUR	Zone 10: Soda Springs Reservoir, Zone 11: Soda Springs Bypassed Reach of NUR, Zone 12: Regulated Reach of NUR Downstream of Project
	River mile of upstream and downstream limits of each zone of effect (e.g., "Zone 1: RM 6.3 - 5.1")	Zone 1: RM 95.6-93.0, Zone 2: 93.0-88.6, Zone 3: RM 88.6-88.5	Zone 3: RM 88.6-88.5, Zone 4: RM 88.5-76.4, Zone 5: RM 76.4-75.4	Zone 5: RM 76.4-75.4, Zone 6: RM 75.4-73.3, Zone 7: RM 73.3-73.2	Zone 7: RM 73.3-73.2, Zone 8: RM 73.2-71.2, Zone 9: RM 71.2-71.0	Zone 10: RM 71.0-69.8, Zone 11: RM 69.8-69.3, Zone 12: RM 69.3-67.2

Table 2. Facility information table for multiple Project developments on the Clearwater River and Fish Creek

Item	Information Requested	Response		
		Clearwater No. 1	Clearwater No. 2	Fish Creek
Name of the Facility	Facility name (use FERC project name or other legal name)	Clearwater No. 1	Clearwater No. 2	Fish Creek
Reason for applying for LIHI Certification	1. To participate in state RPS program	X	X	X
	2. To participate in voluntary REC market (e.g., Green-e)			
	3. To satisfy a direct energy buyer's purchasing requirement			
	4. To satisfy the facility's own corporate sustainability goals			
	5. For the facility's corporate marketing purposes			
	6. Other (describe)			
	If applicable, amount of annual generation (MWh and % of total generation) for which RECs are currently received or are expected to be received upon LIHI Certification	100%	100%	100%
Location	River name (USGS proper name)	Clearwater River	Clearwater River	Fish Creek
	Watershed name - Select region, click on the area of interest until the 8-digit HUC number appears. Then identify watershed name and HUC-8 number from the map at: https://water.usgs.gov/wsc/map_index.html	North Umpqua 17100301	North Umpqua 17100301	North Umpqua 17100301
	Nearest town(s), county(ies), and state(s) to dam	Idleyld Park, Douglas County, Oregon	Idleyld Park, Douglas County, Oregon	Idleyld Park, Douglas County, Oregon
	River mile of dam above mouth	4.9	8.1	6.6
	Geographic latitude and longitude of dam	43.24597388, -122.28172034	43.25113979, -122.33786145	43.21080282, -122.42665881
Facility Owner	Application contact names (Complete the Contact Form in Section B-4 also)	PacifiCorp c/o Steve Albertelli	PacifiCorp c/o Steve Albertelli	PacifiCorp c/o Steve Albertelli
	Facility owner company and authorized owner representative name. For recertifications: If ownership has changed since last certification, provide the effective date of the change.	PacifiCorp c/o Steve Albertelli N/A	PacifiCorp c/o Steve Albertelli N/A	PacifiCorp c/o Steve Albertelli N/A
	FERC licensee company name (if different from owner)	N/A	N/A	N/A
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	P-1927, November 1, 2003, November 1, 2038	P-1927, November 1, 2003, November 1, 2038	P-1927, November 1, 2003, November 1, 2038

Item	Information Requested	Response		
		Clearwater No. 1	Clearwater No. 2	Fish Creek
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	Major	Major	Major
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments. Include links or copies.	Issued June 28, 2002 by Oregon Department of Environmental Quality; Amended December 13, 2022 for pumped storage license amendment. Available on-line at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/North_Umpqua_Project_License.pdf	Issued June 28, 2002 by Oregon Department of Environmental Quality; Amended December 13, 2022 for pumped storage license amendment. Available on-line at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/North_Umpqua_Project_License.pdf	Issued June 28, 2002 by Oregon Department of Environmental Quality; Amended December 13, 2022 for pumped storage license amendment. Available on-line at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/North_Umpqua_Project_License.pdf
	Hyperlinks to key electronic records on FERC e-library website or other publicly accessible data repositories (or provide a separate list)	https://www.pacificorp.com/energy/hydro/north-umpqua-river.html	https://www.pacificorp.com/energy/hydro/north-umpqua-river.html	https://www.pacificorp.com/energy/hydro/north-umpqua-river.html
Powerhouse	Date of initial operation (past or future for pre-operational applications)	6/16/1953	11/30/1953	6/30/1952
	Total installed capacity (MW)	15	26	11
	For recertifications: Indicate if installed capacity has changed since last certification	No change	No change	No change
	Average annual generation (MWh) and period of record used (1994-2023)	44,100	47,500	40,300
	For recertifications: Indicate if average annual generation has changed since last certification	-7,900	-9,800	-10,700
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.)	Run-of-river	Run-of-river	Run-of-river
	For recertifications: Indicate if mode of operation has changed since last certification	No change	No change	No change
	Number, type, and size of turbine/generators, including maximum and minimum hydraulic capacity and maximum and minimum output of each turbine and generator unit	1x vertical-shaft, Francis-type, 21,000 hp @ 616' head. Rated capacity: 15,000 kW @ 350 cfs. Minimum of less than 1,000 kW at 40 cfs.	1x vertical-shaft, Francis-type, 36,000 hp @ 722' head. Rated capacity: 26,000 kW @ 485 cfs. Minimum of less than 1,000 kW @ 66 cfs	1x vertical-shaft, impulse-type, 15,400 hp @ 995' head. Rated capacity: 11,000 kW @ 155 cfs. Minimum of less than 1,000 kW @ 20 cfs.
Trashrack clear spacing (inches) for each trashrack	Waterway intake: 4"; Penstock intake: 2"	Waterway intake: 4"; Penstock intake: 2"	Waterway intake: 8"; Fish screen: 0.069"; Penstock intake: 2"	
Approach water velocity (ft/s) at each intake if known	Unknown	Unknown	0.4 fps at fish screen	

Item	Information Requested	Response		
		Clearwater No. 1	Clearwater No. 2	Fish Creek
	Dates and types of major equipment upgrades For recertifications: Indicate only those since last certification	None	None	None
	Dates, purpose, and type of any recent operational changes (<i>or provide a separate list</i>) For recertifications: Indicate only those since last certification	None	Generation from 0.5 to 10.0 MW with air admission system closed (2015). See narrative in Section 2.2.5.	None
	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments (<i>or provide a separate list</i>)	None	None	Pumped storage license amendment (December 1, 2023). On-hold pending PacifiCorp financial analysis.
Dam or Diversion	Date of original dam or diversion construction and description and dates of subsequent dam or diversion structure modifications	1951-1952	1952-1953	1951-1952
	Dam or diversion structure length, height including separately the height of any flashboards, inflatable dams, etc. and describe seasonal operation of flashboards and the like	1,426'-long, 17'-high	157'-long, 18'-high	133'-long, 6'-high
	Spillway maximum hydraulic capacity	4,200 cfs at 3,880'	2,500 cfs at 3,218'	3,700 cfs at 3,062.5'
	Length and type of each penstock and water conveyance structure between the impoundment and powerhouse	117' of concrete culvert, 342' of concrete flume, 12,578' of gunite-lined canal, 3,950' of steel penstock, and 913' of penstock dresser coupling	88' of concrete culvert, 8,864' of concrete flume, 2,852' of concrete and rock flume, 18,599' of gunite-lined canal, 359' of rock flume, 473' of steel flume, 1,087' of steel flume, and 82' of concrete-encased steel penstock	8,513' of concrete flume, 15,282' of gunite-lined canal, 1,689' of steel flume, 178' of timber flume, 2,240' of steel penstock, and 118' of concrete-encased steel penstock
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	Power	Power	Power
Impoundment and Watershed	Authorized maximum and minimum impoundment water surface elevations For recertifications: Indicate if these values have changed since last certification	3,875' max., 3,874.5' min. No change	3,212.0' normal No change	3,057.7' normal No change
	Normal operating elevations and normal fluctuation range For recertifications: Indicate if these values have changed since last certification	3,875', 0.5' No change	3,212.0' normal, N/A No change	3,057.7' normal, N/A No change

Item	Information Requested	Response		
		Clearwater No. 1	Clearwater No. 2	Fish Creek
	Gross storage volume and surface area at full pool For recertifications: Indicate if these values have changed since last certification	30.2 ac-ft, 11.8 ac No change	0 ac-ft, 1.2 ac No change	2 ac-ft, 3 ac. No change
	Usable storage volume and surface area For recertifications: Indicate if these values have changed since last certification	5.5 ac-ft, 11.8 ac No change	0 ac-ft, 1.2 ac No change	0 ac-ft, 3 ac. No change
	Describe requirements related to impoundment inflow and outflow, elevation restrictions (e.g., fluctuation limits, seasonality) up/down ramping and refill rate restrictions.	Minimum flow outlet to bypassed reach: 40 cfs Jul.-Mar., 60 cfs Apr.-Jun.	Minimum flow outlet to bypassed reach: 40 cfs Jul.-Mar., 60 cfs Apr.-Jun.	Minimum flow outlet to bypassed reach: 130 cfs or natural inflow when less than 130 cfs
	Upstream dams by name, ownership (<i>including if owned by an affiliate of the applicant's company</i>) and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	N/A	Clearwater No. 1 (see left column)	N/A
	Downstream dams by name, ownership (<i>including if owned by an affiliate of the applicant's company</i>), river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Clearwater No. 2 (see right column)	N/A	N/A
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	N/A	N/A	N/A
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control. Indicate locations and acres of flowage rights versus fee-owned property.	Land: approx. 138 ac; Water: approx. 27 ac.	Land: approx. 190 ac.; Water: approx. 11 ac.	Land: approx. 111 ac.; Water: approx. 12 ac.
Hydrologic Setting	Average annual flow at the dam, and period of record used	152 cfs (Oct. 2013 - Sep. 2023)	183 cfs (Oct 2013 - Sep 2023)	165 cfs (Oct. 2013 - Sep. 2023)
	Average monthly flows (cfs) and period of record used	Jan 141, Feb 158, Mar 161, Apr 182, May 189, Jun 163, Jul 139, Aug 129, Sep 126, Oct 143, Nov 147, Dec 152 (Oct. 2013 - Sep. 2023)	Jan 178, Feb 222, Mar 214, Apr 258, May 248, Jun 189, Jul 151, Aug 141, Sep 138, Oct 144, Nov 144, Dec 177 (Oct. 2013 - Sep. 2023)	Jan 211, Feb 259, Mar 236, Apr 299, May 292, Jun 164, Jul 74, Aug 45, Sep 38, Oct 59, Nov 115, Dec 185 (Oct. 2013 - Sep. 2023)

Item	Information Requested	Response		
		Clearwater No. 1	Clearwater No. 2	Fish Creek
	Location and name of closest stream gaging stations above and below the facility	USGS 14314500 CLEARWATER RIVER ABV TRAP CK NR TOKETEE FALLS, OR; USGS 14314700 CLEARWATER R BLW MOWICH CREEK, NR TOKETEE FALLS, OR	USGS 14314700 CLEARWATER R BLW MOWICH CREEK, NR TOKETEE FALLS, OR; USGS 14315500 NORTH UMPQUA RIVER AT TOKETEE FALLS, OR	USGS 14315950 FISH CREEK ABV SLIPPER CREEK NR TOKETEE FALLS, OR; USGS 14316455 N. UMPQUA R BLW SODA SPGS RESV, NR TOKETEE FALLS, OR
	Watershed area at the dam (in square miles). Identify if this value is prorated from gage locations and provide the basis for proration calculation.	41.3 sq. miles upstream of Stump Lake Dam Based on USGS StreamStats at the downstream of the facility gauge location	60.4 sq. miles upstream of Clearwater 2 Diversion Dam Based on USGS StreamStats at the downstream of the facility gauge location	61.4 sq. miles upstream of Fish Creek Diversion Dam Based on USGS StreamStats at the downstream of the facility gauge location
	Other facility specific hydrologic information (e.g., average hydrograph)	N/A	N/A	N/A
Designated Zones of Effect	Numbers and names of each zone of effect (e.g., "Zone 1: Impoundment")	Zone 13: Clearwater No. 1 Impoundment (Stump Lake), Zone 14: Clearwater No. 1 Bypassed Reach, Zone 15: Clearwater No. 2 Impoundment	Zone 15: Clearwater No. 2 Impoundment, Zone 16: Clearwater No. 2 Bypassed Reach, Zone 5: Toketee Reservoir	Zone 17: Fish Creek Impoundment, Zone 18: Fish Creek Bypassed Reach, Zone 7: Slide Creek Impoundment
	River mile of upstream and downstream limits of each zone of effect (e.g., "Zone 1: RM 6.3 - 5.1")	Zone 13: RM 8.5-8.1, Zone 14: RM 8.1-4.9, Zone 15: RM 4.9-4.9	Zone 15: RM 4.9-4.9, Zone 16: RM 4.9-0.0, Zone 5: NUR RM 76.4-75.4	Zone 17: RM 6.6-6.6, Zone 18: RM 6.6-0.0, Zone 7: NUR RM 73.3-73.2

Seven of the eight power plants consist of a single outdoor-type generating unit, while the eighth power plant at the Toketee development contains three, indoor turbine-generators. The Project's total rated capacity is 193,999 kilowatts (kW), as follows:

Table 3. Authorized Installed Capacities

Development	Rated Capacity (kW)
Lemolo No. 1	31,999
Lemolo No. 2	38,500
Clearwater No. 1	15,000
Clearwater No. 2	26,000
Toketee	42,500
Fish Creek	11,000
Slide Creek	18,000
Soda Springs	11,000
Project Total	193,999

The Project includes 117.5 miles of transmission line in seven segments. Five of the seven segments interconnect powerplants and switching stations within the Project, and two segments deliver Project power to PacifiCorp's Dixonville Substation approximately 43 miles west of Soda Springs. Also included are staff housing, support facilities, and access roads to all Project facilities.

1.1.1 Lemolo No. 1 Development

The Lemolo No. 1 Development is the most upstream development on the North Umpqua River. The development consists of a diversion dam impounding the 11,752-acre-foot Lemolo Reservoir, 16,310 feet of canal and flumes, a forebay with 46 acre-feet of active storage, 7,338 feet of steel penstock, and a powerhouse on the North Umpqua River immediately upstream of the mouth of Warm Springs Creek. Lemolo No. 1 is rated at 31,999 kW corresponding to a discharge of 565 cubic feet per second (cfs) and a rated head of 735 feet.

1.1.1.1 Dam

Lemolo Dam is located on the North Umpqua River about 1 mile downstream of the confluence with Lake Creek. The dam is a rockfill structure with upstream, concrete facing and a 106-foot spillway consisting of a 33-foot-wide tainter-gated section and two adjacent flashboard sections. A sluice outlet structure, with a 60-inch, fixed-cone dispersion valve; and 24-inch and 12-inch, fixed-cone, dispersion, instream flow release valves, are incorporated in the dam.

1.1.1.2 Waterway Intake

The Lemolo No. 1 waterway intake includes an intake tower with access bridge, a 164-foot-long power outlet conduit, and a 61-foot-long power outlet discharge and control structure. The intake tower houses a trashrack and wheel-type, intake gate. Two, 60-inch, fixed-cone, dispersion valves are in the control structure just below the downstream face of the dam. A side channel

spillway, immediately downstream of the control structure, prevents inflows to the waterway in excess of its capacity.

1.1.1.3 Waterway

The Lemolo No. 1 waterway consists of 16,310 feet of open-channel conduit extending from the Lemolo Dam to the Lemolo No. 1 forebay and then to the Lemolo No. 1 penstock intake. The conduit consists of gunite-lined canal (14,176 feet), concrete flume (2,042 feet), a forebay with 46 acre-feet of active storage, and transitions (92 feet). The existing capacity of the waterway is 561 cfs.

1.1.1.4 Aquatic/Riparian/Terrestrial Connectivity.

White Mule Creek, which was previously intercepted by Lemolo No. 1 canal, was reconnected to provide aquatic, riparian, and terrestrial connectivity over the Lemolo No. 1 canal in 2008. A second aquatic connectivity site was constructed in 2013 to provide aquatic connectivity across (i.e., perpendicular to) the waterway. Six wildlife crossings were installed across the gunite canal to provide terrestrial connectivity for big game and other wildlife across the Lemolo No. 1 waterway. One under-crossing and five over-crossings provide terrestrial habitat connectivity for wildlife across the penstock alignment.

1.1.1.5 Forebay and Penstock Intake

The Lemolo No. 1 forebay is an open-excavated reservoir with an embankment levee on the north and west sides and with a high-density, polyethylene membrane lining. The 13.16-acre forebay has approximately 46 acre-feet of active storage at maximum water surface elevation of 4,081 feet. The forebay is located to the northeast of the canal and penstock intake and receives flow from the waterway via a 66-foot by 16.5-foot transition structure. An approximately 0.50-acre wetland was constructed to the southwest of the forebay embankment. The hydrology for this wetland enhancement site is provided by a supply line from the invert of the forebay transition structure.

Water is released to the Lemolo No. 1 penstock via a concrete intake structure with trash rack and 15.9-foot-wide, steel tainter gate. The intake is protected from overflowing by a 145-foot-long spillway that discharges through a channel to the North Umpqua River.

1.1.1.6 Penstock

The Lemolo No. 1 steel penstock extends 7,338 feet from the intake to the Lemolo No. 1 powerhouse. Penstock diameter varies from 9.7 feet near the intake to 7.0 feet at the powerhouse.

1.1.1.7 Powerhouse

The Lemolo No. 1 powerhouse is a reinforced concrete structure housing a single turbine-generator. The powerhouse is located on the North Umpqua River immediately upstream of the mouth of Warm Springs Creek. The powerhouse is of the outdoor generator style, with a turbine centerline elevation of 3,318.0 feet. Speed/load, voltage/VAR, load limit, and float control of the Lemolo No. 1 unit are possible from either the powerhouse, or the Toketee Control Center.

1.1.1.8 Impoundments

Lemolo Reservoir has a normal maximum water surface elevation of 4,148.5 feet and a normal maximum water surface area of 419.1 acres. Total storage at normal maximum water surface is

11,752 acre-feet. The principal tributary streams to Lemolo Reservoir are the North Umpqua River, Poole Creek, Lake Creek, and Spring River.

1.1.1.9 Turbine, Generator, and Appurtenant Equipment

The Lemolo No. 1 turbine-generator is a vertical-shaft, Francis-type, hydraulic turbine and synchronous generator set. The turbine is equipped with a 45-inch, mushroom-type, Allis Chalmers valve, which operates as a turbine bypass during turbine load rejections and outages. Generator rating is 34,500 kVA, 0.95 power factor at 11,500 volts and 400 revolutions per minute (rpm). Rated capacity of the combined turbine-generator set is 31,999 kW at 565 cfs and 735 feet net head.

The Lemolo No. 1 transformer is a single-phase, 11.5/124.5-kV transformer rated at 56,000 kVA. Power from the transformer is delivered on Line 53 to the Clearwater switching station, 12 miles from the Lemolo No. 1 powerhouse.

1.1.1.10 Instream Flow Release and Measurement Facilities

The FERC license requires a minimum instream flow for the Lemolo No. 1 Development bypass reach of 50 cfs from November through March, 60 cfs in April, 70 cfs in May, and 80 cfs from June through October. Leakage through the dam abutments, combined with the discharge of the 12-inch and 24-inch fixed-cone dispersion valves in the lower dam outlet works, provide the instream flow. The existing United States Geological Survey (USGS) gage 14313500, 0.4 miles downstream of the dam, effectively measures these flows and thus documents the instream flow in the Lemolo No. 1 bypass reach. To provide daily verification of compliance with instream flows, a new communication link was installed at the USGS gaging site.

1.1.2 Lemolo No. 2 Development

1.1.2.1 Dam

Lemolo No. 2 diversion dam is located on the North Umpqua River 190 feet downstream of the Lemolo No. 1 powerhouse. The dam is a concrete gravity structure with a free-crest spillway surmounted by flashboards. A concrete intake structure, an instream release outlet, and a fish ladder are incorporated in the dam. The instream flow release system and fish ladder were modified in 2004 to provide higher flow releases to the river and additional fish ladder pools with lower weir heights for enhanced fish passage.

1.1.2.2 Waterway Intake

The Lemolo No. 2 waterway intake includes a 122-foot-long, tapered-concrete intake bay with trashrack, tainter gate, and side channel spillway. The side channel spillway, immediately downstream of the tainter gate, prevents inflows to the waterway in excess of its capacity.

1.1.2.3 Waterway

The Lemolo No. 2 waterway consists of 69,503 feet of open-channel conduit and 486 feet of pipeline extending from the Lemolo No. 2 diversion dam to Lemolo No. 2 forebay. The waterway is comprised of concrete flume (9,931 feet), gunite-lined canal (49,352 feet), concrete and rock flume (6,465 feet), steel flume (3,755 feet), and an inverted siphon (486 feet). The existing capacity of the waterway is 637 cfs.

1.1.2.4 Aquatic/Riparian/Terrestrial Connectivity

Seven side streams were previously diverted into the waterway along its length at Helen Creek, Potter Creek, Spotted Owl Creek, Karen Creek, Deer Creek, Thorn Creek, and Mill Creek. Post-relicensing, these diversions were breached and abandoned according to license requirements, and flows in these streams were returned to their original stream channels. The riparian corridor was restored at Potter Creek. A total of 41 aquatic connectivity sites were modified and/or constructed along the waterway between 2003 and 2016 to provide aquatic connectivity across (i.e., perpendicular to) the waterway. The aquatic connectivity sites include bridges over the waterway and culverts below the waterway and adjacent access roads. In addition, twenty-seven wildlife crossings were installed across the gunite canal to provide terrestrial connectivity for big game and other wildlife across the Lemolo No. 2 waterway. Eight of the aquatic connectivity sites and wildlife crossings are co-located.

1.1.2.5 Canal Shut-off & Drainage System

An emergency canal monitoring network and canal shut-off system has been added to existing facilities to divert canal flows during a breach and to stop landslides from impacting the waterway conveyance system. A new stainless-steel headgate operating under stored hydraulic pressure shuts down canal inflows. Along the canal are five radial gate structures with raised gates that are ready to trip closed upon activation to restrict the flows already in the canal. The gate structures include side walls serving as weirs to dampen flows and to eliminate canal overtopping.

The monitoring and gate tripping systems are solar-powered and use submersible, water-driven, 100-watt, electric alternators for battery-charging.

1.1.2.6 Forebay

Lemolo No. 2 forebay is an open excavated reservoir with an embankment levee on the downhill side with a compacted-clay liner. The forebay is protected from overfilling by a 240-foot-long spillway that discharges to Toketee Reservoir via an unlined spillway channel to Stinkhole Pond.

1.1.2.7 Penstock

Water is released to the Lemolo No. 2 penstock via a concrete intake structure with a trashrack and a 12.1-foot by 10.7-foot, wheel-type, intake gate. The penstock extends 3,975 feet from the forebay to Lemolo No. 2 powerhouse. Penstock diameter varies from 10.5 feet near the forebay to 7.3 feet at the powerhouse. A 71-foot-high surge tank is included in the penstock system to limit penstock pressure rise during turbine-generator shutdowns.

1.1.2.8 Powerhouse

The Lemolo No. 2 powerhouse is a reinforced-concrete structure housing a single turbine-generator. The powerhouse is located on the North Umpqua River approximately 3,500 feet upstream of Toketee Reservoir. The powerhouse is of the outdoor generator style, with a turbine centerline elevation of 2450.0 feet. Speed/load, voltage/VAR, and load limit control of the Lemolo No. 2 unit are possible from either the powerhouse or the Toketee Control Center.

1.1.2.9 Re-route Discharge Pipe

Water is diverted from the powerhouse tailrace and carried to Toketee Reservoir via a buried concrete pipe. The re-route discharge structure and piping alleviates ramping in the North Umpqua River bypass reach. The structure has three sluice gates for diverting water into the

bypass reach for pipe maintenance purposes. Under normal operation the sluice gates remain closed. During maintenance and inspection, the pipe headgate is closed, and the sluice gates are open to allow draining of the pipe for maintenance and inspection.

1.1.2.10 Impoundments

At a normal maximum water surface elevation of 3,325.0 feet, the impoundment formed by the Lemolo No. 2 diversion dam has an area of 1.4 acres, and there is no active reservoir storage.

Forebay active storage capacity and area are 159.2 acre-feet and 24.2 acres, respectively, at a normal maximum water surface elevation of 3184.5 feet.

1.1.2.11 Turbine, Generator and Appurtenant Equipment

The Lemolo No. 2 turbine-generator is a vertical-shaft, hydraulic turbine and synchronous generator set. The Francis-type turbine is rated at 51,696 hp under a net effective head of 720 feet. The turbine is equipped with a 45-inch, mushroom-type, Allis Chalmers valve that operates a turbine bypass during turbine load rejections and outages. Generator rating is 45,000 kVA, 0.95 power factor at 11,500 volts and 400 rpm. Rated capacity of the combined turbine-generator set is 38,500 kW at 715 cfs.

The Lemolo No. 2 transformer is a three-phase 11.5/124.5 kV transformer rated at 56,000 kVA. Power from the transformer is delivered on Line 55 to the Clearwater switching station, 1.4 miles from the Lemolo No. 2 powerhouse.

1.1.2.12 Instream Flow Release and Measurement Facilities

The FERC license requires a minimum instream flow for the Lemolo No. 2 Development bypass reach of 50 cfs from November through March, 60 cfs in April, 70 cfs in May through June, and 80 cfs from July through October. Flow released through the fish ladder, spillway leakage, and auxiliary water from the canal headworks comprise the instream flow release. The spillway leakage is not controllable independent of the diversion pond level. During normal operation, the fish ladder gate and one auxiliary flow gate are in the fully open position, while the second auxiliary flow gate modulates flow to maintain bypass reach flows greater than the minimum requirement. Each of the auxiliary flow systems includes a 24-inch slide gate, an ultrasonic flowmeter, and discharges into a concrete stilling basin near the fish ladder entrance. The total flow into the Lemolo No. 2 bypass reach is measured at USGS gage 14313700, which is approximately 600 feet downstream from the diversion dam.

1.1.3 Clearwater No. 1 Development

The Clearwater No. 1 Development is the uppermost development on the Clearwater River, a tributary of the North Umpqua River. The development consists of a diversion dam impounding the 30-acre-foot Stump Lake, approximately 9 miles upstream of Toketee Reservoir, 13,037 feet of canal and flumes, a 120.8-acre-foot forebay, 4,863 feet of penstock, and a powerhouse discharging directly into the Clearwater No. 2 diversion impoundment. Clearwater No. 1 is rated at 15,000 kW corresponding to a discharge of 350 cfs and a rated head of 616 feet.

1.1.3.1 Dam

Clearwater No. 1 diversion dam is located on the Clearwater River approximately 9 miles upstream of its confluence with the North Umpqua River immediately downstream of Toketee

Reservoir. The dam is an earth-fill structure with upstream riprap face and free-crest, concrete spillway. A concrete waterway intake structure is incorporated into the dam near the right abutment.

1.1.3.2 Waterway Intake

The Clearwater No. 1 waterway intake includes a 21-foot concrete intake structure with a trashrack, a timber gate, and a skimming, side-channel spillway. The spillway prevents inflows to the waterway in excess of its capacity.

1.1.3.3 Waterway

The Clearwater No. 1 waterway consists of 13,037 feet of open-channel conduit extending from the Clearwater No. 1 diversion dam to Clearwater No. 1 forebay. The conduit consists of gunite-lined canal (12,578 feet), concrete flume (342 feet), and concrete road culvert (117 feet). The existing capacity of the waterway is 228 cfs.

1.1.3.4 Aquatic/Riparian/Terrestrial Connectivity.

A macroinvertebrate and amphibian connectivity structure is located on the left dam abutment of the Clearwater No. 1 diversion dam. The structure consists of a grouted rock ramp on both sides of the embankment, habitat features (e.g., rock, boulders, woody debris, and vegetation) to provide coverage for amphibian habitat and passage, an access walkway, and piping. Screened water is pumped to the top of the grouted channel and allowed to flow down both sides of the structure to Stump Lake and the Clearwater River, respectively.

Two other aquatic connectivity sites were constructed along the waterway between 2003 and 2011 to provide aquatic connectivity across (i.e., perpendicular to) the waterway. The aquatic connectivity sites include one bridge over the waterway and one culvert below the waterway and adjacent access roads. In addition, ten wildlife crossings were installed across the gunite canal to provide terrestrial connectivity for big game and other wildlife across the waterway. One of the aquatic connectivity sites and wildlife crossings are co-located. Each wildlife crossing is constructed of concrete panels for a finished width of 36 feet and is covered in forest floor material to provide adequate cover for wildlife to cross the canal.

Three under-crossings provide terrestrial habitat connectivity for wildlife beneath the penstock.

1.1.3.5 Forebay

Clearwater No. 1 forebay is an open excavated reservoir with a compacted clay liner. The forebay is protected from overflowing by a side channel spillway that discharges into Mowich Creek.

1.1.3.6 Penstock

Water is released to the Clearwater No. 1 penstock via a concrete intake structure with trashrack and 7.0-foot by 8.9-foot wheel type intake gate. The penstock extends 4,863 feet from the forebay to Clearwater No. 1 powerhouse. Penstock diameter varies from 6.7 feet near the forebay to 5.0 feet at the powerhouse.

1.1.3.7 Powerhouse

The Clearwater No. 1 powerhouse is a reinforced-concrete structure housing a single turbine-generator. The powerhouse is located on the Clearwater River approximately 5 miles upstream of

Toketee Reservoir. The powerhouse is of the outdoor generator style, with a turbine centerline elevation of 3,212.2 feet. Speed/load, voltage/VAR, and load limit control of the Clearwater No. 1 unit are possible from either the powerhouse or the Toketee Control Center.

1.1.3.8 Impoundments

The reservoir impounded by the dam is known as Stump Lake. At a normal maximum water surface elevation of 3,875.0 feet, Stump Lake has an area of 11.8 acres with a total capacity of 30.2 acre-feet.

Forebay active storage capacity and area are 100.6 acre-feet and 16.3 acres, respectively, at normal maximum water surface elevation of 3,862.0 feet.

1.1.3.9 Turbine, Generator, and Appurtenant Equipment

The Clearwater No. 1 turbine-generator is a vertical-shaft, hydraulic turbine and synchronous generator set. The Francis-type turbine is rated at 21,000 hp under a net effective head of 616 feet. Generator rating is 17,647 kVA, 0.85 power factor at 7,200 volts and 514 rpm. Rated capacity of the combined turbine-generator set is 15,000 kW at 350 cfs. The turbine is equipped with a valve which operates as a turbine bypass during turbine load rejections and outages.

The Clearwater No. 1 transformer is a three phase 6.9/124.5-kV transformer rated at 30,000 kVA. Power from the transformer is delivered via Line 57 to the Clearwater switching station, 5.1 miles from the Clearwater No. 1 powerhouse.

1.1.3.10 Instream Flow Release and Measurement Facilities

The existing FERC license requires a minimum instream flow for the Clearwater No. 1 Development bypass reach of 40 cfs from July through March and 60 cfs from April through June. Instream flow is provided from Stump Lake to the bypass reach via a 3-foot diameter, steel pipe that penetrates the dam and is controlled via an automated slide gate. Instream flows are measured via a flow meter on the pipe and at USGS stream gage 14314500 approximately 900 feet downstream of the dam.

1.1.4 Clearwater No. 2 Development

The Clearwater No. 2 Development is the second development on the Clearwater River. The development consists of a diversion dam on the Clearwater River immediately downstream of the Clearwater No. 1 powerhouse, at the mouth of Mowich Creek, impounding a small reservoir, 31,235 feet of canal and flumes, a 70.7-acre-foot forebay, 1,169 feet of penstock, and a powerhouse on the North Umpqua River at Toketee Reservoir. Clearwater No. 2 is rated at 26,000 kW corresponding to a discharge of 485 cfs and a rated head of 722 feet.

1.1.4.1 Dam

Clearwater No. 2 diversion dam is located on the Clearwater River 5 miles upstream from its confluence downstream of Toketee Reservoir and 140 feet downstream of the Clearwater No. 1 powerhouse. The dam is a concrete buttress on a concrete slab, with a free-crest spillway. A concrete canal intake structure and sluice outlet are incorporated in the dam.

1.1.4.2 Waterway Intake

The Clearwater No. 2 waterway intake includes a 26-foot-long concrete intake bay with trashrack, a single, stainless steel slide gate, and side channel spillway.

1.1.4.3 Waterway

The Clearwater No. 2 waterway consists of 31,235 feet of open channel conduit extending from the Clearwater No. 2 diversion dam to Clearwater No. 2 forebay. The waterway is comprised of concrete culvert (88 feet), concrete flume (8,864 feet), concrete and rock flume (2,852 feet), gunite-lined canal (18,599 feet), rock flume (359 feet), and steel flume (473 feet). Five gate structures, four in trapezoidal canal sections and one in a flume section, are located in the upper two-thirds of the waterway. Each structure has a radial gate to restrict flows and vertical weir walls to avoid canal overtopping. Monitoring stations at each gate site and one independent site are tied to a network control system. The existing capacity of the waterway is 341 cfs.

1.1.4.4 Aquatic/Riparian/Terrestrial Connectivity.

Nine aquatic connectivity sites were constructed along the waterway between 2003 and 2014 to provide aquatic connectivity across (i.e., perpendicular to) the waterway. The aquatic connectivity sites include four bridges over the waterway and five culverts below the waterway and adjacent access roads. In addition, fifteen wildlife crossings were installed across the gunite canal to provide terrestrial connectivity for big game and other wildlife across the waterway. Two of the aquatic connectivity sites and wildlife crossings are co-located. Each wildlife crossing is constructed of concrete panels for a finished width of 36 feet and is covered in forest floor material to provide adequate cover for wildlife to cross the canal.

1.1.4.5 Clearwater 2 Canal Shut-off and Drainage System

An emergency canal monitoring network and canal shut-off system has been added to existing facilities to divert continuous canal flows during a breach and to prevent overtopping of the waterway conveyance system. A new stainless-steel headgate operating under stored hydraulic pressure shuts down canal flows. Along the canal are five radial gate structures with raised gates ready to trip closed upon activation to stop flows already in the canal. The gate structure includes side walls serving as weirs to dampen flows and eliminate canal overtopping. The monitoring and gate tripping systems are solar powered and use fiber optic cable conveyed under the transmission line between Clearwater switchyard and Clearwater 1 Plant.

1.1.4.6 Forebay

Clearwater No. 2 forebay is an open excavated reservoir with an embankment levee on the downhill side and a compacted clay lining. Water is released to the Clearwater No. 2 penstock via a concrete intake structure with trash rack and 7.5-foot by 9.6-foot wheel type intake gate.

1.1.4.7 Penstock

Clearwater No. 2 penstock extends 1,169 feet from the forebay to Clearwater No. 2 powerhouse. Penstock diameter varies from 7.2 feet near the forebay to 6.3 feet at the powerhouse.

1.1.4.8 Powerhouse

The Clearwater No. 2 powerhouse is a reinforced-concrete structure housing a single turbine-generator. The powerhouse is located on the North Umpqua River at Toketee Reservoir. The powerhouse is of the outdoor generator style, with a turbine centerline elevation of 2,425.5 feet.

Speed/load, voltage/VAR, and load limit control of the Clearwater No. 2 unit are possible from both the powerhouse and the Toketee Control Center.

1.1.4.9 Impoundment

The small impoundment created by the dam has a surface area of 1.2 acres at normal water surface elevation of 3,212.0 feet. It has no active storage.

Forebay active storage capacity and area are 49.5 acre-feet and 8.6 acres, respectively, at the normal maximum water surface elevation of 3,179.5 feet.

1.1.4.10 Turbine, Generator and Appurtenant Equipment

The Clearwater No. 2 turbine-generator is a vertical-shaft, hydraulic turbine and synchronous generator set. The Francis-type turbine is rated at 36,000 hp under a net effective head of 722 feet. The turbine is equipped with a valve that acts as a turbine bypass (pressure relief valve) during turbine load rejections and outages. Generator rating is 30,588 kVA, 0.85 power factor at 11,500 volts and 450 rpm. The rated capacity of the combined turbine-generator set is 26,000 kW at 485 cfs.

The Clearwater No. 2 transformers are three, single-phase, 11.5/125 kV transformers rated at 10,196 kVA each. Power from the transformers is delivered on Line 55-1 to the Clearwater switching station, 0.3 miles from the Clearwater No. 2 powerhouse.

1.1.4.11 Instream Flow Release and Measurement Facilities

The existing FERC license requires a minimum instream flow for the Clearwater No. 2 Development bypass reach of 40 cfs from July through March and 60 cfs from April through June. An automated slide gate and pipe in the diversion dam provides instream flow to the Clearwater No. 2 bypass reach. Flow through the pipe is measured by an ultrasonic flowmeter, and total flow in the bypass reach is measured at USGS gage 14314700 located approximately 600 ft downstream from the dam.

1.1.5 Toketee Development

The Toketee Development is located at the confluence of the Clearwater and North Umpqua rivers. The development consists of an embankment dam on the North Umpqua River impounding the 1,051-acre-foot Toketee Reservoir, 6,994 feet of wood stave pipe and tunnel, 1,067 feet of single penstock that trifurcates into three 158-foot-long penstocks, and a three-unit powerhouse on the right bank of the North Umpqua River approximately 2 miles downstream of Toketee Reservoir. Toketee is rated at 42,500 kW corresponding to a rated head of 440 feet.

1.1.5.1 Dam

Toketee dam is located on the North Umpqua River immediately upstream of the mouth of the Clearwater River. The dam is an earth-fill, center-clay-core structure. The reservoir is protected from overfilling by a 310-foot-long, ungated, concrete, ogee spillway section in the dam and a 20-foot, gated sluiceway.

1.1.5.2 Waterway Intake

The Toketee waterway intake includes a 79-foot concrete intake structure with trashrack, fixed wheel intake gate, low-level outlet gate, and sluice conduit. The trashrack was replaced in 2010

with a fish screen that provides bar spacing with 0.5-inch gaps, approach velocity of 0.8 feet per second, and an automated trash rake. The fish screen is intended to minimize entrainment of trout over five inches in length from Toketee Reservoir for the purposes of maintaining the fishery in Toketee Reservoir and reducing predation on anadromous fish downstream of Toketee Dam.

1.1.5.3 Waterway

The Toketee waterway measures 6,994 feet extending from the Toketee diversion dam to the tunnel exit. The waterway consists of wood-stave pipe (1,664 feet), concrete-lined tunnel (1,250 feet), and unlined tunnel (4,080 feet).

The concrete tunnel lining includes 1,000 lineal feet at the upstream end, and 250 lineal feet at the downstream end. Rated capacity of the waterway is 1,530 cfs.

1.1.5.4 Penstock

The Toketee penstock extends 1,067 feet from the tunnel exit to a trifurcation. The penstock ranges from 11 feet to 12 feet in diameter, with wall thicknesses between 0.4 and 1.0 inch. A 128-foot-high surge tank is included in the penstock system to limit penstock pressure rise during turbine-generator shutdowns. Downstream from the surge tank, the penstock trifurcates to three, 6.3-foot-diameter penstocks, which extend an average length of 158 feet to the Toketee powerhouse.

