Permit Application For an Existing Hydroelectric Facility:

Exhibits A through E.

Oregon Administrative Rule 690-051-0100

Nichols Gap Hydroelectric Project

(FERC Exempt No. 8704)

Prepared for:

Eagle Point Irrigation District

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EXECUTIVE SUMMARY

Eagle Point Irrigation District (EPID) owns and operates the 0.9-megawatt (MW) Nichols Gap Hydroelectric Project (EPID Project). The EPID Project is located in Jackson County in southwestern Oregon near the town of Eagle Point. The EPID Project area is located along the east bank of an unnamed tributary to Nichols Branch Creek (Unnamed Tributary). The Unnamed Tributary drains approximately 1,000 acres prior to joining Nichols Branch Creek. Nichols Branch Creek is a tributary of Little Butte Creek. Little Butte Creek drains into the Rogue River approximately three miles southwest of Eagle Point (Figure 5-1). The EPID Project area is located within the Rogue River Watershed, one of the principal watersheds of southwestern Oregon and the Cascade Range.

The EPID Project is located downstream of and diverts water from the tailrace of a 2.8 MW Federal Energy Regulatory Commission (FERC) exempt hydroelectric project owned and operated by Pacific Power/PacifiCorp (PacifiCorp Project) (Figure 5-2). The upstream PacifiCorp Project diverts water from the south fork of the Big Butte Creek, a tributary of the Rogue River, into a 17.45-mile-long conveyance owned by EPID. A 1,948-foot extension canal and forebay, along with a 1,934 ft. steel penstock, deliver water to the PacifiCorp Project.

The EPID Project was constructed in 1986 by private parties. EPID purchased the EPID Project in 1994. The Federal Energy Regulatory Commission (FERC) awarded the EPID Project exempt status on October 16, 1984 (FERC-exempt project number p-8704). Oregon Water Resources Department (OWRD) issued EPID Project license HE 507 on April 10,1986 for a 35-year term expiring December 31,2021 (Project License). EPID is now applying for a water right permit to continue diverting PacifiCorp Project tailrace water for non-consumptive use in hydroelectric power production.

EPID Project works include a reinforced concrete intake structure. The intake structure contains a trash rack, instream flow by-pass weir, level control and slide gate. A 3450-foot-long, 48-inch diameter buried penstock connects the intake structure to a 24-foot-wide by 36-foot-long reinforced concrete and masonry powerhouse. The powerhouse contains the turbine, 0.9 MW generator, switchgear, governor, and automated controls. A transformer is located adjacent to the powerhouse and connects to a 700 foot 21-kilovolt (kV) powerline. A 20-foot-long and 15-foot-wide tailrace conveys water from the powerhouse to the unnamed tributary of Nichols Branch Creek. The EPID Project average annual power generation is rated at 2,660,000 kilowatt hours (kWh).

In reliance upon the PacifiCorp Project tailrace flow, the EPID Project operates as a run-of-river facility. The EPID Project maintains a continuous minimum bypass flow of 2 cubic-feet-per-second during Project operation from October or November through May or June, depending on irrigation water demand. When EPID supplies irrigation water to its members, EPID diverts

PacifiCorp Project tailwater away from the EPID Project penstock and into two EPID irrigation canals; the East and West Lateral Irrigation Canals. The irrigation canals are located on each side of the PacifiCorp Project tailrace and EPID Project dam. EPID does not operate the EPID Project when irrigation water demand diminishes the flow rate available for hydrogeneration below 17 cubic-feet-per-second (cfs).

The following water right permit application Exhibits A through F are required under Oregon Administrative Rule690-051-0100, "Application for Major License or Permit: Contents, Scope of Evaluation."

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ACRONYMS

C	
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
D	
DLA	Draft License Application
E	
EPID	Eagle Point Irrigation District
F	
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Forest Service
FPC	Federal Power Commission
FWS	U.S. Fish and Wildlife Service
G	
GW	gigawatt
GWh	gigawatt hour
H	
hp	Horsepower
I	
INR	Institute for Natural Resources
K	
kV	kilovolt
kVA	Kilovolt-amp
KW	kilowatt
kWh	kilowatt hour
L	
LBCW	Little Butte Creek Watershed
M	
msl	mean sea level
MW	megawatt
Mwh	megawatt hour

N	
NMFS	National Marine Fisheries Service
O	
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ORTAC	Oregon Recreation Trails Advisory Council
OWRD	Oregon Water Resource Department
P	
Pacific Power	Pacific Power and Light
PPA	Power Purchase Agreement
PURPA	Public Utilities Policies Act of 1978
Q	
QFs	Qualifying Facilities
S	
SHPO	State Historic Preservation Office
T	
TMDL	Total Maximum Daily Load
U	
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 EXHIBIT A – PROJECT DESCRIPTION

The Project is a 0.9-megawatt (MW) hydroelectric project with FERC exemption number 8704. The Project is located in Jackson County in southwestern Oregon. The nearest town is Eagle Point, Oregon, 3 miles southwest of the Project. The nearest principal city to the Project is Medford, Oregon, located approximately 14 miles southwest of the Project area. The point of diversion for the Project is the tailrace of the Pacific Power Project. The Project consists of a single dam and the associated facilities described below.

1.1 Project Facilities

1.1.1 Dam

The existing EPID Project dam was built in 1957. The dam is 120-feet-wide and 14-feet-high, it is in good condition, and it requires no upgrades at the time of permit application. The existing EPID Project dam is located below and impounds water from the tailrace of the existing Pacific Power Project. By impounding tailrace water, the existing Project dam stabilizes the tailrace water surface elevation and directs water into the existing East and West Lateral Irrigation Canals or, from October or November to May or June, into the EPID Project penstock.

1.1.2 Spillway

The spillway is integrated within the dam and is constructed of reinforced concrete. Energy defusing rocks located at the lower portion of the concrete apron prevent erosion.

1.1.3 Penstock

An existing 48-inch diameter buried steel penstock connects the existing dam to an existing powerhouse located 3,450 feet away.

1.1.4 Powerhouse

The existing 24-foot by 36-foot reinforced concrete and masonry powerhouse is approximately 33 years old. The powerhouse contains the turbine, generator, governor, and automated controls. A transformer is located adjacent the powerhouse.

1.1.5 Tailrace

The powerhouse tailrace is rock-lined and aligned in a manner to minimize scour and erosion to other structures. The 15-foot-wide tailrace conveys the flow from the powerhouse 20-feet to the Unnamed Tributary stream channel.

1.2 Normal Maximum Water Surface Area and Elevation

The existing PacifiCorp Project maintains a constant tailrace flow rate. The existing dam immediately below the PacifiCorp Project tailrace maintains a pool elevation at 2,088 feet and impounds 1.75 acre-feet of tailrace water over an area of approximately 0.25 acres. Elevation, tailrace water volume, and tailrace water surface elevation is unimpacted by EPID Project operation; PacifiCorp tailrace water flows either out to EPID irrigation canals or down the EPID penstock, depending upon the irrigation season.

1.3 Project Turbines / Generators

The EPID Project includes a 1986 Gilkes Turgo Impulse turbine, with a hydraulic capacity of 100 cfs, and one Kato generator with a 900-kW rating. Average annual power generation is rated at 2,660,000 kWh.

1.4 Project Transmission Lines

The EPID Project transformer is connected to approximately 700 feet of existing 21 kV three-phase transmission lines.

1.5 Additional Appurtenant Project Equipment

The EPID Project is monitored and operated by automated computer controls. The 4,160- 20,00-volt step-up pad-mounted transformer is rated at 1,200 kilovolt-amp capacity. The Project utilizes a pole-mounted electronically-controlled recloser and a pole-mounted visible air-brake disconnect switch.

1.6 Property Owners

Table 1-1 below outlines the list of property owners and their respective acreages within 1,000 feet of the EPID Project.

Table 1-1 Property Owners within 1,000 feet of the Project

Name	Address	Acres
Bowman, Ralph C/Deborah Sue	2505 Brophy RD Eagle Point, OR 97524	69.58
Eagle Point Irrigation District	PO Box 157 Eagle Point, OR 97524	55.49
Kuyper, Norma	2383 Brophy RD Eagle Point, OR 97524	192.8
Snowy Butte Ranch Holdings, LLC William St. Laurent	120 NE 136th Ave, 200 Vancouver, WA 98684	39.38
Florey, Matthew M Trustee ET A	2393 Brophy Rd Eagle Point, OR 97524	76.47
Lewis, Kim A Survivors Trust W	3043 Brophy RD Eagle Point, OR 97524	20.55

2.0 EXHIBIT B – PROJECT OPERATION AND RESOURCE UTILIZATION

2.1 Alternative Site Considered

Not applicable. The EPID Project was constructed in 1987.

2.2 Alternative Facility Designs

Not applicable. The EPID Project was constructed in 1987.

2.3 Automatic Power Plant

The power plant is designed to operate automatically at varying flows ranging from 17 cfs to 100 cfs with an average flow of 85 cfs.

2.4 Average Annual Energy Production

The average annual power generation is 2,660,000 kwh based on an average flow of 85 cfs.

2.4.1 Recorded Stream Flows

The EPID Project makes non-consumptive use of PacifiCorp Project tailrace waters at an average rate of 85 cfs. The existing PacifiCorp Power Project. EPID agricultural irrigation water rights do not require bypass flows. The EPID Project maintains a minimum 2 cfs in compliance with Oregon Department of Fish and Wildlife (ODFW) and FERC requirements.

2.4.2 Area-Capacity Curve

The volume of impounded water (1.75 acre-feet), and the pool-area (approximately 0.25 acres), remain constant while the EPID Project makes non-consumptive use of continuous PacifiCorp Project flow. Figure 2-1 illustrates the area-capacity curve for the EPID Project.

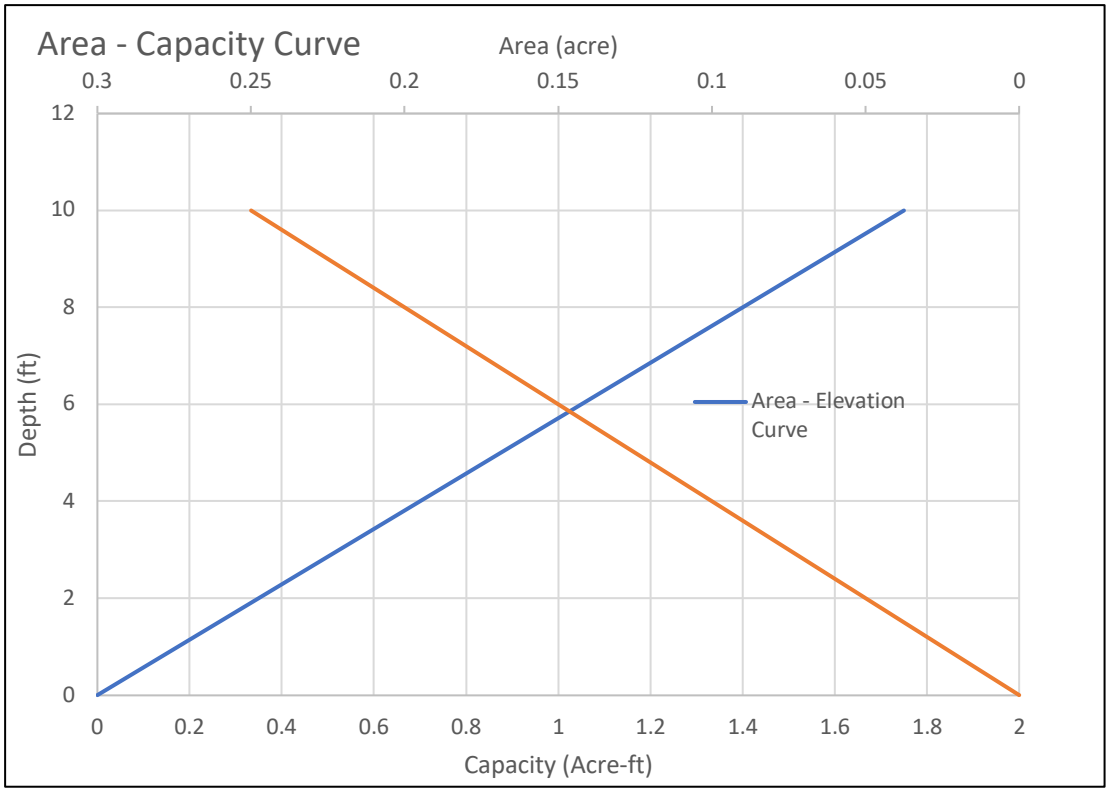


Figure 2-1 Area-Capacity Curve

2.4.3 Estimated Powerplant Hydraulic Capacity

The EPID Project powerplant has an estimated hydraulic capacity at 50 cfs is 490 kWh, and 925 kWh at 100 cfs.

2.4.4 Tailwater Rating Curve

Figure 2-2 illustrates the tailwater rating curve for the EPID Project. The tailwater rating curve represents flow rate versus tailwater elevation of the hydraulics immediately downstream of the EPID Project.

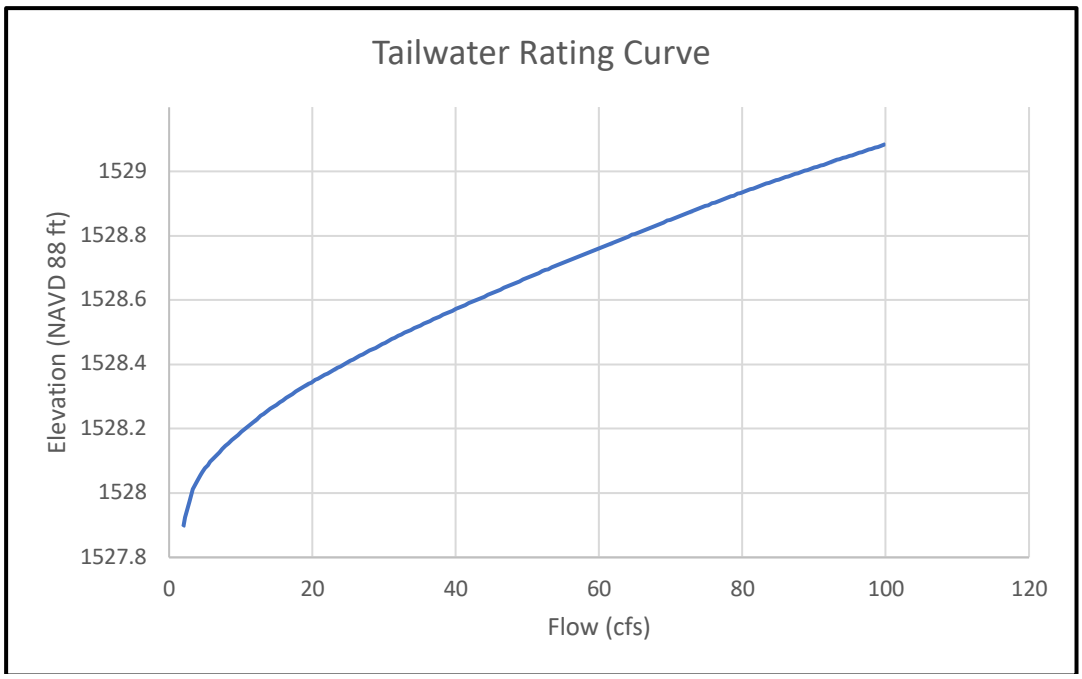


Figure 2-2 Tailwater Rating Curve for the Project

2.4.5 Curve Showing Powerplant Capability Versus Head

Figure 2-3 shows the powerplant capability versus the head, and outlines maximum, normal, and minimum heads.

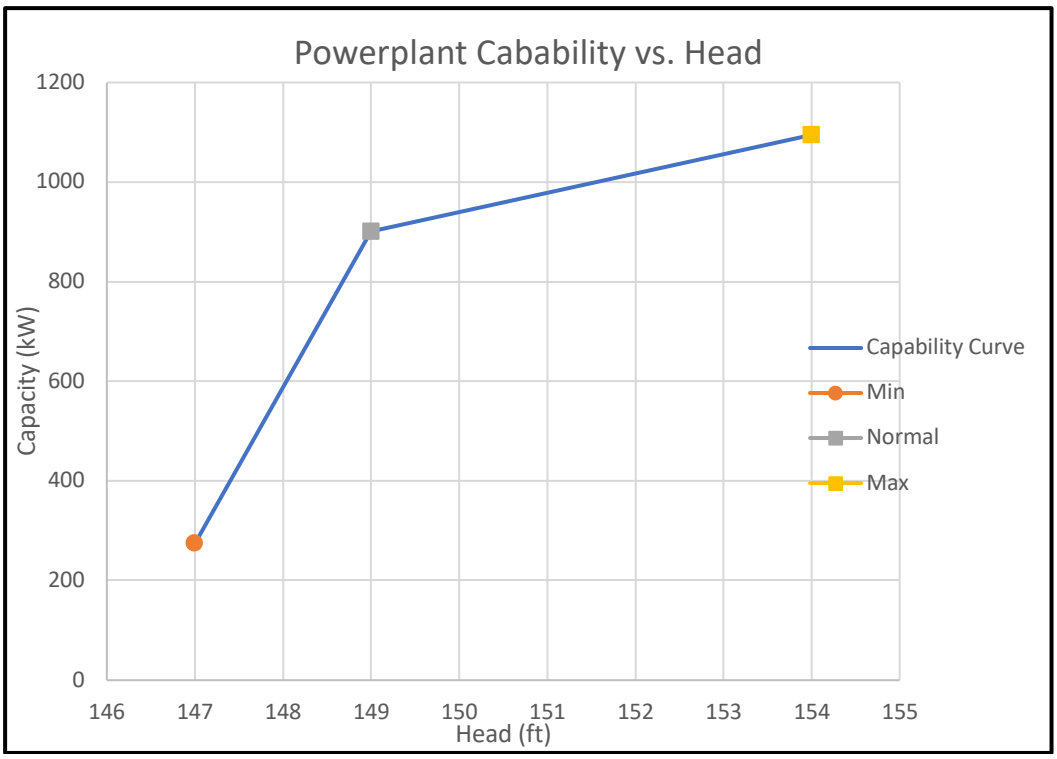


Figure 2-3 Powerplant Capability versus Head for the Project

3.0 EXHIBIT C – PROPOSED CONSTRUCTION SCHEDULE

Exhibit C is not applicable to this application. The EPID Project is fully constructed and has been operational since 1987. The applicant does not propose any additional construction or modifications to existing facilities related to this application.