1.1.5.5 Powerhouse

The Toketee powerhouse has a reinforced-concrete substructure with a steel superstructure enclosed by metal siding. The powerhouse houses three turbine-generators. The powerhouse is located on the North Umpqua River approximately 1.25 miles downstream of Toketee Falls. The powerhouse is of the indoor style, with turbine centerline elevation of 1,987.0 feet. Speed/load, voltage/VAR, and load limit control of the Toketee units are possible from either the powerhouse or the Toketee Control Center.

1.1.5.6 Impoundment

Toketee Reservoir serves as the forebay for the Toketee Development and is proposed to also serve as the source of water for the Fish Creek pumped storage system. Active storage capacity and area are 491.4 acre-feet and 96.9 acres, respectively, at normal maximum water surface elevation of 2,430.0 feet.

1.1.5.7 Turbines, Generators, and Appurtenant Equipment

The Toketee turbine-generators are vertical-shaft, hydraulic turbine and synchronous generator sets. The three Francis-type turbines are rated at 21,200 hp each under a net effective head of 440 feet. Each turbine is provided with a 24-inch, Howell Bunger valve, which operates as a turbine bypass during unit load rejections and outages. Generator ratings are 16,667 kVA each, 0.85 power factor at 6,900 volts and 400 rpm. Installed capacity of the combined turbine-generator sets is 42,500 kW at 1,530 cfs.

The Toketee transformers are nine single phase 6.9/132 kV transformers rated at 5,555 kVA each. Power from the transformers is delivered to the Toketee switching station, adjacent to the Toketee Powerhouse, and from the switching station to Dixonville substation via Line 39.

1.1.5.8 Instream Flow Release and Measurement Facilities

The FERC license requires minimum instream flows of 60 cfs from November 1 to May 31 and 80 cfs from June 1 to October 31 in the Toketee bypassed reach of the North Umpqua River. Minimum flows in the Toketee bypassed reach are provided by a combination of flows from the Clearwater River and flows from the spillway apron drains. The majority of the flow is provided by two, automated, instream flow gates on the Clearwater River Reconnect facility that route flow downstream of Toketee Dam into the bypassed reach. The total flow in the bypassed reach is measured at USGS gage 14315500 located approximately 300 feet downstream of Toketee Dam.

1.1.6 Fish Creek Development

The Fish Creek Development consists of a diversion dam across Fish Creek, 25,662 feet of canal and flumes, a 114.1-acre-foot forebay, 2,358 feet of penstock, and a powerhouse on the left bank of the North Umpqua River between the Toketee powerhouse and the Slide Creek diversion dam. Fish Creek is rated at 11,000 kW corresponding to a discharge of 155 cfs and a rated head of 995 feet.

1.1.6.1 Dam

Fish Creek diversion dam is located on Fish Creek approximately 6 miles upstream of its confluence with the North Umpqua River. The dam is a 6.5-foot-high, concrete, gravity structure with free-crest spillway. Incorporated into the dam is a fish ladder and a sluiceway. The dam and fishway were rebuilt in 1989 to provide improved fish passage and to eliminate the use of wooden flashboards, which historically contributed to long periods of reduced power diversions following flashboard washouts.

1.1.6.2 Fish Screens

The fish screen structure is constructed in a settling pond area between the diversion dam intake and the canal intake. The concrete structure supports eight T-screen assemblies passing diverted flows through eight, gated inlets, into a flume section that carries flows downstream and to a secondary settling pond area just upstream of the canal. Downstream-migrating fish pass the T-screens and are carried through a 30-inch-diameter, gravity-flow pipe, which discharges to Fish Creek at the base of the dam near the fish ladder entrance. At the dam intake, two manually-operated gates allow isolation of the settling pond and fish screen for maintenance purposes. The facility is supported by an equipment building that houses two, propane-fueled, 30 kw generators, two air compressors for screen cleaning and for air motors on automated gates, two air tanks, and various electrical and control equipment. Two, 1,000-gallon, underground, propane tanks are near the equipment building. An access road provides maintenance access for the sediment collection pool and for future sediment removal upstream of the diversion dam.

1.1.6.3 Waterway Intake

The Fish Creek waterway intake is located northwest of the Fish Creek diversion dam and consists of two impoundments separated by a fish screen structure and supporting facilities constructed in 2008. The waterway canal intake is a concrete structure with two 5.3-foot by 4.3-foot slide gates.

1.1.6.4 Waterway

The Fish Creek waterway consists of 25,662 feet of open-channel conduit extending from the Fish Creek diversion dam to Fish Creek forebay. The waterway is comprised of timber flume (178 feet), steel flume (1,689 feet), concrete flume (8,513 feet), and gunite-lined canal (15,282 feet). An emergency canal shutoff and drainage system was constructed in 2008 and consists of air-operated, automatic headgates, two below-grade canal drainage sites capable of discharging 50 cfs, and six canal water level monitoring sites located across the waterway. The existing capacity of the waterway is 177 cfs.

1.1.6.5 Aquatic/Riparian/Terrestrial Connectivity

Six aquatic connectivity sites were constructed along the waterway between 2011 and 2015 to provide aquatic connectivity across (i.e., perpendicular to) the waterway. The aquatic connectivity sites consist of culverts below the waterway and adjacent access roads. In addition, nine wildlife crossings were installed across the gunite canal to provide terrestrial connectivity for big game and other wildlife across the waterway. One each of the aquatic connectivity sites and wildlife crossings are co-located. Each wildlife crossing is constructed of concrete panels for a finished width of 36 feet and is covered in forest floor material to provide adequate cover for wildlife to cross the canal.

1.1.6.6 Canal Shut-Off and Drainage System

The system diverts canal flows to Fish Creek upon notification of non-normal flow conditions in the waterway. The system includes two, automated canal headgates with air-powered gate closures using supporting equipment from the fish screen facility; two below-ground, canal drainage facilities coupled to hillside drainage pipelines and energy dissipation outlets; and six canal water level monitoring sites powered by solar panels and portable canal inflow generators. Communication is through a dedicated radio network tied to alarms monitored at the Toketee Control Center. The canal drainage sites are each capable of discharging 50 cfs.

1.1.6.7 Forebay

The Fish Creek forebay is an open excavated reservoir with a soil embankment and a compacted-clay liner. Water is released to the Fish Creek penstock via a 22-foot-long concrete intake structure with trashrack and slide gate. The forebay is protected from overflowing by a spillway that empties into a lined and unlined channel that discharges into the North Umpqua River. PacifiCorp proposes to utilize the Fish Creek forebay as the upper reservoir in the Fish Creek pumped storage system.

1.1.6.8 Penstock

The Fish Creek penstock extends 2,358 feet from the forebay to Fish Creek powerhouse. Penstock diameter varies from 4.5 feet near the forebay to 3 feet at the powerhouse.

1.1.6.9 Powerhouse

The Fish Creek powerhouse is a reinforced-concrete structure housing a single turbine-generator. The powerhouse is located on the left bank of the North Umpqua River between the Toketee powerhouse and the Slide Creek diversion dam. The powerhouse is of the outdoor generator style, with a turbine centerline elevation of 1,992.0 feet. Speed/load, voltage/VAR, and load limit control of the Fish Creek unit are possible from either the powerhouse or the Toketee Control Center.

1.1.6.10 Impoundments

There is no active storage in the Fish Creek diversion impoundment at the normal water surface elevation of 3,057.7 feet. Forebay active storage capacity and area are 87.2 acre-feet and 9.3 acres, respectively, at the normal maximum water surface elevation of 3,025.9 feet.

1.1.6.11 Turbines, Generators, and Appurtenant Equipment

The Fish Creek turbine-generator is a vertical-shaft, hydraulic turbine and synchronous generator set. The impulse-type turbine is rated at 15,400 hp under a net effective head of 995 feet. Generator rating is 12,941 kVA, 0.85 power factor at 6,900 volts and 450 rpm. Rated capacity of the combined turbine-generator set is 11,000 kW at 155 cfs.

The Fish Creek transformers are three, single-phase 6.9/125 kV transformers rated at 4,333 kVA each. Power from the transformers is delivered to Line 42, which is a collector transmission line between Soda Springs powerhouse substation and the Toketee switching station.

1.1.6.12 Instream Flow Release and Measurement Facilities

The Fish Creek Development bypass reach instream flow is 130 cfs year around. The diversion dam's fish ladder passes 10 cfs through its entrance slot and 10 cfs through a supplemental water by-pass discharging at the ladder's pool entrance, and the fish screen facility passes 30 cfs through its bypass pipe exiting at the fish ladder intake slot. The remainder of the minimum flow requirement is provided from the dam as overflow spill and/or through the sluiceway gate. Instream flow is controlled by adjusting the amount of flow diverted at the automated canal headgates. When natural inflows are less than 130 cfs, which occurs during approximately half of the year, the canal diversion is closed. Total flow to the bypassed reach is measured at USGS gage 14315950 located approximately 300 feet downstream of the diversion dam.

1.1.6.13 Riparian Stillwater Pond

An expanded riparian still-water pond is located immediately upstream of the canal headgate. This pond was expanded in order to accommodate the loss of riparian habitat from installation of the fish screens.

1.1.7 Slide Creek Development

The Slide Creek Development is located on the North Umpqua River between the Toketee powerhouse and Soda Springs Reservoir. The development consists of a diversion dam located 900 feet downstream of the Toketee powerhouse, with 9,653 feet of canal and flumes, 374 feet of penstock, and a powerhouse with tailrace barrier on the North Umpqua River approximately 1.3 miles upstream of the Soda Springs diversion dam. Slide Creek is rated at 18,000 kW corresponding to a discharge of 1,500 cfs and a rated head of 169 feet.

1.1.7.1 Dam

Slide Creek diversion dam is located on the North Umpqua River 900 feet downstream of the Toketee powerhouse. The dam is a 30-foot-high, concrete, gravity structure with three integral, spillway gate sections. A concrete intake structure is incorporated into the dam at the right abutment.

1.1.7.2 Waterway Intake

The Slide Creek waterway intake includes a 73-foot-long, concrete intake with a 20-foot-wide tainter gate. Downstream of the intake is a 190-foot-long, side-channel spillway which discharges excess flows to the North Umpqua River.

1.1.7.3 Waterway

The Slide Creek waterway is an open channel conduit extending 9,653 feet from the Slide Creek intake structure to Slide Creek penstock. The waterway consists of concrete and rock flume (1,921 feet), two-wall concrete flume (3,396 feet), and concrete-lined canal (4,336 feet). The existing capacity of the waterway is 1,500 cfs.

1.1.7.4 Aquatic/Riparian/Terrestrial Connectivity

Four aquatic connectivity sites were constructed along the waterway between 2003 and 2012 to provide aquatic connectivity across (i.e., perpendicular to) the waterway. The aquatic connectivity sites include one flume crossing and three culverts below the waterway and adjacent access roads. In addition, one wildlife crossing was installed across the gunite canal to provide terrestrial connectivity for big game and other wildlife across the waterway. The wildlife crossing is constructed of concrete panels for a finished width of 36 feet and is covered in forest floor material to provide adequate cover for wildlife to cross the canal.

1.1.7.5 Forebay

The Slide Creek forebay structure has no storage capacity. Water enters the Slide Creek penstock via a concrete intake structure with trashrack and 20-foot-wide, steel, tainter gate. The intake is protected from overflowing by a 300-foot spillway which discharges directly to the North Umpqua River. An automated, 54-inch, square, sluice gate is built into the spillway section for emergency flow releases during unplanned plant outages.

1.1.7.6 Penstock

The Slide Creek penstock extends 374 feet from the intake to the Slide Creek powerhouse. Penstock diameter is 12 feet.

1.1.7.7 Powerhouse

The Slide Creek powerhouse is a reinforced concrete structure housing a single turbine-generator. The powerhouse is located on the right bank of the North Umpqua River approximately 1.3 miles upstream of the Soda Springs diversion dam. The powerhouse is of the outdoor generator style, with a turbine centerline elevation of 1,811.0 feet. Speed/load, voltage/VAR, load limit, and float control of the Slide Creek unit are possible from either the powerhouse, or the Toketee Control Center.

1.1.7.8 Tailrace Barrier

Slide Creek tailrace barrier was installed in 2011. The barrier is a 162-foot-long, reinforced-concrete structure separating the powerhouse tailrace from the North Umpqua River and running parallel with the river flow. It consists of 12 bays for dispersing and regulating powerhouse discharge flows through the 12 porosity control baffles and diffuser screens. This structure prevents adult salmon and steelhead from entering the powerhouse tailrace or being delayed in their upstream migration.

1.1.7.9 Impoundment

The reservoir behind the Slide Creek diversion dam has a gross storage capacity of 43.0 acre-feet with no active storage and a surface area of 2.0 acres at the normal water surface elevation of 1,982.0 feet. The impoundment is inclusive of the Toketee and Fish Creek tailraces.

1.1.7.10 Turbine, Generator, and Appurtenant Equipment

The Slide Creek turbine-generator is a vertical shaft hydraulic turbine and synchronous generator set. The Francis type turbine is rated at 25,000 hp under a net effective head of 169 feet. Generator rating is 21,176 kVA, 0.85 power factor at 6,900 volts and 200 rpm. Rated capacity of the combined turbine-generator set is 18,000 kW at 1,500 cfs.

The Slide Creek transformer is a three-phase 6.9/124.5-kV transformer rated at 21,000 kVA. Power from the transformers is delivered to Line 42, a collector transmission line between Soda Springs powerhouse substation and the Toketee switching station.

1.1.7.11 Instream Flow Release and Measurement Facilities

Minimum instream flow for the Slide Creek Development bypass reach is 240 cfs year-round. The instream flow is provided at the diversion dam by a spillway and an Obermeyer weir built into the sluiceway of Slide Creek dam. Operation of the weir is automated to modulate the instream flow requirement over a range of reservoir operational levels. Total instream flow is measured at USGS gage 14315700 located approximately 900 feet downstream of the diversion dam.

1.1.8 Soda Springs Development

The Soda Springs Development is the furthest downstream development on the North Umpqua River. The development consists of a diversion dam downstream of the Slide Creek powerhouse impounding a 412-acre-foot reservoir, a fish passage facility, 2,112 feet of steel pipe flowline from the reservoir to the powerhouse, an additional 176 feet of steel pipe connecting the fish screen to the flowline, a surge tank, 168 feet of steel penstock, and a powerhouse with tailrace barrier on the North Umpqua River approximately 1.5 miles downstream of the mouth of Medicine Creek. Soda Springs is rated at 11,000 kW corresponding to a rated head of 107 feet.

1.1.8.1 Dam

Soda Springs dam is located on the North Umpqua River 1.3 miles downstream of the mouth of Slide Creek and the Slide Creek powerhouse. The dam is a 77-foot-high, 309-foot-long, thin-arch, reinforced-concrete type dam. Water is released to the Soda Springs penstock via one of the two concrete intake structures at the fish screen and north intake, respectively. The reservoir is protected from overflowing by releasing water to the river from a 36-foot-wide, gated spillway section and a 20-foot-wide, gated, trash sluice section that discharge to the North Umpqua River. Water can also be released to the river through a submerged 4 foot by 5-foot sluice gate and 20-inch pipe near the base of the dam.

1.1.8.2 Waterway Intake

The two Soda Springs waterway intakes are integral parts of the dam. The primary intake (south intake structure) is a 36-foot-wide, concrete structure with a trashrack, fish screen, and two

headgates at the bifurcated penstock entrance. The secondary intake (north intake structure) is a 41-foot-wide, concrete structure with trashrack and a steel, fixed-wheel intake gate.

1.1.8.3 Fish Screens

The fish screens are inside a 285-foot-long concrete fish passage structure, the mouth of which is the south intake. The fish screen facility includes stainless steel primary, secondary, and tertiary (i.e., finishing) screens, which are kept clean by traveling brush and back-wash systems, respectively. The finishing screen section includes a ramped bottom with an automated range of 12 feet to accommodate a range of reservoir water levels. The screen facility diverts fish into a fish return pipe that transports fish into the river downstream of the dam. This fish-flow can be routed through a fish evaluation building for monitoring fish.

1.1.8.4 Fish Ladder

The fish ladder is an integral part of the dam and fish screen structure. It consists of a 59--pool, half-Ice-Harbor, concrete fish ladder with a fish counting facility. The fish ladder entrance, located at the base of the dam, connects to the middle fish ladder pools on the south side of the fish screen through a 3-ft-wide transport channel that passes under the spillway, trash sluice, and fish screen structure. The fish ladder penetrates the dam near the south abutment and the exit structure extends into Soda Springs Reservoir along the south bank. The fish ladder exit section includes 15 automated gates to accommodate a 14-foot range of reservoir water levels. A non-public, maintenance boat ramp is located along the fish ladder exit structure.

1.1.8.5 Waterway

The Soda Springs waterway consists of 2,112 feet of 12-foot-diameter, steel pipe extending from the Soda Springs diversion dam to the surge tank. A 176-foot-long flowline tie-in consisting of a 12-foot-diameter steel pipe connects the fish screen structure to this flowline. A 3-foot-diameter air stack, approximately 1,200 feet downstream from the dam, provides pressure and vacuum relief for the pipeline.

1.1.8.6 Penstock

The Soda Springs penstock extends 168 feet from the 82-foot-high surge tank to the Soda Springs powerhouse. The penstock diameter is 12 feet with 1/2-inch-thick walls. The surge tank is included in the penstock system to limit penstock pressure rise during turbine-generator shutdowns.

1.1.8.7 Powerhouse

The Soda Springs powerhouse is a reinforced-concrete structure housing a single turbine-generator. The powerhouse is located on the North Umpqua River approximately 1.5 miles downstream of the mouth of Medicine Creek. The powerhouse is of the outdoor generator style, with a turbine centerline elevation of 1,697 feet. Speed/load, voltage/VAR, and load limit control of the Soda Springs unit are possible from either the powerhouse, or the Toketee Control Center.

1.1.8.8 Tailrace Barrier

The Soda Springs tailrace barrier is a reinforced concrete structure separating the powerhouse tailrace from the North Umpqua River and runs parallel with the river reach. It consists of 20 bays for dispersing and regulating powerhouse discharge flows through the 20 fish screens. This structure prevents adult salmon and steelhead from entering the powerhouse tailrace and delaying upstream migration.

1.1.8.9 Impoundment

The reservoir formed by the Soda Springs diversion dam has an active storage capacity and area of 307.4 acre-feet and 31.5 acres, respectively, at the normal maximum water surface elevation of 1807.0 feet.

1.1.8.10 Turbine, Generator, and Appurtenant Equipment

The Soda Springs turbine-generator is a vertical-shaft, hydraulic turbine and synchronous generator set. The Francis-type turbine is rated at 16,000 hp under a net effective head of 107 feet. A 78-inch butterfly valve operates as a turbine bypass during turbine load rejections and outages. Generator rating is 12,941 kVA, 0.85 power factor at 6,900 volts and 164 rpm. Rated capacity of the combined turbine-generator set is 11,000 kW at 1,500 cfs.

The Soda Springs transformers are three, single-phase, 6.5/132-kV transformers rated at 4,333 kVA each. Power from the transformers is delivered to the Soda Springs substation, adjacent to the Soda Springs powerhouse, and from Soda Springs substation to Dixonville substation via Line 46.

1.1.8.11 Instream Flow Release and Measurement

The instream flow for the Soda Springs Development bypass reach is 275 cfs year-round. The instream flow is typically provided as a combination of flow from the fish ladder (25 cfs), fish ladder auxiliary water (220 cfs) and fish screen flow (30 cfs). When any of these systems are out-of-service, instream flow is provided by the 4-foot by 5-foot sluice gate at the base of the dam, the log chute, or the spillway. Total instream flow in the bypassed reach is measured at USGS gage 14316455 located approximately 500 feet downstream of the dam.

An additional in-stream flow release structure was constructed in 2009 between the Soda Springs Dam and powerhouse. This consists of a concrete open box structure with an integrated dissipater block and valved, 36-inch pipe tap to the Soda Springs penstock. This feature made it possible to provide the minimum in-stream flow during the construction of the Soda Springs fish passage facility. This structure is permanent as it will also provide ongoing operational flexibility to enhance the minimum in-stream flow capability should the area downstream of the dam require dewatering in the future.

PacifiCorp constructed additional armoring, elevated existing facilities, and moved communications and control equipment from the top of the dam to within the fish passage structure, in order to provide protection of crucial equipment and functionality in the event of a high-flow event that overtops the dam. This work was completed in 2013.

1.1.9 Transmission

The North Umpqua transmission system is a 115-kV loop configuration consisting of transmission lines 39, 42 and 46, which interconnect two switching stations located at Toketee and Clearwater and substations at Soda Springs and in Dixonville, Oregon. Lines 39 and 46 are the two outlet lines that transfer the power from the North Umpqua developments to the Dixonville substation near Roseburg, Oregon. Line 42 connects the Soda Springs substation and Toketee switching station with radial collector lines 42-1 from Slide Creek powerhouse and 42-2 from Fish Creek powerhouse. The Clearwater switching station is the collector station for the upper Project developments (Lemolo No. 1, Lemolo No. 2, Clearwater No. 1 and Clearwater No.

2). Lines 53, 55, 57, and 55-1 are radial collector lines from Lemolo No. 1, Lemolo No. 2, Clearwater No. 1 and Clearwater No. 2, respectively. Line 51 transmits all the power from the upper Project developments at the Clearwater switching station to the Toketee switching station. All transmission lines use predominantly wood-pole, "H"-frame structures. The total line length is 117.5 miles.

1.1.9.1 Switching Stations and Substation Toketee Switching Station

The Toketee switching station is a major collection point on the North Umpqua loop transmission system consisting of Line 39, 42 and 46. It is also the terminus of Line 39 which is a major outlet line to the Dixonville substation, where power is transferred to the regional electrical grid. Line 42 connects the Toketee switching station to the Soda Springs substation. The Toketee switchyard is in a small, fenced area above the Toketee powerhouse. The switching station consists of a 115-kV, single bus of 250 kcmil (i.e., thousands of circular mils) copper (586 A rating at high ambient temperatures) and two circuit breakers for isolating Lines 39 and 42. Line 51 is connected to the common bus through a manual disconnect switch. The structures are lattice-type, painted steel.

1.1.9.2 Clearwater Switching Station

The Clearwater switching station is the terminus of the collector transmission lines from the upper Project developments. It is located near the Toketee Ranger Station in a $\frac{3}{4}$ -acre fenced yard. The switching station consists of two, 115-kV, single buses and four circuit breakers. The buses are 795 kcmil aluminum conductor steel reinforced (ACSR) (774 A rating at high ambient temperatures). The structures are lattice-type, galvanized steel.

1.1.9.3 Soda Springs Substation

The Soda Springs substation separates the Line 42 collector transmission line for the lower Project developments from Line 46, which is the other major outlet transmission line to Dixonville substation. The Soda Springs substation consists of a 115-kV, single bus of 250 kcmil copper (586 A rating at high ambient temperatures) with one circuit breaker. The substation is located west of and adjacent to the Soda Springs powerhouse. Structures are lattice-type, painted steel.

1.1.9.4 Outlet Transmission Lines

The transmission system includes two major 115-kV outlet transmission lines, Line 46 and Line 39, which interconnect the North Umpqua developments to the regional electrical grid at the Dixonville substation. Line 46 begins at the Soda Springs switching station, Line 39 begins at the Toketee switching station, and then they both generally follow the North Umpqua River in a westerly direction to the Dixonville substation. Line 39 also provides power for consumer loads at the Glide substation, Steamboat substation, and Illahee Flats substation. The transmission line structures are generally two-pole, wood, "H"-frames with some three-pole, wood, "H"-frames at angles and dead-ends.

Line 46 is 42.5 miles long. The line conductor is 795 kcmil ACSR supported on 4-inch by 7-inch, steel, angle-iron crossarms and seven suspension insulators. Five, 600 A, pole-top, manual-disconnect switches are located along the line. These are used to sectionalize the transmission line to facilitate fault location and repair.

Line 39 is 49.1 miles long. The line conductor is either 250 kcmil bare copper or 795 kcmil ACSR supported on 4-inch by 7-inch, steel angle-iron crossarms. Five, 600 A, pole-top, manual-disconnect switches are located along the line. These are used to sectionalize the transmission line to facilitate fault location and repair.

1.1.10 Support Facilities

1.1.10.1 Toketee Village

Toketee Village is located near the Toketee and Fish Creek powerhouses. It includes Toketee Control Center, the North Umpqua Implementation Center, office spaces, ten Project staff homes, temporary staff housing, kitchen, dining room, gymnasium, garage, water treatment facilities, and an oil storage building.

Toketee Control Center, the only Project facility staffed 24 hours a day, controls remote plant operations, is the Project headquarters, and contains offices of the production manager, control operators, and other Project staff.

1.1.10.2 Clearwater Village

Clearwater Village is located on the eastern shore of Toketee Reservoir near the mouth of the Clearwater River and includes 10 Project staff homes, a guest cottage, two bachelor's cottages, a bunkhouse, and a meeting hall. Also included in Clearwater Village are a mess hall, cook's housing, shop buildings, warehouses, parking garage, and a fueling station.

1.1.10.3 Other Project Housing

Operator's homes exist at the Lemolo No. 1 ($n=1$), Lemolo No. 2 ($n=2$), and Slide Creek ($n=2$) developments. These houses are generally located near the powerhouse of their respective developments.

1.2 PROJECT HISTORY

1.2.1 Construction History

On January 30, 1947, the Federal Power Commission issued a 50-year license to the California Oregon Power Company (Copco) for Project No. 1927, the Toketee Hydroelectric Project. The license was amended several times to add the seven other developments of the resulting North Umpqua Hydroelectric Project (Project). Copco originally constructed the Project developments between 1947 and 1956, beginning with Toketee and ending with Lemolo No. 2. John C. Boyle, Chief Engineer of Copco, documented Project development and construction in his book *Toketee* (Boyle, 1977)³. The Project license was transferred from Copco to Pacific Power & Light Company (a predecessor of PacifiCorp) in 1961. The original license expired in January 1997, and the Project operated under annual licenses for several years pending disposition of a new license application.

In 1955 and 1956, Copco made significant repairs to structures damaged by a flood of December 1955. Construction activity in the 1960s through 1980s primarily consisted of replacing original timber structures with concrete and/or steel structures consistent with modern design standards.

³ Available upon request due to the large file size of the scanned book.

Following relicensing studies in the mid-1990s and submission of a license application to the FERC in January 1995, PacifiCorp entered into a settlement process with seven state and federal agencies to resolve all issues regarding relicensing, compliance with state and federal resource plans and regulations, and proposed resource protection, mitigation, and enhancement measures (PM&Es) for the purpose of obtaining a new FERC license. The settlement process concluded with preparation of the Settlement Agreement Concerning the Relicensing of the North Umpqua Hydroelectric Project (SA), which was signed by involved parties on June 13, 2001. On November 18, 2003, FERC issued to PacifiCorp a new 35-year license adopting the SA for the Project. The SA and license ushered in a significant era of new construction related to implementation of PM&Es, primarily occurring from 2001 through 2012. The largest of these projects was construction of the upstream and downstream fish passage facilities at Soda Springs Dam, which took three years and was completed in 2012. Other major construction projects implemented during this period include, but are not limited to, tailrace barriers at Soda Springs and Slide Creek powerplants; a fish screen at Fish Creek diversion; canal shut-off and drainage systems on Fish Creek, Lemolo No. 2, and Clearwater No. 2 waterways; a pipeline rerouting tailrace flows from the Lemolo No. 2 powerplant to Toketee Reservoir; aquatic and terrestrial habitat connectivity structures; and fish habitat enhancements in reaches accessible to anadromous fish.

Construction during the current LIHI certification term primarily consisted of Project maintenance and upgrades for dam safety.

The Project construction history is summarized below in Table 4.

Table 4. Project construction history

Development	Major Construction Activity	Year(s)
Toketee	Original construction	1947-1951
Slide Creek	Original construction	1950-1951
Fish Creek	Original construction	1950-1952
Soda Springs	Original construction	1950-1952
Clearwater No. 1	Original construction	1951-1952
Fish Creek	Canal headgate structure replacement and modification; supplementary spillway construction	1953
Clearwater No. 2	Original construction	1952-1953
Fish Creek	Diversion dam repairs following December 1955 flood damage	1955
Lemolo No. 1	Original construction	1953-1955

Development	Major Construction Activity	Year(s)
Clearwater No. 2	Sections of gunite-lined canal replaced with wood flumes following December 1955 flood damage	1956
Soda Springs	Flowline repair and realignment following December 1955 flood damage	1956
Soda Springs	Upstream section of flowline encased in concrete	1956
Lemolo No. 2	Original construction	1955-1956
Toketee	Rock-bolting in tunnel	1967
Soda Springs	Right abutment thrust block extension; upstream diversion wall construction in response to December 1964 flood and overtopping	1972
Soda Springs	Flowline expansion couplings, 6" extensions, and monitoring instrumentation	1972
Soda Springs	Flowline ring girders and footings modified at landslide	1972
Fish Creek	Penstock ring girder foundations 34-36 replacement	1974
Fish Creek	Forebay spillway crest raised two feet to 3,026.4	1978-1979
Fish Creek	Flume 6 timbers replaced with concrete	1983
Soda Springs	Spillway gates raised two feet to 1807.5 feet	1983
Fish Creek	Flume 1 timbers replaced with concrete	1985
Clearwater No. 2	Timber flume sections replaced with double- or single-walled concrete flumes	1980-1985
Fish Creek	Flumes 7 and 8 timbers replaced with steel	1986
Fish Creek	Flume 4 timbers replaced with concrete and new timbers; Flume 5 timbers replaced with concrete	1987
Fish Creek	Forebay sinkholes backfilled and compacted with silty clay or powdered bentonite	1989
Fish Creek	Original earth-fill embankment dam replaced with concrete gravity dam; dam sluiceway and fish ladder construction	1989
Toketee	Rock-bolting and shotcrete repairs to tunnel; installation of venting hole in tunnel	1990

Development	Major Construction Activity	Year(s)
Soda Springs	Construction of fish habitat features in the bypassed reach to benefit native anadromous fish	1992
Lemolo No. 1	Turbine runner upgrade, generator rewinding, excitation system replacement, and control and protection systems replacement	2003
All	Flow gaging stations and measurement devices added or upgraded on each bypassed reach and waterway	2001-2003
Slide Creek	Construction of fish habitat features in the bypassed reach to benefit native anadromous fish	2002-2003
Lemolo No. 2	Fish ladder modification; instream flow release system upgrades	2004
Soda Springs	Major upgrade of automation controls to sync turbine and bypass valve flow to meet new ramping requirements during a plant trip	2004
Soda Springs	Construction of fish habitat features in the bypassed reach to benefit native anadromous fish	2004
Clearwater No. 1	Concrete bulkhead and 36-inch diameter minimum flow release pipe with slide gate installed at sluiceway	2005
Lemolo No. 1	Low-level outlet modifications including 24-inch bypass conduit, valve house, and fixed-cone valve	2005
Lemolo No. 2	Potter Creek diversion removal and channel restoration; removal of small diversions on Spotted Owl Creek and other minor creeks	2005
Clearwater No. 2	Concrete bulkhead and 36-inch diameter minimum flow release pipe with slide gate installed at sluiceway	2006
Toketee	Construction of Clearwater Reconnect water control and fish passage structure to supply minimum flows to Toketee bypass reach	2006
Clearwater No. 1	Aquatic connectivity structure for amphibians and aquatic life constructed over dam	2007
Fish Creek	Canal shut-off and drainage system construction	2007
Fish Creek	Fish screen construction	2007
Slide Creek	Obermeyer weir construction at dam spillway	2007
Soda Springs	Tailrace barrier construction	2007

Development	Major Construction Activity	Year(s)
Clearwater No. 2	Canal shut-off and drainage system construction	2008
Lemolo No. 1	White Mule Creek diversion decommissioning and restoration of aquatic connectivity	2008
Lemolo No. 2	Canal shut-off and drainage system construction	2009
Soda Springs	In-stream flow release structure with penstock tap constructed	2009
Lemolo No. 1	Spillway radial gate arm reinforcement	2010
Soda Springs	Deflector wall constructed on right abutment above flowline	2010
Toketee	Trash rack upgrade, fish screen installation, and automated trash rake installation	2010
Lemolo No. 1	Forebay expansion construction	2009-2010
Lemolo No. 2	Powerplant discharge reroute pipe to Toketee Reservoir constructed to eliminate ramping in river and protect northwestern pond turtles	2011
Slide Creek	Tailrace barrier construction	2010-2011
Soda Springs	Flowline ring girders and footings modified at landslide	2012
Soda Springs	Fish passage facilities and penstock river crossing construction	2010-2012
Clearwater No. 1	Forebay trashrack cleaning system upgrade	2014
Clearwater No. 2	Forebay trashrack cleaning system upgrade	2014
Lemolo No. 1	Forebay trashrack cleaning system upgrade	2014
Slide Creek	Automated trash rake installed at penstock trashrack	2014
Soda Springs	Fish screen reconstruction following failure of screens during December 2, 2012 high flow event	2013-2014
Soda Springs	Vertical slide gate installation on downstream side of Low-Level Sluiceway G-6	2018
Toketee	Installation of butterfly shut-off valve in penstock upslope of powerhouse	2022

1.2.2 Compliance History

PacifiCorp has not been cited for a license violation during the current LIHI certification term. Environmental compliance notifications and/or follow-up reporting were provided to the relevant agencies for nine events during the current certification term. These events, which are addressed for the respective ZOE in the relevant criteria standard, include the following:

- an erosive event in the Lemolo No. 2 bypassed reach on June 30, 2011 as a result of debris blocking a trashrack and forcing diverted water to overflow the Lemolo No. 2 waterway at Flume 12 (see Section 2.2.4);
- a minimum flow event in the Soda Springs bypassed reach on September 16, 2014 as a result of equipment malfunctions during maintenance (see Section 2.1.11.1);
- an upstream fish protection facility issue on December 9, 2014 resulting in salmon accessing the Slide Creek powerhouse tailrace upstream of the tailrace barrier (see Section 2.3.9);
- a ramping event in the Lemolo 2 bypassed reach on December 15, 2015 as a result of winter storm damage and a gate malfunction (see Section 2.1.4.1);
- a ramping event in the Wild and Scenic Reach downstream of Soda Springs powerplant on December 15, 2015 as a result of a winter storm and debris build-up at Soda Springs Dam (see Section 2.1.12.1);
- an upstream fish protection facility issue on December 23, 2017 resulting in salmon accessing the Slide Creek powerhouse tailrace upstream of the tailrace barrier (see Section 2.3.9);
- a ramping event in the Slide Creek bypassed reach on June 22, 2023 as a result of transmission line maintenance problems (see Section 2.1.8.1);
- a ramping event in the Soda Springs bypassed reach and Wild and Scenic Reach on January 29, 2024 as a result of a winter storm and debris build-up at Soda Springs Dam (see Sections 2.1.11.2 and 2.1.12.2); and
- a ramping event in the Slide Creek bypassed reach on August 7, 2024 as a result of operator error (see Section 2.1.8.2).

Each of these occurrences has been resolved and/or corrected as described in the referenced sections of this application.

1.3 PROJECT OPERATIONS

The Project historically operates in a peaking mode, generating more electricity during high-demand periods, typically from 6 A.M. to 10 P.M, however, this mode of operation is evolving as more variably-fueled, renewable resource generating assets are added to the western grid and the Project responds more to energy supply. Storage capacity is used at each of the reservoirs and forebays to respond to energy supply and demand, but relatively little storage is available at the developments, except for Lemolo Reservoir, Toketee Reservoir, and Soda Springs Reservoir.

Lemolo Reservoir is the primary source of water storage for shaping Project flows to daily peaking operations for downstream developments. Soda Springs Reservoir is used for reregulation of flows from upstream developments and is operated to release a baseflow based on ambient watershed runoff estimates with the goal of maintaining a relatively stable flow to the

North Umpqua River downstream of the Soda Springs powerhouse. Typically, flows are released from a high Lemolo Reservoir throughout the daylight hours and are absorbed by a low Soda Springs Reservoir; this water management strategy is typically reversed at night as Lemolo Reservoir is re-filled, and Soda Springs Reservoir water surface elevations are reduced as stable flows are released to the North Umpqua River downstream of the Project.

The Project license, SA, and water quality certification define minimum instream flows and ramping rates that must be maintained in the bypassed and regulated reaches of the Project. If natural inflow to a Project development is less than the minimum flow requirement, then all flow will be discharged into the bypassed reach. This is typical of the Fish Creek development as inflow to the diversion dam is, on average, less than the required 130 cfs minimum flow from June through December. The SA also defines seasonal minimum water surface elevations and ramping rates for management of Lemolo Reservoir. Additional details on minimum flows, minimum water surface elevations, and ramping rates are provided in the respective analysis of ecological flow regimes in Section 2.1.

The Project generators are operated automatically by programmable logic controller (PLC) and may also be operated manually by on-site operators, as needed. Plant functions are monitored over the supervisory control and data acquisition (SCADA) network by control operators at PacifiCorp's Toketee Control Center near North Umpqua River mile 73.3 and remotely at PacifiCorp's Hydro Control Center near Ariel, Washington. Although control operators can adjust generation through the network, they generally allow the plant to run in automatic mode and will call out an on-site operator for any unplanned outages or alarms.

1.4 PROJECT WATERSHED

The Umpqua River Basin of southwestern Oregon covers a drainage area of approximately 4,689 square miles from its headwaters on the west slope of the Cascade Mountains to its terminus at Winchester Bay and the Pacific Ocean at Reedsport, Oregon. The basin is delineated in three unique sub-basins (Figure 3):

- the North Umpqua (Hydrologic Unit Code (HUC) 17100301), from Maidu Lake in the Mount Thielsen Wilderness along the Douglas-Klamath County line approximately 70 miles east of Roseburg to the confluence with the South Umpqua approximately 5 miles northwest of Roseburg;
- the South Umpqua (HUC 17100302), from the north side of Fish Mountain, approximately 20 miles northwest of Crater Lake to the confluence with the North Umpqua approximately 5 miles northwest of Roseburg; and
- the Umpqua (HUC 17100303), from the confluence of the North and South Umpqua approximately 5 miles northwest of Roseburg to Winchester Bay at the Pacific Ocean.

The Project watershed is located entirely within the North Umpqua River sub-basin. The North Umpqua River is approximately 106 miles in length and has a drainage area of approximately 1,374 square miles. The farthest downstream Project diversion dam is located at river mile (RM) 69.8 on the North Umpqua River, resulting in an upstream Project watershed of approximately 382 square miles, representing approximately 28 percent of the area in the North Umpqua River Basin. The Project watershed includes the Headwaters North Umpqua River

(HUC 1710030102), Clearwater River (HUC 1710030103), Fish Creek (1710030104), and Upper North Umpqua River (HUC 1710030105) watersheds (Figure 4). The Project reaches of the North Umpqua River drop in elevation from 4,148.5 feet at Lemolo Reservoir's normal maximum water surface elevation at RM 93.0 to 1,691.0 feet at Soda Springs Powerplant normal tailwater elevation at RM 69.3 (average elevation loss of approximately 104 feet per river mile). Slide Creek dam is the upstream barrier to anadromy at RM 73.2; the historic, natural barrier to anadromy occurs at Toketee Falls at RM 74.6.

There are no dams within the watershed upstream of the Project. Winchester Dam is the only dam on the North Umpqua River downstream of the Project at RM 7.