4.0 EXHIBIT D – PROJECT COSTS AND FINANCING

4.1 Costs of New Construction, Modification, or Repair

Not applicable. The EPID Project is fully constructed, and the applicant does not propose any new construction or modifications to existing facilities.

4.2 Original Cost of Structures or Facilities

4.2.1 Original Land or Water Rights Cost

The initial water right application for the Project estimated the cost of site access as $30,000 in 1984.

4.2.2 Original All Major Project Works Cost

The estimated cost of the EPID Project was $1,400,000 in 1984.

4.2.3 Additions or Modifications

No additions or modifications have been made to the EPID Project.

4.3 Estimated Average Annual Cost of the Total Project as Proposed

4.3.1 Cost of Capital (Equity and Debt)

Not applicable. No additional capital is needed for the EPID Project.

4.3.2 Local, State, and Federal Taxes

Not applicable. The EPID Project is owned and operated by EPID, an Oregon Irrigation District organized under ORS Chapter 545 and exempt from taxation.

4.3.3 Depreciation or Amortization Schedule

Not Applicable.

4.3.4 Operation and Maintenance Expenses

Operation and maintenance expenses vary and are funded through EPID's assessment process.

4.4 Estimated Annual Value of Project Power

The Public Utilities Policies Act of 1978 (PURPA) created an obligation for electric utilities to offer to purchase power from, and interconnect with, qualifying generation projects. PURPA is implemented through a set of rules established by the FERC and each state with jurisdiction over

Pacific Power. Qualifying Facilities (QFs), such as the EPID Project, must meet certain criteria as specified in the FERC rules.

The EPID Project is delivering electricity to Pacific Power under a power purchase agreement (PPA). The contract prices under the PPA are $15.44 per Mwh (2020), and $16.01 per Mwh (2021).

EPID is currently in the process of obtaining a new PPA with Pacific Power. The current Pacific Power QF rate schedule appears below in Table 4-1. Because the rates appearing in Table 4-1 will be out of date when EPID enters into a new PPA, EPID will provide OWRD with the contracted rate schedule once a new PPA is effective.

Table 4-1 PacifiCorp Power Avoided Costs Rates for Eligible QFs

Deliveries During Calendar Year	Renewable Base Load QF	
	On-Peak Energy Price	Off-Peak Energy Price
2019	3.54	2.43
2020	3.15	2.20
2021	4.06	1.44
2022	4.13	1.51
2023	4.20	1.58
2024	4.30	1.68
2025	4.40	1.66
2026	4.49	1.71
2027	4.58	1.75
2028	4.68	1.80
2029	4.78	1.84
2030	4.88	1.88
2031	4.98	1.93
2032	5.08	1.98
2033	5.17	2.03
2034	5.28	2.07
2035	5.40	2.10
2036	5.51	2.14

Source: PacifiCorp 2020

4.5 Power Consequences of Denial of the Permit

The EPID Project generates an average of 2.66 million kWh annually. EPID Project power is carbon-free renewable power for Oregon; the equivalent of approximately 4,350 barrels of oil or 1,190 tons of coal annually. The EPID renewable energy resource helps displace the nation's dependency on oil, coal, and other nonrenewable resources. Currently, output is sold through a PPA to Pacific Power. If this permit application is denied, Oregon will lose 0.9 MW of renewable power.

4.6 Financing and Annual Revenues

Applicant uses revenue generated by EPID assessments to meet the costs identified in Section 4.3.

5.0 EXHIBIT E – ENVIRONMENTAL REPORT

The EPID Project is a 0.9-MW hydroelectric project with FERC exemption number 8704. The EPID Project is located in Jackson County in southwestern Oregon. Eagle Point, Oregon, is located 3 miles southwest of the Project, and the nearest principal city to the Project is Medford, Oregon, approximately 14 miles southwest. See Figure 5-1 below for a geographic overview.

The EPID Project is fully constructed and began operations in 1987. EPID does not propose any new construction or modifications to the Project as part of this application.

Figure 5-1 Geographic Overview of the EPID Project Area

5.1 GENERAL DESCRIPTION

EPID purchased the EPID Project in 1994. The Federal Energy Regulatory Commission (FERC) awarded exempt status on October 16, 1984 (FERC-exempt project number p-8704). The Oregon Water Resource Department issued license HE 507 on April 10, 1986 for a 35-year license term expiring December 31, 2021 (Project License). EPID is now applying for a permit to continue to divert water for hydroelectric power production.

The EPID Project is the second-most downstream hydroelectric facility on the Unnamed Tributary (Figure 5-2). The first project (upstream) is the Eagle Point Hydroelectric Project, a 2.8 MW, FERC-exempt, hydro facility owned and operated by Pacific Power / PacifiCorp (PacifiCorp Project). The downstream EPID Project diverts water for non-consumptive use from the tailrace of the upstream PacifiCorp Project.

PacifiCorp Project water is diverted from the south fork of the Big Butte Creek, a tributary of the Rogue River, into a 17.45-mile-long conveyance system owned and operated by EPID. EPID diverts water from the tailrace of the Pacific Power Project for non-consumptive use by the EPID Project.

The EPID Project uses the PacifiCorp tailrace flows as a run-of-river facility bypassing a minimum flow of 2 cfs during operation. The EPID Project operates from October or November through May or June, depending on irrigation water demand. When EPID supplies irrigation water to its members, EPID diverts PacifiCorp Project tailwater away from the EPID Project penstock and into two EPID irrigation canals; the East and West Lateral Irrigation Canals. The EPID irrigation laterals are located on each side of the PacifiCorp Project tailrace and the EPID Project dam. EPID does not operate the EPID Project when irrigation water demand diminishes the available PacifiCorp Project tailrace flow rate below 17 cfs.

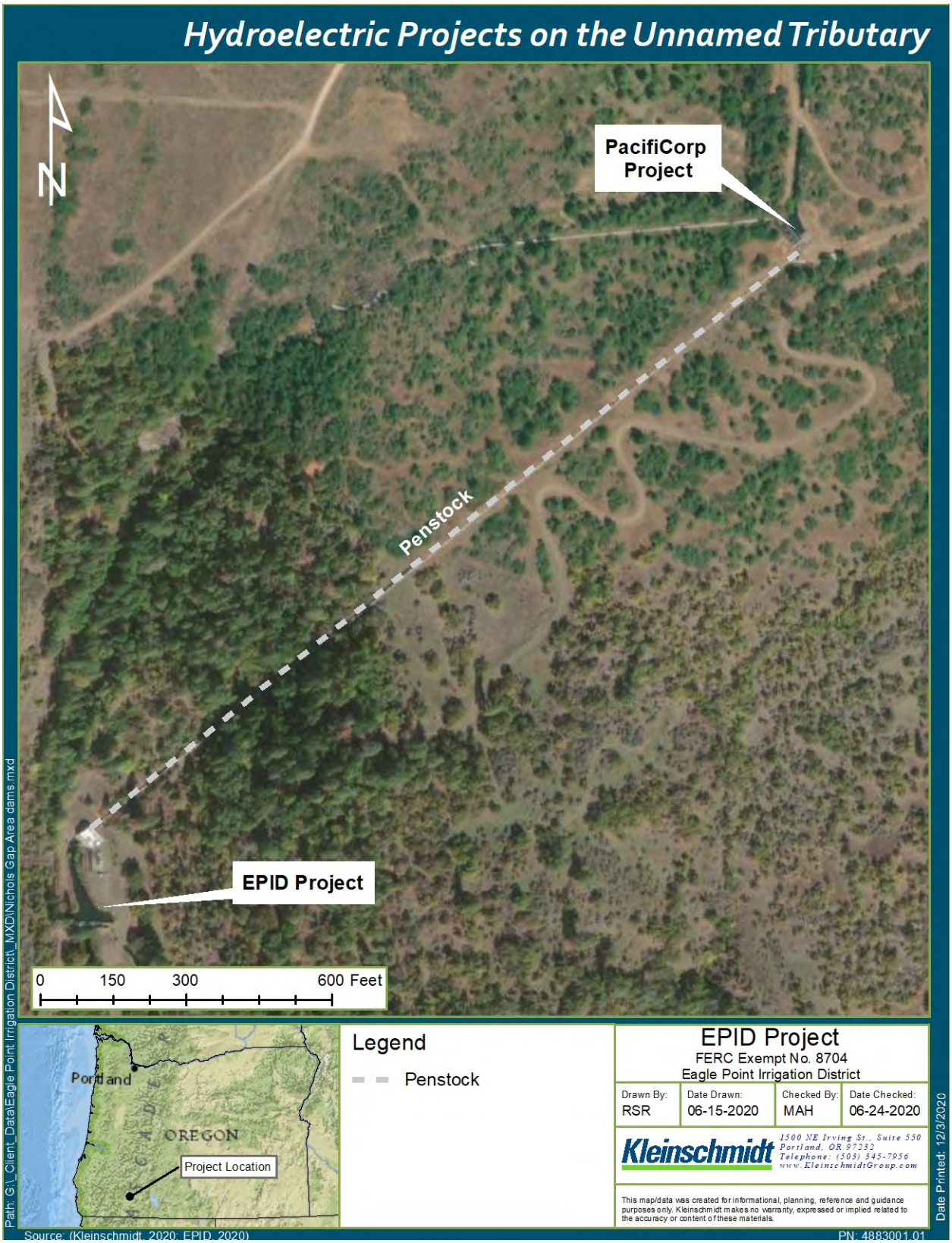


Figure 5-2 Hydroelectric Projects on Unnamed Tributary

5.1.1 Project Location

The EPID Project is located in Jackson County in southwestern Oregon in the town of Eagle Point. The EPID Project area is located along the east bank of the Unnamed Tributary (Figure 5-1).

The point of diversion for the PacifiCorp Project is the South Fork of Big Butte Creek. EPID conveys water from the point of diversion through a conduit system owned by EPID to a 1,948-foot-long canal-forebay owned by PacifiCorp. A 1,934-foot-long penstock with a 100 cfs capacity conveys water from the canal-forebay to the PacifiCorp Project. Depending upon the season and demand for irrigation water, either the EPID irrigation canals (the East and West Lateral Irrigation Canals) or the EPID Project penstock take water from the tailbay immediately below the PacifiCorp Project. All facilities downstream of the PacifiCorp tailbay are owned and operated by EPID.

Big Butte Creek is a 12-mile-long (19 km) tributary of the Rogue River. It drains approximately 245 square miles of Jackson County. Its two forks, the North Fork and the South Fork, both begin high in the Cascade Range near Mount McLoughlin (USGS 1980a).

The Nichols Branch is a tributary of Little Butte Creek which drains into the Rogue River approximately three miles southwest of the town of Eagle Point. The Unnamed Tributary drains approximately 1,000 acres prior to entering the Nichols Branch. The EPID Project returns flow to the Unnamed Tributary, then Little Butte Creek, then to the Rogue River.

Little Butte Creek is a 17-mile-long (27 km) tributary of the Rogue River. Its drainage basin consists, in part, of approximately 354 square miles of Jackson County. It also has two forks, the North Fork and the South Fork, which begin high in the Cascade Range near Mount McLoughlin and Brown Mountain. They both flow generally west until they meet near Lake Creek (USGS 1980b). The main stem continues west, flowing through the communities of Brownsboro, Eagle Point, and White City, before finally emptying into the Rogue River.

5.1.2 Project Facilities

The EPID Project dam was constructed in 1986. EPID Project works include a reinforced concrete intake structure containing a trash rack, instream flow by-pass weir, level control and slide gate; a 3450-foot-long, 48-inch buried penstock; and a 24-foot-wide by 36-foot-long reinforced concrete and masonry powerhouse with a removable roof (Figure 5-3).

The powerhouse contains the turbine, generator, switchgear, governor, automated controls, and a transformer is located adjacent to the powerhouse. The Project utilizes one turbine generator unit with a capacity of 0.9 megawatt (MW). Average annual power generation is rated at 2,660,000

kilowatt hours (kWh). A 20-foot-long and 15-foot wide tailrace conveys return flow from the powerhouse to the Unnamed Tributary channel.

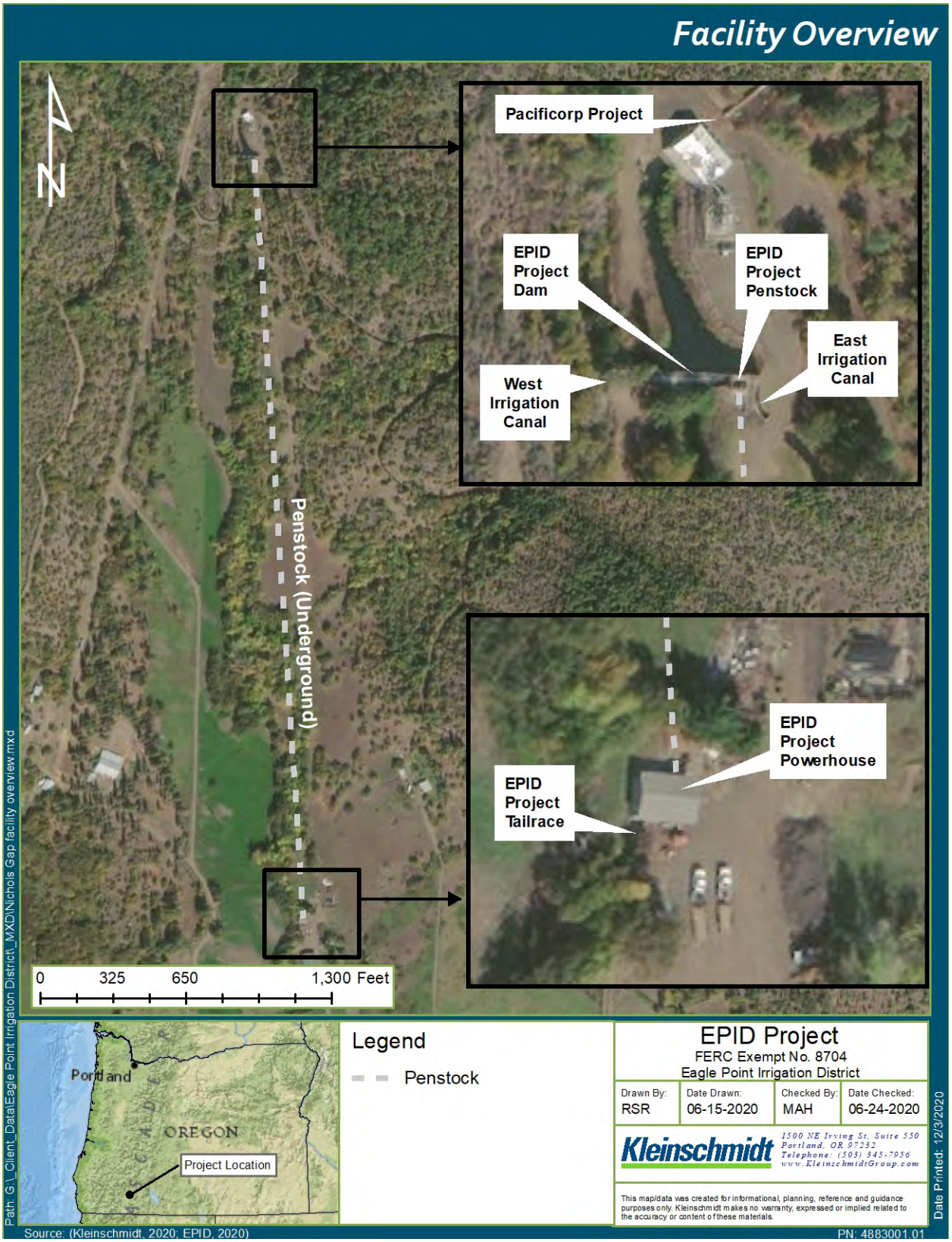


Figure 5-3 EPID Project Facility Overview

FERC-exempt project number p-8704 license requires the EPID Project to maintain a continuous 2 cfs bypass flow. EPID is proposing to continue operations as described and proposes no changes to EPID Project operations.

EPID is proposing no modifications to the existing EPID Project facilities. The existing dam, penstock, powerhouse, and other appurtenant features are all well maintained, in good working order, and no changes are required or proposed to these facilities that are outside the normal maintenance practices or ongoing safety requirements.

5.2 WATER USE AND QUALITY

The EPID Project is located in the Rogue River Basin Watershed, one of the principal watersheds of southwestern Oregon and the Cascade Range and flows approximately 215 miles in a generally westward direction to the Pacific Ocean (Figure 5-4). The Rogue River Basin of southwestern Oregon covers a drainage area of approximately 5,156 square miles from its headwaters on the west slope of the Cascade Mountains to its terminus at the Pacific Ocean in Gold Beach, Oregon (USGS 2015). The Rogue River Basin is broken into 3 sub-watersheds: the Upper, Middle, and Lower Rogue sub-watersheds (Figure 5-4).