1.5 ZONES OF EFFECT

The waters affected or potentially affected by the current Project are the North Umpqua River, Clearwater River, Fish Creek, and tributaries to these waters in the Project watersheds. There are no agreements in place to regulate water inflows to the Project. Oregon Department of Fish and Wildlife (ODFW) manages Diamond Lake water surface elevation and flow into Lake Creek upstream of the Project via a weir at the mouth of the Diamond Lake outlet to Lake Creek, which is a tributary to Lemolo Reservoir (ODFW, 2009).

There are five developments with diversion dams, impoundments, and powerplant tailraces on the North Umpqua River. All five of these developments have bypassed reaches of the North Umpqua River. The three upstream developments (Lemolo No. 1, Lemolo No. 2, and Toketee) on the North Umpqua River have tailraces that discharge directly to the downstream development's impoundment on the North Umpqua River (i.e., Lemolo No. 1 tailrace discharges to the Lemolo No. 2 Impoundment of the North Umpqua River). Slide Creek and Soda Springs discharge to unimpounded reaches of the North Umpqua River. Project flows discharged from Soda Springs powerplant at the downstream extent of the Project enter a regulated reach of the North Umpqua River designated as a Wild and Scenic River.

There are two developments on Clearwater River. Clearwater No. 1 discharges directly to the Clearwater No. 2 impoundment on the Clearwater River, and Clearwater No. 2 discharges to Toketee Reservoir. The Clearwater No. 2 bypassed reach of the Clearwater River is tributary to the North Umpqua River downstream of Toketee Dam; water diverted through the Clearwater No. 2 development rejoins Clearwater No. 2 bypassed reach flows at the confluence of the North Umpqua and Clearwater Rivers within the Toketee bypassed reach.

There is a single development on Fish Creek that discharges to the Slide Creek impoundment. The bypassed reach of Fish Creek is tributary to the North Umpqua River downstream of Slide Creek Dam within the Slide Creek bypassed reach of the North Umpqua River.

Figure 3. Project location and Umpqua River watersheds (HUC 8)

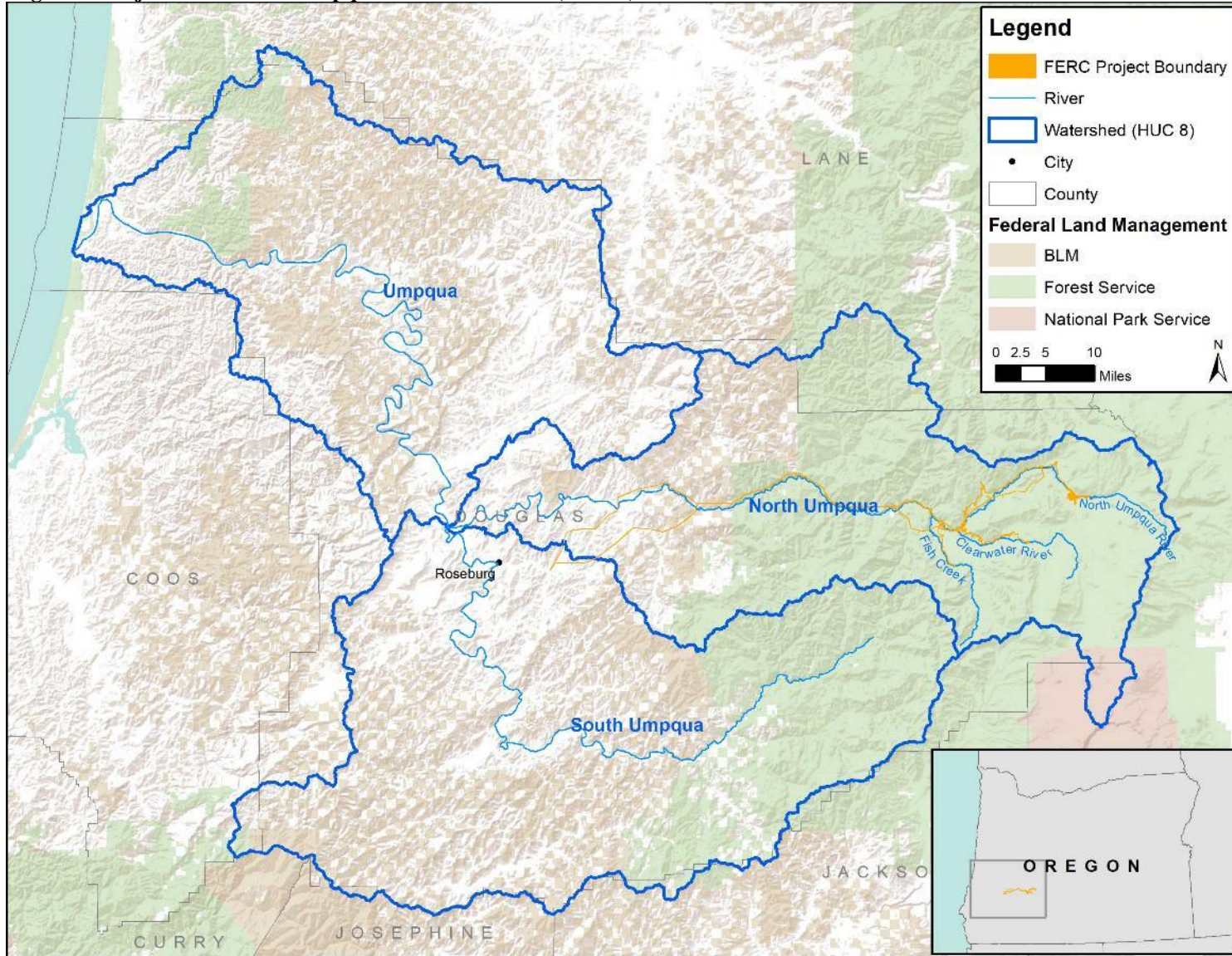
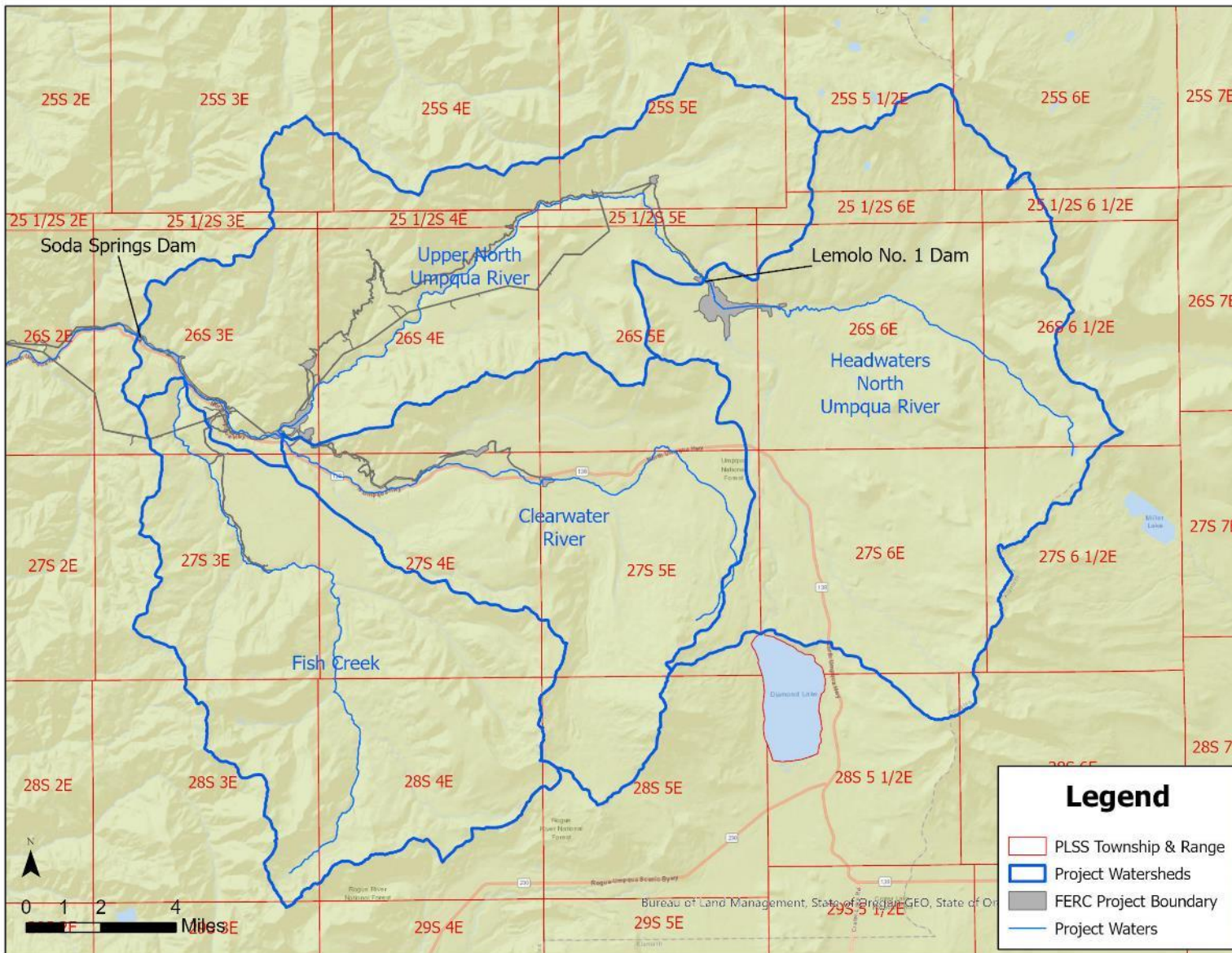


Figure 4. Project watersheds (HUC 10) within the North Umpqua Watershed (HUC 8)



The eight hydroelectric developments on three different streams result in eighteen distinct zones of effect (ZOE) for the purposes of LIHI certification standards analysis. These ZOE are, in order from upstream to downstream by river, ZOE 1 to ZOE 12 on the North Umpqua River, followed by ZOE 13 to ZOE 16 on the Clearwater River, and concluding with ZOE 17 to ZOE 18 on Fish Creek:

- (1) the approximately 419-acre **Lemolo Reservoir** impounding the North Umpqua River from the inlet to the Reservoir (RM 95.6) to Lemolo No. 1 Dam (RM 93.0);
- (2) the approximately 4.30-mile **Lemolo No. 1 bypassed reach** of the North Umpqua River from Lemolo No. 1 Dam (RM 93.0) to the upstream extent of the Lemolo No. 2 impoundment of the North Umpqua River (RM 88.6);
- (3) the approximately 1.4-acre **Lemolo No. 2 impoundment** of the North Umpqua River from RM 88.6 to Lemolo No. 2 Dam at RM 88.5, inclusive of the Lemolo No. 1 powerplant tailrace;
- (4) the approximately 12.10-mile **Lemolo No. 2 bypassed reach** of the North Umpqua River from Lemolo No. 2 Dam (RM 88.5) to the upstream extent of Toketee Reservoir (RM 76.4);
- (5) the approximately 96.9-acre **Toketee Reservoir** impounding the North Umpqua River from the downstream extent of the Lemolo No. 2 bypassed reach (RM 76.4) to Toketee Dam (RM 75.4), inclusive of the Lemolo No. 2 and Clearwater No. 2 powerplant flows;
- (6) the approximately 2.08-mile **Toketee bypassed reach** of the North Umpqua River from Toketee Dam (RM 75.4) to the upstream extent of Slide Creek impoundment (RM 73.3);
- (7) the approximately 2.0-acre **Slide Creek impoundment** from the downstream extent of the Toketee bypassed reach (RM 73.3) to Slide Creek Dam (RM 73.2), inclusive of the Toketee and Fish Creek powerplant tailraces;
- (8) the approximately 1.94-mile **Slide Creek bypassed reach** of the North Umpqua River from Slide Creek Dam (RM 73.2) to the Slide Creek powerplant tailrace (RM 71.2);
- (9) the approximately 0.20-mile **Slide Creek full-flow reach** of the North Umpqua River from Slide Creek powerplant tailrace (RM 71.2) to the upstream extent of Soda Springs Reservoir (RM 71.0);
- (10) the approximately 31.5-acre **Soda Springs Reservoir** from the downstream extent of the Slide Creek full-flow reach of the North Umpqua River (RM 71.0) to Soda Springs Dam (RM 69.8);
- (11) the approximately 0.5-mile **Soda Springs bypassed reach** of the North Umpqua River from Soda Springs Dam (RM 69.8) to the Soda Springs powerplant tailrace (RM 69.3);
- (12) the approximately 2.1-mile **regulated reach of the North Umpqua River downstream of the Project** from Soda Springs powerplant tailrace to USGS gage number 14316500 upstream of Copeland Creek in the Wild and Scenic Reach of the North Umpqua River;

- (13) the approximately 11.8-acre **Clearwater No. 1 impoundment** known as Stump Lake from Clearwater River mile 8.5 to Clearwater No. 1 Dam (RM 8.1);
- (14) the approximately 3.22-mile **Clearwater No. 1 bypassed reach** of the Clearwater River from Clearwater No. 1 Dam (RM 8.1) to the upstream extent of the Clearwater No. 2 impoundment (RM 4.9);
- (15) the approximately 1.2-acre **Clearwater No. 2 impoundment** of the Clearwater River from the downstream extent of the Clearwater No. 1 bypassed reach (RM 4.9) to Clearwater No. 2 Dam (RM 4.9), inclusive of the Clearwater No. 1 powerplant tailrace;
- (16) the approximately 5.23-mile **Clearwater No. 2 bypassed reach** of the Clearwater River from Clearwater No. 2 Dam (RM 4.9) to the river confluence with the North Umpqua River (RM 0.0) downstream of Toketee Dam within the Toketee bypassed reach (ZOE 6);
- (17) the approximately 3-acre **Fish Creek impoundment** of Fish Creek from RM 6.6 to Fish Creek Dam (RM 6.6); and
- (18) the approximately 7.05-mile **Fish Creek bypassed reach** of Fish Creek from Fish Creek Dam (RM 6.6) to the confluence with the North Umpqua River (RM 0.0) downstream of Slide Creek Dam within the Slide Creek bypassed reach (ZOE 8).

Conceptual flowcharts of the zones of effect on each stream are provided in Figures 5 through 7. An overview map of the Project ZOE is provided in Figure 8, and aerial photography maps of the ZOE by Project development, along with one detail map of the Toketee Reservoir area, are provided in Figures 9 through 17. The zones of effect are individually evaluated for compliance with LIHI certification standards in Section 2.0 of this application.

Figure 5. Zones of Effect conceptual flowchart for the North Umpqua River developments

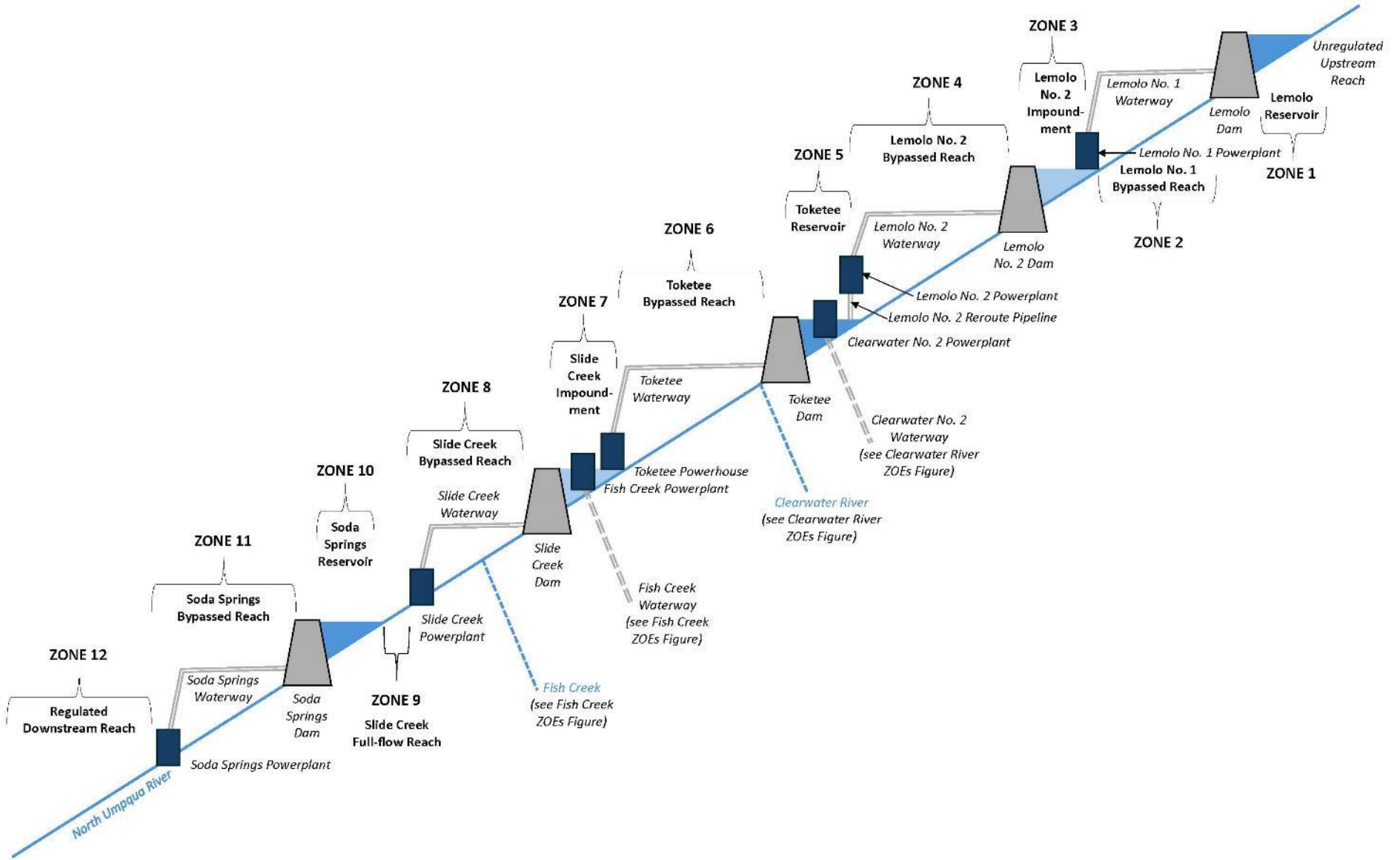


Figure 6. Zones of Effect conceptual flowchart for the Clearwater River developments