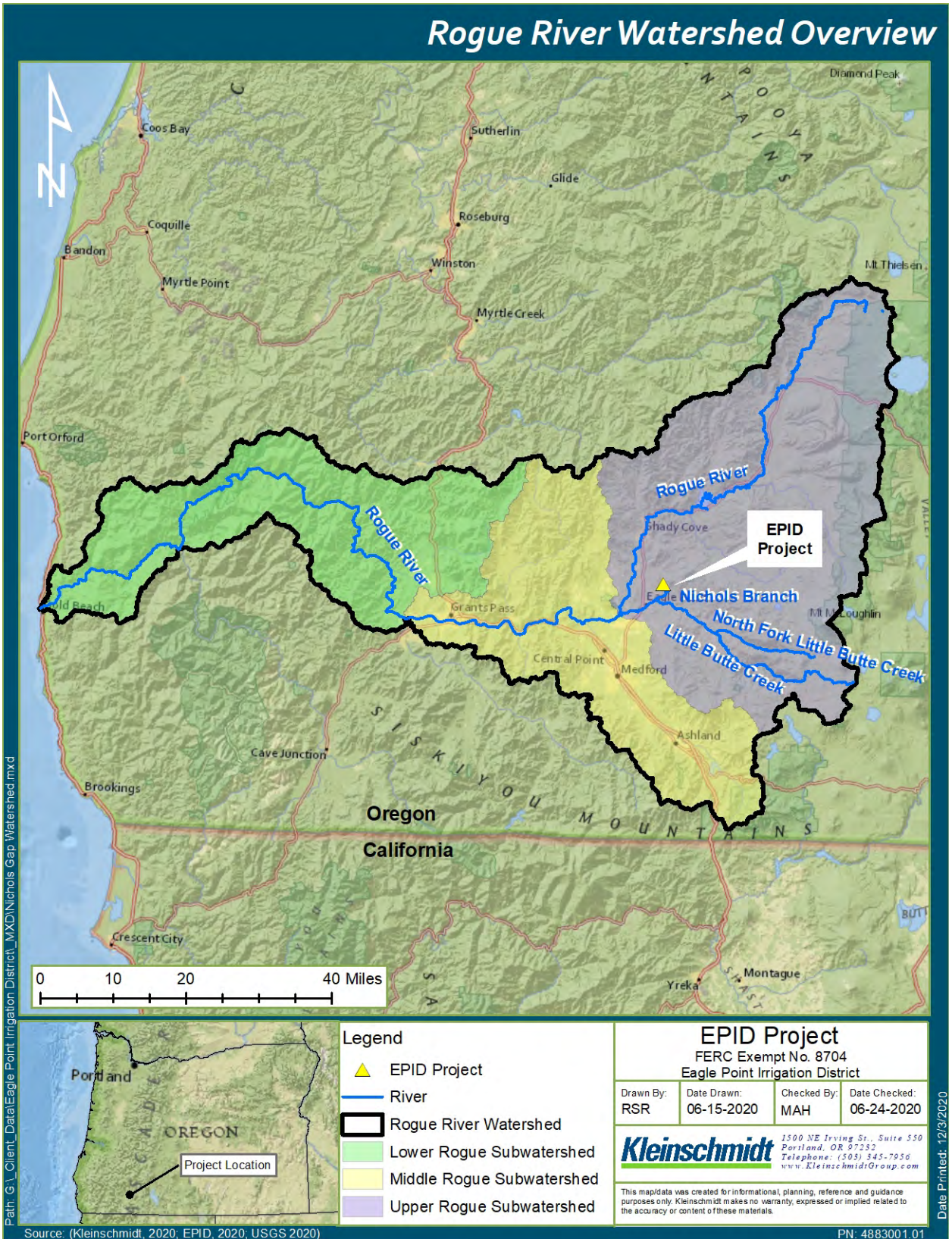


Figure 5-4 Rogue River Watershed Overview

5.2.1 Drainage Area

The EPID Project is located along the east bank of the Unnamed Tributary to the Nichols Branch. The Unnamed Tributary drains approximately 1,000 acres above the Nichols Branch confluence. Nichols Branch is a tributary of the larger Little Butte Creek. Little Butte Creek drains into the Rogue River, a principal watershed in southwest Oregon, approximately 3 miles southwest of the town of Eagle Point (Ryan 1984).

The Unnamed Tributary collects surface water runoff and upstream flow from the Eagle Point irrigation canal for downstream distribution into gravity lateral canals.[1] The Unnamed Tributary upstream of the dam drains approximately 110 acres of forested upland.

The PacifiCorp Project contributes an average annual flow of 63 cfs from the tailrace into the stabilization pool above the EPID dam, irrigation canals, and penstock. Only flows from October or November through May or June from the Unnamed Tributary are available for power generation by the EPID Project. During the irrigation season, PacifiCorp Project tailrace flows are diverted to agricultural irrigation.

5.2.2 Streamflow, Gage Data, and Flow Statistics

The EPID Project is located in the Little Butte Creek Watershed (LBCW), which is located in the Upper Rogue sub-watershed, the largest sub-watershed in the Rogue River Watershed. Elevations in the Upper Rogue sub-watershed range from 1,878 feet above mean sea level (msl) near Prospect, Oregon, to 8,139 feet above msl at Hillman Peak, with a mean of 4,655 feet above msl (URWA 2006). The Upper Rogue River sub-watershed includes a total of fourteen water availability basins.

There are presently five operating stream gauges in the Upper Rogue Watershed, which include:

- Elk Creek near McLeod,
- Big Butte Creek near McLeod
- Rogue River near McLeod,
- Rogue River below Prospect, and
- Rogue River at Dodge Bridge (URWA 2006).

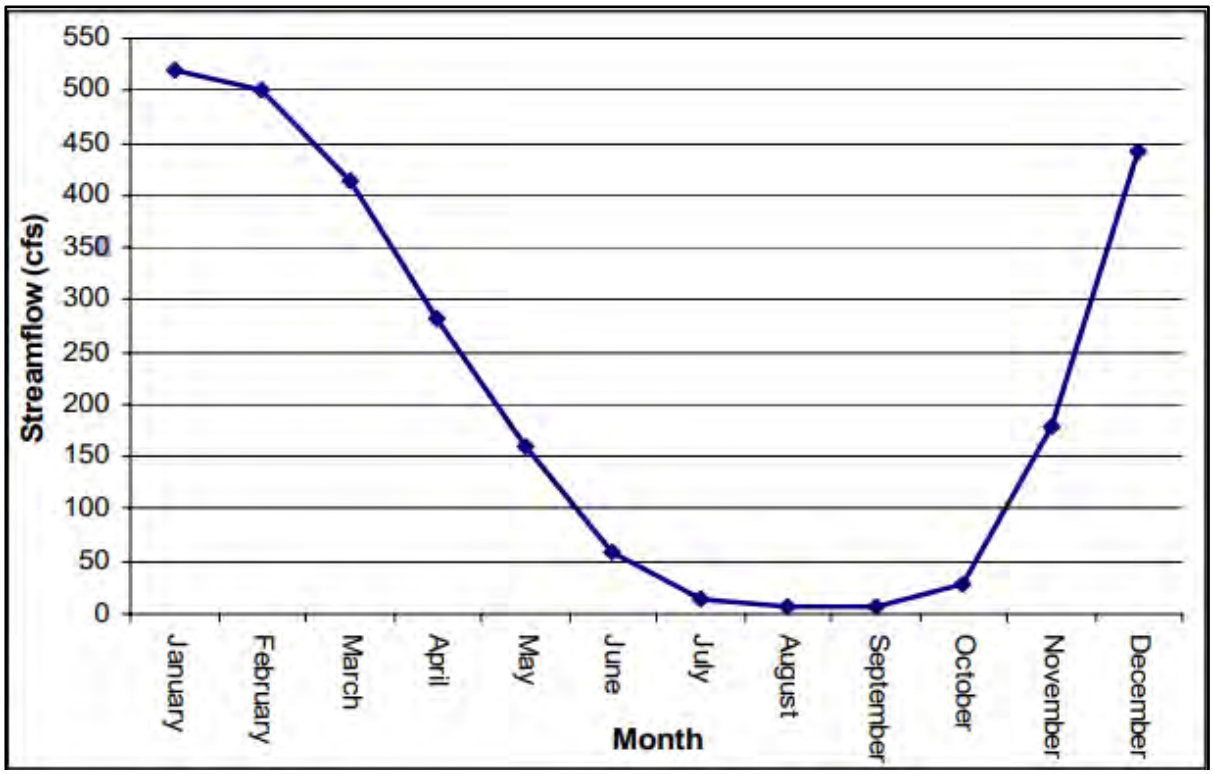
The relevant stream gage in nearest proximity the EPID project is the U.S. Geological Survey gage at *Elk Creek near Trail, Oregon, Gage No. 1433800*. Gage No. 1433800 is located upstream of the PacifiCorp Project and it captures flows originating from a much larger drainage (133 square miles). However, Gage No. 1433800 water quality data is believed to be

[1] Lateral canals [are] built to conserve any water flowing in them that is not utilized, and also water that finds its way back into the natural channels after being applied to the land (Edward J. Mehren, Henry Coddington Meyer, John M. Goodell, 1909).

representative of the South Fork Big Butte Creek, the source of the majority of Unnamed Tributary flows.