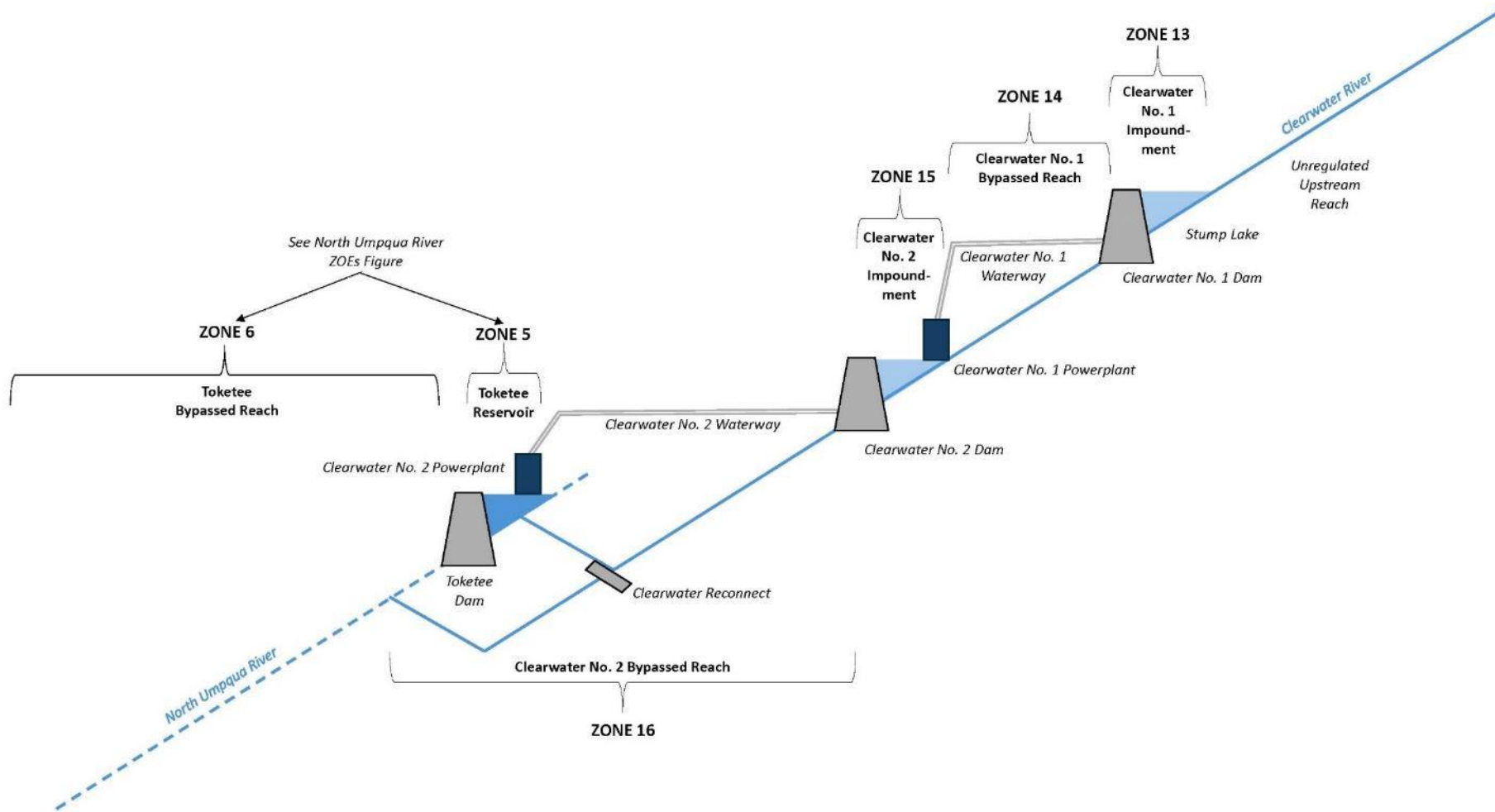


Figure 8. Overview of Project Zones of Effect

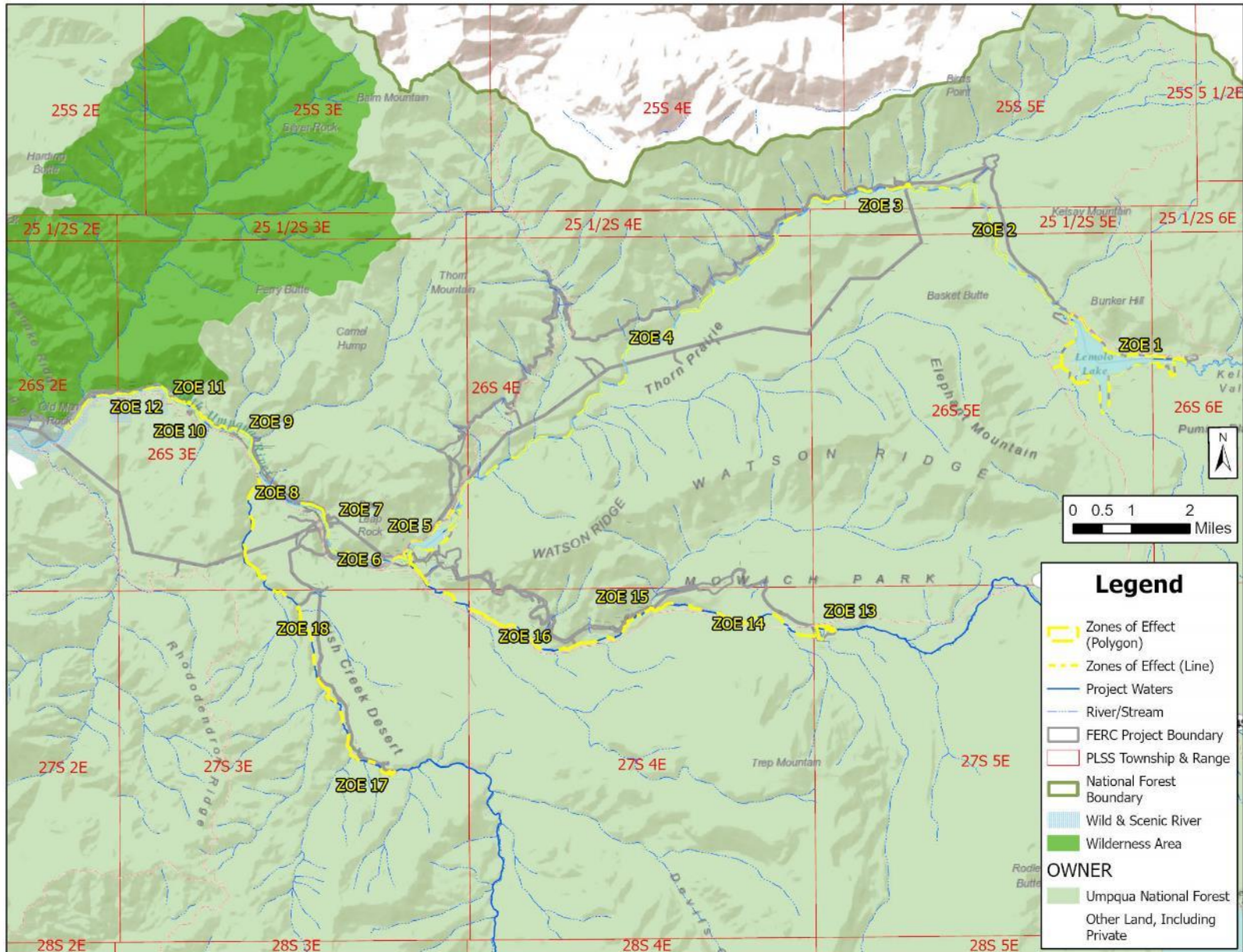


Figure 9. ZOE 1 through 3 associated with the Lemolo No. 1 development

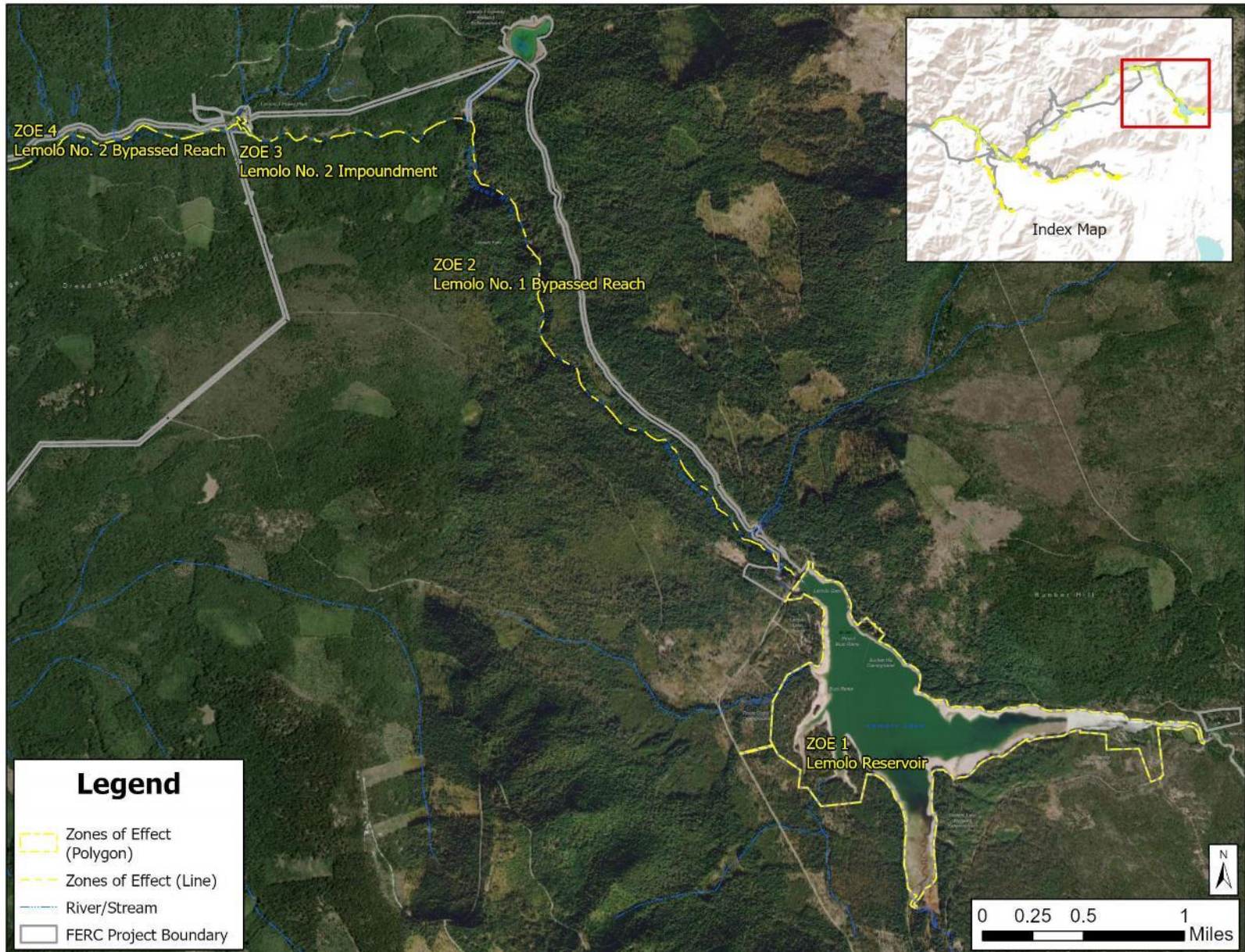


Figure 10. ZOE 3 through 5 associated with the Lemolo No. 2 development

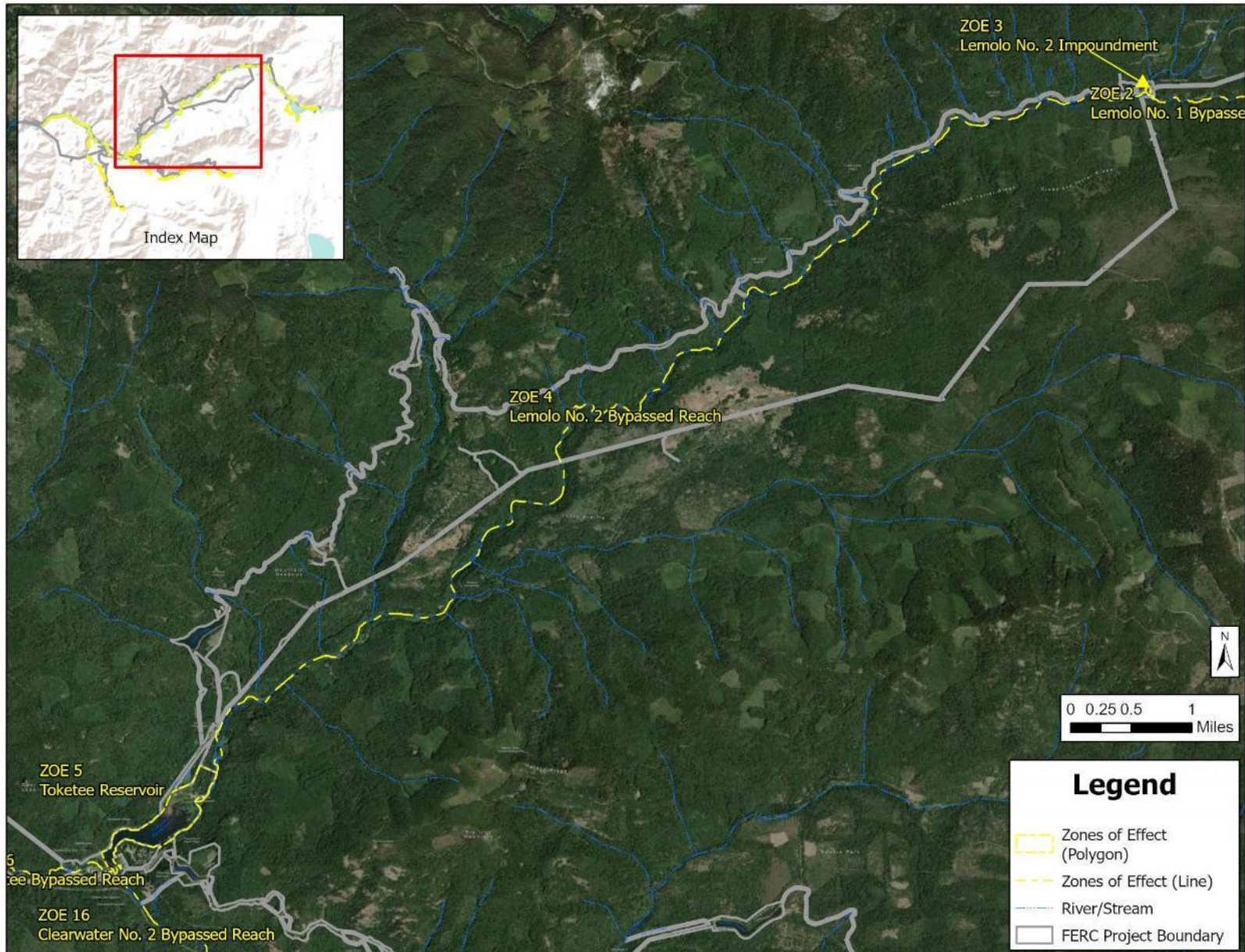


Figure 11. Detail of ZOE 5 (Toketee Reservoir) and other interfacing ZOE's

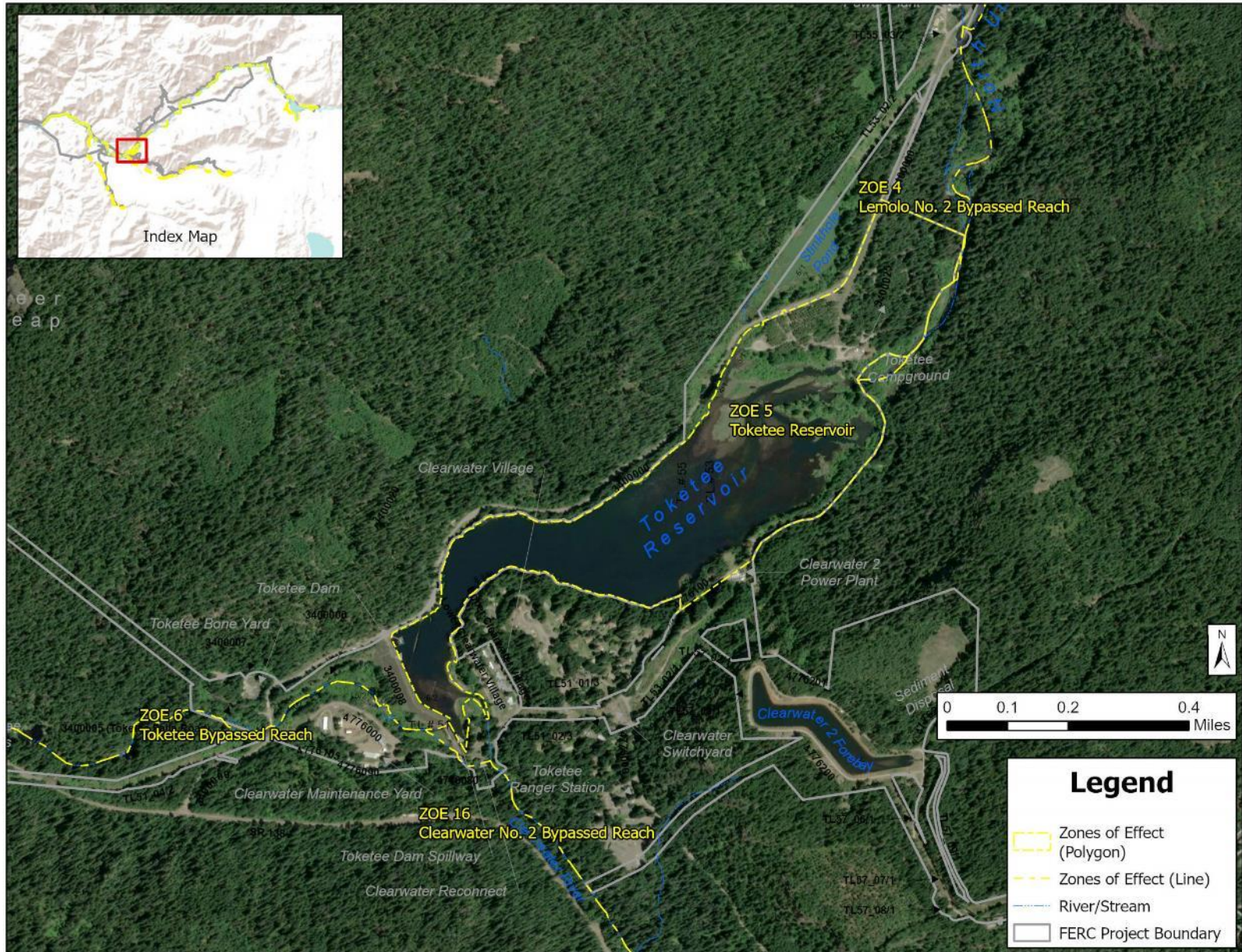


Figure 12. ZOE 5 through 7 associated with the Toketee development

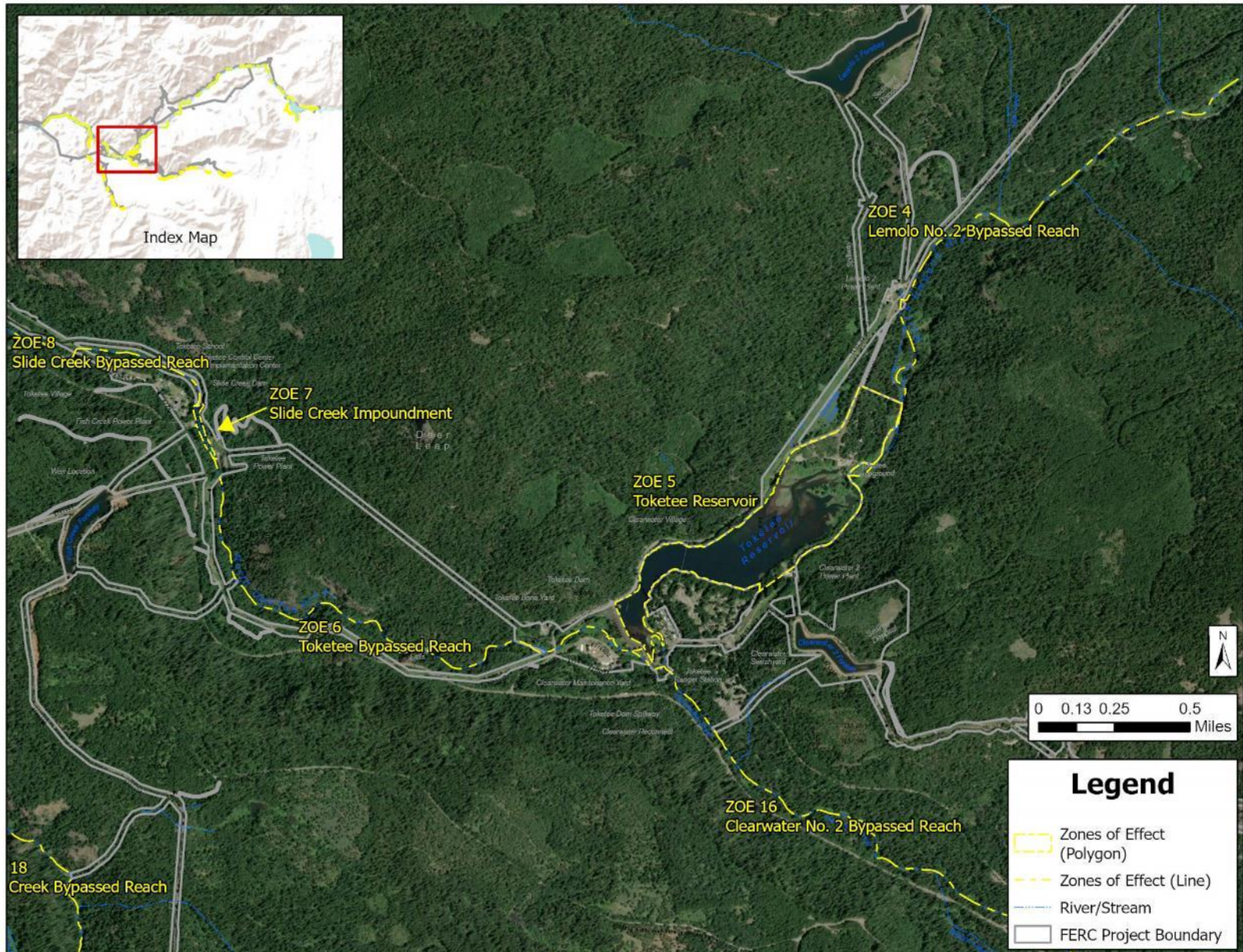


Figure 13. ZOE 7 through 9 associated with the Slide Creek development

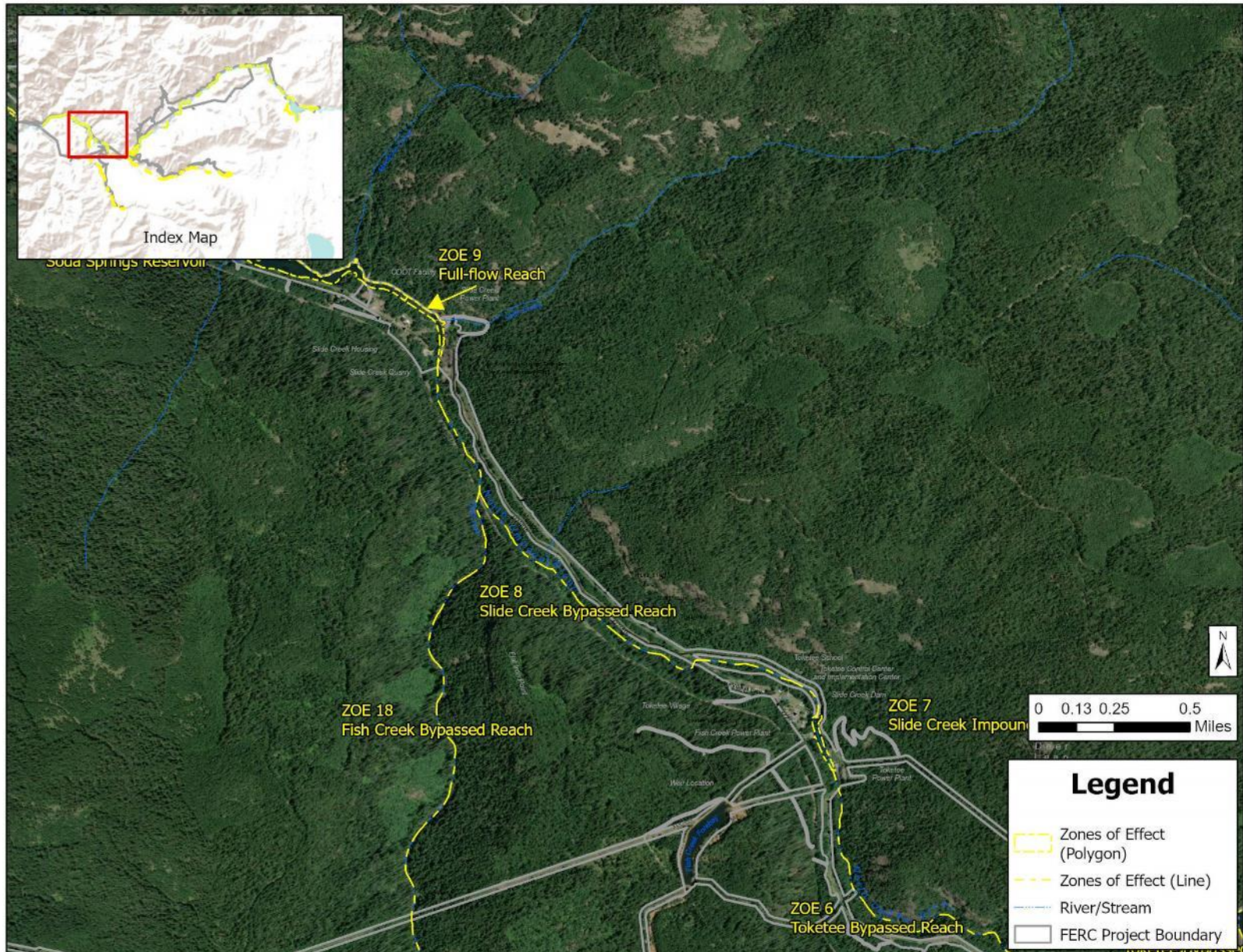


Figure 14. ZOE 10 through 12 associated with the Soda Springs development

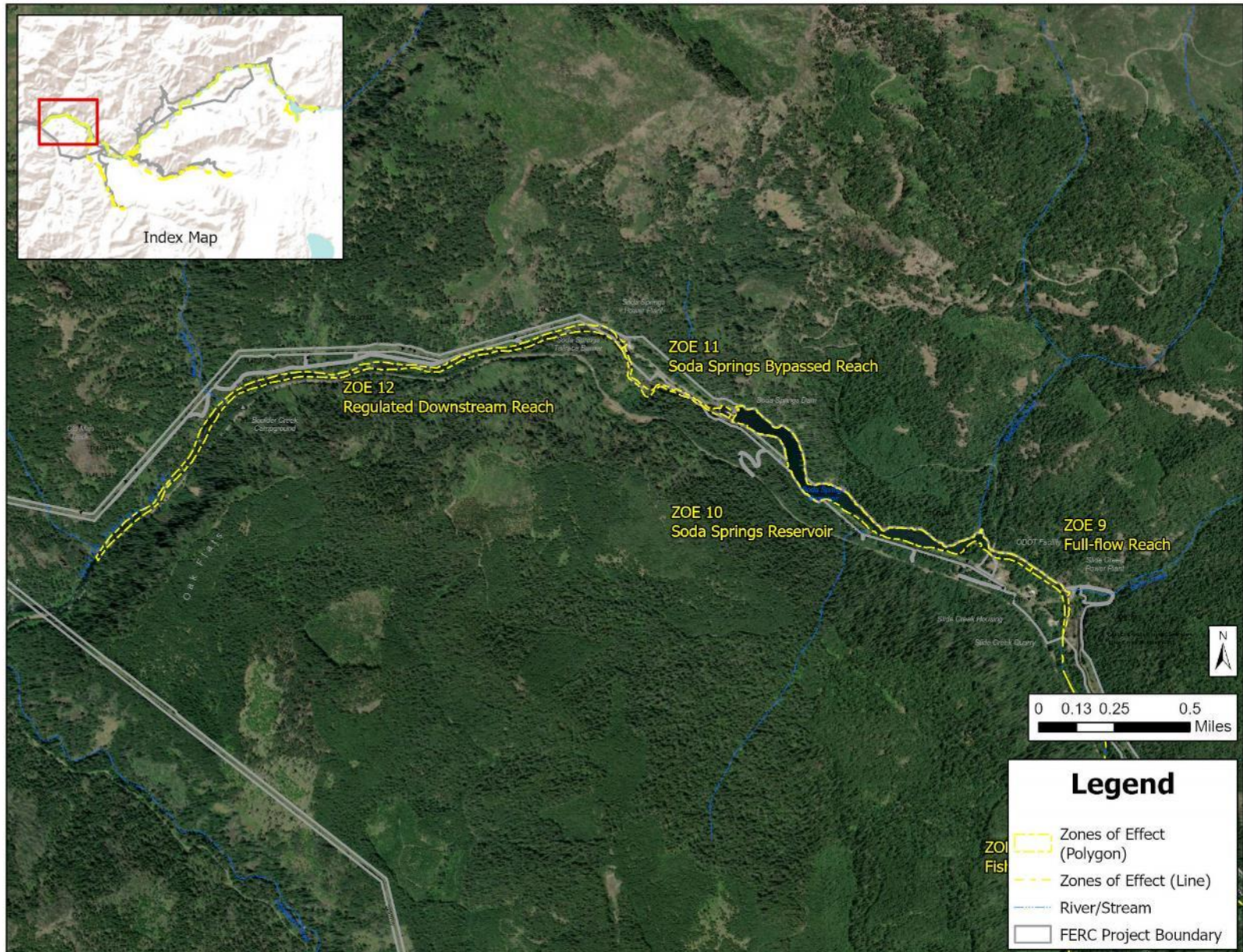


Figure 16. ZOE 15 and 16 associated with the Clearwater No. 2 development

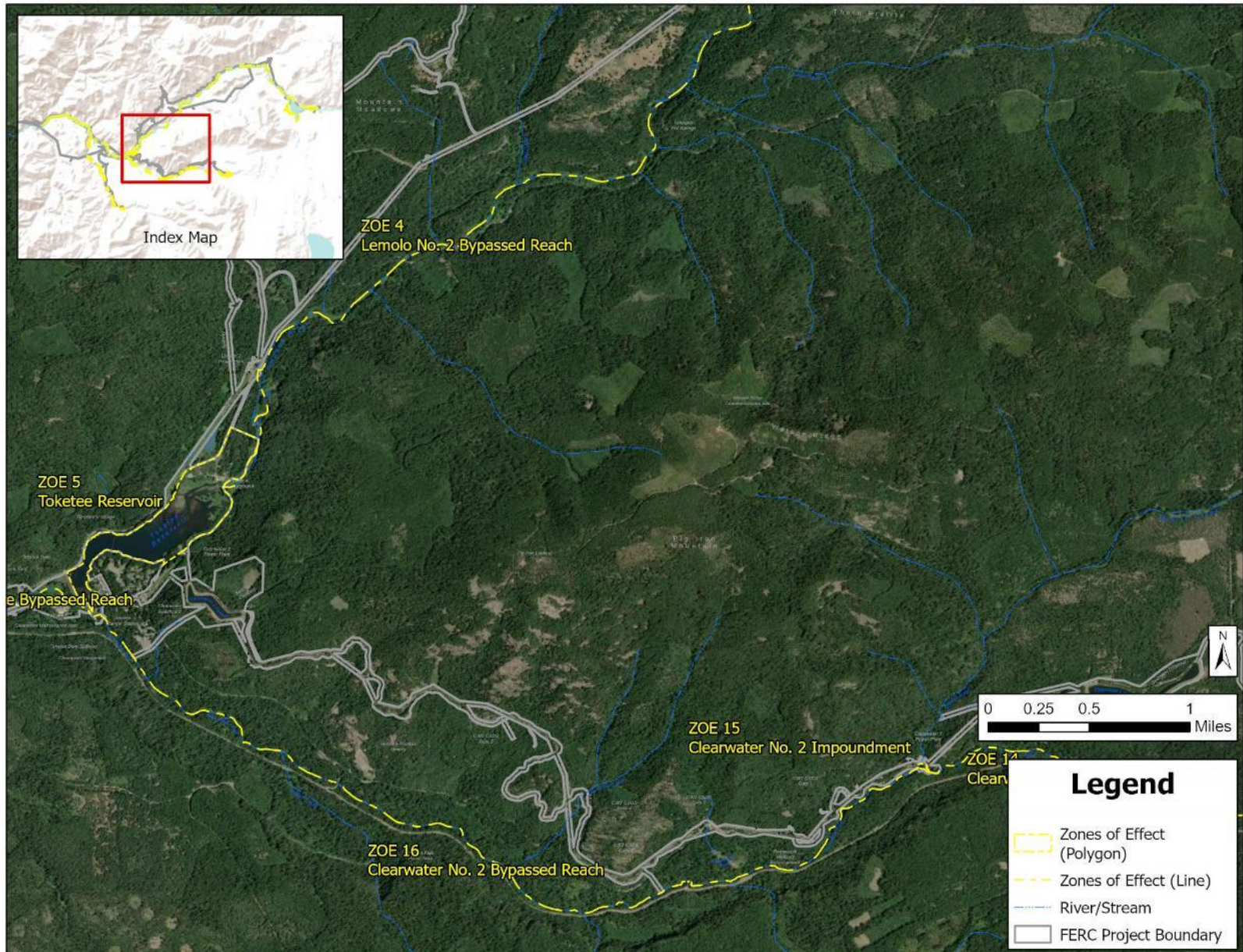
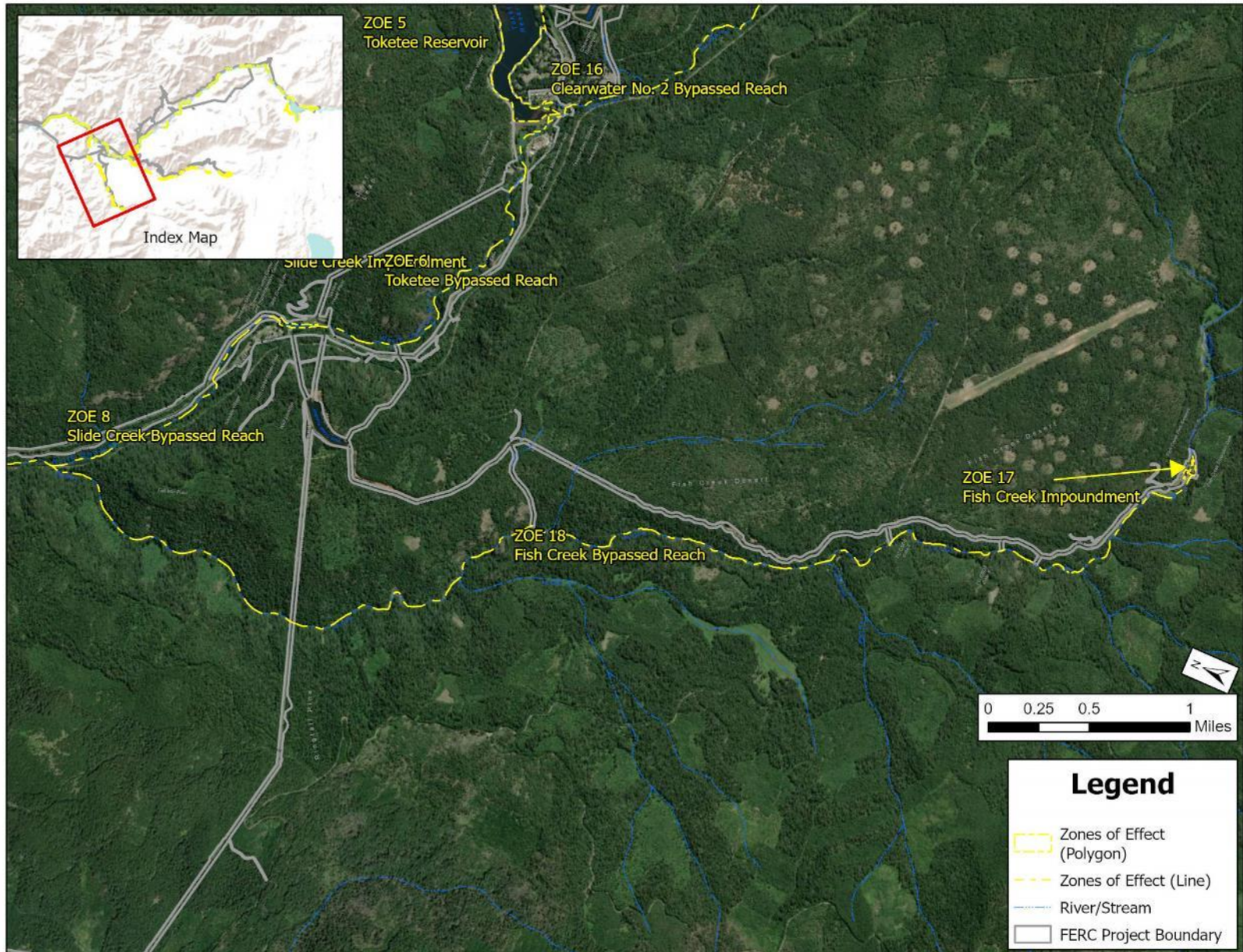


Figure 17. ZOE 17 and 18 associated with the Fish Creek development



As described in Section 1.1, each of the Project developments has a waterway conveying Project flows from the diversion dam to a penstock and powerplant. The Project has a total waterway length of 37.3 miles (mi), including 21.7 mi of canal, 9.8 mi of flume, and 5.8 mi of penstock. The waterways traverse generally-forested, terrestrial habitats upslope from their respective riverine bypassed reaches to maintain hydraulic head between the diversion dam and turbine-generators. Five of the eight developments (Lemolo Nos. 1 and 2, Clearwater Nos. 1 and 2, and Fish Creek) have forebays with useable storage capacity upstream of the penstock intake. The Project license and SA include extensive PM&E measures associated with the Project waterways and their ancillary facilities (e.g., roads). However, it was determined in consultation with LIHI that these off-channel waterways do not constitute ZOE's for the purposes of evaluating compliance with the LIHI certification criteria.

1.6 CHANGES SINCE LAST CERTIFICATION

In 2014, exploratory drilling immediately downstream of Toketee Dam encountered a very soft, sandy zone. There were no signs of distress to the dam related to this condition under static loading, but due to potential dam safety issues that could result under seismic loading, PacifiCorp elected to reduce the normal maximum water surface elevation in Toketee Reservoir from 2,430 feet to 2,428 feet. By letters of May 20, 2014 (Attachment 1) and July 16, 2014 (Attachment 2), FERC's Portland Regional Office concurred with PacifiCorp's decision to lower the reservoir while revised seismic liquefaction and stability analyses are conducted. PacifiCorp continues to maintain this operational restriction while coordinating appropriate dam safety rehabilitation measures with FERC.

PacifiCorp engaged in the FERC license amendment process to add proposed pumped storage additions to the existing Project. Though FERC issued a license amendment to PacifiCorp on December 1, 2023⁴, PacifiCorp is continuing to evaluate the value of the proposed pumped storage additions to PacifiCorp's system and whether implementation of such is of value to the company's customers. Therefore, PacifiCorp is proceeding with application for recertification by LIHI considering the current Project conditions (i.e., without pumped storage).

There have not been any other Project changes relevant to the LIHI certification standards since the last LIHI certification.

2.0 CERTIFICATION STANDARDS

PacifiCorp reviewed the certification criteria and alternative standards outlined in LIHI's *Low Impact Hydropower Certification Handbook, 2nd Edition* (Revision 2.05: January 1, 2022) for each of the Zones of Effect (ZOE's) identified in Section 1.5. An alternative standards matrix (Handbook Table 2.c.) was completed for the ZOE's, as presented below in Table 5, and the selected alternative standards for each ZOE are grouped by criterion and presented in the applicable sub-sections. The Project meets one or more of the alternative standards for each criterion and ZOE, and therefore, the Project is a candidate for recertification of low impact.

⁴ https://elibrary.ferc.gov/eLibrary/filelist?accession_num=20231201-3050

Table 5. Alternative standards matrix for Project ZOE (Adapted from LIHI Handbook Table 2.c.)

		CRITERION <i>(type in one numbered standard and PLUS if applicable)</i>							
Zone Name	River Mile at upper and lower extent of Zone	A	B	C	D	E	F	G	H
		Ecological Flows	Water Quality	Upstream Fish Passage	Downstream Fish Passage	Shoreline and Watershed Protection	Threatened and Endangered Species	Cultural and Historic Resources	Recreational Resources
ZOE 1. Lemolo Reservoir	95.6-93.0	1	2	1	4	2	3	2	2
ZOE 2. Lemolo No. 1 Bypassed Reach	93.0-88.6	2	2	4	1	1	3	1	2
ZOE 3. Lemolo No. 2 Impoundment	88.6-88.5	1	2	1	4	1	3	2	2
ZOE 4. Lemolo No. 2 Bypassed Reach	88.5-76.4	2	2	2	1	1	3	1	2
ZOE 5. Toketee Reservoir	76.4-75.4	1	2	1	2	1	3	2	2
ZOE 6. Toketee Bypassed Reach	75.4-73.3	2	2	4	1	1	3	1	2
ZOE 7. Slide Creek Impoundment	73.3-73.2	1	2	1	4	1	3	2	2
ZOE 8. Slide Creek Bypassed Reach	73.2-71.2	2, PLUS	2	4, PLUS	1	1	3	1	2
ZOE 9. Full-flow Reach	71.2-71.0	2, PLUS	2	1, PLUS	1	1	3	1	2
ZOE 10. Soda Springs Reservoir	71.0-69.8	1	2	1, PLUS	2, PLUS	1	3	2	2
ZOE 11. Soda Springs Bypassed Reach	69.8-69.3	2, PLUS	2	2, PLUS	1	1	3	1	2
ZOE 12. Regulated Reach of NUR Downstream of Project	69.3-67.2	2	2	1	1	2	3	1	2

		CRITERION <i>(type in one numbered standard and PLUS if applicable)</i>							
Zone Name	River Mile at upper and lower extent of Zone	A	B	C	D	E	F	G	H
		Ecological Flows	Water Quality	Upstream Fish Passage	Downstream Fish Passage	Shoreline and Watershed Protection	Threatened and Endangered Species	Cultural and Historic Resources	Recreational Resources
ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)	8.5-8.1	1	2	1	4	1	3	2	2
ZOE 14. Clearwater No. 1 Bypassed Reach	8.1-4.9	2	2	4	1	1	3	1	2
ZOE 15. Clearwater No. 2 Impoundment	4.9-4.9	1	2	1	4	1	3	2	2
ZOE 16. Clearwater No. 2 Bypassed Reach	4.9-0.0	2	2	4	2	1	3	1	2
ZOE 17. Fish Creek Impoundment	6.6-6.6	1	2	1	2	1	3	2	2
ZOE 18. Fish Creek Bypassed Reach	6.6-0.0	2	2	2, PLUS	1	1	3	1	2

2.1 CRITERION A - ECOLOGICAL FLOW REGIMES

Table 6. Ecological flow regime alternative standards matrix

Zone Name	River Mile at upper and lower extent of Zone	<i>Criterion A: Ecological Flow Regimes Alternative Standards</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Plus</i>
ZOE 1. Lemolo Reservoir	95.6-93.0	X				
ZOE 2. Lemolo No. 1 Bypassed Reach of NUR	93.0-88.6		X			
ZOE 3. Lemolo No. 2 Impoundment	88.6-88.5	X				
ZOE 4. Lemolo No. 2 Bypassed Reach of NUR	88.5-76.4		X			
ZOE 5. Toketee Reservoir	76.4-75.4	X				
ZOE 6. Toketee Bypassed Reach of NUR	75.4-73.3		X			
ZOE 7. Slide Creek Impoundment	73.3-73.2	X				
ZOE 8. Slide Creek Bypassed Reach of NUR	73.2-71.2		X			X
ZOE 9. Full-flow Reach of NUR	71.2-71.0		X			X
ZOE 10. Soda Springs Reservoir	71.0-69.8	X				
ZOE 11. Soda Springs Bypassed Reach of NUR	69.8-69.3		X			X
ZOE 12. Regulated Reach of NUR Downstream of Project	69.3-67.2		X			X
ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)	8.5-8.1	X				
ZOE 14. Clearwater No. 1 Bypassed Reach of CR	8.1-4.9		X			
ZOE 15. Clearwater No. 2 Impoundment	4.9-4.9	X				
ZOE 16. Clearwater No. 2 Bypassed Reach of CR	4.9-0.0		X			
ZOE 17. Fish Creek Impoundment	6.6-6.6	X				
ZOE 18. Fish Creek Bypassed Reach of FC	6.6-0.0		X			

STANDARD A-1. Not Applicable/De Minimis Effect: *The facility operates in a true run-of-river operational mode and there are no bypassed reaches or water diversions associated with the applicable Zone of Effect; or the facility is located within an existing water conduit that does not discharge into natural waterways.*

STANDARD A-2. Agency Recommendation: *The flow regime at the facility was developed in accordance with a science-based, agency recommendation.*

STANDARD A-PLUS: *In addition to satisfying one or more of the standards above, the facility is operating an adaptive management program to regularly evaluate and adjust facility operations with respect to flows and habitat conditions; or has implemented significant, non-flow habitat enhancements (for example, structural improvements leading to river restoration) with demonstrated net benefits to fish and wildlife resources affected by the facility.*

As the ecological flow criterion is related to riverine flows (see LIHI Handbook, Section 3.2.1, Introduction to Standards) and the Project impoundments have either de minimis impacts and/or water management regimes that support fish and wildlife, the impoundment (i.e., non-riverine)

ZOEs meet Standard A-1. The Project complies with science-based, resource agency recommendations regarding flow conditions for fish and wildlife protection for all impacted riverine reaches, thereby meeting Standard A-2 in these reaches. Four of the reaches downstream of Slide Creek Dam and within anadromous fish habitat meet Standard A-PLUS as a result of on-going adaptive management programs and/or fish habitat enhancements with demonstrated net benefits to fish and wildlife.

Resource agency recommendations regarding flow conditions are contained in SA Section 5, as adopted in the FERC license, and in the Clean Water Act Section 401 Water Quality Certification (WQC) issued on June 28, 2002, as modified by a letter from Oregon Department of Environmental Quality (ODEQ) dated June 6, 2005 (License Appendix A). The License and SA are available on PacifiCorp's Project website⁵.

The ecological flow regime recommendations in these documents were based on Instream Flow Incremental Methodology (IFIM) studies conducted by PacifiCorp during relicensing (ca. 1993 and 1994) and additional IFIM studies prepared pursuant to the North Umpqua Cooperative Watershed Analysis (Watershed Analysis) (Stillwater Sciences, Inc., 1998). PacifiCorp's IFIM studies presented in its License Application (PacifiCorp, 1995) included fish population studies; aquatic habitat surveys and channel segmentation; calculating and selecting transect locations to represent each study reach; measuring physical variables at each transect at a number of flows; observing the affected life stages of all affected fish species at various stream depths and velocities; and computer modeling based on field measurements to quantify the relationship between flow and fish habitat for affected fish species and life stages in Physical Habitat Simulation (PHABSIM) software to determine the Weighted Useable Area (WUA) for each species and life stage at various flow. The IFIM study examined habitat needs of native rainbow trout and non-native brown and brook trout upstream of Soda Springs Dam and of anadromous salmonids downstream of Soda Springs Dam and in reaches upstream of the dam that could be made accessible if fish passage were provided (i.e., Fish Creek and the North Umpqua River upstream of Soda Springs Dam to the natural barrier to anadromy at Toketee Falls within the Toketee bypassed reach). PacifiCorp initiated the North Umpqua Cooperative Watershed Analysis with input from resource agencies, conservation groups, academic institutions, and interested members of the public to address specific resource concerns that emerged during the formal relicensing process using a collaborative process to resolve these issues within an objective scientific framework. The Watershed Analysis provided revised IFIM analysis using a drift-feeding curve for rainbow trout, macroinvertebrate curves, temperature modelling for different flow regimes, and additional variables.

The FERC Project license and the WQC specify minimum in-stream flows for the first seven years of the project license and modified minimum flows following the construction of anadromous fish passage facilities in 2012 (Table 7). Minor discrepancies between the SA and the WQC minimum flow amounts were reconciled by a modification to the WQC approved by ODEQ in a letter dated June 6, 2005.

⁵ <http://www.pacificorp.com/es/hydro/hl/nur.html>

Table 7. Current instream flow requirements (cubic feet per second) in each Project bypassed reach

	Lemolo 1	Lemolo 2	Clearwater 1	Clearwater 2	Toketee	Fish Creek	Slide Creek	Soda Springs
Jan	50	50	40	40	60	130	240	275
Feb	50	50	40	40	60	130	240	275
Mar	50	50	40	40	60	130	240	275
Apr	60	60	60	60	60	130	240	275
May	70	70	60	60	60	130	240	275
Jun	80	70	60	60	80	130	240	275
Jul	80	80	40	40	80	130	240	275
Aug	80	80	40	40	80	130	240	275
Sep	80	80	40	40	80	130	240	275
Oct	80	80	40	40	80	130	240	275
Nov	50	50	40	40	60	130	240	275
Dec	50	50	40	40	60	130	240	275

SA Section 5.7 affirms that the specified flow releases will be sufficient to operate the existing and planned fish passage facilities:

In-stream flows contained in Appendix C, Tables 1 and 2 for Soda Springs, Fish Creek, and Lemolo 2 bypass reaches include flows necessary for proper operation and maintenance of fish passage facilities at the respective dams. No additional in-stream flows shall be required for these purposes.

SA Section 6 outlines ramping rate restrictions for the Project. PacifiCorp has constructed new facilities to eliminate all ramping in the eight bypass reaches, except during planned Project maintenance and emergency shutdowns. PacifiCorp is meeting goals for minimizing impacts during maintenance and emergency shutdowns by scheduling maintenance work at times of the year preferred by the resource agencies, limiting flow fluctuations to the extent possible during emergency situations, upgrading the Soda Springs powerhouse emergency bypass valve, and implementing other measures specified in SA Section 6. Pursuant to SA Section 6.6, during planned Project maintenance, PacifiCorp shall minimize impacts in bypassed reaches by:

- Taking into consideration the time of year and length of shutdown;
- Planning Project maintenance so that resulting high flows will, as much as is feasible, coincide with the high-flow period of the natural hydrograph;
- Planning Project maintenance so as to prevent water-quality standard violations;
- Adhering to the following ramping regime:
 - If salmon fry less than or equal to 60 mm in length are present (approximately March 1 through June 30), no ramping shall occur during daylight hours (one hour before sunrise to one hour after sunset) and ramping shall not exceed 0.2 feet per hour during night hours.

- If salmon fry are not present, but fry of resident trout or steelhead are present (approximately May 1 through August 31 for steelhead and June 1 through September 30 for trout), ramping shall not exceed 0.2 feet per hour during daylight hours and 0.2 feet per hour during night hours.
- If neither fry of salmon, resident trout, or steelhead are present (approximately October 1 through February 28), down-ramping shall not exceed 0.2 feet per hour and up-ramping shall not exceed 0.5 feet per hour.

The ramping regime is monitored through the Flow Monitoring Plan required under SA Section 5.5 and may be modified upon written agreement by PacifiCorp, ODFW, National Oceanic and Atmospheric Administration (NOAA) Fisheries, ODEQ, U.S. Fish and Wildlife Service (FWS), and Forest Service.

License Article 403 requires PacifiCorp to prepare a Flow Monitoring Plan to ensure compliance with the WQC conditions regarding minimum flows and ramping. PacifiCorp also committed to monitor in-stream flow conditions in SA Section 5.5. In 2004, PacifiCorp developed a Flow Monitoring Plan specifying gage installation and data reporting requirements. The Plan was approved by FWS, NOAA Fisheries, Forest Service, ODFW, ODEQ, Oregon Water Resources Department (OWRD), and FERC. Based on mutual agreement of the parties, the Flow Monitoring Plan was revised in 2007 and approved by FERC on June 4, 2008. The Flow Monitoring Plan is available on PacifiCorp's Project website⁶.

The Flow Monitoring Plan provides for both annual reports and real-time event reporting. Event reporting is rapid reporting of events of specified thresholds, which alerts the agencies as quickly as possible of events capable of causing resource damage so that they can respond if necessary. These event reports are based on provisional data, and do not necessarily equate to a lack of compliance or FERC violation. Annual reporting provides an analysis of the official flow records by water year. Flow monitoring data is provided to ODEQ, OWRD, and Forest Service annually in accordance with the Flow Monitoring Plan. Reports are based on data from USGS that is quality-controlled and -assured from 18 gaging stations and PacifiCorp review of any flow events that deviate from minimum flow, ramping rate, or water right thresholds. The most recent flow monitoring report was filed with the ODEQ, OWRD, and Forest Service on November 22, 2023 for water year 2022 (Attachment 3).

Since the inception of the revised Flow Monitoring Plan in 2007, minimum flows have been met with few exceptions. Variations to WQC flows were either small in magnitude or short in duration or were caused by planned maintenance, natural events, equipment failure, or emergency shutdowns. Naturally low flows in Fish Creek, however, regularly drop to less than the required flow even after PacifiCorp ceases diversion, which is a condition anticipated and recognized by resource agencies. Deviations from flow limits have been discussed openly with the agencies and none have been material violations of the flow requirements.

⁶ https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/management-plans/Flow_Monitoring_Plan.pdf

During the past ten years, PacifiCorp has record of only six flow or ramping events that have been significant enough to trigger real-time event reporting to agencies pursuant to the Flow Monitoring Plan. These events, which are discussed in detail in their respective ZOE below, include:

- a minimum flow event in the Soda Springs bypassed reach (ZOE 11) on September 16, 2014 as a result of equipment malfunctions during maintenance;
- a ramping event in the Lemolo 2 bypassed reach (ZOE 4) on December 15, 2015 as a result of winter storm damage and a gate malfunction;
- a ramping event in the Wild and Scenic Reach downstream of Soda Springs powerplant (ZOE 12) on December 15, 2015 as a result of a winter storm and debris build-up at Soda Springs Dam;
- a ramping event in the Slide Creek bypassed reach (ZOE 8) on June 22, 2023 as a result of transmission line maintenance problems;
- a ramping event in the Soda Springs bypassed reach (ZOE 11) and downstream Wild and Scenic Reach (ZOE 12) on January 29, 2024 as a result of a winter storm and debris build-up at Soda Springs Dam; and
- a ramping event in the Slide Creek bypassed reach (ZOE 8) on August 7, 2024 as a result of operator error.

The annual reports developed by PacifiCorp in consultation with the Resource Coordination Committee (RCC), which includes representatives from the four federal (Bureau of Land Management (BLM), Forest Service, FWS, and NOAA Fisheries) and three state (ODEQ, ODFW, and OWRD) resource agencies that signed the SA, conclude that the Project is meeting the protection, mitigation, and enhancement recommendations regarding flow conditions. The annual reports are available on PacifiCorp's website under the "Resource Coordination Committee" link and "Annual Reports" tab. Improvements in gaging systems, flow control systems, and rating stability (as the period of record grows) are expected to further improve this record in the future.

Additional details supporting selection of standards for each ZOE are provided in the following sub-sections.

2.1.1 ZOE 1. Lemolo Reservoir

Lemolo Reservoir meets Standard A-1 (Not Applicable/De Minimis Effect) for ecological flows as it is an impoundment zone with water management that supports fish and wildlife resources. Lemolo Reservoir is approximately 419 acres with gross storage volume of 11,752 acre-feet and useable storage volume of 11,079 acre-feet. Agency recommendations for Lemolo Reservoir management are provided in SA Sections 6.4.5 (Ramping; Wild and Scenic River Reach Below Soda Springs Powerhouse; Management of Natural Flow Events and Lemolo Draft or Refill), 9.3 (Reservoir and Forebay Management and Mitigation; Management of Lemolo Reservoir), and 17.2 (Recreation; Operations and Maintenance). Reservoir and forebay management is one of the stated management goals of the SA (see Section 3.4), and this goal is, in part, achieved by maintaining aquatic habitat to support productive trout fisheries and maintaining a catch rate of 0.5 trout per angler hour in Lemolo Reservoir. In support of this goal, PacifiCorp annually

contributes funds to ODFW for hatchery production of 15,000 catchable rainbow trout for stocking in Project impoundments.

Pursuant to SA Section 9.3, PacifiCorp maintains Lemolo Reservoir at or near full pool (4,148.5') from Memorial Day through Labor Day each year. PacifiCorp makes reasonable efforts to limit total annual drawdown of Lemolo Lake to 25 feet below full pool to a maximum drawdown elevation of 4,123.5 feet after Labor Day and before the next Memorial Day. PacifiCorp establishes the timing and quantity of water discharged during the first 10 feet of drawdown and consults with ODFW and Forest Service to manage drawdowns from 10 feet to 25 feet below full pool. PacifiCorp restricts water level fluctuations in Lemolo Reservoir to no more than 0.5 feet per day to minimize entrainment of gamefish from the reservoir. PacifiCorp prepares an annual reservoir drawdown plan considering current and future water year predictions and in consultation with ODFW and Forest Service. Exceptions to the depth and timing of drawdowns are allowed under certain conditions, including for fisheries production, in consultation with the agencies. The purposes of the seasonal drawdown are to increase flow into the Wild and Scenic reach of the North Umpqua River to improve spawning conditions for spring Chinook salmon during September and October, to manage high flow events during winter, and to capture a portion of snowmelt for refilling the reservoir in the spring.

2.1.2 ZOE 2. Lemolo No. 1 Bypassed Reach of NUR

The Lemolo No. 1 Bypassed Reach of the North Umpqua River (NUR) meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that provide fish and wildlife protection, mitigation, and enhancement in this reach. The specifics of the agency recommendation and scientific or technical basis for such are provided in the introductory paragraphs to Section 2.1. PacifiCorp is required to maintain a minimum flow in this reach of 50 cfs from November through March, 60 cfs in April, 70 cfs in May, and 80 cfs from June through October and adhere to the ramping regimes provided in the introductory paragraphs to Section 2, which were determined by the agencies to be protective of the life stages of fish in this bypassed reach. PacifiCorp endeavors to limit maintenance that would affect flows in this bypassed reach to the period identified in SA Appendix D, thereby protecting fish during critical life stages and during low flow periods.

2.1.3 ZOE 3. Lemolo No. 2 Impoundment

Lemolo No. 2 Impoundment meets Standard A-1 (Not Applicable/De Minimis Effect) for ecological flows as it is an approximately 1.4-acre impoundment zone of a run-of-river development with no appreciable storage. Gaging in the diversion waterway and bypassed reaches upstream and downstream of the impoundment provides record of run-of-river operation, which is monitored and reported in annual flow monitoring reports. There are no agency recommendations for management of ecological flow regimes within the impoundment.

2.1.4 ZOE 4. Lemolo No. 2 Bypassed Reach of NUR

The Lemolo No. 2 Bypassed Reach of the NUR meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that provide fish and wildlife protection, mitigation, and enhancement in this reach. The specifics of the agency recommendation and scientific or technical basis for such are provided in the introductory paragraphs to Section 2.1. PacifiCorp is required to maintain a minimum flow in this reach of 50 cfs from November through March, 60 cfs in April, 70 cfs from May through

June, and 80 cfs from July through October and adhere to the ramping regimes provided in the introductory paragraphs to Section 2, which were determined by the agencies to be protective of the life stages of fish in this bypassed reach. PacifiCorp endeavors to limit maintenance that would affect flows in this bypassed reach to the period identified in SA Appendix D, thereby protecting fish during critical life stages and during low flow periods.