5.2.2.1 Elk Creek Sub-watershed

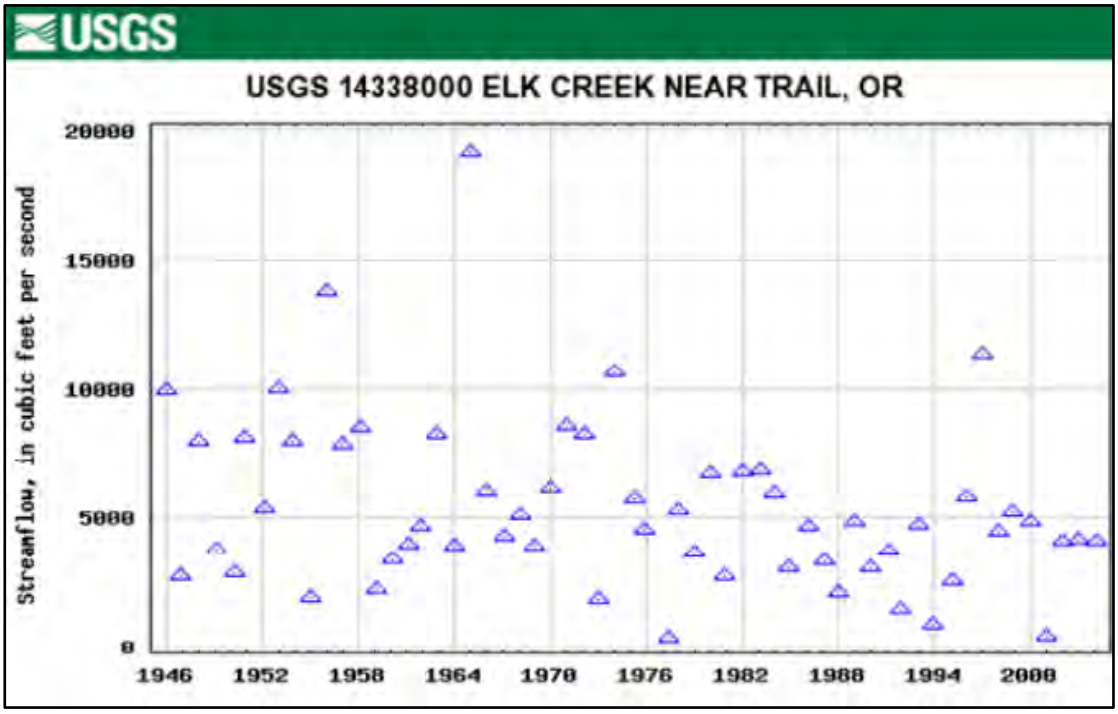
The Elk Creek sub-watershed covers approximately 134 square miles on the western edge of the assessment area, between the Trail Creek sub-watershed to the west and the Upper Rogue River sub-watershed to the east (URWA 2006). The relevant Elk Creek stream gauge in nearest proximity the EPID Project in the sub-watershed contains the nearest gaging station to the Project (Gauging Station #14338000). The gage is located approximately 10 miles north of the Project. The mean monthly stream flows at the Elk Creek gauging station are shown in Figure 5-5.



Source: USGS 2006

Figure 5-5 Mean Monthly Streamflow at Gauging Station #14338000

The maximum discharge recorded at USGS gauging station #14338000, Elk Creek near McLeod, was 19,200 cfs on December 22, 1964. The minimum recorded discharge was 0.01 cfs on October 8, 1987, the result of dam construction 1.30 miles upstream (URWA 2006). Peak Streamflow events are shown in Figure 5-6.



Source: USGS 2006

Figure 5-6 Peak Streamflow Events at Gauging Station #14338000

5.2.2.2 Big Butte Creek Sub-watershed

The Big Butte Creek Sub-watershed encompasses approximately 247 square miles in the southeast portion of the Upper Rogue Watershed. Watershed elevations range from 1,534 ft above msl at the mouth of Big Butte Creek, to the highest elevation in the Upper Rogue Watershed, 9,495 ft above msl at Mount McLoughlin (URWA 2006). The Big Butte Creek near McLeod gauging station (#14337500) is located north of the Elk Creek gauging station. The period of record for gauging station #14337500, Big Butte Creek near McLeod is from October 1945 to the present with a data gap between September 1957 and October 1967 (URWA 2006).

According to the Oregon Water Resources Department, the highest stream discharge recorded at this site was 8,950 cfs on December 22, 1955, which would place this discharge record at the 100-year storm event (Table 5-1). The December 22, 1964, flood was the highest, unrecorded water event (therefore no plotted point above) outside of the period of record. The lowest recorded discharge was 6.4 cfs on June 23 and 24, 1977 (URWA 2006). The peak discharge estimates for Big Butte Creek are shown below in Table 5-1.

Table 5-1 OWRD Peak Discharge Estimates for Big Butte Creek

Event Year	Streamflow (cfs)
2	3,050
5	4,400
10	5,360
20	6,340
25	6,660
50	7,770
100	8,810
500	11,700

Source: URWA 2006

5.2.3 Climate and Precipitation

The LBCW has a Mediterranean climate that is wet and mild during the winter and hot and dry during the summer (LBCWC 2003). Precipitation varies from almost 19 inches annually around Eagle Point to over 50 inches in the higher elevations (LBCWC 2003). Fall, winter, and early spring may bring below freezing overnight temperatures, but temperatures below 20° F are uncommon (LBCWC 2003). Some morning and evening fog during the height of winter often keeps overnight temperatures from falling. Summer conditions are hot and dry (LBCWC 2003). Mid-summer day temperatures are 90° F and above, with night temperatures dropping 30° F (LBCWC 2003).

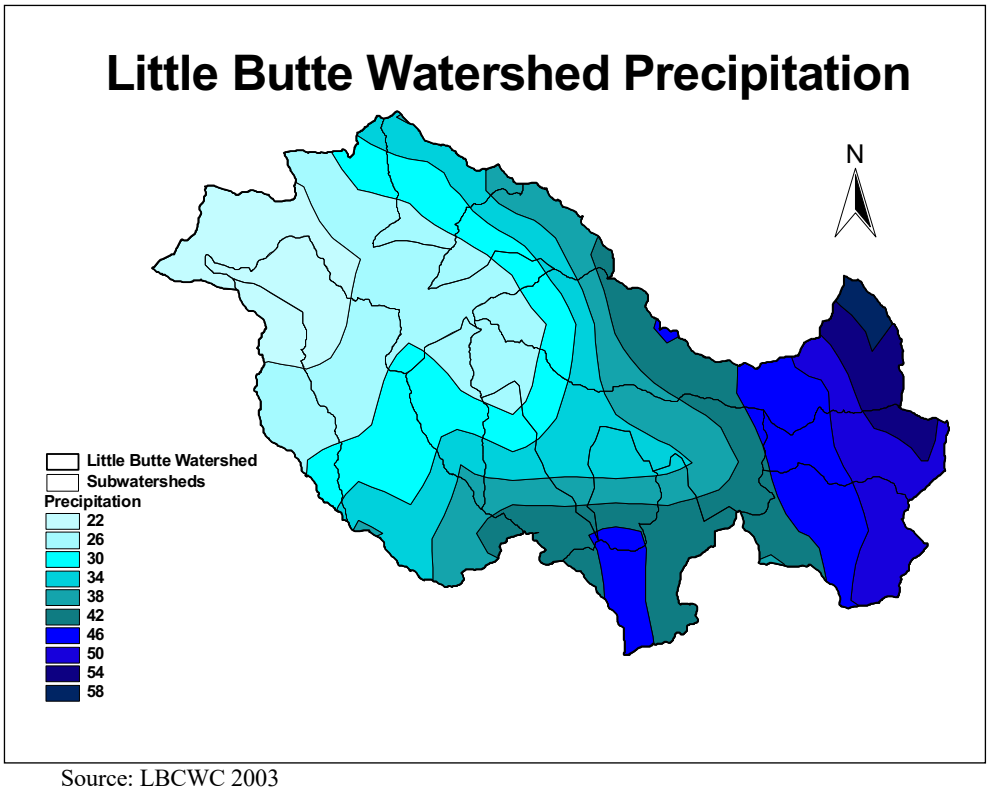
Mean monthly precipitation values for each of the seven sub-watersheds are listed in Figure 5-7 below.