Pursuant to SA Sections 5.4 and 6.1, PacifiCorp rerouted flows from the Lemolo 2 tailrace, previously discharging to a full-flow reach of the NUR upstream of Toketee Reservoir, to Toketee Reservoir via a buried pipeline between the tailrace and the reservoir (see Photos 15 and 16). This project, known as the Lemolo 2 reroute and completed in 2011, effectively extended the Lemolo No. 2 bypassed reach to Toketee Reservoir in order to protect fish and wildlife habitat from ramping due to peaking operations at the Lemolo No. 2 powerplant. The former full-flow reach exhibits low-gradient braiding and side channels that are rare in the steep-gradient, predominantly V-shaped channels of the Upper North Umpqua sub-basin. This former full-flow reach supports native fish rearing and sensitive wildlife species, including northwest pond turtle (*Actinemys marmorata*).

2.1.4.1 December 15, 2015 Ramping Event

A ramping event necessitating real-time reporting occurred in the Lemolo 2 bypassed reach on December 15, 2015 as a result of storm damage and a gate malfunction. A significant winter storm on December 13, 2015 downed trees onto Project transmission lines and resulted in generating unit trips. Control, indication, and alarm systems were greatly compromised due to storm damage of powerlines and control cables. Prior to the December 15, 2015 incident, the Lemolo 2 diversion was in full spill of approximately 340 cfs, and the canal headgate was open only 0.4 ft to supply enough canal water to sustain fish life and minimal generation at Lemolo 2 powerplant to power the Clearwater village area.

On December 15, 2015, between 07:30 and 07:45, the canal headgate opened for unknown reasons, allowing most of the inflow to the development to enter the diversion waterway and causing the bypassed reach water level to drop rapidly. Ramping in the bypassed reach resulted in a unit stage drop of 1.17' (i.e., greater than the 1' unit stage change reporting threshold) and a minimum flow of 45 cfs, which was 5 cfs less than the 50 cfs requirement, though less than the 50% or of minimum flow reporting threshold, from approximately 8:15 to 10:45. Upon discovery of this situation at approximately 10:45, on-site operators responded immediately to manually open the sluice gate while taking manual control of the canal headgate to close it back to the original setting.

There were no observations of resource damage from this event, but access to the bypass reach was essentially impossible due to heavy snow, downed trees, and unplowed roads. Rather than keeping flows low for an extended period to survey for any damage, PacifiCorp considered it a higher priority to restore flows to more than the minimum and resume the prior high-flow condition to sustain natural flows to the downstream end of the Project and the Wild and Scenic reach.

PacifiCorp notified relevant agencies of the event on December 15, 2015 (Attachment 4). PacifiCorp does not have record of any agency responses to the notification. The event was not deemed a violation of the FERC license.

2.1.5 ZOE 5. Toketee Reservoir

Toketee Reservoir meets Standard A-1 (Not Applicable/De Minimis Effect) for ecological flows as it is an impoundment zone with water management that supports fish and wildlife resources. Toketee Reservoir is approximately 96.9 acres with gross storage volume of 1,051 acre-feet and useable storage volume of 491.4 acre-feet. As discussed in Section 2.1.1, PacifiCorp annually contributes funds to ODFW for hatchery production of 15,000 catchable rainbow trout for stocking in Project impoundments. A recent (2022-2023) recreational angler survey reported a catch rate of 0.52 fish per angler-hour from 118 anglers on 29 survey days over a 185-day-long survey period in Toketee Reservoir (Meridian Environmental, Inc., 2024).

Toketee Reservoir is operated as a regulating facility to absorb flow fluctuations from the four upstream developments of the Project, Lemolo Nos. 1 and 2 and Clearwater Nos. 1 and 2. Lemolo No. 2 powerplant discharges flows via the Lemolo 2 reroute pipe to the northeastern extent of Toketee Reservoir north and downstream of the discharge of the Lemolo No. 2 bypassed reach. Clearwater No. 2 powerplant discharges to Toketee Reservoir on the south shore approximately midway between the upper reservoir and Toketee Dam. The license provides for a maximum daily operating range of six feet of fluctuation, but under normal operation, PacifiCorp operates within a four-foot daily range of fluctuation to avoid turbidity impacts from the mobilization of fine sediment filling the upper portion of the reservoir. As described in Section 1.6, PacifiCorp currently maintains the reservoir at a maximum water surface elevation of 2,428 feet while appropriate dam safety rehabilitation measures are negotiated with FERC.

2.1.6 ZOE 6. Toketee Bypassed Reach of NUR

The Toketee Bypassed Reach of the NUR meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that provide fish and wildlife protection, mitigation, and enhancement in this reach. The specifics of the agency recommendation and scientific or technical basis for such are provided in the introductory paragraphs to Section 2.1. PacifiCorp is required to maintain a minimum flow in this reach of 60 cfs from November through May and 80 cfs from June through October and adhere to the ramping regimes provided in the introductory paragraphs to Section 2, which were determined by the agencies to be protective of the life stages of fish in this bypassed reach. PacifiCorp endeavors to limit maintenance that would affect flows in this bypassed reach to the period identified in SA Appendix D, thereby protecting fish during critical life stages and during low flow periods.

Pursuant to SA Sections 5.9 and 10.3, PacifiCorp reconnected flows from the Clearwater No. 2 bypassed reach, which were previously diverted in full to Toketee Reservoir, to the historic channel of the Clearwater River and its confluence with the North Umpqua River downstream of Toketee Dam and within the Toketee bypassed reach. These flows from the Clearwater River are used to supplement the in-stream flow regime in the Toketee bypassed reach. The Clearwater Reconnect facility also provides passage for fish, amphibians, wildlife, and habitat components, including woody debris and gravel (see Photos 40 and 41).

The Toketee bypassed reach is inclusive of the approximately 120'-high Toketee Falls, which is the historic barrier to upstream anadromous fish passage.

2.1.7 ZOE 7. Slide Creek Impoundment

Slide Creek Impoundment meets Standard A-1 (Not Applicable/De Minimis Effect) for ecological flows as it is an approximately 2.0-acre impoundment zone of a run-of-river development with approximately 43.0 acre-feet of appreciable storage. Gaging in the diversion waterway and bypassed reaches upstream and downstream of the impoundment provides record of run-of-river operation, which is monitored and reported in annual flow monitoring reports. Toketee powerhouse discharges flow on river-right in the upper impoundment zone; Fish Creek powerplant discharges flow on river-left in the lower impoundment zone. The impact of fluctuations from these tailraces is ameliorated by the storage capacity of the impoundment. There are no ramping restrictions in the reach of the impoundment downstream of Toketee tailrace, also known as the Toketee full-flow reach (see SA Section 6.3). There are no agency recommendations for management of ecological flow regimes within the impoundment.

2.1.8 ZOE 8. Slide Creek Bypassed Reach of NUR

The Slide Creek Bypassed Reach of the NUR meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that provide fish and wildlife protection, mitigation, and enhancement in this reach. The specifics of the agency recommendation and scientific or technical basis for such are provided in the introductory paragraphs to Section 2.1. PacifiCorp is required to maintain a continuous minimum flow in this reach of 240 cfs and adhere to the ramping regimes provided in the introductory paragraphs to Section 2, which were determined by the agencies to be protective of the life stages of fish in this bypassed reach. PacifiCorp endeavors to limit maintenance that would affect flows in this bypassed reach to the period identified in SA Appendix D, thereby protecting fish during critical life stages and during low flow periods. Slide Creek Dam, at the upstream extent of the Slide Creek bypassed reach, is the current barrier to upstream anadromous fish passage, and as such, this ZOE is subject to the ramping rates and timing protective of salmon and steelhead.

The Slide Creek Bypassed Reach of the NUR also meets Standard A-PLUS (Agency Recommendation) for ecological flow regimes as PacifiCorp implements significant, non-flow habitat enhancements with demonstrated net benefits to fish and wildlife resources affected by the facility in this reach. Pursuant to SA Section 8.2, PacifiCorp was required to enhance spawning habitat for anadromous fish, prioritizing Chinook salmon, by installing boulders to trap spawning gravel within this reach from the Slide Creek powerplant upstream to the confluence with Fish Creek. Initial placement of boulders at six sites was completed in October 2002 and substantially improved in 2003 based on the first year of monitoring. PacifiCorp prepared, in consultation with Forest Service, ODFW, NOAA Fisheries, and FWS, a Slide Creek Bypassed Reach Habitat Enhancement Project Implementation Plan⁷ and Monitoring Plan, both approved by FERC order of September 28, 2004. Gravel was added to the reach from 2003 through 2005 and monitored for retention behind the boulder structures as it was determined that the boulder structures alone did not create sufficient habitat in this gravel- and sediment-constrained reach. A post-construction monitoring report was completed in February 2006. The Monitoring Plan prescribed that the first spawning habitat conditions monitoring survey after final implementation should occur following the first 5-year or greater flow event, and subsequent

⁷ https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/management-plans/Habitat_Restoration_Creation_Project.pdf

surveys should be conducted 5 years after each prior survey. In December 2005, a 5.3-year recurrence interval flood event occurred, initiating the first post-high-flow survey in October 2006. In 2011, 5 years after 2006 monitoring, flow conditions in the Study Reach were too high to conduct monitoring, thus the second post-high-flow survey was postponed to 2012. The third and fourth post-high-flow surveys were conducted in 2017 and 2022, each being 5 years after the previous survey. PacifiCorp's funding of this program was cost-capped per SA Section 8.3.5; the cost cap was reached in 2024. The 2022 monitoring report (Attachment 5) was provided to the RCC on January 1, 2023 and notes adaptive management measures needed to continue providing benefits from these enhancements to fish in this reach, including gravel augmentation, which was completed in September 2024 (see Photo 29) and made possible by the PacifiCorp-funded federal mitigation fund required by SA Section 19.2. Monitoring will continue throughout the license term pursuant to the Monitoring Plan. In addition to gravel augmentation, PacifiCorp also passes sediment past Slide Creek Dam during high flow events in support of fluvial geomorphic process restoration.

2.1.8.1 Ramping Event of June 22, 2023

A ramping event necessitating real-time reporting occurred in the Slide Creek bypassed reach on June 22, 2023 as a result of transmission line maintenance problems. Prior to this incident, the bypassed reach had been at a normal flow of approximately 280 cfs (i.e., greater than the 240 cfs minimum flow), and the Toketee powerhouse was generating normally but with Unit 2 offline for maintenance.

Line switching for a planned transmission line inspection on June 22, 2023 required Toketee generation to be greatly reduced. This reduction was achieved by reducing flow through the powerhouse which was planned to occur for only about 2 minutes, which would not have appreciably affected bypassed reach flow. However, problems with the switch slowed the work and caused the flow reduction through the powerplant to last about 28 minutes, during which the flow into Slide Creek Impoundment and, ultimately, Slide Creek bypassed reach first jumped to about 460 cfs then dropped to 188 cfs resulting in approximately 1.11 feet of stage reduction (i.e., greater than the maximum stage change of 1 foot per subsequent 15-minute unit values). Flow from Toketee powerhouse was restored as rapidly as possible to get bypassed reach flows more than 240 cfs, but the flow control systems did not respond properly to keep the bypassed reach flow from increasing to approximately 600 cfs, resulting in an approximately 1.60-foot stage increase. Personnel were immediately dispatched to Slide Creek Dam to manually troubleshoot the flow control systems and restore remote control so that the Toketee Control Center operator could gradually reduce bypassed reach flows into the normal range.

Contributing factors included the malfunctioning switch, which was replaced during an emergency outage the following week. Other operational corrective actions, including planning for extended, unexpected events during line switching, were identified during debriefing of personnel involved in this event and implemented thereafter.

Damage was not assessed because this event occurred briefly and was corrected quickly. Stranding of fish was not likely because the actual stage drop from ambient conditions to the lowest stage was only 0.45 ft (2.33 – 1.88 ft) and brief. The peak event flow of about 600 cfs was less than earlier spring flows of 1,000 cfs during that water year.

PacifiCorp notified relevant agencies of the event on June 23, 2023 (Attachment 6). PacifiCorp does not have record of any agency responses to the notification. The event was not deemed a violation of the FERC license.

2.1.8.2 Ramping Event of August 7, 2024

A ramping event necessitating real-time reporting occurred in the Slide Creek bypassed reach on August 7, 2024 as a result of operator error. For several days prior to this incident, the bypassed reach had been relatively stable at a stage of approximately 2.45 ft (approximately 320 cfs).

On August 7, 2024 at 08:31, the Slide Creek Powerhouse tripped offline unexpectedly during troubleshooting of an alarm caused by low turbine seal water flow. To reduce the impact of the rejected flow shifting to the waterway spillway, the Toketee Control Center operator intended to open the Emergency Bypass Gate to allow waterway flows to immediately spill from the bottom of the waterway drain into the river. Instead, the operator inadvertently increased the opening of the spillgate at Slide Creek diversion dam. The mistake was rapidly recognized and immediately corrected. Nevertheless, the flow change from the brief spillgate increase caused the water level at the Slide Creek Bypassed Reach gage to rise from 2.49 feet to 3.52 feet (326 to 638 cfs) within 15 minutes, a stage change of 1.03 feet, thus triggering reporting for a stage change of greater than 1 foot per 15 minutes. The stage then returned to 2.54 ft (339 cfs) within the hour. Subsequent stage variation downstream of Soda Springs Reservoir was +/- 0.06 ft (20 cfs) at the Soda Springs Bypassed Reach and Copeland Creek gages, and therefore well within compliance limits.

On-site conditions were assessed, and although there was evidence of the flow pulse in the riparian grass laying downstream along the bank, there was no sign of stranded fish, bank erosion, or other effects. The water quality station downstream of Soda Springs Powerhouse showed an increase in turbidity of 0.3 nephelometric turbidity unit (NTUs), but this was within the range of recent sensor variation and may also have been related to cleaning of the Soda Springs Fish Ladder Counting Station or ongoing wildfire and firefighting activity near the water quality station.

Corrections to prevent a recurrence of this event include modifying the powerhouse programming to open the Emergency Bypass Gate during non-emergency plant trips to automate the process of minimizing flow impacts in the river. Operator debriefing and event review reminded all operators to be diligent in their selection of control devices and double-check before initiating changes.

PacifiCorp notified relevant agencies of the event on August 8, 2024 (Attachment 7). On August 29, 2024, ODFW responded to PacifiCorp's notification, acknowledging the event, and thanking PacifiCorp for the notification, on-site evaluation, and the corrective actions to be implemented (Attachment 8). PacifiCorp does not have record of any other agency responses to the notification. The event was not deemed a violation of the FERC license to date of this application.

2.1.9 ZOE 9. Full-flow Reach of NUR

The Slide Creek full-flow reach of the NUR meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that

provide fish and wildlife protection, mitigation, and enhancement in this reach. This reach receives the full flow of the North Umpqua River upstream of Slide Creek dam via the confluence of flows in the Slide Creek bypassed reach and diverted flows discharged back to the river via Slide Creek powerplant.

The Slide Creek full-flow Reach of the NUR also meets Standard A-PLUS (Agency Recommendation) for ecological flow regimes as PacifiCorp implements an adaptive management plan to regularly evaluate and adjust Project operations with respect to flows and habitat conditions. Pursuant to SA Section 6.2.1, PacifiCorp developed a monitoring plan, in consultation with ODFW, NOAA Fisheries, ODEQ, FWS, and Forest Service, to evaluate the effects of ramping levels on anadromous fish in this full-flow reach. The monitoring plan was approved on February 7, 2011 by FERC order that required a final monitoring report by March 1, 2021. The goal of the Plan was to evaluate the effects of the daily ramping rate and range on spawning, rearing, and migration of anadromous fish. The anadromous fish most likely to use the area, and hence the target fish species for this monitoring effort, were steelhead (*Oncorhynchus mykiss*), spring Chinook salmon (*O. tshawytscha*), and coho salmon (*O. kisutch*).

The final monitoring report was filed with FERC on February 16, 2021 (Attachment 9). The report documents all three target fish species spawning and rearing in the full-flow reach. However, since the completion of fish passage facilities constructed in 2012, flow in the full-flow reach has been relatively stable with very little load shaping or ramping anticipated by SA Section 6.2. The most recent period of daily load-shaping ramping was in early July 2013. The reduction in frequency of daily load shaping and ramping at the Slide Creek powerplant is due to several factors, including:

- reduced incentive for daily load shaping;
- less water available for load shaping as a result of the increased minimum instream flow;
- temporary limitations on upstream water level fluctuations in Toketee Reservoir due to ongoing seismic hazard remediation efforts;
- periodic limitations on downstream water level fluctuations related to debris management at the Soda Springs fish passage facility; and
- the challenges of balancing multiple compliance metrics for flows, water levels, and fish passage and protection facilities.

Therefore, direct monitoring of ramping impacts on anadromous fish was not warranted or possible at the time of reporting, and the report was filed as interim pending future proposals for larger ramping. Substantial, routine, daily ramping is not anticipated until at least some of the current constraints are removed or relieved. However, pursuant to SA 6.2.2, flow regulation is required in the full-flow reach due to documented anadromous salmonid spawning. Thus, PacifiCorp regulates flow in this reach by limiting generation flow changes at the Toketee powerhouse to no more than 510 cfs per hour (i.e., one of the three Toketee units brought on-line per hour), to protect against rapid flow fluctuations in the full-flow reach. If load shaping operations that would exceed the current ramping restriction are resumed, PacifiCorp will monitor the impacts of more aggressive ramping on fish use within the full-flow reach in consultation with the agencies. This adaptive management plan will be reviewed via reporting of annual flows and ramping in each Flow Monitoring Annual Report and any subsequent full-flow reach monitoring reports.

2.1.10 ZOE 10. Soda Springs Reservoir

Soda Springs Reservoir meets Standard A-1 (Not Applicable/De Minimis Effect) for ecological flows as it is an impoundment zone with water management that supports fish and wildlife resources. Soda Springs Reservoir is approximately 31.5 acres with gross storage volume of 576 acre-feet and useable storage volume of 432 acre-feet.

Soda Springs Reservoir is operated as a re-regulating facility to absorb flow fluctuations from the seven upstream developments of the Project to provide stable flows to the two regulated reaches downstream of Soda Springs Dam: the Soda Springs bypassed reach (ZOE 11) and the regulated reach downstream of the Project (ZOE 12).

2.1.11 ZOE 11. Soda Springs Bypassed Reach of NUR

The Soda Springs Bypassed Reach of the NUR meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that provide fish and wildlife protection, mitigation, and enhancement in this reach. The specifics of the agency recommendation and scientific or technical basis for such are provided in the introductory paragraphs to Section 2.1. PacifiCorp is required to maintain a continuous minimum flow in this reach of 275 cfs and adhere to the ramping regimes provided in the introductory paragraphs to Section 2, which were determined by the agencies to be protective of the life stages of fish in this bypassed reach. PacifiCorp endeavors to limit maintenance that would affect flows in this bypassed reach to the period identified in SA Appendix D, thereby protecting fish during critical life stages and during low flow periods. This ZOE is subject to the ramping rates and timing protective of salmon and steelhead.

PacifiCorp designed and constructed the fish passage facilities at Soda Springs Dam such that flows discharging from the fish passage facilities enter the Soda Springs bypassed reach upstream of the restored and enhanced alluvial reach pursuant to SA Section 5.8.

The Soda Springs Bypassed Reach of the NUR also meets Standard A-PLUS (Agency Recommendation) for ecological flow regimes as PacifiCorp implements significant, non-flow habitat enhancements with demonstrated net benefits to fish and wildlife resources affected by the facility in this reach. Pursuant to SA Section 7.2, PacifiCorp prepared, in consultation with Forest Service, ODFW, NOAA Fisheries, and FWS, a Gravel Augmentation Implementation Plan and Gravel Augmentation Monitoring Plan, approved by FERC on July 16, 2004 and December 13, 2004, respectively, for restoration of fluvial geomorphic processes downstream of Soda Springs Dam (i.e., in the Soda Springs bypassed reach and the regulated reach downstream of the Project) through addition of spawning gravels. The SA and Implementation Plan required PacifiCorp to provide a one-time pulse of about 4,000 tons (3,000 cubic yards) of gravel in 2004 and distribute about 100 tons (74 cubic yards) of gravel among up to five sites, seven times during the term of the License subject to the evaluation of the one-time pulse. PacifiCorp's funding was cost-capped per SA Section 7.2.3. In consultation with the agencies and pursuant to the Monitoring Plan results, PacifiCorp conducted gravel augmentation activities in 2004, 2006, 2017, 2018, 2019, and 2020 before reaching the cost-cap. Expenditures are tracked in annual reports prepared by the RCC and filed with FERC. Pursuant to SA Section 7.2.4, additional funding for gravel augmentation downstream of Soda Springs Dam during the license term may be made available through the PacifiCorp-funded federal mitigation fund required by SA Section 19.2. The most recent gravel augmentation monitoring report for the years 2017 through 2021 (Attachment 10)

was submitted to the RCC on May 18, 2022 and demonstrates ongoing benefits to fish within this reach. Gravel augmentation in these reaches was completed in September 2024 using the federal mitigation fund (see Photo 33). In addition to gravel augmentation, PacifiCorp also passes large woody debris past Soda Springs Dam in support of fluvial geomorphic process restoration.

PacifiCorp's implementation of SA Section 8.3 (Main-stem North Umpqua Anadromous Fish Spawning Habitat Enhancement, North Umpqua River Habitat Restoration/Creation Project) provides further support for attainment of Standard A-PLUS. The SA identifies a goal of maximizing spawning habitat for anadromous fish in the mainstem North Umpqua River, with priority given to Chinook salmon spawning habitat, through creation or restoration of approximately 5,000 to 15,000 square feet of spawning habitat in the Soda Springs bypassed reach. PacifiCorp prepared a feasibility report in August 2003, conducted a baseline habitat survey in 2004, and constructed initial habitat and conducted post-construction surveys in August 2004, all of which are dependent on the ecological flow regime in this reach. PacifiCorp prepared, in consultation with the agencies, a Baseline Habitat Survey Report and Habitat Restoration/Creation Project Monitoring Plan approved by FERC order of March 3, 2005. PacifiCorp conducts annual monitoring in collaboration with ODFW and provides annual monitoring reports including recommendations on habitat management and/or needs. PacifiCorp's funding of this program was cost-capped per SA Section 8.3.5. In consultation with the agencies and pursuant to the monitoring plan results, PacifiCorp conducted habitat restoration and/or creation tasks in the years 2003 through 2006, 2012, 2014, 2015, and 2017 through 2024 before reaching the cost-cap. Expenditures are tracked in annual reports prepared by the RCC and filed with FERC. Additional funding for habitat creation and/or restoration downstream of Soda Springs Dam during the license term may be made available through the PacifiCorp-funded federal mitigation fund required by SA Section 19.3. The most recent spawning habitat monitoring report (Attachment 11) was submitted to the RCC on January 16, 2024 for calendar year 2023 and demonstrates ongoing benefits to fish within this reach, including record high redd counts for Coho salmon and sustained use by steelhead and Chinook salmon.

2.1.11.1 Ramping Event of September 16, 2014

A ramping event requiring real-time reporting occurred in the Soda Springs bypassed reach on September 16, 2014 as a result of equipment malfunctions during a special flow change to perform maintenance on the new fish ladder Attraction Water Supply system. The flow was corrected within 30 minutes and the event was reported to the ODFW, ODEQ, OWRD, and Forest Service within two hours. The event was discussed at length during the October 18, 2014 Resource Coordination Committee (RCC) meeting. The RCC recognized PacifiCorp's diligence in investigating and correcting the causes of this event and there were no resulting penalties or formal letters of violation. This event was reported to LIHI in the previous certification application of 2014.

2.1.11.2 Ramping Event of January 29, 2024

A ramping event requiring real-time reporting occurred in the Soda Springs bypassed reach and Wild and Scenic Reach on January 29, 2024 as a result of a winter storm and debris build-up at Soda Springs Dam. For several days prior to this incident, the bypassed reach had been at high flows of approximately 2,000 to 3,000 cfs, and the regulated reach downstream of the Project was experiencing flows of approximately 4,000 to 5,000 cfs. Flows in both reaches were beginning to recede from the weekend's high flow peaks.

The prior rain and snowmelt surge had created a new, large flotilla of trees, logs, and forest debris on the Soda Springs Reservoir safety boom that needed to be cleared. The FERC License requires passing large woody debris beyond the dam in the largest sizes practical. The best and safest method for so doing is to pass them through the log chute and spillway when they are small and smooth enough to fit.

The crew and operators developed a plan to raise the safety boom to free the logs and open the spillway to pass the debris as it arrived there. Much debris passed successfully this way, but some debris remained hung up on the boom. The spillway flow was reduced back to normal, and the log chute was re-opened to pass the remaining debris as it broke loose. However, the spillway had to be briefly shut to make the logs go thru the log chute instead of getting trapped near the fish screen entrance. All large woody debris was ultimately, successfully passed downstream into the bypassed reach.

The combination of a flow pulse for passing some logs through the spillway and a flow drop for passing the remaining logs through the log chute resulted in the range of water levels briefly exceeding the reporting limits. The stage range went up by 1.08 feet between 15-minute units in the bypassed reach (exceeding the reporting threshold of 1 foot per 15 minutes), and the stage range went down by 1.12 feet over five 15-minute unit values in the regulated reach downstream of the Project (exceeding the reporting threshold of 1 foot per 75 minutes (five 15-minute units) in the regulated reach downstream of the Project.

Corrective actions included restoring gate settings and flows back to normal immediately upon passage of the debris. Damage was not assessed because this event occurred briefly and was corrected quickly. Impacts to aquatic life are not likely since the background flows were already high, and the lowest flows remained greater than the level of recent flow in each reach. Also, exceedingly few fry are present in these reaches during January.

PacifiCorp notified relevant agencies of the event on January 29, 2024 (Attachment 12). On February 2, 2024, ODFW responded to PacifiCorp's notification, acknowledging the event, concurring with PacifiCorp's conclusion that impacts to fisheries were limited in scope and duration, defining potential impacts for events of this type, and requesting additional coordination with ODFW staff in the future (Attachment 13). PacifiCorp does not have record of any other agency responses to the notification. The event was not deemed a violation of the FERC license to date of this application.

2.1.12 ZOE 12. Regulated Reach of NUR Downstream of Project

The regulated reach of the NUR downstream of the Project, which is within the designated Wild and Scenic Reach of the river, meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that provide fish and wildlife protection, mitigation, and enhancement in this reach. In the designated Wild and Scenic River reach of the North Umpqua River downstream of Soda Springs powerplant, when flow levels are less than 1600 cfs, PacifiCorp limits fluctuations to 5 percent or less variation in calculated incoming flows upstream of Soda Springs dam. When flows are greater than 1600 cfs, and up to a point where natural flow results in spilling at Soda Springs Dam, PacifiCorp limits ramping in the regulated reach downstream of the Project to 0.1 foot per hour

and 0.5 foot per day. PacifiCorp monitors compliance with these limits pursuant to the Flow Monitoring Plan.

Pursuant to SA Section 6.4.5 and to follow anticipated natural flow events in the watershed when Soda Springs Dam is not spilling water, PacifiCorp makes all reasonable efforts to limit flow changes in the Wild and Scenic River reach downstream of Soda Springs powerhouse to 5 percent change per hour from then current base conditions, with a goal not to exceed 0.1 feet per hour, as many times a day as necessary to follow the anticipated natural flow event. During draft or refill of Lemolo Reservoir, PacifiCorp makes all reasonable efforts to limit flow changes in the Wild and Scenic River reach downstream of Soda Springs powerhouse to 5 percent change per day from then current base flows but shall not exceed 0.1 feet per day.

The regulated reach downstream of the Project also meets Standard A-PLUS (Agency Recommendation) for ecological flow regimes as PacifiCorp implements significant, non-flow habitat enhancements with demonstrated net benefits to fish and wildlife resources affected by the facility in this reach. Refer to the details on implementation of the SA Section 7.2 Gravel Augmentation Plan provided above in Section 2.1.11. The Gravel Augmentation Plan and program include the Wild and Scenic River reach downstream of Soda Springs powerhouse for 1.5 miles to the confluence of Boulder Creek, whereupon natural geomorphic contributions are restored.

2.1.12.1 Ramping Event of December 15, 2015

A ramping event requiring real-time reporting occurred in the regulated reach downstream of the Project on December 15, 2014 as a result of a winter storm and debris build-up at Soda Springs Dam. The entire Project was off-line due to storm damage as of mid-day on December 13, 2015. Control, indication, and alarm systems were greatly compromised due to storm damage of powerlines and control cables. Prior to this incident, Soda Springs bypassed reach flows were approximately 1,300 cfs, and flows in the regulated reach downstream of the Project were approximately 1,600 cfs.

On December 15, 2015, at 03:00 hours, the Soda Springs spillway became obstructed with debris causing flow in the bypassed reach to drop. To clear the debris and restore flows, the spillgate was opened wide enough to allow the logs, trees, and debris to pass intact underneath the gate. This released a pulse of flow that was so brief it was not measured at the Soda Springs bypassed reach gage but was measured at the Copeland gage at 03:45 hours as approximately 2,600 cfs and a stage increase change of 1.32 feet within 15 minutes and then 1.28 ft down within 30 minutes. Within 30 minutes of the initial ramp, flow at both gages was restored to background levels.

There were no observations of resource damage from this event, although it occurred during hours of darkness and extremely poor access and weather conditions (e.g., snow, rain, and downed trees and powerlines). Personnel were prioritizing accident response and safety at that time. Rather than keeping flows low for an extended period to survey for any damage, PacifiCorp considered it a higher priority to restore flows to background and minimize resource damage. Some of the gage sites were not updating very effectively during the storm, thus delaying PacifiCorp's ability to analyze real-time data.

Periodic flushing of debris is a requirement of SA Section 7.3 (Passage of Woody Debris), and all safe and practical attempts are made to minimize impacts to flows during passage of debris.

PacifiCorp notified relevant agencies of the event on December 16, 2015 (Attachment 14). PacifiCorp does not have record of any agency responses to the notification. The event was not deemed a violation of the FERC license.

2.1.12.2 Ramping Event of January 29, 2024

See Section 2.1.11.2 for details on this event that affected Soda Springs bypassed reach and the regulated reach downstream of the Project.

2.1.13 ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)

Clearwater No. 1 meets Standard A-1 (Not Applicable/De Minimis Effect) for ecological flows as it is an approximately 11.8-acre impoundment zone of a run-of-river development with approximately 5.5 acre-feet of appreciable storage. Gaging in the diversion waterway and bypassed reach downstream of the impoundment provides record of run-of-river operation, which is monitored and reported in annual flow monitoring reports. There are no agency recommendations for management of ecological flow regimes within the impoundment.

2.1.14 ZOE 14. Clearwater No. 1 Bypassed Reach of CR

The Clearwater No. 1 Bypassed Reach of the Clearwater River meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that provide fish and wildlife protection, mitigation, and enhancement in this reach. The specifics of the agency recommendation and scientific or technical basis for such are provided in the introductory paragraphs to Section 2.1. PacifiCorp is required to maintain a minimum flow in this reach of 40 cfs from July through March and 60 cfs from April through June and adhere to the ramping regimes provided in the introductory paragraphs to Section 2, which were determined by the agencies to be protective of the life stages of fish in this bypassed reach. PacifiCorp endeavors to limit maintenance that would affect flows in this bypassed reach to the period identified in SA Appendix D, thereby protecting fish during critical life stages and during low flow periods.

2.1.15 ZOE 15. Clearwater No. 2 Impoundment

Clearwater No. 2 Impoundment meets Standard A-1 (Not Applicable/De Minimis Effect) for ecological flows as it is an approximately 1.2-acre impoundment zone of a run-of-river development with no appreciable storage. Gaging in the diversion waterway and bypassed reaches upstream and downstream of the impoundment provides record of run-of-river operation, which is monitored and reported in annual flow monitoring reports. There are no agency recommendations for management of ecological flow regimes within the impoundment.

2.1.16 ZOE 16. Clearwater No. 2 Bypassed Reach of CR

The Clearwater No. 2 Bypassed Reach of the Clearwater River meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that provide fish and wildlife protection, mitigation, and enhancement in this reach. The specifics of the agency recommendation and scientific or technical basis for such are provided in the introductory paragraphs to Section 2.1. PacifiCorp is required to maintain a minimum flow in this reach of 40 cfs from July through March and 60 cfs from April through

June and adhere to the ramping regimes provided in the introductory paragraphs to Section 2, which were determined by the agencies to be protective of the life stages of fish in this bypassed reach. PacifiCorp endeavors to limit maintenance that would affect flows in this bypassed reach to the period identified in SA Appendix D, thereby protecting fish during critical life stages and during low flow periods.

Pursuant to SA Sections 5.9 and 10.3, PacifiCorp reconnected flows from the Clearwater No. 2 bypassed reach, which were previously diverted in full to Toketee Reservoir, to the historic channel of the Clearwater River and its confluence with the North Umpqua River downstream of Toketee Dam and within the Toketee bypassed reach. These flows from the Clearwater River are used to supplement the in-stream flow regime in the Toketee bypassed reach. The Clearwater Reconnect facility also provides passage for fish, wildlife, and habitat components, including woody debris and gravel.

2.1.17 ZOE 17. Fish Creek Impoundment

Fish Creek Impoundment meets Standard A-1 (Not Applicable/De Minimis Effect) for ecological flows as it is an approximately 3-acre impoundment zone of a run-of-river development with no appreciable storage. Gaging in the diversion waterway and bypassed reach downstream of the impoundment provides record of run-of-river operation, which is monitored and reported in annual flow monitoring reports. There are no agency recommendations for management of ecological flow regimes within the impoundment.

2.1.18 ZOE 18. Fish Creek Bypassed Reach of FC

The Fish Creek Bypassed Reach of Fish Creek meets Standard A-2 (Agency Recommendation) for ecological flow regimes as PacifiCorp implements science-based, agency recommendations that provide fish and wildlife protection, mitigation, and enhancement in this reach. The specifics of the agency recommendation and scientific or technical basis for such are provided in the introductory paragraphs to Section 2.1. PacifiCorp is required to maintain a continuous minimum flow in this reach of 130 cfs (or the natural inflow to the development when less than 130 cfs) and adhere to the ramping regimes provided in the introductory paragraphs to Section 2, which were determined by the agencies to be protective of the life stages of fish in this bypassed reach. Inflow to the Project is typically less than 130 cfs from June through December. PacifiCorp endeavors to limit maintenance that would affect flows in this bypassed reach to the period identified in SA Appendix D, thereby protecting fish during critical life stages and during low flow periods. This ZOE is subject to the ramping rates and timing protective of salmon and steelhead as a result of fish passage at Soda Springs Dam.

2.2 CRITERION B - WATER QUALITY

Table 8. Water quality alternative standards matrix

Zone Name	River Mile at upper and lower extent of Zone	<i>Criterion B: Water Quality Alternative Standards</i>			
		<i>1</i>	<i>2</i>	<i>3</i>	<i>Plus</i>
ZOE 1. Lemolo Reservoir	95.6-93.0		X		
ZOE 2. Lemolo No. 1 Bypassed Reach of NUR	93.0-88.6		X		
ZOE 3. Lemolo No. 2 Impoundment	88.6-88.5		X		
ZOE 4. Lemolo No. 2 Bypassed Reach of NUR	88.5-76.4		X		
ZOE 5. Toketee Reservoir	76.4-75.4		X		
ZOE 6. Toketee Bypassed Reach of NUR	75.4-73.3		X		
ZOE 7. Slide Creek Impoundment	73.3-73.2		X		
ZOE 8. Slide Creek Bypassed Reach of NUR	73.2-71.2		X		
ZOE 9. Full-flow Reach of NUR	71.2-71.0		X		
ZOE 10. Soda Springs Reservoir	71.0-69.8		X		
ZOE 11. Soda Springs Bypassed Reach of NUR	69.8-69.3		X		
ZOE 12. Regulated Reach of NUR Downstream of Project	69.3-67.2		X		
ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)	8.5-8.1		X		
ZOE 14. Clearwater No. 1 Bypassed Reach of CR	8.1-4.9		X		
ZOE 15. Clearwater No. 2 Impoundment	4.9-4.9		X		
ZOE 16. Clearwater No. 2 Bypassed Reach of CR	4.9-0.0		X		
ZOE 17. Fish Creek Impoundment	6.6-6.6		X		
ZOE 18. Fish Creek Bypassed Reach of FC	6.6-0.0		X		

STANDARD B-2. Agency Recommendation: *The facility is in compliance with all water quality conditions contained in a recent Water Quality Certification or science-based resource agency recommendation providing reasonable assurance that water quality standards will be met for all waterbodies that are directly affected by the facility. Such recommendations, whether based on a generally applicable water quality standard or one that was developed on a site-specific basis, must include consideration of all water quality components necessary to preserve healthy fish and wildlife populations, human uses and recreation;*

The Project complies with the conditions in the Clean Water Act Section 401 Water Quality Certification (WQC) for the Project issued by ODEQ on June 28, 2002, as modified by a letter from ODEQ dated June 6, 2005, and therefore, all Project ZOE's meet Standard B-2. ODEQ indicated at the RCC meeting of August 20, 2014, that all special monitoring activities required by the WQC have been completed and show the Project to comply with state water quality criteria. PacifiCorp has filed required monitoring reports with the ODEQ and implemented operational modifications in accordance with the WQC implementation schedule. Progress on major water quality improvement initiatives was documented in PacifiCorp's annual reports which are available on PacifiCorp's website. Documentation from ODEQ indicating that the WQC terms and conditions remain valid and in effect for the Project is included in Attachment 30.

On December 13, 2022, ODEQ issued to PacifiCorp a water quality certification modification (Certification Modification; Attachment 15) pursuant to PacifiCorp's February 25, 2022 application to the FERC to amend the existing Project license for the Fish Creek Pumped Storage Project (Pumped Storage Project). In DEQ's cover letter to the Certification Modification, ODEQ notes that they are reasonably assured that operation of the Pumped Storage Project under an amended FERC license will be consistent with provisions of the Clean Water Act Sections 301, 302, 303, 306 and 307, state water quality standards, Oregon Revised Statute (ORS) 543A.025 (2) to (4) and other appropriate requirements of state law, provided PacifiCorp complies with the Certification Modification conditions. The Certification Modification did not alter any of the terms and conditions of the original WQC for the Project but only provided additional terms and conditions specific to the Pumped Storage Project. As PacifiCorp has not decided whether to proceed with the Pumped Storage Project, PacifiCorp has temporarily paused implementation of the Certification Modification conditions. ODEQ acknowledged this temporary pause via email of May 21, 2024 (Attachment 16).

The only ongoing water quality monitoring requirement is continuous operation of the Soda Springs Water Quality Station, with annual reports to ODEQ. The most recent water quality monitoring report for water year 2023 (Attachment 17), submitted to ODEQ on February 19, 2024, indicates that all water quality parameters downstream of the Project are within current ODEQ criteria.

The beneficial uses designated by ODEQ for both the "North Umpqua River Main Stem" and "All Other Tributaries to Umpqua, North and South Umpqua Rivers" (Oregon Administration Rules [OAR 340-041-0320, Table 320A](#)⁸) include Public Domestic Water Supply, Private Domestic Water Supply, Industrial Water Supply, Irrigation, Livestock Watering, Fish & Aquatic Life, Wildlife & Hunting, Fishing, Boating, Water Contact Recreation, Aesthetic Quality, and Hydropower (i.e., all beneficial uses except for Commercial Navigation & Transportation). The current Fish Use Designation (Figure 320A) for the Project Area upstream of Soda Springs Dam is "Salmon and Trout Rearing and Migration" (seven-day-average maximum (7DAM) temperature of 18.0 °C). The Fish Use Designation for Project ZOE's downstream of Soda Springs Dam and the amended, but unapproved by the Environmental Protection Agency (EPA), Fish Use Designation for the entire Project area is "Core Cold Water Habitat" (7DAM temperature of 16 °C). The current Salmon and Steelhead Spawning Use Designation (Figure 320B) for the Project area upstream of Soda Springs Dam is "No Spawning Use." The spawning use designation in the ZOE's downstream of Soda Springs Dam and in the amended, but unapproved by EPA seasonal use designations (7DAM temperature of 13°C) for the Project reaches made accessible by the Soda Springs fish passage facilities are September 1 through June 15. Spawning use is not designated for reaches upstream of Slide Creek and Fish Creek dams in the amended, but unapproved by EPA, designations. There are two new fish use designation figures in the amended, but unapproved by EPA, rules: Figure 320D, Year-Round Dissolved Oxygen (DO) Fish Use Designations, and Figure 320E, Seasonal DO Salmonid

⁸ ODEQ has amended the beneficial uses and fish uses designated in this rule. The amendments were adopted by the Environmental Quality Commission on November 16, 2023. The amended beneficial uses are not applicable for Clean Water Act purposes until approved by the U.S. EPA. However, the beneficial uses for Project-affected waters are the same in the amended rule as the current rule. The fish use designations and salmon and steelhead spawning use designations are different in the amended rule. The amended water quality standards for the basin are found on-line at <https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=309349>

Spawning Use Designations. The DO Fish Use Designation for the Project is Cold-Water Aquatic Life (≥ 8 milligrams per liter (mg/L) as an absolute minimum, with exceptions per OAR 340-041-0016 (2)). The Seasonal DO Salmonid Spawning Use Designations, requiring a minimum DO of 11.0 mg/L with exceptions per OAR 340-041-0016 (1), are September 1 through June 15 for the Project reaches made accessible by the Soda Springs fish passage facilities and January 1 through June 15 for reaches upstream of Slide Creek and Fish Creek dams.

ODEQ's 2022 Integrated Report⁹ and 303 (d) list¹⁰ was approved by the U.S. EPA on September 1, 2022. The comment period on the 2024 Integrated Report closed on July 1, 2024¹¹, but the 2024 report has yet to be approved by the EPA. Table 9 identifies the waters within the Project ZOE's that are on the current 303 (d) list.

Table 9. Project waters on ODEQ's current 303 (d) list

Assessment Unit Name	Assessment Unit Description	HUC 12	HUC 12 Name	Pollutant
Lemolo Lake	Lake/Reservoir Unit	171003010205	Lemolo Lake-North Umpqua River	Harmful Algal Blooms
North Umpqua River	Soda Springs Reservoir to Copeland Creek	171003010803	Deception Creek-North Umpqua River	Temperature

For the Lemolo Reservoir algae listing, a technical working group (TWG) that included ODEQ and other resource agencies, determined that based on three years of experimental actions, there is insufficient evidence to conclude that hydropower operations contributed directly to summer blue-green algae blooms. There have not been any harmful algal bloom advisories issued for Lemolo Reservoir since 2011 (Oregon Health Authority, 2024). There are many complex factors, including contributions from upstream sources and fishery trophic dynamics that influence algae blooms in Lemolo Reservoir. PacifiCorp continues to work with ODEQ, Forest Service, ODFW, and other stakeholders in the North Umpqua Lake Management Group to continue monitoring, understanding, and improving the water quality and fishery in Lemolo Lake.

EPA and ODEQ are currently working under a federal court order to reissue the Umpqua basin temperature total maximum daily load (TMDL) revision by the court-ordered deadline of Feb. 28, 2025¹². The North Umpqua River Subbasin Quality Assurance Project Plan includes temperature data and modelling provided to ODEQ by PacifiCorp. The TMDL modeling data indicate that PacifiCorp will comply with the temperature load allocation by implementing the minimum instream flows stipulated in the SA. PacifiCorp began providing the minimum instream flows specified in the SA and in the WQC in December 2005. The Project complies with the current TMDL's temperature load allocations and with the WQC conditions that address the 303(d)-listed parameters.

⁹ <https://www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx>

¹⁰ <https://www.oregon.gov/deq/wq/Documents/IR2022-303dImpWaters-TMDL.xlsx>

¹¹ <https://www.oregon.gov/deq/wq/Pages/proposedIR.aspx>

¹² See <https://www.oregon.gov/deq/wq/tmdls/Pages/tmdlRumpqua.aspx>

Downstream of Soda Springs powerhouse, (RM 68.9), continuous monitoring since 2001 shows that temperatures have not exceeded the salmon/steelhead spawning temperature criteria except by less than 1 °C during the earliest fringe of the salmon spawning period (i.e., the first week of September) and only during years with warmest temperatures and lowest flows (since 2004, only during 2007, 2015, 2017, 2020, and 2022). Based on this monitoring, ODEQ determined that the Project does not contribute to temperature exceedances within this 303(d)-listed reach. PacifiCorp will continue to collaborate as ODEQ progresses through their TMDL revisions to manage and/or delist this reach.

In summary, operation of the Project currently complies with the conditions of the WQC and the load allocations to the Project in the current Umpqua Basin TMDL. Monitoring has demonstrated that by maintaining minimum flows in accordance with the TMP, the facilities will continue to meet ODEQ numeric temperature criteria. Monitoring also shows that the Project does not contribute to the temperature exceedance in the 303(d) listed reach downstream of Soda Springs Dam. PacifiCorp has rerouted the powerhouse discharge into Toketee Reservoir in accordance with the SA and monitoring of that reach has demonstrated that pH now meets state criteria. PacifiCorp continues to be actively engaged with the Forest Service and the North Umpqua Lake Management Group to improve fisheries and water quality in Lemolo Reservoir and the basin. Implementation of these measures provides assurance that the Project will continue to meet water quality standards.

Pursuant to SA Section 14.1, PacifiCorp continues to implement the FERC-approved Erosion Control Plan (ECP)¹³. The ECP includes provisions for identifying, prioritizing, remediating, preventing, monitoring, and reporting erosion sites with the goal of reducing sediment loading in Project-affected waters. Pursuant to SA Section 14.2, PacifiCorp constructed canal shut-off and drainage systems that, in the event of a failure on any section of the Fish Creek, Lemolo 2, and Clearwater 2 waterways, will promptly capture within the canal and/or redirect diverted flows to natural channels with the goal of draining an affected waterway segment within 30 minutes to reduce the erosive impact of unintended spill from the waterway.

Any water quality activities conducted pursuant to the Certification during the current LIHI certification term are addressed below in the pertinent ZOE.

2.2.1 ZOE 1. Lemolo Reservoir

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2. Despite the 303(d) listing of Lemolo Reservoir, there have not been any harmful algal bloom advisories issued for Lemolo Reservoir since 2011 (Oregon Health Authority, 2024), and technical working groups addressing water quality determined that hydropower operations did not contribute to algal blooms within the reservoir.

¹³ https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/north-umpqua-river/management-plans/ECP_Vol-1_ECP.pdf

2.2.2 ZOE 2. Lemolo No. 1 Bypassed Reach of NUR

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.3 ZOE 3. Lemolo No. 2 Impoundment

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

The Lemolo No. 1 Forebay discharges to ZOE 3 via the Lemolo No. penstock, powerplant, and tailrace. WQC Condition 2(d)(2) required monitoring of pH at the Lemolo No. 1 Forebay during August of the first and second year of operation and every five years thereafter, unless discontinued or modified with the approval of ODEQ. PacifiCorp placed the forebay into service in October 2010. Monitoring in August 2011 indicated high pH due to a combination of stagnation, warming, and heavy blooms of algae and macrophytes. PacifiCorp continued and expanded monitoring in 2012 and 2013 and demonstrated that a daily water flushing cycle adopted by PacifiCorp from May through September successfully reduced macrophyte growth and pH to levels within ODEQ water quality standards. PacifiCorp conducted the first 5-year interval monitoring in August 2018 and submitted a report of the results to ODEQ on September 6, 2018 (Attachment 18). The 2018 monitoring results were consistent with the 2012 and 2013 findings demonstrating that pH remained within water quality standard thresholds when PacifiCorp implemented the forebay flushing regime. On March 29, 2021, ODEQ concurred with the monitoring results and determined the requirement to monitor pH at the Lemolo No. 1 Forebay has been satisfied and that no further monitoring is required subject to the following conditions (Attachment 19):

1. PacifiCorp shall continue to operate the Lemolo No. 1 waterway in a manner that includes daily drawdown of the forebay;
2. PacifiCorp shall visually inspect the forebay annually for the presence of macrophyte growth, and if abundant aquatic plant growth is observed in the forebay, PacifiCorp shall contact DEQ. Per Condition 2(c)(2) of the WQC, ODEQ may require PacifiCorp to undertake measures to assess potential water quality impairments and/or take corrective measures if pH excursions are suspected or confirmed.
3. PacifiCorp shall notify ODEQ at least 30 days prior to undertaking forebay maintenance to remove accumulated sediment or abundant aquatic vegetation.

PacifiCorp has maintained compliance with these requirements since 2018, providing further support for application of Standard B-2 within this ZOE.

2.2.4 ZOE 4. Lemolo No. 2 Bypassed Reach of NUR

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

Pursuant to WQC Condition 3(i), PacifiCorp is required to coordinate erosion remediation measures in accordance with SA Sections 14.3.2 and 14.3.3. During the night of June 30, 2011, during water-up following canal maintenance, a trashrack in the Lemolo No. 2 waterway became blocked with debris, forcing several hundred cfs of water to overflow the waterway for several

hours at the Flume 12 spillway. Erosion from this event deposited approximately 4,000 cubic yards of soil and rock (angular gravel, cobble, boulders) from the adjacent hillside into the riparian area and river channel of the North Umpqua River in this ZOE.

A habitat survey later in 2011 assessed the effects of the slide on aquatic habitat by comparing habitat conditions with those documented during aquatic habitat surveys completed during relicensing in 1992. The survey results indicated that the impact of spillway slide angular material deposited in the river channel was limited to a few hundred feet downstream from the Flume 12 spillway, but the parties agreed to add a second study reach (Response Reach) further downstream for long-term monitoring. The Response Reach was selected in a lower gradient area where future angular bedload impacts may occur, based on review of the 1992 habitat survey data and from aerial photography.

In April 2012, PacifiCorp and the participating parties to the SA developed the Flume 12 Remediation Plan (Plan) to prevent future erosion and to evaluate and address the effects of this event on aquatic habitat. Assessments and monitoring were conducted pursuant to the Plan in 2012. Final monitoring was conducted in 2016, and on December 16, 2016, PacifiCorp submitted the final report of these efforts to the agencies (Attachment 20). Surveyors observed trout redds in the Flume 12 reach in 2011, 2012, and 2016, suggesting that a similar amount of spawning habitat was available in the reach despite the angular bedload transport that occurred between the 2011 and 2016 surveys. Final monitoring data suggest that the Flume 12 Reach continues to have angular substrate patches originating from the Flume 12 erosion event, but continues to have a diversity of habitat types, instream cover, and spawning habitat. The Response Reach habitat was similar among all years and does not appear to have been adversely affected by the Flume 12 slide event. No angular substrate was observed in the Response Reach, suggesting that it either has not progressed that far downstream, or has become rounded and natural-appearing if it has. No further remediation or monitoring were required.

2.2.5 ZOE 5. Toketee Reservoir

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

The Clearwater No. 2 powerplant tailrace discharges to Toketee Reservoir. Condition 9(c)(1) of the WQC requires PacifiCorp to operate the Clearwater No. 2 powerhouse at a power generation level of at least 2 megawatts (MW) to protect water quality in the tailrace from excessive levels of total dissolved gas (TDG) caused by air entrainment from the air admission valve on the turbine. TDG studies conducted by PacifiCorp in 2001 demonstrated that TDG exceeded the 110% criterion at low-power output, thereby necessitating Condition 9(c)(1). In consultation with ODEQ, PacifiCorp retested TDG levels in July 2015 in response to low generation levels with the air admission system physically plugged. Tailrace TDG levels never exceeded 107% saturation during the 2015 tests, thereby demonstrating Project compliance with the TDG criteria at low generation output provided that the air admission system is fully disabled. On July 20, 2015, PacifiCorp provided a study report to ODEQ (Attachment 21), and on September 1, 2015, ODEQ provided an interim agreement authorizing PacifiCorp to operate Clearwater No. 2 powerplant at generation levels ranging from 0.5 to 10 MW with the air admission system closed and physically plugged until such time as ODEQ chooses to modify the Project WQC

(Attachment 22). PacifiCorp has maintained compliance with these requirements since 2015, providing further support for application of Standard B-2 within this ZOE.

2.2.6 ZOE 6. Toketee Bypassed Reach of NUR

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.7 ZOE 7. Slide Creek Impoundment

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.8 ZOE 8. Slide Creek Bypassed Reach of NUR

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.9 ZOE 9. Full-flow Reach of NUR

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.10 ZOE 10. Soda Springs Reservoir

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.11 ZOE 11. Soda Springs Bypassed Reach of NUR

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.12 ZOE 12. Regulated Reach of NUR Downstream of Project

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2. PacifiCorp continues to operate the long-term, water quality monitoring station downstream of Soda Springs powerplant. Ongoing monitoring through the license term will determine compliance with current and future water quality criteria as defined by ODEQ. The only ongoing water quality monitoring requirement for the Project is continuous operation of the Soda Springs Water Quality Station within ZOE 17, with annual reports to ODEQ. The most recent water quality monitoring report for water year 2023 (Attachment 17), submitted to ODEQ on February 19, 2024, indicates that all water quality parameters downstream of the Project are within current ODEQ criteria

2.2.13 ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.14 ZOE 14. Clearwater No. 1 Bypassed Reach of CR

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.15 ZOE 15. Clearwater No. 2 Impoundment

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.16 ZOE 16. Clearwater No. 2 Bypassed Reach of CR

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.17 ZOE 17. Fish Creek Impoundment

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2.

2.2.18 ZOE 18. Fish Creek Bypassed Reach of FC

This ZOE complies with the conditions in the WQC for the Project and meets Standard B-2 as described in the introductory paragraphs to Section 2.2. The retention time of impounded water is less than one hour, and therefore, the impoundment is unlikely to alter the physical, chemical, or biotic characteristics necessary to support fish and wildlife resources or human water uses. For most of the year, inflows to the dam are less than the required minimum flow in this ZOE, and PacifiCorp discharges the entire inflow to the dam into the bypassed reach.

2.3 CRITERION C - UPSTREAM FISH PASSAGE**Table 10. Upstream fish passage alternative standards matrix**

Zone Name	River Mile at upper and lower extent of Zone	<i>Criterion C: Upstream Fish Passage Alternative Standards</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Plus</i>
ZOE 1. Lemolo Reservoir	95.6-93.0	X				
ZOE 2. Lemolo No. 1 Bypassed Reach of NUR	93.0-88.6				X	
ZOE 3. Lemolo No. 2 Impoundment	88.6-88.5	X				
ZOE 4. Lemolo No. 2 Bypassed Reach of NUR	88.5-76.4		X			
ZOE 5. Toketee Reservoir	76.4-75.4	X				
ZOE 6. Toketee Bypassed Reach of NUR	75.4-73.3				X	
ZOE 7. Slide Creek Impoundment	73.3-73.2	X				
ZOE 8. Slide Creek Bypassed Reach of NUR	73.2-71.2				X	X
ZOE 9. Full-flow Reach of NUR	71.2-71.0	X				X
ZOE 10. Soda Springs Reservoir	71.0-69.8	X				X
ZOE 11. Soda Springs Bypassed Reach of NUR	69.8-69.3		X			X
ZOE 12. Regulated Reach of NUR Downstream of Project	69.3-67.2	X				
ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)	8.5-8.1	X				
ZOE 14. Clearwater No. 1 Bypassed Reach of CR	8.1-4.9				X	
ZOE 15. Clearwater No. 2 Impoundment	4.9-4.9	X				
ZOE 16. Clearwater No. 2 Bypassed Reach of CR	4.9-0.0				X	
ZOE 17. Fish Creek Impoundment	6.6-6.6	X				
ZOE 18. Fish Creek Bypassed Reach of FC	6.6-0.0		X			X

STANDARD C-1. Not Applicable/De Minimis Effect: *The facility does not create a barrier to upstream passage, or there are no migratory fish in the vicinity of the facility and the facility is not the cause of extirpation of species that were present historically; or*

STANDARD C-2. Agency Recommendation: *The facility is in compliance with science-based fish passage resource agency recommendations for the facility and which may include provisions for appropriate monitoring and effectiveness determinations; or*

STANDARD C-4. Acceptable Mitigation: *In the absence of science-based fish passage resource agency recommendations and in lieu of upstream passage provisions at the facility, the facility employs approved, alternative fish passage mitigation measures that support the species affected by the facility. These measures could be in-kind or out-of-kind mitigation. In all cases, resource agencies must approve the measures and must have determined that the total benefits provided by them equal or exceed the benefits of providing upstream passage provisions at the facility, measured in terms of reproductive success (for example, numbers of fish produced) or area of suitable fish habitat provided.*

STANDARD C-PLUS: *In addition to satisfying one or more of the standards above, the facility has deployed an advanced technology, the primary purpose of which is to increase upstream passage; or is part of a basin-scale redevelopment strategy; or is operating an adaptive management program to regularly evaluate the effectiveness of the measures implemented. The program should include monitoring of the overall passage effectiveness and correction of deficiencies in effectiveness.*

In non-impoundment zones, the Project complies with mandatory fish passage prescriptions and resource agency recommendations regarding upstream fish passage (Standard C-2) and/or implements agency-approved mitigation for upstream fish passage (Standard C-4). The SA includes agency recommendations that were subsequently adopted in Section 18 prescriptions by the FWS and NOAA Fisheries (formerly National Marine Fisheries Service (NMFS)). Impoundment zones do not create a barrier to upstream passage (Standard C-1).

Native migratory fish species, as defined by ODFW¹⁴, that occur now or have occurred historically in the Project ZOE include:

- Anadromous species
 - spring Chinook salmon (*Oncorhynchus tshawytscha*),
 - coho salmon (*O. kisutch*),
 - winter and summer steelhead (*Oncorhynchus mykiss*), and
 - Pacific lamprey (*Lampetra tridentate*); and
- Potamodromous species
 - coastal cutthroat trout (*Oncorhynchus clarkii*),
 - kokanee (*O. nerka*), and
 - rainbow trout (*O. mykiss*).

¹⁴ <https://www.dfw.state.or.us/fish/CRP/migratory.asp>

The historic barrier to upstream passage of anadromous fish in the North Umpqua River was at the approximately 125-foot-high Toketee Falls at river mile 74.6, within ZOE 6 (Toketee bypassed reach). The current barrier to upstream passage of anadromous fish in the North Umpqua River is Slide Creek Dam at river mile 73.2 (ZOE 8), a difference of 1.4 miles between the historic and current barriers to upstream fish passage. There are two partial and/or seasonal upstream passage obstacles for anadromous fish in Fish Creek: an approximately 6-foot-high waterfall at river mile 1.8 and a series of major cascades at river mile 3.2 within the Fish Creek bypassed reach (ZOE 18).

ODFW notes that the eruption of Mt. Mazama approximately 7,500 years ago may have temporarily extirpated fish in some reaches of the upper North Umpqua River basin, and natural barriers to fish passage (e.g., Toketee Falls) would have restricted recolonization of fish from downstream areas (see SA Appendix E, Page 7). Resident trout currently existing upstream of this natural barrier may be descendants of hatchery fish stocked in the basin or fish that survived the eruption of Mt. Mazama. Rainbow trout in Fish Creek and in reaches of the North Umpqua River downstream of Toketee Falls within Project ZOEs may be descendants of hatchery fish stocked in the basin or native resident trout that survived the eruption of Mt. Mazama.

Anthropogenically-introduced kokanee are only found in Lemolo Reservoir (ZOE 1). Other non-native and/or non-migratory species in Project ZOEs include brook trout, brown trout, bluegill, brown bullhead, and tui chub.

PacifiCorp has completed the construction of all facilities for upstream fish passage outlined in the SA in consultation with Forest Service, FWS, ODFW, and NOAA Fisheries. The largest and most recent project, the fish ladder at Soda Springs Dam, was completed in 2012 (SA Section 4.1.1; ZOE 11). To monitor the passage of anadromous fish upstream of Soda Springs Dam (into ZOEs 8, 9, 10, and 18), PacifiCorp has established a fund to implement a Long-Term Monitoring and Predator Control Program. PacifiCorp contributes \$100,000 annually (escalated annually from 2001 dollars) to this fund for the duration of the license (SA Section 19.2). This program provides for adaptive management of restored habitats and control of predator species within reaches made accessible by upstream fish passage at Soda Springs Dam as informed by monitoring results, thereby meeting Standard C-PLUS in these reaches. Creating fish passage at Soda Springs dam provides access to over 80 percent of the pre-project spawning and rearing habitat that was previously inaccessible to anadromous fish, especially for spring Chinook salmon in the mainstem North Umpqua River and steelhead in Fish Creek.

PacifiCorp has constructed and placed in service other prescribed upstream fish passage and protection improvements. In April 2006, construction was completed on upgrades to the fishway at the Lemolo No. 2 diversion (SA Section 4.3.1; ZOE 4). The Lemolo No. 2 fishway is now in compliance with current state standards for providing upstream passage for resident trout. In November 2007, PacifiCorp constructed a tailrace barrier at the Soda Springs powerplant to prevent false attraction, delay, and use of the tailrace by adult anadromous fish, thus ensuring access to enhanced habitat and increased instream flows upstream of the powerplant in the bypass reach (SA Section 4.1.1; ZOE 12). PacifiCorp constructed a similar tailrace barrier for the same purposes at the Slide Creek powerplant in 2011 (ZOE 9).

In addition, SA Section 19.1 requires that PacifiCorp provide mitigation measures and funding to benefit wild anadromous and other migratory fish populations in lieu of constructing fish passage facilities that would have limited benefit at North Umpqua project developments upstream of the natural barrier of Toketee Falls (SA Section 4.3.1; ZOE 2, 6, 14, and 16) and at Slide Creek Dam (SA Section 4.2; ZOE 8). These improvements are detailed in a March 2001 Memorandum of Understanding (ODFW MOU) between PacifiCorp and ODFW, included as Attachment E to the SA. ODFW concluded in the MOU that PacifiCorp's proposed mitigation measures provided a net benefit to affected fish species and provided a waiver of state fish passage requirements for the Slide Creek, Toketee, Lemolo No. 1, and Clearwater Nos. 1 and 2 dams. Funding of the SA 19.1.1 enhancement account fulfills PacifiCorp's obligations under the ODFW MOU. PacifiCorp provides reporting of the annual funding in its annual reports available on the Project website.

Three mitigation measures were proposed and implemented for waiving fish passage requirements at Slide Creek dam: (1) upgrading the Rock Creek¹⁵ diversion dam fishway to improve upstream passage for migratory fish and to allow for sorting of hatchery from wild fish, (2) adding large woody debris to East Fork Rock Creek, and (3) increasing riparian protection through purchase of conservation easements in portions of the Rock Creek basin. Mitigation measures for fish passage waivers at Toketee, Clearwater Nos. 1 and 2, and Lemolo No. 1 dams included a combination of elements in the upper North Umpqua watershed and in the Canton Creek¹⁶ basin that are designed to benefit native resident trout populations. These elements are: (1) reconnection of the Clearwater River to the mainstem North Umpqua River downstream of Toketee dam, (2) measures to benefit native rainbow trout populations in the upper North Umpqua River watershed, and (3) habitat enhancement on private lands in the upper Canton Creek basin (upper Pass Creek and East Fork Pass Creek subbasins) upstream of anadromous fish barriers. PacifiCorp provides documentation of compliance with these mandatory mitigation measures in its annual reports available on the Project website.¹⁷

Additional details on upstream fish passage relevant to compliance with the identified Standard(s) in each ZOE is provided in the following subsections.

2.3.1 ZOE 1. Lemolo Reservoir

This ZOE meets Standard C-1 as it is an impoundment zone upstream of Lemolo No. 1 Dam with no additional barriers to further upstream fish passage in the zone and de minimis effect to upstream fish passage. In addition, this is the farthest upstream dam in the Headwaters North Umpqua River watershed (see Figure 4).

2.3.2 ZOE 2. Lemolo No. 1 Bypassed Reach of NUR

This ZOE meets Standard C-4 as acceptable mitigation identified in the ODFW MOU has been implemented in lieu of upstream fish passage at Lemolo No. 1 dam at the upstream extent of the zone. As described in the introductory paragraphs of Section 2.3, ODFW has waived state fish passage requirements at this dam in lieu of a combination of elements in the upper North

¹⁵ Rock Creek is downstream of the Project and tributary to the North Umpqua River at approximately RM 35.7.

¹⁶ Canton Creek is downstream of the Project and tributary to Steamboat Creek less than one mile upstream from its confluence with the North Umpqua River at approximately RM 53.

¹⁷ <http://www.pacificorp.com/es/hydro/hl/nur.html>; select "Resource Coordination Committee" link, then select the "Annual Reports" tab to access the annual reports

Umpqua watershed and in the Canton Creek basin that are designed to provide a net benefit for native resident trout populations.

According to the ODFW MOU:

Lemolo No. 1 dam impounds Lemolo Lake, which contains primarily brown trout, with small numbers of rainbow trout, kokanee, and tui chub. Fish populations in the Lemolo No. 1 bypass reach downstream of Lemolo No. 1 dam are made up of approximately 55 percent brown trout and 45 percent rainbow trout. Providing fish passage at this location could increase the potential for dispersal of introduced kokanee into downstream reaches. Lemolo Falls, however, is a 37-m (120-ft) high natural barrier to upstream migration located 3.2 km (2 mi) downstream of Lemolo dam. Rainbow trout in Lemolo Reservoir have resulted from intentional stocking of hatchery fish or hatchery fish that migrated downstream from Diamond Lake via Lake Creek.

In comparison with the proposed mitigations, fish passage at this dam would only function to improve habitat connectivity between existing subpopulations of resident trout, some of which are already isolated by proximate natural barriers to upstream migration (e.g., the 125-foot-high Lemolo Falls). Fish passage at this dam would not result in access to additional habitat for resident fish that is not already occupied by these species, nor would it provide access to spawning habitat necessary to maintain their populations. Therefore, ODFW concluded that the proposed combination of alternative mitigation measures will result in a net benefit to wild native fish through habitat improvement and increases in fish populations in the enhanced waters in lieu of fish passage.

2.3.3 ZOE 3. Lemolo No. 2 Impoundment

This ZOE meets Standard C-1 as it is an impoundment zone upstream of Lemolo No. 2 Dam with no additional barriers to further upstream fish passage in the zone and de minimis effect to upstream fish passage.

2.3.4 ZOE 4. Lemolo No. 2 Bypassed Reach of NUR

This ZOE meets Standard C-2 as it fulfills agency recommendations for upstream fish passage at Lemolo No. 2 Dam at the upstream extent of the zone. In April 2006, pursuant to SA Section 4.3.1, PacifiCorp upgraded the existing fishway at the Lemolo No. 2 diversion to meet the state's current resident fish passage criteria (see Photo 13). The Lemolo No. 2 Fishway Operation and Maintenance Plan and Evaluation Plan, both filed with FERC on August 31, 2005, were approved by FERC order of January 16, 2006. The final Fish Passage Facility Evaluation Report was completed pursuant to the approved Evaluation Plan on October 22, 2007. PacifiCorp continues to operate and maintain the facility pursuant to the approved Operation and Maintenance Plan.

2.3.5 ZOE 5. Toketee Reservoir

This ZOE meets Standard C-1 as it is an impoundment zone upstream of Toketee Dam with no additional barriers to further upstream fish passage in the zone and de minimis effect to upstream fish passage.

2.3.6 ZOE 6. Toketee Bypassed Reach of NUR

This ZOE meets Standard C-4 as acceptable mitigation identified in the ODFW MOU has been implemented in lieu of upstream fish passage at Toketee Dam at the upstream extent of the zone. As described in the introductory paragraphs of Section 2.3, ODFW has waived state fish passage requirements at this dam in lieu of a combination of elements in the upper North Umpqua watershed and in the Canton Creek basin that are designed to provide a net benefit for native resident trout populations.

According to the ODFW MOU:

Toketee dam impounds Toketee Lake, which contains a fish population consisting of primarily brown trout, with smaller numbers of rainbow trout and tui chub present. Downstream of Toketee dam in the Toketee bypass reach, fish populations consist of approximately 45–50 percent rainbow trout; 41 percent brown trout; 9–14 percent brook trout.

...

Due to the presence of substantial numbers of introduced brown and brook trout in Toketee Lake and the Clearwater River, as well as the number of natural barriers to fish passage in the Clearwater drainage which limit distribution, improving habitat connectivity for resident trout is a low priority at this site.

In comparison with the proposed mitigations, fish passage at this dam would only function to improve habitat connectivity between existing subpopulations of resident trout, some of which are already isolated by natural barriers to upstream migration (e.g., Toketee Falls) and many of which are non-native. Fish passage at this dam would not result in access to additional habitat for resident fish that is not already occupied by these species, nor would it provide access to spawning habitat necessary to maintain their populations. Therefore, ODFW concluded that the proposed combination of alternative mitigation measures will result in a net benefit to wild native fish through habitat improvement and increases in fish populations in the enhanced waters in lieu of fish passage.

2.3.7 ZOE 7. Slide Creek Impoundment

This ZOE meets Standard C-1 as it is an impoundment zone upstream of Slide Creek Dam with no additional barriers to further upstream fish passage in the zone and de minimis effect to upstream fish passage.

2.3.8 ZOE 8. Slide Creek Bypassed Reach of NUR

This ZOE meets Standard C-4 as acceptable mitigation identified in the ODFW MOU has been implemented in lieu of upstream fish passage at Slide Creek Dam at the upstream extent of the zone. As described in the introductory paragraphs of Section 2.3, ODFW has waived state fish passage requirements at this dam in lieu of a combination of elements in the Rock Creek basin that provide a net benefit to anadromous and resident fish through implementation of the SA 19.1 enhancement fund.

According to the ODFW MOU:

Passage at Slide Creek dam would allow anadromous fish access to an additional 2.2 km (1.4 mi) of stream habitat in the North Umpqua River. Historical fish distributions in the reach are unknown, although habitat preferences of anadromous fish species and anecdotal information indicate that spring chinook salmon and steelhead are the species most likely to have occurred in this reach, given their ability to use mainstem habitats and anecdotal reports that they historically occurred above Soda Springs dam. The range of sea-run coastal cutthroat trout historically extended to Toketee Falls (NMFS 1996), and coho salmon may also have occasionally used this reach, but the largest portions of these populations likely were concentrated lower in the watershed, and their preference for spawning and rearing in tributary habitats suggests that they were unlikely to have been abundant upstream of the present location of Slide Creek dam. The extent to which Pacific lamprey occupied this reach is unknown. Spawning gravels are extremely limited in this reach; however, potentially high-quality adult holding and juvenile rearing habitat for steelhead and spring chinook salmon does occur in the reach.

The ODFW MOU quantified the net benefit of the proposed mitigation measures in lieu of passage at Slide Creek Dam as follows:

- improved access for steelhead to 37.6 miles of additional habitat,
- improved access for spring Chinook salmon to 6.4 miles of additional habitat,
- improved access for coho salmon to 26.1 miles of additional habitat,
- improved access for migratory cutthroat trout to 42.9 miles of additional habitat,
- 33 percent greater increase in age 0+ chinook salmon production potential in the watershed analysis study area, and
- 1 to 9 percent increase in coho salmon smolt production potential in the watershed analysis study area.

The benefits from the ongoing mitigation measures in the Rock Creek basin are greater than the waived benefits of providing access to habitat upstream of Slide Creek Dam.

This reach is adaptively managed consistent with the SA 19.2 Long-term Monitoring and Predator Control Program described in additional detail in Section 2.3 and 2.3.11, thereby meeting Standard C-PLUS.

2.3.9 ZOE 9. Full-flow Reach of NUR

This ZOE meets Standard C-1 as it is a full-flow reach devoid of barriers and with no effect to upstream fish passage in the zone. PacifiCorp constructed a tailrace barrier at the Slide Creek powerplant in 2011 to prevent false attraction, delay, and use of the tailrace by anadromous fish in this ZOE, thus ensuring access to enhanced habitat and increased instream flows upstream of the powerplant in ZOE 8 (see Photo 30). This reach is adaptively managed consistent with the SA 19.2 Long-term Monitoring and Predator Control Program described in additional detail in Section 2.3 and 2.3.11, thereby meeting Standard C-PLUS.

On December 9, 2014 and again on December 23, 2017, as previously high, storm flows were decreasing and clearing of turbidity, PacifiCorp staff observed several live adult coho salmon swimming within the Slide Creek powerhouse tailrace (i.e., upstream of the tailrace barrier). Following a call to ODFW Fisheries staff, and within existing Scientific Take Permit conditions, a fish salvage was initiated for several days to capture as many salmon as possible from the turbulent tailrace and liberate them to the river outside of the tailrace barrier, where other adult coho salmon were observed milling around and spawning. In 2014, fifteen salmon were salvaged alive and returned to the river outside the tailrace barrier. In 2017, seven salmon (six males and one gravid female) were salvaged and liberated. In both years, the salmon entered the tailrace during high flow events when some of the pressure relief panels opened, as designed, to prevent damage to the tailrace barrier structure. PacifiCorp reviewed operational data, evaluated possible corrective actions, and implemented selected corrective actions to further reduce the risk of the panels opening and permitting coho salmon into the tailrace. Corrective actions included adding additional magnets and re-closure lines to the pressure relief panels and decreasing powerplant generation during high flow events to reduce the propensity of pressure relief panels to open. PacifiCorp has not observed any further entry of fish into the tailrace since the corrective actions were implemented.

2.3.10 ZOE 10. Soda Springs Reservoir

This ZOE meets Standard C-1 as it is an impoundment zone upstream of Soda Springs Dam with no additional barriers to further upstream fish passage in the zone and de minimis effect to upstream fish passage. This reach is adaptively managed consistent with the SA 19.2 Long-term Monitoring and Predator Control Program described in additional detail in Section 2.3 and 2.3.11, thereby meeting Standard C-PLUS.

2.3.11 ZOE 11. Soda Springs Bypassed Reach of NUR

This ZOE meets Standard C-2 as it fulfills agency recommendations for upstream fish passage at Soda Springs Dam at the upstream extent of the zone. PacifiCorp completed construction of upstream fish passage facilities at Soda Springs dam in 2012 pursuant to SA Section 4.1.1 and 4.1.2 (see Photos 32 and 33). On April 10, 2013, FERC accepted the final construction report. On November 3, 2016, PacifiCorp filed with FERC the Final Soda Springs Fish Passage Facilities Hydraulic and Biological Evaluation Report (Attachment 23). On January 26, 2024, PacifiCorp filed with FERC the most recent Soda Springs Fish Passage Facilities Operations and Maintenance Annual Report for CY 2023 (Attachment 24) prepared in consultation with the agencies.

PacifiCorp has established a fund pursuant to SA Section 19.2 to implement a Long-Term Monitoring and Predator Control Program. PacifiCorp contributes \$100,000 annually (escalated annually from 2001 dollars) to this fund for the duration of the license. This purpose of this program is to monitor and evaluate the success of anadromous fish reintroduction in the North Umpqua River upstream of Soda Springs Dam and to formulate and implement a study plan, implementation plan, and monitoring and adaptive management plan concerning the potential predation of anadromous salmonid juveniles by nonnative predator species in Soda Springs Reservoir, thereby qualifying this reach for Standard C-PLUS. Adaptive management pursuant to monitoring results of this program may also include habitat enhancement and gravel augmentation as described in Section 2.1.

Pursuant to SA Section 19.2, ODFW counts and identifies to species fish ascending the fish ladder at Soda Springs Dam through the use of a fish counting window and video monitoring equipment in Pool 45 near the upstream extent of the ladder where it breaches the dam. ODFW prepared and submitted to the RCC on July 5, 2024, the most recent annual report of SA 19.2 activities in calendar year 2023 (see Attachment 25). The 2023 count of unclipped spring Chinook salmon ($n=730$) was the second greatest observed in the 11 years of documenting upstream passage at Soda Springs Dam (the previous 10-year average was 483 fish/year). The 2023 unclipped coho salmon return ($n=1,359$) shattered the previous record count ($n=542$) documented in 2020 and was more than five times greater than the previous 10-year average of 248 fish/year. Twenty-one adult brown trout were removed from Soda Springs Reservoir during two targeted removal efforts in 2023, with 18 of the 21 captured brown trout released into Lemolo Reservoir to supplement an established fishery and help with tui chub control.

2.3.12 ZOE 12. Regulated Reach of NUR Downstream of Project

This ZOE meets Standard C-1 as it is a full-flow reach devoid of barriers and with no effect to upstream fish passage in the zone. PacifiCorp constructed a tailrace barrier at the Soda Springs powerplant in 2007 to prevent false attraction, delay, and use of the tailrace by adult anadromous fish in this ZOE, thus ensuring access to enhanced habitat and increased instream flows upstream of the powerplant in ZOE 11 (see Photo 35). This reach is adaptively managed consistent with the SA 19.2 Long-term Monitoring and Predator Control Program described in additional detail in Section 2.3 and 2.3.11, thereby meeting Standard C-PLUS.

2.3.13 ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)

This ZOE meets Standard C-1 as it is an impoundment zone upstream of Clearwater No. 1 Dam with no additional barriers to further upstream fish passage in the zone and de minimis effect to upstream fish passage. In addition, this is the farthest upstream dam in the Clearwater River watershed (see Figure 4).

2.3.14 ZOE 14. Clearwater No. 1 Bypassed Reach of CR

This ZOE meets Standard C-4 as acceptable mitigation identified in the ODFW MOU has been implemented in lieu of upstream fish passage at Clearwater No. 1 Dam at the upstream extent of the zone. As described in the introductory paragraphs of Section 2.3, ODFW has waived state fish passage requirements at this dam in lieu of a combination of elements in the upper North Umpqua watershed and in the Canton Creek basin that are designed to provide a net benefit for native resident trout populations. There are populations of brook trout and rainbow trout both upstream and downstream of the dam.

In comparison with the proposed mitigations, fish passage at this dam would only function to improve habitat connectivity between existing subpopulations of resident trout. Fish passage at this dam would not result in access to additional habitat for resident fish that is not already occupied by these species, nor would it provide access to spawning habitat necessary to maintain their populations. Therefore, ODFW concluded that the proposed combination of alternative mitigation measures will result in a net benefit to wild native fish through habitat improvement and increases in fish populations in the enhanced waters in lieu of fish passage.

2.3.15 ZOE 15. Clearwater No. 2 Impoundment

This ZOE meets Standard C-1 as it is an impoundment zone upstream of Clearwater No. 2 Dam with no additional barriers to further upstream fish passage in the zone and de minimis effect to upstream fish passage.

2.3.16 ZOE 16. Clearwater No. 2 Bypassed Reach of CR

This ZOE meets Standard C-4 as acceptable mitigation identified in the ODFW MOU has been implemented in lieu of upstream fish passage at Clearwater No. 2 Dam at the upstream extent of the zone. As described in the introductory paragraphs of Section 2.3, ODFW has waived state fish passage requirements at this dam in lieu of a combination of elements in the upper North Umpqua watershed and in the Canton Creek basin that are designed to provide a net benefit for native resident trout populations. There are populations of brook trout and rainbow trout both upstream and downstream of the dam.