Mean Monthly Precipitation (Inches)							
Month	Upper Rogue	South Fork	Big Butte	Elk Creek	Shady Cove	Trail Creek	Lost Creek
January	7.48	6.39	5.26	8.15	4.50	6.61	5.98
February	6.10	5.92	4.46	5.35	3.39	5.06	4.52
March	6.08	6.01	4.67	4.83	3.34	4.51	4.46
April	3.68	3.71	2.99	2.88	1.94	2.66	2.70
May	2.69	2.83	2.50	2.57	1.69	2.37	2.25
June	1.60	1.81	1.60	1.24	0.90	1.19	1.19
July	0.71	0.69	0.48	0.37	0.25	0.26	0.31
August	1.17	0.97	0.74	0.95	0.74	0.77	0.89
September	1.85	1.88	1.47	1.32	1.09	1.25	1.39
October	4.00	3.76	3.34	4.29	2.63	3.59	3.45
November	8.52	7.94	6.02	6.45	4.87	6.20	6.28
December	8.18	7.89	6.39	7.75	5.29	7.13	6.67
Yearly Total	**56.06**	**49.80**	**39.92**	**46.15**	**30.63**	**41.60**	**40.09**

Source: OSU 1961-1990 as cited in USGS 2006

Figure 5-7 Mean Monthly Precipitation for the Upper Rogue Watershed

Precipitation patterns for the LBCW and its sub-watersheds are illustrated below in Figure 5-8.



Source: LBCWC 2003

Figure 5-8 Precipitation pattern in LBCW in Inches

5.2.4 Water Quality

Nichols Branch water quality data is unavailable. Little Butte Creek is a water-quality-limited stream due to temperature, habitat modification, sediment, flow modifications, and fecal coliform, which affect water quality and limit factors for long-term sustainability of native fish and other aquatic species (USDA 1997). Water quality elements temperature, sedimentation, and habitat modification are detailed below.

Much remains unknown about the water quality status of tributary streams in the Upper Rogue Watershed, outside of the Project area. While data gathering has occurred on select tributaries over the years, much of the information has been collected for specific reasons, and using various collection protocols. As such, it is not as valuable in understanding watershed conditions (URWA 2006).

According to the Oregon Department of Environmental Quality (ODEQ) 303(d) list of impaired waters, the Project area is within the Kanutchan Creek-Little Butte Creek area (HUC12 171003070812) which was listed in 2010, and last assessed in 2018, as having some active areas of impaired waters for water contact recreation. ODEQ did not impose a Total Maximum Daily Load (TMDL) (ODEQ 2020).

5.2.5 Temperature

Temperatures in exceedance of 70 degrees Fahrenheit (°F) can be lethal to fish and limit summer rearing habitat within the watershed. Summer stream temperatures vary throughout the watershed with cooler temperatures generally found in most headwater streams. Elevated summer water temperatures are a limiting factor in Little Butte, North Fork Little Butte (below the National Forest boundary), South Fork Little Butte (below Beaver Dam Creek), Antelope, Conde, and Dead Indian creeks (USDA 1997).

Streamflow patterns in North and South Form Little Butte Creeks are heavily influenced by water withdrawals, which affect stream temperature. These water withdrawals include those for the trans-basin water diversions to the adjacent Bear Creek Watershed, and local instream water withdrawal. Both forks of Little Butte Creek are also heavily affected by riparian vegetation removal and channel alternations. Riparian vegetation removal through timber harvesting, road building, agricultural practices, and residential development has resulted in a lack of stream shading. Channel alterations such as channel

straightening and confinement by roads have produced wide, shallow streams. The lack of stream shading and wide, shallow streams have increased solar radiation and water temperatures (USDA 1997).

Southwest Oregon also has natural-caused factors that influence temperature and water quality including hot, arid summers, a lack of vegetation following floods, and sedimentation from natural erosion and landslides (USDA 1997).

5.2.6 Sedimentation

Sedimentation has had effects on water quality in Little Butte Creek due to the geology of the area. The LBCW contains the Cascade Mountains Physiographic Province with two volcanic sub-provinces: High and Western Cascades. The High Cascades are young lava flows with stable slopes, as opposed to the Western Cascades, which are an older geology and have softer volcanic materials, including unstable ash deposits and stable weathered basalt lavas) (USDA 1997).

The LBCW has also been impacted heavily by landslides, surface erosions, clear-cut logging in unstable areas, tractor logging, riparian vegetation removal, and agricultural practices. Roads are the single greatest contributor to sediment in the watershed. The high road density, roads near stream channels, and clear-cut harvesting have accelerated landslides and erosion (USDA 1997). In 1997, the New Year's Day flood that impacted much of Oregon, altered the alluvial canyons and valleys in the LBCW. Much of the gravel, cobble, and sediment were delivered from streamside landslides and general slope failures within South Fork Little Butte and Dead Indian Creeks (USDA 1997).

5.2.7 Habitat Modification

Little Butte Creek has been subject to modification through channel straightening, adjacent road building, wood removal from the stream, timber harvesting, and residential and agricultural development, all of which have contributed to diminished water quality.

5.2.8 Water Uses

The major existing water use for the Unnamed Tributary is agricultural irrigation. The Eagle Point Irrigation Canal was constructed to provide water to ranchers and farmers within EPID. The Eagle Point Irrigation Canal originates along the South Fork Big Butte Creek near Butte Falls and skirts the north slope of Round Top Mountain. The canal crosses the mountain range at Nichols Gap where a dam diverts flow into two lateral canals. The canals and associated waterworks convey agricultural irrigation water within the boundaries of the Eagle Point Irrigation District (Ryan 1984).

The Medford Water Commission and EPID each perform a trans-basin diversion for municipal and agricultural use (URWA 2006). Four irrigation districts operate in the LBCW watershed: Medford Irrigation District, Rogue River Valley Irrigation District, Talent Irrigation District and EPID (LBCWC 2003). The Medford Irrigation District, Rogue River Valley Irrigation District, Talent Irrigation District convey water from Four Mile Lake to Fish Lake via the Cascade Canal. Water from Little Butte Creek is also diverted through canal systems for use in the Bear Creek watershed.

ODFW has developed minimum instream flow requirements for the watershed and granted junior instream rights that are not met most years. Diversions just above the confluence of the North and South Forks deplete stream flows to the point where there usually is only enough water left to satisfy senior downstream water rights (LBCWC 2003). Antelope Creek, located approximately 10 miles south of the EPID Project, is also heavily diverted for irrigation purposes. New appropriations for irrigation are not allowed on Antelope Creek (LBCWC 2003).

Major water uses in the Upper Rogue sub-watershed, both consumptive and non-consumptive, include storage, irrigation, municipal, domestic, agricultural, industrial, power generation, and recreation. Table 5-2 below outlines the consumptive water uses in the Big Butte Creek sub-watershed.

Table 5-2 Consumptive Water Uses in the Big Butte Creek Subwatershed

Big Butte Creek above Mouth – Water Availability Basin #3530710 12/27/2005									
Month	**Storage**	**Irrigation**	**Municipal**	**Industrial/ Manufacture**	**Commercial**	**Domestic**	**Agriculture**	**Other**	**Use Total**
January	0.04	0.0	203.0	0.0	0.33	0.0	0.0	0.0	203.37
February	0.08	0.0	203.0	0.0	0.33	0.0	0.0	0.0	203.41
March	0.10	0.0	203.0	0.0	0.33	0.0	0.0	0.0	203.43
April	0.07	6.13	203.0	0.0	0.33	0.0	0.0	0.0	209.53
May	0.0	14.10	203.0	0.0	0.33	0.0	0.0	0.0	217.43
June	0.0	22.70	203.0	0.0	0.33	0.0	0.0	0.0	226.03
July	0.0	32.50	199.0	0.0	0.33	0.0	0.0	0.0	231.83
August	0.0	26.40	204.0	0.0	0.33	0.0	0.0	0.0	230.73
September	0.0	16.30	204.0	0.0	0.33	0.0	0.0	0.0	220.63
October	0.0	1.42	204.0	0.0	0.33	0.0	0.0	0.0	205.75
November	0.0	0.0	203.0	0.0	0.33	0.0	0.0	0.0	203.33
December	0.03	0.0	203.0	0.0	0.33	0.0	0.0	0.0	203.36

Source: URWA 2006 - All values shown in cfs continuous throughout the month.

In the LBCW existing and future water uses include domestic, livestock, municipal, industrial, irrigation, agriculture, power, development, recreation, wildlife and fish habitat. There are, in normal rainfall years, sufficient supplies of water to supply these needs, although economic development in the watershed may be slowed without development of additional supplies in the future. Little potential exists for developing ground water to meet existing and future needs in the watershed because of geological constraints. The City of Eagle Point has a municipal water system with sources outside of the LBCW. All lands outside of the city limits rely on wells utilizing ground water.