In comparison with the proposed mitigations, fish passage at this dam would only function to improve habitat connectivity between existing subpopulations of resident trout. Fish passage at this dam would not result in access to additional habitat for resident fish that is not already occupied by these species, nor would it provide access to spawning habitat necessary to maintain their populations. Therefore, ODFW concluded that the proposed combination of alternative mitigation measures will result in a net benefit to wild native fish through habitat improvement and increases in fish populations in the enhanced waters in lieu of fish passage

Pursuant to SA Sections 7.5 and 10.3 and the ODFW MOU, in 2006 PacifiCorp constructed a structure to reconnect a portion of flows from the Clearwater No. 2 Bypassed Reach with the Toketee Bypassed Reach just downstream of Toketee Dam. Prior to this reconnection, all flows in this ZOE were diverted to Toketee Reservoir via a short channel just upstream of Toketee Dam. The ODFW MOU notes:

A low-head control structure will be constructed that during base flows will direct some of the flow down the historical channel and some of the flow into Toketee Lake; during high flow events, all of the water will be directed down the historical channel. Thus, the reconnection will provide for transport of sediment and large woody debris from the Clearwater River basin into the Toketee bypass reach of the North Umpqua River and downstream. It will also allow for upstream and downstream movement of fish between the Clearwater River and the North Umpqua River, and between Toketee Lake and the North Umpqua River downstream.

PacifiCorp constructed the structure pursuant to the agency-approved designs and has been successfully operating and maintaining the structure since 2006.

2.3.17 ZOE 17. Fish Creek Impoundment

This ZOE meets Standard C-1 as it is an impoundment zone upstream of Fish Creek Dam with no additional barriers to further upstream fish passage in the zone and de minimis effect to upstream fish passage. In addition, this is the farthest upstream dam in the Fish Creek watershed (see Figure 4).

2.3.18 ZOE 18. Fish Creek Bypassed Reach of FC

This ZOE meets Standard C-2 as it fulfills agency recommendations for upstream fish passage at Fish Creek Dam at the upstream extent of the zone. SA Section 4.3.1 confirms that the Fish Creek fishway complied with current state standards for upstream passage of resident trout (see Photos 42 and 43). The Fish Creek Diversion Dam Fishway Operation and Maintenance Plan, filed with FERC on August 31, 2005, was approved by FERC order of January 16, 2006. PacifiCorp continues to operate and maintain the facility pursuant to the approved Operation and Maintenance Plan. This reach is adaptively managed consistent with the SA 19.2 Long-term Monitoring and Predator Control Program described in additional detail in Section 2.3 and 2.3.11, thereby meeting Standard C-PLUS.

2.4 CRITERION D - DOWNSTREAM FISH PASSAGE AND PROTECTION

Table 11. Downstream fish passage and protection alternative standards matrix

Zone Name	River Mile at upper and lower extent of Zone	<i>Criterion D: Downstream Fish Passage and Protection Alternative Standards</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Plus</i>
ZOE 1. Lemolo Reservoir	95.6-93.0				X	
ZOE 2. Lemolo No. 1 Bypassed Reach of NUR	93.0-88.6	X				
ZOE 3. Lemolo No. 2 Impoundment	88.6-88.5				X	
ZOE 4. Lemolo No. 2 Bypassed Reach of NUR	88.5-76.4	X				
ZOE 5. Toketee Reservoir	76.4-75.4		X			
ZOE 6. Toketee Bypassed Reach of NUR	75.4-73.3	X				
ZOE 7. Slide Creek Impoundment	73.3-73.2				X	
ZOE 8. Slide Creek Bypassed Reach of NUR	73.2-71.2	X				
ZOE 9. Full-flow Reach of NUR	71.2-71.0	X				
ZOE 10. Soda Springs Reservoir	71.0-69.8		X			X
ZOE 11. Soda Springs Bypassed Reach of NUR	69.8-69.3	X				
ZOE 12. Regulated Reach of NUR Downstream of Project	69.3-67.2	X				
ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)	8.5-8.1				X	
ZOE 14. Clearwater No. 1 Bypassed Reach of CR	8.1-4.9	X				
ZOE 15. Clearwater No. 2 Impoundment	4.9-4.9				X	
ZOE 16. Clearwater No. 2 Bypassed Reach of CR	4.9-0.0		X			
ZOE 17. Fish Creek Impoundment	6.6-6.6		X			
ZOE 18. Fish Creek Bypassed Reach of FC	6.6-0.0	X				

STANDARD D-1. Not Applicable/De Minimis Effect: *The facility does not create a barrier to downstream passage, or there are no migratory fish in the vicinity of the facility; if migratory fish were present historically, the facility did not contribute to the extirpation of such species; the facility does not contribute adversely to the sustainability of riverine fish populations or to their access to habitat necessary for the completion of their life cycles; or*

STANDARD D-2. Agency Recommendation: *The facility is in compliance with a science-based resource agency recommendation for downstream fish passage or fish protection, which may include provisions for appropriate monitoring and effectiveness determinations; or*

STANDARD D-4. Acceptable Mitigation: *In the absence of science-based resource agency recommendation for downstream fish passage and in lieu of downstream passage and/or protection provisions at the facility, the applicant employs approved alternative fish passage mitigation measures that support migratory and native non-migratory fish species affected by the facility. These measures might include in-kind or out-of-kind mitigation. In all cases, resource agencies must approve the measures and must have determined that the total benefits provided by them are likely to equal or exceed the benefits of installing and operation downstream passage and/or protection provisions, measured in terms of reproductive success (for example numbers of fish produced) or areas of suitable fish habitat provided.*

STANDARD D-PLUS: *In addition to satisfying one or more of the standards above, the facility has deployed an advanced technology, the primary purpose of which is to increase downstream passage; or is part of a basin-scale redevelopment strategy; or is operating an adaptive management program to regularly evaluate the effectiveness of the measures implemented. The program should include monitoring of the overall passage effectiveness and correction of deficiencies in effectiveness.*

Fish evaluated for this criterion are identified in the introductory paragraphs of Section 2.3.

The Project complies with Mandatory Fish Passage Prescriptions and resource agency recommendations regarding anadromous fish, thereby qualifying the ZOE's with dams within anadromous fish habitat (ZOE 10 (Soda Springs Reservoir) and ZOE 17 (Fish Creek Impoundment)) for Standard D-2. The SA reflects agency recommendations that were subsequently adopted in Section 18 prescriptions by FWS and NOAA Fisheries. Toketee Reservoir (ZOE 5) and Clearwater No. 2 Bypassed Reach (ZOE 16) also comply with agency recommendations for downstream fish passage of resident trout and, therefore, Standard D-2. Bypassed and full-flow reaches downstream of dams and powerplants qualify for Standard D-1 as there is no additional facility barrier to further downstream movement in the zone.

PacifiCorp has completed the design and construction of all facilities for downstream fish passage outlined in the SA in consultation with Forest Service, FWS, ODFW, and NOAA Fisheries. The largest and newest project, the fish screen at Soda Springs Dam, was completed in 2012 (SA Section 4.1.2). Following damage to the primary fish screens in the winter of 2012, the screen facility was improved, repaired, and returned to service in March 2014. To monitor the passage of anadromous fish downstream of Soda Springs Dam, PacifiCorp has established a fund to implement a Long-Term Monitoring and Predator Control Program. PacifiCorp contributes \$100,000 annually (escalated annually from 2001 dollars) to this fund for the duration of the license (SA Section 19.2).

PacifiCorp constructed a fish screen at the Fish Creek intake in 2008 (SA Section 4.3.2), and PacifiCorp completed additional modifications that increase velocity across the screens to prevent debris buildup in 2012, thereby qualifying this ZOE for Standard D-2. PacifiCorp

modified the trashrack at the Toketee intake in 2010 to minimize downstream movement of trout longer than five inches (SA Section 4.3.3), thereby qualifying this ZOE for Standard D-2.

SA Section 4.3.4 requires that PacifiCorp provide mitigation measures and funding to benefit wild anadromous and other migratory fish populations in lieu of constructing downstream fish passage facilities that would have limited benefit at Project developments upstream of the natural barrier of Toketee Falls and at Slide Creek Dam. The MOU notes that:

The remaining dams (Toketee, Clearwater Nos. 1 and 2, and Lemolo No. 1) prevent upstream movement and impede downstream movement by rainbow, brown, and brook trout. Although these dams impede movement and genetic exchange between these subpopulations, most of these fish are either non-native species (brown and brook trout), or are unlikely to represent the pure native stock that historically occurred in the basin (rainbow trout). During the cooperative watershed analysis, the Science Team (which included members of ODFW) assigned lower priority to providing fish passage for mixed populations of native and non-native trout in the upper portions of the project than for other project impacts, such as improving flow and habitat conditions in project bypass reaches for resident and anadromous fish.

Therefore, these dams meet Standard D-4. The mitigation in lieu of upstream and downstream fish passage at Slide Creek Dam is described in Section 2.3 and 2.3.8 and also qualifies the Slide Creek Impoundment ZOE for Standard D-4.

Additional details on upstream fish passage relevant to compliance with the identified Standard(s) in each ZOE is provided in the following subsections.

2.4.1 ZOE 1. Lemolo Reservoir

This ZOE meets Standard D-4 as acceptable mitigation with net benefits to affected fish species, identified in the ODFW MOU and described in Sections 2.3 and 2.4 of this application, has been implemented in lieu of downstream fish passage at Lemolo No. 1 Dam at the downstream extent of the zone. Monitoring of the mitigation measures is conducted pursuant to SA Sections 19.1 and 19.4, as described in Section 2.3.

2.4.2 ZOE 2. Lemolo No. 1 Bypassed Reach of NUR

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.2.

2.4.3 ZOE 3. Lemolo No. 2 Impoundment

This ZOE meets Standard D-4 as acceptable mitigation with net benefits to affected fish species, identified in the ODFW MOU and described in Sections 2.3 and 2.4 of this application, has been implemented in lieu of downstream fish passage at Lemolo No. 2 Dam at the downstream extent of the zone. Monitoring of the mitigation measures is conducted pursuant to SA Sections 19.1 and 19.4, as described in Section 2.3.

2.4.4 ZOE 4. Lemolo No. 2 Bypassed Reach of NUR

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.4.

2.4.5 ZOE 5. Toketee Reservoir

This ZOE meets Standard D-2 as PacifiCorp has implemented agency recommendations related to downstream fish passage within the ZOE. Analysis of fish populations upstream and downstream of Toketee Dam, at the downstream extent of this zone, as well as the net benefit to fish species of implementing the approved mitigation measures for upstream fish passage, is provided in the ODFW MOU and Section 2.3.6.

Pursuant to SA Section 4.3.3, in 2010, PacifiCorp replaced the Toketee waterway intake trashrack with a fish screen that provides bar spacing with 0.5-inch gaps, approach velocity of 0.8 feet per second, and an automated trash rake. The fish screen is intended to minimize entrainment of trout over five inches in length from Toketee Reservoir for the purposes of maintaining the fishery in Toketee Reservoir and reducing predation of anadromous fish by brown trout downstream of Toketee Dam. Non-native brown trout (*Salmo trutta*) are the overwhelmingly predominant (90 percent) species within Toketee Reservoir; rainbow trout (*Oncorhynchus mykiss*) comprise an estimated 5 percent of the fish population in Toketee Reservoir. The trashrack modifications were designed in consultation with ODFW.

The Clearwater Reconnect facility, described in Section 2.3.16 and required pursuant to the mitigation measures identified in the ODFW MOU, provides downstream passage of fish from Toketee Reservoir to the Toketee Bypassed Reach via the short reach of the Clearwater No. 2 Bypassed Reach between the reconnect facility and the confluence of the Clearwater River with the North Umpqua River immediately downstream of Toketee Dam (i.e., the Toketee Bypassed Reach). The facility has been in operation since 2006.

2.4.6 ZOE 6. Toketee Bypassed Reach of NUR

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.6.

2.4.7 ZOE 7. Slide Creek Impoundment

This ZOE meets Standard D-4 as acceptable mitigation with net benefits to affected fish species, identified in the ODFW MOU and described in Sections 2.3 and 2.4 of this application, has been implemented in lieu of downstream fish passage at Slide Creek Dam at the downstream extent of the zone. Monitoring of the mitigation measures is conducted pursuant to SA Sections 19.1 and 19.4, as described in Section 2.3.

2.4.8 ZOE 8. Slide Creek Bypassed Reach of NUR

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.8.

2.4.9 ZOE 9. Full-flow Reach of NUR

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.9.

2.4.10 ZOE 10. Soda Springs Reservoir

This ZOE meets Standard D-2 as PacifiCorp has implemented agency recommendations related to downstream fish passage within the ZOE. Pursuant to SA Section 4.1.2, PacifiCorp constructed fish screen facilities in consultation with the agencies and consistent with state and federal criteria for the salmonid fry life stage, which is also intended to protect juvenile lamprey. PacifiCorp completed construction of downstream fish passage facilities at Soda Springs Dam in 2012 (see Photo 33). Pursuant to SA Section 4.1.2.c, the facilities include a Fish Evaluation Building (FEB; see Photo 34) containing a fish trap downstream of the screen for evaluating screen performance and to accommodate long-term monitoring of the downstream migrant population as part of the program to evaluate the success of the reintroduction of anadromous fish upstream of Soda Springs Dam (see below for discussion of the SA 19.2 program). On April 10, 2013, FERC accepted the final construction report. The fish screen structure was repaired following failure of the screens in a December 2, 2012 flood event; the repair was completed in 2014.

On November 3, 2016, PacifiCorp filed with FERC the Final Soda Springs Fish Passage Facilities Hydraulic and Biological Evaluation Report (Attachment 23). This report included information on the condition and/or mortality of migrating juvenile fish passing through the screen system to the FEB. Initial mortality of screened hatchery test fish was 0 percent for both fry and smolts. Delayed mortality was 0 percent for hatchery smolts and less than 1 percent for hatchery fry. Injury of hatchery fry was 0 percent and less than 1 percent for hatchery smolts. Wild fry and juvenile fish were also captured incidentally during the study and showed similarly low rates of injury and mortality. On January 26, 2024, PacifiCorp filed with FERC the most recent Soda Springs Fish Passage Facilities Operations and Maintenance Annual Report for CY 2023 (Attachment 24) prepared in consultation with the agencies.

PacifiCorp has established a fund pursuant to SA Section 19.2 to implement a Long-Term Monitoring and Predator Control Program. PacifiCorp contributes \$100,000 annually (escalated annually from 2001 dollars) to this fund for the duration of the license. This purpose of this program is to monitor and evaluate the success of anadromous fish reintroduction in the North Umpqua River upstream of Soda Springs Dam and to formulate and implement a study plan, implementation plan, and monitoring and adaptive management plan concerning the potential predation of anadromous salmonid juveniles by nonnative predator species in Soda Springs Reservoir, thereby qualifying this reach for Standard C-PLUS. Adaptive management pursuant to monitoring results of this program may also include habitat enhancement and gravel augmentation as described in Section 2.1.

Pursuant to SA Section 19.2, ODFW operates the FEB to sample, count, and identify to species fish descending past the fish screen. ODFW prepared and submitted to the RCC on July 5, 2024, the most recent annual report of SA 19.2 activities in calendar year 2023 (see Attachment 25). The FEB was operated during 110 days within 44 weeks across 12 months in 2023. During most weeks, the FEB was operated three nights per week, but only one or two nights per week when

necessitated by flow conditions or staffing schedules. The total number of juvenile salmonids estimated to have passed downstream past Soda Springs Dam during the 44 weeks sampled in 2023 was 133,956 which was more than twice what was estimated for 2022 ($n=63,629$). The FEB adult fish trap was also operated from February through the first two weeks of October, but instream leaf debris and drifting salmon carcasses made it impossible to operate the trap the rest of October through December. Of note, no adult brown trout were captured in the adult trap in 2023 (see the discussion of the predator control program in Section 2.3.10).

2.4.11 ZOE 11. Soda Springs Bypassed Reach of NUR

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.11.

2.4.12 ZOE 12. Regulated Reach of NUR Downstream of Project

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.12.

2.4.13 ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)

This ZOE meets Standard D-4 as acceptable mitigation with net benefits to affected fish species, identified in the ODFW MOU and described in Sections 2.3 and 2.4 of this application, has been implemented in lieu of downstream fish passage at Clearwater No. 1 Dam at the downstream extent of the zone. Monitoring of the mitigation measures is conducted pursuant to SA Sections 19.1 and 19.4, as described in Section 2.3.

2.4.14 ZOE 14. Clearwater No. 1 Bypassed Reach of CR

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.14.

2.4.15 ZOE 15. Clearwater No. 2 Impoundment

This ZOE meets Standard D-4 as acceptable mitigation with net benefits to affected fish species, identified in the ODFW MOU and described in Sections 2.3 and 2.4 of this application, has been implemented in lieu of downstream fish passage at Clearwater No. 2 Dam at the downstream extent of the zone. Monitoring of the mitigation measures is conducted pursuant to SA Sections 19.1 and 19.4, as described in Section 2.3.

2.4.16 ZOE 16. Clearwater No. 2 Bypassed Reach of CR

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.16. See Section 2.3.16 for discussion of the Clearwater Reconnect facility, which provides upstream and downstream passage for fish within this ZOE at the downstream extent of the bypassed reach upstream of the confluence with the North Umpqua River within the Toketee Bypassed Reach.

2.4.17 ZOE 17. Fish Creek Impoundment

This ZOE meets Standard D-2 as PacifiCorp has implemented agency recommendations related to downstream fish passage within the ZOE. Pursuant to SA Section 4.3.2, PacifiCorp, in consultation with the agencies, designed and constructed a fish screen at the Fish Creek waterway intake in 2007 to provide fish protection from the diversion intake and allow safe and timely downstream fish passage for resident trout as well as other adult salmonids and lamprey that may be exposed to the diversion intake (see Photo 44). PacifiCorp filled a post-construction hydraulic and biological evaluation report with FERC in November 2009. In 2012, PacifiCorp modified the facility to upgrade the air system and reduce the channel width in the screen pool to increase the sweeping velocity of flow across the screens and better transport debris downstream. PacifiCorp conducted a second hydraulic balancing of the screens in the post-modification configuration in May 2013 and documented the results in a second hydraulic evaluation report in June 2013 (Attachment 26). The report concluded that the screens remained well within the 0.4 feet per second (fps) approach velocity criteria (average approach velocities were less than 0.3 fps for fish protection while successfully increasing the sweeping velocity from 0.8 to 2.3 fps to better move debris off the screens and flowing downstream.

2.4.18 ZOE 18. Fish Creek Bypassed Reach of FC

This ZOE meets Standard D-1 as there are no barriers to downstream fish passage within the ZOE, and flows within the reach are adequate to support safe, effective, and timely downstream migration as described in Section 2.1.18.

2.5 CRITERION E – SHORELINE AND WATERSHED PROTECTION

Table 12. Shoreline and watershed protection alternative standards matrix

Zone Name	River Mile at upper and lower extent of Zone	<i>Criterion E: Shoreline and Watershed Protection Alternative Standards</i>			
		<i>1</i>	<i>2</i>	<i>3</i>	<i>Plus</i>
ZOE 1. Lemolo Reservoir	95.6-93.0		X		
ZOE 2. Lemolo No. 1 Bypassed Reach of NUR	93.0-88.6	X			
ZOE 3. Lemolo No. 2 Impoundment	88.6-88.5	X			
ZOE 4. Lemolo No. 2 Bypassed Reach of NUR	88.5-76.4	X			
ZOE 5. Toketee Reservoir	76.4-75.4	X			
ZOE 6. Toketee Bypassed Reach of NUR	75.4-73.3	X			
ZOE 7. Slide Creek Impoundment	73.3-73.2	X			
ZOE 8. Slide Creek Bypassed Reach of NUR	73.2-71.2	X			
ZOE 9. Full-flow Reach of NUR	71.2-71.0	X			
ZOE 10. Soda Springs Reservoir	71.0-69.8	X			
ZOE 11. Soda Springs Bypassed Reach of NUR	69.8-69.3	X			
ZOE 12. Regulated Reach of NUR Downstream of Project	69.3-67.2		X		
ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)	8.5-8.1	X			
ZOE 14. Clearwater No. 1 Bypassed Reach of CR	8.1-4.9	X			

Zone Name	River Mile at upper and lower extent of Zone	<i>Criterion E: Shoreline and Watershed Protection Alternative Standards</i>			
		<i>1</i>	<i>2</i>	<i>3</i>	<i>Plus</i>
ZOE 15. Clearwater No. 2 Impoundment	4.9-4.9	X			
ZOE 16. Clearwater No. 2 Bypassed Reach of CR	4.9-0.0	X			
ZOE 17. Fish Creek Impoundment	6.6-6.6	X			
ZOE 18. Fish Creek Bypassed Reach of FC	6.6-0.0	X			

STANDARD E-1. Not Applicable/De Minimis Effect: *There are no lands associated with the facility where the facility owner has direct or indirect ownership or control over lands surrounding the facility and its riverine zones that have significant ecological value for protecting water quality, aesthetics, or low-impact recreation, and the facility is not subject to any Shoreline Management Plan (SMP) or similar protection plan.*

STANDARD E-2. Agency Recommendation: *The facility is in compliance with all government agency recommendations in a license, exemption, water quality certificate, or other authorization, such as an approved SMP or equivalent for protection, mitigation, or enhancement of shoreline surrounding the facility.*

Project ZOE's occur entirely on federally-owned lands within the Diamond Lake Ranger District of the Umpqua National Forest administered by the Forest Service. There are no lands associated with the Project under the direct or indirect ownership or control of PacifiCorp. There are no shoreline buffer zones or shoreline management plans associated with the Project. There are no known existing erosive conditions, mass soil movement, slumping, or other unstable conditions associated with Project impoundment shorelines and stream banks. Therefore, Project ZOE's have a de minimis impact on shoreline and watershed protection as defined by LIHI and generally meet Standard E-1.

However, PacifiCorp manages and operates Lemolo Reservoir, the largest and most upstream Project impoundment, consistent with the 0.5 foot per day drawdown restriction defined by SA Section 9.3.3 as explained herein in Section 2.1 and 2.1.1. Shoreline protection and erosion prevention are implicit to this requirement, and therefore, ZOE 1 (Lemolo Reservoir) meets the agency recommendations of Standard E-2.

A total of 33.8 miles of the North Umpqua River from Soda Springs Powerplant to Rock Creek are designated as Wild and Scenic River under the recreational classification¹⁸. The regulated reach of river downstream of the Project (ZOE 12) is within the designated Wild and Scenic River segment. PacifiCorp implements the ramping restrictions of SA Section 6.4 and required minimum flows described in Section 2.1 and 2.1.12 to protect the outstandingly remarkable values (fish, history, prehistory, recreation, scenery, and water quality) of the Wild and Scenic Reach, and therefore, ZOE 12 meets the agency recommendations of Standard E-2.

¹⁸ <https://www.rivers.gov/rivers/apps/river/north-umpqua>

PacifiCorp implements several other SA requirements pertinent to LIHI's stated goal for this criterion related to the protection, mitigation, or enhancement of soils, vegetation, and ecosystem functions on shoreline and watershed lands associated with the Project. Pursuant to SA Section 9.4, revegetation and erosion control of Project reservoirs and forebays is governed by the FERC-approved Project Vegetation Management Plan and Erosion Control Plan required by SA Sections 12 and 14, respectively, both of which are available on PacifiCorp's Project website. The Vegetation Management Plan outlines PacifiCorp's responsibilities for vegetation maintenance, noxious weed prevention and control, and revegetation. The Erosion Control Plan outlines PacifiCorp's responsibilities for identifying, remediating, and preventing erosion. PacifiCorp conducts annual coordination and planning meetings with signatory agencies for each of the SA-mandated management plans.

PacifiCorp has established funds to implement watershed protection and enhancement measures that were agreed to by the parties to the SA. The funds include (dollar values escalated for inflation from 2001 dollars):

- A Tributary Enhancement Fund pursuant to SA 19.1 that PacifiCorp initially established with \$2 million. PacifiCorp contributed an additional \$430,000 annually to the fund for seven years (2005-2011). In addition, pursuant to SA 19.4, PacifiCorp is contributing \$162,000 annually to ODFW for the purposes of (1) monitoring tasks associated with the Tributary Enhancement Program and (2) oversight of on-site mitigation measures performed by PacifiCorp or other entities.
- Pursuant to SA 19.3, PacifiCorp is making graduated payments totaling \$8 million and contributing an additional \$250,000 annually for the duration of the license to a federal mitigation fund administered by the Forest Service. This fund was established to implement projects that mitigate the facility's impacts to wetlands and still-water-breeding amphibian habitat, riparian and aquatic species connectivity, vegetation management, terrestrial species connectivity, and soil loss and soil productivity resulting in erosion that were not mitigated through other sections of the SA.

PacifiCorp reports on implementation of these funds in the annual report to FERC.

Additional details on shoreline and watershed protection relevant to compliance with the identified Standard(s) in each ZOE is provided in the following subsections.

2.5.1 ZOE 1. Lemolo Reservoir

PacifiCorp manages and operates Lemolo Reservoir, the largest and most upstream Project impoundment, consistent with the 0.5 foot per day drawdown restriction defined by SA Section 9.3.3 as explained herein in Section 2.1 and 2.1.1. Shoreline protection and erosion prevention are implicit to this requirement, and therefore, ZOE 1 (Lemolo Reservoir) meets the agency recommendations of Standard E-2.

2.5.2 ZOE 2. Lemolo No. 1 Bypassed Reach of NUR

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.3 ZOE 3. Lemolo No. 2 Impoundment

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.4 ZOE 4. Lemolo No. 2 Bypassed Reach of NUR

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.5 ZOE 5. Toketee Reservoir

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.6 ZOE 6. Toketee Bypassed Reach of NUR

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.7 ZOE 7. Slide Creek Impoundment

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.8 ZOE 8. Slide Creek Bypassed Reach of NUR

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.9 ZOE 9. Full-flow Reach of NUR

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.10 ZOE 10. Soda Springs Reservoir

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.11 ZOE 11. Soda Springs Bypassed Reach of NUR

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.12 ZOE 12. Regulated Reach of NUR Downstream of Project

This ZOE is within the designated Wild and Scenic River segment. PacifiCorp implements the ramping restrictions of SA Section 6.4 and required minimum flows described in Section 2.1 and

2.1.12 to protect the outstandingly remarkable values (fish, history, prehistory, recreation, scenery, and water quality) of the Wild and Scenic Reach. PacifiCorp has a long-term record of water quality compliance within this ZOE as described in Section 2.2 and 2.2.12. Therefore, this ZOE meets the agency recommendations of Standard E-2.

2.5.13 ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.14 ZOE 14. Clearwater No. 1 Bypassed Reach of CR

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.15 ZOE 15. Clearwater No. 2 Impoundment

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.16 ZOE 16. Clearwater No. 2 Bypassed Reach of CR

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.17 ZOE 17. Fish Creek Impoundment

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.5.18 ZOE 18. Fish Creek Bypassed Reach of FC

As described in the introductory paragraph of Section 2.5, this ZOE does not have shoreline buffer zones or management plans and has a de minimis impact on shoreline and watershed protection as defined by LIHI, thereby meeting Standard E-1.

2.6 CRITERION F - THREATENED AND ENDANGERED SPECIES PROTECTION

Table 13. Threatened and endangered species protection alternative standards matrix

Zone Name	River Mile at upper and lower extent of Zone	<i>Criterion F: Threatened and Endangered Species Protection Alternative Standards</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Plus</i>
ZOE 1. Lemolo Reservoir	95.6-93.0			X		
ZOE 2. Lemolo No. 1 Bypassed Reach of NUR	93.0-88.6			X		
ZOE 3. Lemolo No. 2 Impoundment	88.6-88.5			X		
ZOE 4. Lemolo No. 2 Bypassed Reach of NUR	88.5-76.4			X		

Zone Name	River Mile at upper and lower extent of Zone	<i>Criterion F: Threatened and Endangered Species Protection Alternative Standards</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Plus</i>
ZOE 5. Toketee Reservoir	76.4-75.4			X		
ZOE 6. Toketee Bypassed Reach of NUR	75.4-73.3			X		
ZOE 7. Slide Creek Impoundment	73.3-73.2			X		
ZOE 8. Slide Creek Bypassed Reach of NUR	73.2-71.2			X		
ZOE 9. Full-flow Reach of NUR	71.2-71.0			X		
ZOE 10. Soda Springs Reservoir	71.0-69.8			X		
ZOE 11. Soda Springs Bypassed Reach of NUR	69.8-69.3			X		
ZOE 12. Regulated Reach of NUR Downstream of Project	69.3-67.2			X		
ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)	8.5-8.1			X		
ZOE 14. Clearwater No. 1 Bypassed Reach of CR	8.1-4.9			X		
ZOE 15. Clearwater No. 2 Impoundment	4.9-4.9			X		
ZOE 16. Clearwater No. 2 Bypassed Reach of CR	4.9-0.0			X		
ZOE 17. Fish Creek Impoundment	6.6-6.6			X		
ZOE 18. Fish Creek Bypassed Reach of FC	6.6-0.0			X		

STANDARD F-3. Recovery Planning and Action: *The facility is in compliance with relevant conditions in a species recovery plan, in an incidental take permit or statement, biological opinion, habitat conservation plan, or similar government document and the incidental take document and/or biological opinion issued relevant to the facility was designed to be a long-term solution for protection of the listed species.*

The Project complies with biological opinions (BIOP) and incidental take statements (ITS) issued by FWS and NOAA Fisheries, and therefore, the Project complies with Standard F-3.

Project activities occur within the FERC Project boundary as defined in the Project License and current FERC Exhibit G Maps (see Appendix B). Therefore, the FERC Project boundary delineates the Project Footprint for the purposes of Biological Assessments in consultation with the agencies. The Action Area is defined as “all areas to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action.”¹⁹ PacifiCorp requested technical assistance from the local Service Field Office regarding delineation of the Action Area during a recent consultation and determined that a 5-mile buffer of the Project Footprint was sufficient to encompass the extents of both direct and indirect impacts of the Project.

PacifiCorp reviewed the Action Area in the Environmental Conservation Online System – Information for Planning and Consultation (ECOS-IPaC) website (USFWS, 2024) and received

¹⁹ 50 CFR 402.02

the list of threatened and endangered terrestrial species that may be affected by the Project on June 14, 2024. The ECOS-IPaC list includes eight species. One listed as endangered species, gray wolf, is known to occur in the Project area but was not included on the ECOS-IPaC list. PacifiCorp reviewed NOAA Fisheries website for the list of threatened and endangered marine species potentially affected by the Project and identified two such species. The list of federally-listed threatened and endangered species with potential to occur within the Action Area is provided in Table 14.

Table 14. Federally-listed threatened and endangered species potentially affected by the Project

Common Name	Scientific Name	Federal Listing Status	Critical Habitat
Chinook salmon, Oregon Coast ESU	<i>Oncorhynchus tshawytscha</i>	Candidate	N/A
Coho salmon, Oregon Coast ESU	<i>Oncorhynchus kisutch</i>	Threatened	Designated
Franklin's bumble bee	<i>Bombus franklini</i>	Endangered	Not designated
Gray wolf	<i>Canis lupis</i>	Endangered	Not designated
Kincaid's lupine	<i>Lupinus sulphureus ssp. kincaidii</i>	Threatened	Designated
Marbled murrelet	<i>Brachyramphus marmoratus</i>	Threatened	Designated
Monarch Butterfly	<i>Danaus plexippus plexippus</i>	Candidate	N/A
Northern spotted owl	<i>Strix occidentalis caurina</i>	Threatened	Designated
Northwestern pond turtle	<i>Actinemys marmorata</i>	Proposed	Not designated
Rough popcornflower	<i>Plagiobothrys hirtus</i>	Endangered	Not designated
Whitebark pine	<i>Pinus albicaulis</i>	Threatened	Not designated

On December 13, 2002, NOAA Fisheries issued a BIOP and ITS (Reference No. F/NWR/2002/00509) for the Project covering Oregon Coast (OC) coho salmon. NOAA Fisheries determined that the Project is not likely to jeopardize the continued existence of the OC coho salmon based, in part, on the fact that License and SA measures “are expected to increase coho salmon spawning and rearing habitat quantity and quality in the Action Area in both the short- and long-term, which should increase overall production in the basin.” See Sections 2.1, 2.2., 2.3, and 2.4 for discussion of PM&Es related to fisheries. NOAA Fisheries continues to monitor ITS compliance through participation in the RCC. These species only potentially occur within Fish Creek (ZOE 17 and 18) and the North Umpqua River downstream of Slide Creek Dam (ZOE 8 through 12). The North Umpqua Watershed is within the mapped Essential Fish Habitat for OC coho and Chinook salmon.

On December 23, 2002, the Service issued a BIOP and ITS (Reference No. 1-15-2002-F-1002) for the Project covering northern spotted owl and Kincaid's lupine. PacifiCorp reinitiated consultation with the Service in 2013 regarding the 2012 revisions to northern spotted owl critical habitat, and on May 15, 2013 the Service provided a letter of concurrence with

PacifiCorp's determination (Attachment 27). PacifiCorp conducts annual reporting on ITS compliance and an annual meeting with the Level 1 Team²⁰ regarding terrestrial ESA issues associated with the Project. PacifiCorp submitted the most recent annual report, covering calendar year 2023 (Attachment 28), to the Service on January 23, 2024 and received the Service's concurrence on January 24, 2024.

Consultation and/or effects determinations vary with respect to the other species identified in Table 14. PacifiCorp recently consulted with the Service on a Biological Assessment of Project effects to the recently (ca. 2022) listed Franklin's bumble bee (*Bombus franklini*), submitted to the Service on August 15, 2024. PacifiCorp's Biological Assessment for Franklin's bumble bee concludes that the Project may affect but is not likely to adversely affect the species, which has not been observed across its range since 2006. On October 18, 2024, the Service issued a Letter of Concurrence with PacifiCorp's determination of effects to Franklin's bumble bee (Attachment 31). The Project was previously determined to have no effect on marbled murrelet as there is only incidental overlap (approximately 167 acres) of the Project with the eastern, inland extent of the identified range of the species with the western extent of the transmission corridors on private lands, which are greater than 50 miles from coastal waters and do not currently support the old-growth, dense canopy nesting habitat needed by the species, and are outside of any ZOE's addressed in this application. PacifiCorp is awaiting a final rule before proceeding with consultation on Project effects to northwestern pond turtle. Monarch butterfly is currently a candidate species warranted for but precluded from listing by higher listing priorities; PacifiCorp is currently preparing an application for enrollment in the Candidate Conservation Agreement with Assurances for monarch butterfly within energy and transportation rights-of-way. Whitebark pine typically grows at the subalpine treeline or with other high-mountain conifers just below the treeline and subalpine zone (USFWS, 2021) and only occurs at high elevations in the Action Area to the east of the Project Footprint and outside of any ZOE's addressed in this application. There are no known rough popcornflower populations in the Project Footprint; the nearest population to the Project Footprint is the Soggy Bottoms Sister site within the North Bank Habitat Management Area (USFWS, 2021), located within the northwest quarter of Township 26 South and Range 4 West in the northwestern extent of the Action Area and outside of any ZOE's addressed in this application.

The gray wolf was originally listed as endangered in 1978 throughout the contiguous US and Mexico (except for Minnesota, where the species was listed as threatened). In 2020, the species was delisted due to recovery; and in 2022 this decision was reversed, and the species was relisted throughout the US and Mexico, excluding the Northern Rocky Mountain population. The species is currently listed as threatened in Minnesota and endangered in the remaining states. The Project occurs within an area of known wolf activity for the pack known as the Indigo Unit, which was designated by ODFW in March 2019 (ODFW, 2024). Until recently, gray wolves had not been observed in or near the Project since the 1930s; however, in 2018 the public began reporting observations of wolf activity in the area, which eventually led to the designation of the Indigo Unit in 2019. Gray wolves inhabit a wide range of habitats, and limited habitat impacts within the Project would represent an insignificant portion of any potential gray wolf home range. Therefore, the Project is unlikely to affect gray wolf.

²⁰ The Level 1 Team includes representatives from the local Service field office, the Umpqua National Forest of the Forest Service, and the Roseburg District of the Bureau of Land Management (BLM).

The only state-listed fish or wildlife species²¹ with the potential to occur within Project ZOE is the northern spotted owl. The only state-listed plant species²² with the potential to occur within the Project ZOE is Kincaid's lupine, Umpqua mariposa-lily (*Calochortus umpquaensis*), and wayside aster (*Eucephalus vialis*). None of these species have been observed during relicensing surveys in 1992 through 1994 or in any subsequent project-specific rare plant surveys and are unlikely to occur in the primarily aquatic ZOE.

2.6.1 ZOE 1. Lemolo Reservoir

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.2 ZOE 2. Lemolo No. 1 Bypassed Reach of NUR

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.3 ZOE 3. Lemolo No. 2 Impoundment

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE occurs within mapped northern spotted owl critical habitat.

2.6.4 ZOE 4. Lemolo No. 2 Bypassed Reach of NUR

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE occurs within mapped northern spotted owl critical habitat.

2.6.5 ZOE 5. Toketee Reservoir

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.6 ZOE 6. Toketee Bypassed Reach of NUR

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3.

2.6.7 ZOE 7. Slide Creek Impoundment

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

²¹ https://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp

²² <https://www.oregon.gov/oda/programs/PlantConservation/Pages/ListedPlants.aspx>

2.6.8 ZOE 8. Slide Creek Bypassed Reach of NUR

As described in the introductory paragraphs of Section 2.6, the Project complies with BIOPs and ITSs issued by FWS and NOAA Fisheries relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.9 ZOE 9. Full-flow Reach of NUR

As described in the introductory paragraphs of Section 2.6, the Project complies with BIOPs and ITSs issued by FWS and NOAA Fisheries relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.10 ZOE 10. Soda Springs Reservoir

As described in the introductory paragraphs of Section 2.6, the Project complies with BIOPs and ITSs issued by FWS and NOAA Fisheries relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.11 ZOE 11. Soda Springs Bypassed Reach of NUR

As described in the introductory paragraphs of Section 2.6, the Project complies with BIOPs and ITSs issued by FWS and NOAA Fisheries relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.12 ZOE 12. Regulated Reach of NUR Downstream of Project

As described in the introductory paragraphs of Section 2.6, the Project complies with BIOPs and ITSs issued by FWS and NOAA Fisheries relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.13 ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.14 ZOE 14. Clearwater No. 1 Bypassed Reach of CR

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.15 ZOE 15. Clearwater No. 2 Impoundment

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE occurs within mapped northern spotted owl critical habitat.

2.6.16 ZOE 16. Clearwater No. 2 Bypassed Reach of CR

As described in the introductory paragraphs of Section 2.6, the Project complies with the BIOP and ITS issued by FWS relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.17 ZOE 17. Fish Creek Impoundment

As described in the introductory paragraphs of Section 2.6, the Project complies with BIOPs and ITSs issued by FWS and NOAA Fisheries relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.6.18 ZOE 18. Fish Creek Bypassed Reach of FC

As described in the introductory paragraphs of Section 2.6, the Project complies with BIOPs and ITSs issued by FWS and NOAA Fisheries relevant to this ZOE, and therefore, this ZOE complies with Standard F-3. This ZOE partially occurs within mapped northern spotted owl critical habitat.

2.7 CRITERION G - CULTURAL AND HISTORIC RESOURCE PROTECTION**Table 15. Cultural and historic resource protection alternative standards matrix**

Zone Name	River Mile at upper and lower extent of Zone	Criterion G: Cultural and Historic Resource Protection Alternative Standards		
		1	2	Plus
ZOE 1. Lemolo Reservoir	95.6-93.0		X	
ZOE 2. Lemolo No. 1 Bypassed Reach of NUR	93.0-88.6	X		
ZOE 3. Lemolo No. 2 Impoundment	88.6-88.5		X	
ZOE 4. Lemolo No. 2 Bypassed Reach of NUR	88.5-76.4	X		
ZOE 5. Toketee Reservoir	76.4-75.4		X	
ZOE 6. Toketee Bypassed Reach of NUR	75.4-73.3	X		
ZOE 7. Slide Creek Impoundment	73.3-73.2		X	
ZOE 8. Slide Creek Bypassed Reach of NUR	73.2-71.2	X		
ZOE 9. Full-flow Reach of NUR	71.2-71.0	X		
ZOE 10. Soda Springs Reservoir	71.0-69.8		X	
ZOE 11. Soda Springs Bypassed Reach of NUR	69.8-69.3	X		
ZOE 12. Regulated Reach of NUR Downstream of Project	69.3-67.2	X		
ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)	8.5-8.1		X	
ZOE 14. Clearwater No. 1 Bypassed Reach of CR	8.1-4.9	X		
ZOE 15. Clearwater No. 2 Impoundment	4.9-4.9		X	
ZOE 16. Clearwater No. 2 Bypassed Reach of CR	4.9-0.0	X		
ZOE 17. Fish Creek Impoundment	6.6-6.6		X	
ZOE 18. Fish Creek Bypassed Reach of FC	6.6-0.0	X		

STANDARD G-1. Not Applicable/De Minimis Effect: *There are no cultural or historic resources present on facility lands that can be potentially threatened by construction or operation of the facility, or facility operations have been shown to not adversely affect those that are or were historically present; or*

STANDARD G-2. Approved Plan: *The facility is in compliance with approved state, federal, and recognized tribal plans for protection, enhancement, or mitigation of impacts to cultural or historic resources affected by the facility.*

There are no known cultural or historic resources in the Project bypassed reaches, and Project operation and maintenance are unlikely to affect any unknown resources in the bypassed reaches. Therefore, Standard G-1 applies to the bypassed reach ZOE. The Project complies with all requirements regarding cultural resource protection, mitigation or enhancement included in the SA and FERC license, including the Historic Properties Management Plan (HPMP) for the Project, available on PacifiCorp's Project website, thereby meeting Standard G-2 in impoundment ZOE within the FERC boundary.

PacifiCorp performed cultural resource surveys within the Project boundary during relicensing and subsequent project-specific reviews, and PacifiCorp has identified cultural and historic resources within the Project boundary. Project facilities are contributing elements to the overall North Umpqua Hydroelectric Project Historic District, which the State Historic Preservation Office (SHPO) concurs is eligible for listing in the National Register of Historic Places. Article 414 of the Project license requires PacifiCorp to implement the "Programmatic Agreement Among the Federal Energy Regulatory Commission and the Oregon Historic Preservation Officer for Managing Historic Properties that May be Affected by a License Issuing to PacifiCorp for the Operation of the North Umpqua Hydroelectric Project in Douglas County, Oregon (FERC No. 1927)," executed on January 3, 2003, including but not limited to the HPMP (formerly referred to as the Cultural Resources Management Plan) for the Project. In the event that the Programmatic Agreement is terminated, the Project license requires PacifiCorp to implement the provisions of its approved HPMP.

PacifiCorp submitted the HPMP to Forest Service, BLM, and the SHPO for review and comment in December 2003. PacifiCorp addressed all agency comments and submitted the final plan to FERC on December 28, 2006, which was acknowledged by FERC letter of October 16, 2007. PacifiCorp continues to implement the ongoing monitoring and reporting requirements of the Programmatic Agreement and the HPMP. PacifiCorp is required to file annual reports with FERC, BLM, Forest Service, SHPO, and the Tribes, including the Confederated Tribes of the Grande Ronde, the Confederated Tribes of Siletz Indians, and the Cow Creek Band of Umpqua Tribe of Indians. PacifiCorp filed the most recent annual report on December 18, 2023 (Attachment 29²³).

²³ The annual report cover letter is provided for proof of submission, but the annual report is omitted due to the presence of privileged cultural resource information.

2.7.1 ZOE 1. Lemolo Reservoir

The Project complies with all requirements regarding cultural resource protection, mitigation or enhancement included in the SA and FERC license, including the HPMP for the Project, thereby meeting Standard G-2 in this impoundment ZOE within the FERC boundary.

2.7.2 ZOE 2. Lemolo No. 1 Bypassed Reach of NUR

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.7.3 ZOE 3. Lemolo No. 2 Impoundment

The Project complies with all requirements regarding cultural resource protection, mitigation or enhancement included in the SA and FERC license, including the HPMP for the Project, thereby meeting Standard G-2 in this impoundment ZOE within the FERC boundary.

2.7.4 ZOE 4. Lemolo No. 2 Bypassed Reach of NUR

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.7.5 ZOE 5. Toketee Reservoir

The Project complies with all requirements regarding cultural resource protection, mitigation or enhancement included in the SA and FERC license, including the HPMP for the Project, thereby meeting Standard G-2 in this impoundment ZOE within the FERC boundary.

2.7.6 ZOE 6. Toketee Bypassed Reach of NUR

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.7.7 ZOE 7. Slide Creek Impoundment

The Project complies with all requirements regarding cultural resource protection, mitigation or enhancement included in the SA and FERC license, including the HPMP for the Project, thereby meeting Standard G-2 in this impoundment ZOE within the FERC boundary.

2.7.8 ZOE 8. Slide Creek Bypassed Reach of NUR

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.7.9 ZOE 9. Full-flow Reach of NUR

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.7.10 ZOE 10. Soda Springs Reservoir

The Project complies with all requirements regarding cultural resource protection, mitigation or enhancement included in the SA and FERC license, including the HPMP for the Project, thereby meeting Standard G-2 in this impoundment ZOE within the FERC boundary.

2.7.11 ZOE 11. Soda Springs Bypassed Reach of NUR

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.7.12 ZOE 12. Regulated Reach of NUR Downstream of Project

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.7.13 ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)

The Project complies with all requirements regarding cultural resource protection, mitigation or enhancement included in the SA and FERC license, including the HPMP for the Project, thereby meeting Standard G-2 in this impoundment ZOE within the FERC boundary.

2.7.14 ZOE 14. Clearwater No. 1 Bypassed Reach of CR

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.7.15 ZOE 15. Clearwater No. 2 Impoundment

The Project complies with all requirements regarding cultural resource protection, mitigation or enhancement included in the SA and FERC license, including the HPMP for the Project, thereby meeting Standard G-2 in this impoundment ZOE within the FERC boundary.

2.7.16 ZOE 16. Clearwater No. 2 Bypassed Reach of CR

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.7.17 ZOE 17. Fish Creek Impoundment

The Project complies with all requirements regarding cultural resource protection, mitigation or enhancement included in the SA and FERC license, including the HPMP for the Project, thereby meeting Standard G-2 in this impoundment ZOE within the FERC boundary.

2.7.18 ZOE 18. Fish Creek Bypassed Reach of FC

There are no known cultural or historic resources in this ZOE, and Project operation and maintenance are unlikely to affect any unknown resources in this ZOE. Therefore, Standard G-1 applies to this ZOE.

2.8 CRITERION H - RECREATIONAL RESOURCES

Table 16. Recreational resources alternative standards matrix

Zone Name	River Mile at upper and lower extent of Zone	Criterion H: Recreational Resources Alternative Standards			
		1	2	3	Plus
ZOE 1. Lemolo Reservoir	95.6-93.0		X		
ZOE 2. Lemolo No. 1 Bypassed Reach of NUR	93.0-88.6		X		
ZOE 3. Lemolo No. 2 Impoundment	88.6-88.5		X		
ZOE 4. Lemolo No. 2 Bypassed Reach of NUR	88.5-76.4		X		
ZOE 5. Toketee Reservoir	76.4-75.4		X		
ZOE 6. Toketee Bypassed Reach of NUR	75.4-73.3		X		
ZOE 7. Slide Creek Impoundment	73.3-73.2		X		
ZOE 8. Slide Creek Bypassed Reach of NUR	73.2-71.2		X		
ZOE 9. Full-flow Reach of NUR	71.2-71.0		X		
ZOE 10. Soda Springs Reservoir	71.0-69.8		X		
ZOE 11. Soda Springs Bypassed Reach of NUR	69.8-69.3		X		
ZOE 12. Regulated Reach of NUR Downstream of Project	69.3-67.2		X		
ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)	8.5-8.1		X		
ZOE 14. Clearwater No. 1 Bypassed Reach of CR	8.1-4.9		X		
ZOE 15. Clearwater No. 2 Impoundment	4.9-4.9		X		
ZOE 16. Clearwater No. 2 Bypassed Reach of CR	4.9-0.0		X		
ZOE 17. Fish Creek Impoundment	6.6-6.6		X		
ZOE 18. Fish Creek Bypassed Reach of FC	6.6-0.0		X		

STANDARD H-2. Agency Recommendations: *The facility demonstrates compliance with resource agency recommendations for recreational access or accommodation (including recreational flow releases), or any enforceable recreation plan in place for the facility.*

The Project complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, all ZOE's meet Standard H-2.

All Project ZOE's are on public lands within the Diamond Lake Ranger District of the Umpqua National Forest administered by the Forest Service. PacifiCorp does not own or operate any recreational amenities associated with the Project. Recreational amenities associated with the Project are owned and operated by the Forest Service and funded by PacifiCorp pursuant to SA Section 17 and the Recreation Resources Management Plan (RRMP) available on PacifiCorp's Project website. Recreation amenities associated with Project ZOE's are primarily located on the large impoundments at Lemolo and Toketee Reservoirs. The Umpqua National Forest's recreation web page²⁴ provides users with additional information on recreation sites associated

²⁴ <https://www.fs.usda.gov/recmain/umpqua/recreation>

with the Project. There has not been a FERC Environmental and Recreation Inspection during the previous certification term. Federal Power Act Part 8 recreation signage for the Project is provided at Lemolo Reservoir, Toketee Reservoir, and the Soda Springs bypassed reach near the powerplant. Photos of recreation facilities and amenities are provided in Appendix A, Photos 3 through 9 and Photos 17 through 21. Maps of the recreation facilities at Lemolo and Toketee Reservoirs are provided in Figures 18 and 19.

SA Section 17 and the RRMP require PacifiCorp to fund recreation operations, maintenance, and capital improvements in addition to funding for public information and recreation monitoring. PacifiCorp provides funding for 27 recreation sites, including developed and dispersed sites associated with the Project, of which 21 sites are within ZOE's. The other PacifiCorp-funded recreation sites are associated with Project forebays outside of ZOE's²⁵. PacifiCorp's recreation funding for calendar year 2024 amounted to \$144,127, of which \$120,699 was for campground operation and maintenance. PacifiCorp and Forest Service track progress on implementation of SA Section 17 and RRMP requirements through annual coordination meetings and the rolling action planning process. The most recent RRMP rolling action plan is available on PacifiCorp's Project website.

Per the terms of the SA Section 17.6, PacifiCorp must allow public access to project reservoirs, stream channels, and adjacent lands for recreational purposes, to the extent consistent with public safety and FERC requirements. Pursuant to SA Section 17.7, PacifiCorp is also responsible for funding law enforcement related to land- and water-based recreation activities within the Project boundaries. On December 22, 2021, PacifiCorp executed a law enforcement services agreement with Douglas County Sherriff's Office for a term ending June 30, 2026.

Pursuant to SA Section 17.8, PacifiCorp funds capital improvements and potential, future expansion at existing recreation facilities in addition to funding for deferred backlog of capital improvements and public information programs, as listed on, and in accordance with, specified schedules attached to the SA. Recreation capital improvements provided by PacifiCorp pursuant to the RRMP and SA Section 17.8 include rebuilding the boat ramp at the Poole Creek Campground at Lemolo Reservoir in 2010 to ensure boat access from the opening day of fishing season through mid-October and constructing an Americans with Disabilities Act (ADA)-compliant, accessible fishing pier at Toketee Reservoir in 2011.

Pursuant to the Project Transportation Management Plan, PacifiCorp is responsible for funding all road maintenance on PacifiCorp-maintained Recreation Roads within recreation amenities associated with the Project, including Bunker Hill, East Lemolo, and Poole Creek Campgrounds in ZOE 1 and Toketee Campground in ZOE 5 (see Figures 18 and 19).

As described in Section 2.1.1 and pursuant to SA Section 17.12, PacifiCorp maintains Lemolo Reservoir at or near full pool elevation throughout the peak recreation season.

²⁵ There are PacifiCorp-funded recreation sites at Lemolo No. 2 forebay, Clearwater Nos. 1 and 2 forebays, and Fish Creek forebay.

Figure 18. Recreation sites within ZOE 1 (Lemolo Reservoir).

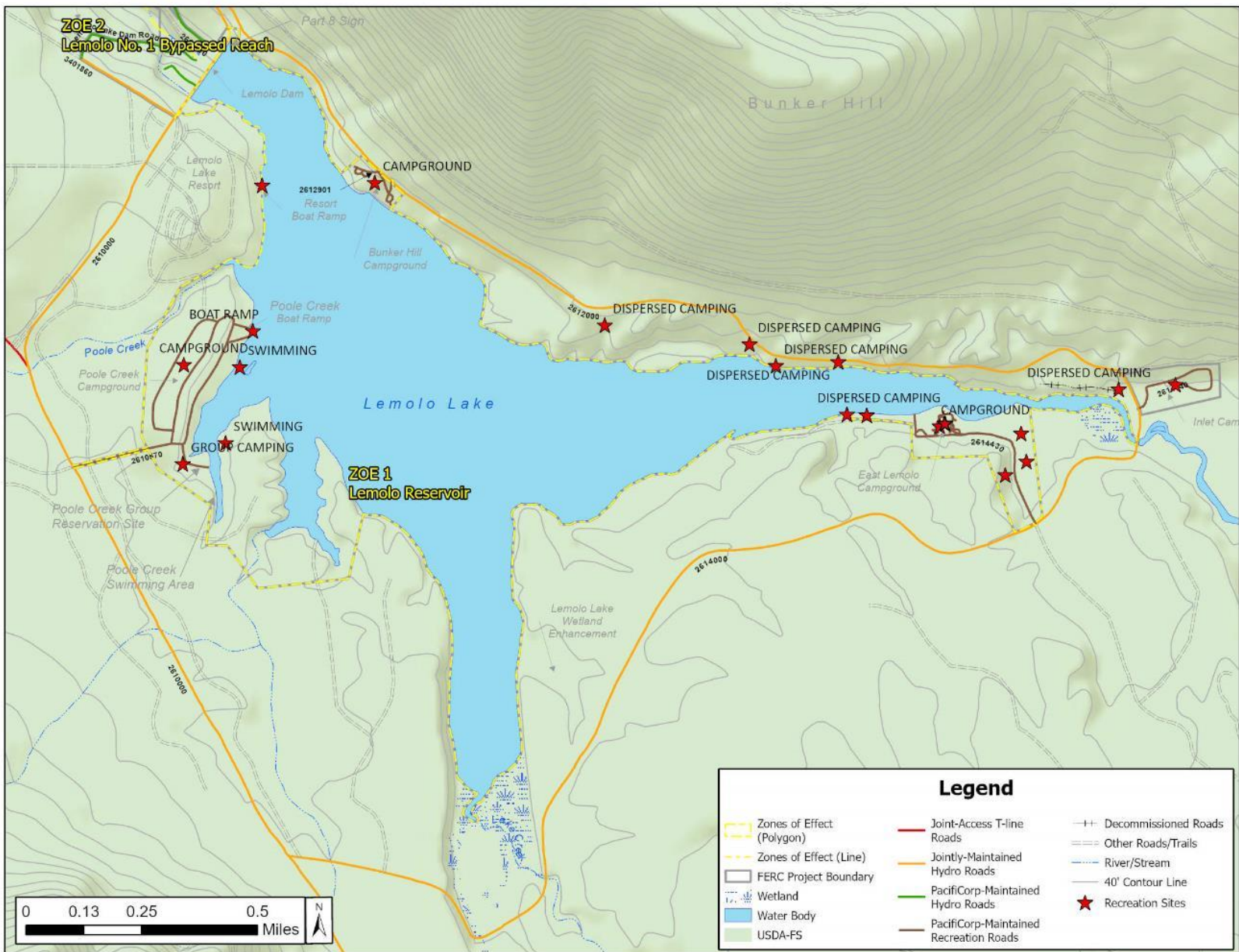
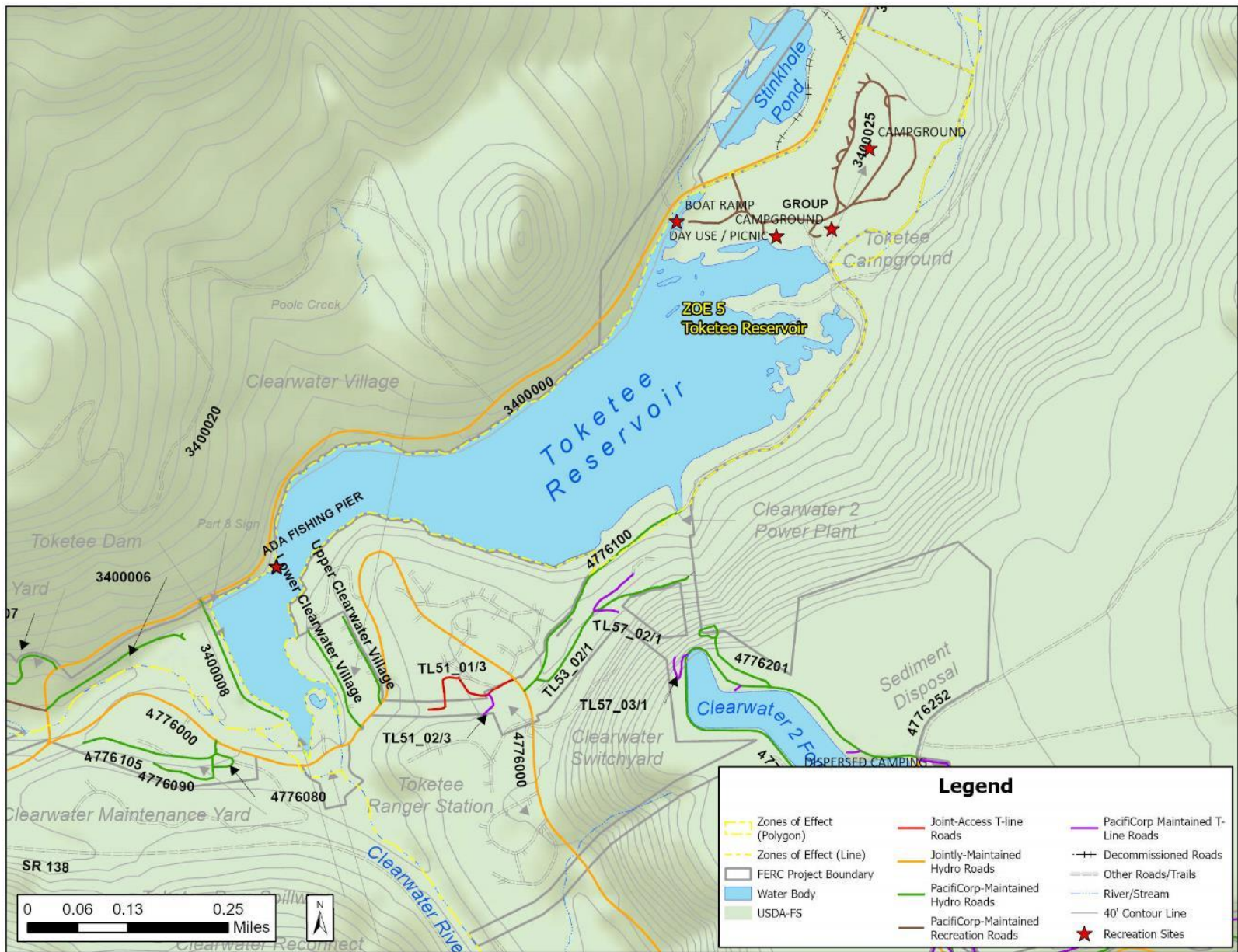


Figure 19. Recreation sites within ZOE 5 (Toketee Reservoir).



License Article 403 requires PacifiCorp to operate gages downstream of the Project (see Section 2.8.12 below) and to provide notice to the public of scheduled maintenance releases at the project developments. PacifiCorp posts its planned maintenance schedules on its North Umpqua River Flows webpage²⁶.

2.8.1 ZOE 1. Lemolo Reservoir

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2. As described in Section 2.1.1 and pursuant to SA Section 17.12, PacifiCorp maintains Lemolo Reservoir at or near full pool elevation throughout the peak recreation season. Recreation amenities funded by PacifiCorp and owned, operated, and maintained by Forest Service within this ZOE include (see Photos 3 through 9):

- Poole Creek Campground,
- Poole Creek Group Reservation Site,
- Poole Creek Boat Ramp,
- Poole Creek Swimming Area,
- Bunker Hill Campground,
- East Lemolo Campground, and
- eight dispersed campsites.

Federal Power Act Part 8 recreation signage for the Project is provided on the north side of the dam at the western extent of the reservoir (Photo 2).

2.8.2 ZOE 2. Lemolo No. 1 Bypassed Reach of NUR

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.3 ZOE 3. Lemolo No. 2 Impoundment

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.4 ZOE 4. Lemolo No. 2 Bypassed Reach of NUR

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.5 ZOE 5. Toketee Reservoir

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2. Recreation amenities funded by PacifiCorp and owned, operated, and maintained by Forest Service within this ZOE include (see Photos 17 through 21):

- Toketee Lake Campground,
- Toketee Lake Boat Ramp,
- Toketee Lake Picnic Area,
- Toketee Lake Group Site, and
- Toketee Lake Fishing Pier.

²⁶ <https://www.pacificorp.com/community/recreation/water-release/north-umpqua-river.html>

Federal Power Act Part 8 recreation signage for the Project is provided on the north side of the dam at the western extent of the reservoir.

2.8.6 ZOE 6. Toketee Bypassed Reach of NUR

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.7 ZOE 7. Slide Creek Impoundment

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.8 ZOE 8. Slide Creek Bypassed Reach of NUR

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2. Federal Power Act Part 8 recreation signage for the Project is provided on river-right at the Forest Service picnic area and viewing platform just upstream of the powerplant tailrace.

2.8.9 ZOE 9. Full-flow Reach of NUR

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.10 ZOE 10. Soda Springs Reservoir

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.11 ZOE 11. Soda Springs Bypassed Reach of NUR

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.12 ZOE 12. Regulated Reach of NUR Downstream of Project

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2. PacifiCorp's "North Umpqua River Flows" webpage²⁷ provides a link to the USGS site for Gage No. 14316500²⁸, funded by PacifiCorp and operated and maintained by USGS, in the Wild and Scenic Reach downstream of the Project. PacifiCorp provides flows sufficient to support recreation values in the Wild and Scenic reach as described in Section 2.1.12.

2.8.13 ZOE 13. Clearwater No. 1 Impoundment (Stump Lake)

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2. Recreation amenities funded by PacifiCorp and owned, operated, and maintained by Forest Service within this ZOE include the Garwood 21 Stump Access dispersed site.

²⁷ <https://www.pacificorp.com/community/recreation/water-release/north-umpqua-river.html>

²⁸ http://waterdata.usgs.gov/or/nwis/uv?dd_cd=01&format=html&period=10&site_no=14316500

2.8.14 ZOE 14. Clearwater No. 1 Bypassed Reach of CR

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.15 ZOE 15. Clearwater No. 2 Impoundment

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.16 ZOE 16. Clearwater No. 2 Bypassed Reach of CR

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.17 ZOE 17. Fish Creek Impoundment

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

2.8.18 ZOE 18. Fish Creek Bypassed Reach of FC

This ZOE complies with the recreation resource PM&Es of SA Section 17 and the FERC License, and therefore, this ZOE meets Standard H-2.

3.0 ATTESTATION AND WAIVER

As an Authorized Representative of PacifiCorp, the Undersigned attests that the material presented in the application is true and complete.

The Undersigned acknowledges that the primary goal of the Low Impact Hydropower Institute's certification program is public benefit, and that the LIHI Governing Board and its agents are not responsible for financial or other private consequences of its certification decisions.

The Undersigned further acknowledges that if LIHI Certification of the applying facility is granted, the LIHI Certification Mark License Agreement must be executed prior to the final certification decision and prior to marketing the electricity product as LIHI Certified® (which includes selling RECs in a market that requires LIHI Certification).

The Undersigned further agrees to hold the Low Impact Hydropower Institute, the Governing Board, and its agents harmless for any decision rendered on this or other applications, from any consequences of disclosing or publishing any submitted certification application materials to the public, or on any other action pursuant to the Low Impact Hydropower Institute's certification program.

Company Name: PacifiCorp

Authorized Representative:

Name: William C. Shallenberger

Title: Vice President, Renewable Resources

Authorized Signature:  _____

Date: 10/30/2024

4.0 CONTACTS

Table 17. Applicant-related contacts

Facility Owner:	
Name and Title	Will Shallenberger, Vice President, Renewable Resources
Company	PacifiCorp
Phone	503-701-2211
Email Address	will.shallenberger@pacificorp.com
Mailing Address	825 NE Multnomah St., Suite 1800, Portland, OR 97232
Facility Operator (if different from Owner):	
Name and Title	
Company	
Phone	
Email Address	
Mailing Address	
Consulting Firm / Agent for LIHI Program (if different from above):	
Name and Title	
Company	
Phone	
Email Address	
Mailing Address	
Compliance Contact (responsible for LIHI Program requirements):	
Name and Title	Steve Albertelli, License Program Manager
Company	PacifiCorp
Phone	541-776-6676
Email Address	steve.albertelli@pacificorp.com
Mailing Address	925 S. Grape St., Bldg. 5, Medford, OR 97501
Party responsible for accounts payable:	
Name and Title	Debbi Smith, Senior Project Coordinator
Company	PacifiCorp
Phone	801-220-4632
Email Address	debbi.smith@pacificorp.com
Mailing Address	1407 W North Temple, Room 210, Salt Lake City, UT 84116

Table 18. Current and relevant state, federal, and tribal resource agency contacts with knowledge of the facility

Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	U.S. Forest Service	<input checked="" type="checkbox"/> Flows <input checked="" type="checkbox"/> Water Quality <input checked="" type="checkbox"/> Fish/Wildlife <input checked="" type="checkbox"/> Watershed <input checked="" type="checkbox"/> T&E Species <input checked="" type="checkbox"/> Cultural/Historic <input checked="" type="checkbox"/> Recreation
Name and Title	Jed Hancock, Hydropower Program Coordinator, Umpqua National Forest	
Phone	541-650-1703	
Email address	Jedidiah.hancock@usda.gov	
Mailing Address	34963 Shoreview Drive, Cottage Grove, OR 97424	
Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	NOAA Fisheries	<input type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input checked="" type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input checked="" type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Michelle McMullin, Fishery Biologist, Oregon Coast Branch	
Phone	503-395-0150	
Email address	Michelle.mcmullin@noaa.gov	
Mailing Address	1201 Northeast Lloyd Boulevard, Suite 1100, Portland, OR 97232	
Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	U.S. Fish and Wildlife Service	<input type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input checked="" type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input checked="" type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Frank Weaver, Wildlife Biologist	
Phone	503-260-1247	
Email address	Frank_weaver@fws.gov	
Mailing Address	777 NW Garden Valley Blvd, Roseburg, OR 97471	

Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	U.S. Bureau of Land Management	<input checked="" type="checkbox"/> Flows <input checked="" type="checkbox"/> Water Quality <input checked="" type="checkbox"/> Fish/Wildlife <input checked="" type="checkbox"/> Watershed <input checked="" type="checkbox"/> T&E Species <input checked="" type="checkbox"/> Cultural/Historic <input checked="" type="checkbox"/> Recreation
Name and Title	Mike Korn, Swiftwater Field Manager, Roseburg District	
Phone	541-464-3211	
Email address	mkorn@blm.gov	
Mailing Address	777 NW Garden Valley Blvd, Roseburg, OR 97471	
Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	Oregon Department of Environmental Quality	<input checked="" type="checkbox"/> Flows <input checked="" type="checkbox"/> Water Quality <input type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Valerie Thompson, 401 Hydropower Program Coordinator	
Phone	971-269-8293	
Email address	Valerie.thompson@deq.oregon.gov	
Mailing Address	700 NE Multnomah Street, Suite 600, Portland, OR 97232	
Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	Oregon Department of Fish and Wildlife	<input checked="" type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input checked="" type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input checked="" type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Jason Brandt, Southwest Hydropower Coordinator	
Phone	541-315-6222	
Email address	Jason.r.brandt@odfw.oregon.gov	
Mailing Address	4192 North Umpqua Highway, Roseburg, OR 97470	

Agency Contact		Area of Responsibility (check applicable boxes)
Agency Name	Oregon Water Resources Department	<input checked="" type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input type="checkbox"/> T&E Species <input type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Craig Kohanek, Hydroelectric Program Coordinator	
Phone	503-979-3185	
Email address	Ron.c.kohanek@water.oregon.gov	
Mailing Address	725 Summer Street NE, Suite A, Salem, OR 97301	
Stakeholder Contact		Area of Responsibility (check applicable boxes)
Organization Name	Cow Creek Band of Umpqua Tribe of Indians	<input type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input type="checkbox"/> T&E Species <input checked="" type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Ben Steward, Tribal Historic Preservation Officer	
Phone	541-677-5575 ext. 5236	
Email address	thpo@cowcreek-nsn.gov	
Mailing Address	2371 NE Stephens Street, Suite 100, Roseburg, OR 97470	
Stakeholder Contact		Area of Responsibility (check applicable boxes)
Organization Name	Confederated Tribes of the Grand Ronde Indian Community	<input type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input type="checkbox"/> T&E Species <input checked="" type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Briecce Edwards, Deputy Tribal Historic Preservation Officer	
Phone	503-879-5211	
Email address	thpo@grandronde.org	
Mailing Address	9615 Grand Ronde Road, Grand Ronde, OR 97347	

Stakeholder Contact	Area of Responsibility (check applicable boxes)	
Organization Name	Confederated Tribes of the Siletz Indians	<input type="checkbox"/> Flows <input type="checkbox"/> Water Quality <input type="checkbox"/> Fish/Wildlife <input type="checkbox"/> Watershed <input type="checkbox"/> T&E Species <input checked="" type="checkbox"/> Cultural/Historic <input type="checkbox"/> Recreation
Name and Title	Buddy Lane, Education and Cultural Programs Director	
Phone	541-444-8373	
Email address	culturalresources@ctsi.nsn.us	
Mailing Address	PO Box 549, Siletz, OR 97380	

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APPENDIX A. PROJECT PHOTOS

(September 18, 2024)



Photo 1. Looking downstream (west) from the bridge on Forest Service Road 2614 at the North Umpqua River inlet to Lemolo Reservoir (ZOE 1)



Photo 2. Looking southeast from the right abutment of Lemolo No. 1 Dam at the downstream extent of Lemolo Reservoir (ZOE 1). FPA Part 8 recreation signage is seen at left of frame.



Photo 3. Looking north at Poole Creek Group Reservation Site on the southwest shore of Lemolo Reservoir (ZOE 1).



Photo 4. Representative photo of a campsite within Poole Creek Campground on the western shore of Lemolo Reservoir (ZOE 1).



Photo 5. Looking east at the Poole Creek Swimming Area on the western shore of Lemolo Reservoir (ZOE 1).



Photo 6. Looking northeast at the Poole Creek Boat Ramp on the western shore of Lemolo Reservoir (ZOE 1).



Photo 7. Looking northwest at the entrance to the Bunker Hill Campground on the northeastern shore of Lemolo Reservoir (ZOE 1).



Photo 8. Representative photo of a campsite at East Lemolo Campground on the left bank of the North Umpqua River arm of Lemolo Reservoir (ZOE 1).



Photo 9. Looking north at the boat ramp in East Lemolo Campground on Lemolo Reservoir (ZOE 1).



Photo 10. Looking northwest from the top of Lemolo No. 1 Dam at the upper Lemolo No. 1 bypassed reach (ZOE 2) of the North Umpqua River.



Photo 11. Looking upstream at the lower Lemolo No. 1 bypassed reach (ZOE 2) where it enters the Lemolo No. 2 impoundment (ZOE 3). The Lemolo No. 1 powerplant and tailrace are seen on the left of frame.



Photo 12. Looking downstream from Lemolo No. 2 dam at the upper Lemolo No. 2 bypassed reach of the North Umpqua River (ZOE 4).



Photo 13. Looking downstream (west) from Lemolo No. 2 dam at the Lemolo No. 2 fish ladder. The upper Lemolo No. 2 bypassed reach (ZOE 4) is seen at the left of frame.



Photo 14. Looking northwest from Forest Service Road 34 at Lemolo No. 2 powerplant.



Photo 15. Looking south at the Lemolo No. 2 reroute structure. Lemolo No. 2 powerplant tailrace flows enter the pipeline at the right of frame, thereby protecting the lower Lemolo No. 2 bypassed reach (ZOE 4; seen at center of frame beyond the gates) from ramping.



Photo 16. Looking downstream (west) at the discharge of the Lemolo No. 2 bypassed reach (ZOE 4) into upper Toketee Reservoir (ZOE 5). The Lemolo No. 2 reroute pipeline discharge is seen at the right of frame.



Photo 17. Representative photo of a campsite at Toketee Lake Campground. The lower Lemolo No. 2 bypassed reach (ZOE 4) in the background.



Photo 18. Looking west at the Toketee Lake Boat Ramp facilities on the northwest shore of Toketee Reservoir (ZOE 5). A vault toilet is seen at right of frame. The boat ramp and recreational signage are seen at left of frame.



Photo 19. Looking southeast at Toketee Lake Picnic Area on Toketee Reservoir (ZOE 5).



Photo 20. Looking north at Toketee Lake Group Site on the northern shore of Toketee Reservoir (ZOE 5).



Photo 21. Looking east at the Toketee Lake Fishing Pier on the northwest shore of Toketee Reservoir (ZOE 5).



Photo 22. Looking east at Clearwater No. 2 powerplant, which discharges flows to Toketee Reservoir (ZOE 5) from the southeastern shoreline.



Photo 23. Looking southeast from the right abutment of Toketee Dam at Toketee Reservoir (ZOE 5) and the Toketee waterway intake and trash rake. FPA Part 8 recreational signage is see at left of frame.



Photo 24. Looking downstream (northwest) from the Toketee Dam left abutment at the lower Clearwater No. 2 bypassed reach of the Clearwater River (ZOE 16; lower left) confluence with the Toketee bypassed reach of the North Umpqua River (ZOE 6; middle left).



Photo 25. Looking upstream (south) at the lower Toketee bypassed reach of the North Umpqua River (ZOE 6). The Toketee powerhouse substation is seen at left of frame.



Photo 26. Looking downstream (north) at the Slide Creek impoundment (ZOE 7). Toketee powerhouse is seen at right of frame. Fish Creek powerplant is seen in the middle distance on river left.



Photo 27. Looking north at Fish Creek powerplant. Slide Creek impoundment (ZOE 7) can be seen through the trees at lower right of frame. The Slide Creek dam spillway gate can be seen to the right of the generator.



Photo 28. Looking upstream (south) at Slide Creek Dam and the transition between Slide Creek impoundment (ZOE 7) and the Slide Creek bypassed reach (ZOE 8).



Photo 29. Chinook salmon utilizing 110 cubic yards of newly installed spawning gravels in the Slide Creek bypassed reach (ZOE 8) immediately downstream of Slide Creek dam.



Photo 30. Looking upstream (south) at the lower Slide Creek bypassed reach (ZOE 8) at the transition to the Slide Creek full-flow reach of the North Umpqua River (ZOE 9). Slide Creek powerplant and tailrace barrier are seen at left of frame.



Photo 31. Looking downstream (northwest) at the Slide Creek full-flow reach of the North Umpqua River (ZOE 9). Chinook salmon can be seen on spawning gravels in the river.



Photo 32. Looking northeast at Soda Springs Reservoir (ZOE 10). Fish ladder exit gates are seen in the lower middle of frame. Soda Springs dam crest and the north intake tower are seen in the middle distance.



Photo 33. Looking upstream (southeast) at Soda Springs Dam and the upper Soda Springs bypassed reach of the North Umpqua River (ZOE 11). The fish ladder entrance can be seen at water level on the center left of frame. The fish screen structure is at the right of frame. Freshly installed spawning gravels are seen at the base of the fish screen.



Photo 34. Looking downstream (northwest) at the Soda Springs bypassed reach (ZOE 11). Fish screened from diversion are returned to the river via the pipe at the bottom right of frame. The Fish Evaluation Building is seen on river-right in the middle distance.



Photo 35. Looking upstream (southeast) at Soda Springs powerplant and tailrace barrier from the upper Wild and Scenic Reach of the North Umpqua River (ZOE 12).



Photo 36. Looking upstream (northeast) at the Copeland Creek gage (USGS 14316500) on river-left at the downstream extent of the regulated reach of the North Umpqua River (ZOE 12).



Photo 37. Looking east from the right embankment of Clearwater No. 1 dam at Clearwater No. 1 impoundment (Stump Lake; ZOE 13).



Photo 38. Looking northeast (upstream) at Clearwater No. 1 dam and the upper Clearwater No. 1 bypassed reach of Clearwater River (ZOE 14).



Photo 39. Looking upstream (east) at the transition from the lower Clearwater No. 1 bypassed reach (ZOE 14; middle distance) to the Clearwater No. 2 impoundment (ZOE 15) upstream of Clearwater No. 2 dam. Clearwater No. 2 powerplant is seen at left of frame. Clearwater No. 2 bypassed reach (ZOE 16) is seen at the middle right of frame.



Photo 40. Looking upstream (east) from the right abutment of the Clearwater Reconnect facility at the Clearwater No. 2 bypassed reach (ZOE 16). Flows at left of the boom continue to Toketee Reservoir. Flows to the right of the boom continue downstream of the Clearwater Reconnect facility to the lower Clearwater No. 2 bypassed reach.



Photo 41. Looking downstream (southwest) at the Clearwater Reconnect facility and the Clearwater No. 2 bypassed reach (ZOE 16).



Photo 42. Looking east (upstream) at Fish Creek impoundment (ZOE 17) and Fish Creek dam. The fish ladder exit and diversion intake are seen at left of frame.



Photo 43. Looking downstream (southwest) from the right abutment of Fish Creek dam at the upper Fish Creek bypassed reach (ZOE 18). The fish ladder and fish return pipe discharge are seen at right of frame.



Photo 44. Looking northwest at the Fish Creek fish screens within the Fish Creek diversion waterway.



Photo 45. Looking downstream (north) from the Highway 138 bridge over the lower Fish Creek bypassed reach (ZOE 18; left of frame) confluence with the Slide Creek bypassed reach of the North Umpqua River (ZOE 8).

APPENDIX B. PROJECT MAPS

(Relevant FERC Exhibit G map sheets provided under separate cover)