The LCBW consists mostly of tertiary volcanic rocks. These are low permeability rocks capable of yielding only small quantities of ground water. Generally, wells drilled in these rocks are only adequate for domestic, livestock, or other low-flow demand uses. The area at the mouth of Antelope and Little Butte Creeks consists of alluvium similar to the Bear Creek watershed. The best water bearing materials within the alluviums are sand and gravel beds. Generally, these

materials are only a few feet thick and too limited in volume to supply major quantities of groundwater. In general, the alluvium contains a large percentage of clay and yields only small to moderate quantities of water to wells. The alluvium is recharged mainly by precipitation and, less significantly, by infiltration of excess irrigation waters.

5.2.9 Seasonal Variation of Water Quality

Water quality in the Unnamed Tributary and flow rate vary seasonally and annually.

5.2.10 Water Rights

The Medford Water Commission holds a right to divert 30 to 60 cfs from the Big Butte Creek sub-watershed under certificate 86832 and permit 23210 and typically transfers 40 cfs from the Big Butte Springs system via the Medford Aqueduct for communities in the Bear Creek Watershed to the south. These communities include Medford, Talent, Phoenix, Jacksonville, Central Point, White City, and Eagle Point (URWA 2006).

EPID, which is located in the LBCW, holds a 1915 right to divert water from Big Butte Creek for irrigation and pond maintenance uses from the Big Butte Creek sub-watershed under certificate 89373. This is EPID's main irrigation right. EPID performed upgrades to the diversion works and fish passage infrastructure along Big Butte Creek in the early 2000s. EPID also holds certificate No. 31970 for power development. This right is utilized by the PacifiCorp Project. This is not considered a consumptive use because the water is returned to a stream although the water returns to a different watershed in the Rogue Basin.

5.2.11 Instream Flow Uses

The upstream PacifiCorp Project and the downstream EPID Project operate as a run-of-river facilities. The PacifiCorp Project runs year-around. The EPID Project operates seasonally between October or November through May or June when 17 to 98 cfs are available for power generation.

The PacifiCorp Project operates under PC 858, Certificate No. 31970 for 100 cfs from Big Butte Creek allocated by the Legislature under ORS 538.430, and having a priority date of July 5, 1957. The downstream EPID Project operates under HE 507 which provides for the diversion of up to 85 cfs and a 2 cfs bypass flow during the non-irrigation season of each year and is set to expire in 2021 (ODFW 2019).

EPID proposes to continue to release the required minimum 2 cfs flows and reconcile its new hydroelectric water right with the historic use of releases from the PacifiCorp Project to the downstream EPID Project. Accordingly, EPID is requesting a water right permit for 100 cfs.

5.2.12 Description of Any Existing Lake or Reservoir

The existing dam impounds an area of approximately 0.25 acres with a volume of 1.75 acre-feet, and a water surface elevation of 2,088 feet. The area, volume impounded, and water surface elevation is not impacted by operation of the EPID Project. The existing dam is 120-foot-wide, 14-foot-high reinforced concrete dam below the existing Pacific Power and Light powerhouse at Nichols Gap (PacifiCorp Project). The existing dam impounds water from the PacifiCorp Project tailrace, stabilizes tailrace water surface elevation and then directs water either to the EPID penstock or into the existing East and West Lateral Irrigation Canals.

5.2.13 Resource Impacts and Proposed Measures

The existing 0.9 MW EPID Project operates under a FERC exemption because of its size and minimal impacts to the environment. EPID proposes no changes to EPID Project operations. EPID has not identified potential impacts and is not proposing any studies related to water resources.

5.3 FISH, WILDLIFE AND BOTANICAL

5.3.1 Existing Environment

The EPID Project is located within the LBCW, which is predominantly temperature coniferous forest. The LBCW contains approximately 373 square miles in Jackson County and 19 square miles in Klamath County (LBCWC 2003). Elevations in the watershed range from 1,200 feet above mean sea level at the mouth to over 9,300 feet. The upper portion of the watershed is located on the High Cascade plateau and is a low gradient system. As it flows toward the Rogue River it takes on a steeper stream profile until the lower 19 miles where it returns to a low gradient system (LBCWC 2003).

5.3.1.1 Fish and Aquatic

Little Butte Creek is a water quality limited stream due to temperature, habitat modification, sediment, flow modifications, and fecal coliform, which affect water quality and limit factors for long-term sustainability of native fish and other aquatic species (USDA 1997). The LBCW supports Anadromous fish species including chinook salmon, steelhead trout, coho salmon, cutthroat trout, and Pacific Lamprey. The South Fork Little Butte Creek contains one of the largest populations of rearing coho Salmon in the Upper Rogue river basin. This population of coho salmon is listed by the National Marine Fisheries Service (NMFS) as a threatened species (USDA 1997).

5.3.1.2 Birds

Proximity to a year-round water supply at Nichols Gap and the numerous vegetative species create suitable environment for numerous avian species. Distinctive species which have been observed in the surrounding area include Cooper's hawk (*Accipter cooperii*), sharp-shinned hawk (*A. striatas*), red-tailed hawk (*Bateo jamaicensis*), sparrow hawk (*Falco sparverius*), screech owl (*Otas asio*), great-horned owl (*Baba virginianas)* and golden eagle (*Aquila chrysaetos*). In addition, many non-game songbirds likely reside in the area (Ryan 1984).

Many of these bird species are likely seasonal residents. According to the U.S Fish and Wildlife Service (USFWS 2020), some potentially occurring migratory bird species in the project area may also include the Bald Eagle (*Haliaeetus leucocephalus*), Golden Eagle (*Aquila chrysaetos*), Great Blue Heron (*Ardea herodias*), Lesser Yellowlegs (*Tringa flavipes*), Olive-sided Fly Catcher (*Contopus cooperi*), northern spotted owl (*Strix occidentalis caurina*) and the Rufous Hummingbird (*Selasphorus rufus*). These species may be present and breeding in the project area during different seasons.

5.3.1.3 Mammals

The mammal species in the vicinity is the black-tailed deer (*Odocoileus hemionus columbianus*). The herd has been identified by ODFW as a subunit of the 5,000- to 6,000-member Rogue Game

Management Unit. The unit migrates between the Butte Falls/Cascade Range and the Rogue River Valley. The deer occupy the project vicinity during their winter range which occurs between late September and early June. Breeding occurs outside of the project area in the upper elevations of the Cascade Range.

The project area also lies along the fringe of an area where a healthy growing population of Roosevelt elk (*Cervus elaphus*) (Ryan 1984). Elk breed in their summer range and winter in the Project area.

5.3.1.4 Botanical

More than 43% of the riparian zone on the larger streams in the LBCW is described as either dense forest or young dense forest (Table 5-3) (LBCWC 2003).

The natural vegetation which occupies the project area is dominated by open to partly dense stands of California black oak (*Quercus kelloggii*), Oregon white Oak (*g. garryana*), and ponderosa pine (*Pinus ponderosa*). Understory constituents include buckbrush (*Ceanothus cuneatus*), and a variety of annual grasses on the upper dry hillslopes. Oregon ash (*Fraxinus oregana*), black cottonwood (*Populus trichocarpa*) and willows (*Salix spp.*) occur along the banks of the stream channel (Ryan 1984; USFWS 2020).

Table 5-3 Vegetation Classification for Little Butte Creek Watershed

Riparian Category	Miles (sq)	Acres	Percentage of
Dense Forest	8.55	5,470.96	38.42
Sparse Forest	0.70	447.05	3.14
Urban Ag	5.57	3,566.33	25.05
Young Dense Forest	1.05	672.22	4.72
Young Non-forest	6.38	4,081.66	28.67
Total	22.25	14,238.22	100.00

Source: LBCWC 2003

Human activity in the LBCW such as mining, farming, and rural development have impacted the health of the riparian zones, especially on private lands (LBCWC 2003). Riparian restoration in low gradient streams in the LBWC have been altered in condition as well as composition (LBCWC 2003). Large conifers for woody debris recruitment have been replaced by hardwoods such as alders and maples. Conifers often provide longer and larger logs than hardwoods, thus providing significant habitat potential when recruited to streams (LBCWC 2003). Site-specific information on riparian habitat condition is extremely limited. This means that any current information on riparian conditions in the watershed is general in nature. More information is needed on the condition of riparian zones on lands lower in the watershed. Most of this land is in private ownership (LBCWC 2003).

In general, blackberries present a major hazard to the riparian area's zone health. The non-native species of the blackberry plant is highly invasive, especially in areas where this is little over

structure (LBCWC 2003). The non-native blackberry provides very little shade or stream bank stabilizations (LBCWC 2003).

Additional information for vegetation in the LBCW is limited including shade provided, shade potential, species composition, and size of trees (LBCWC 2003).

5.3.2 Threatened and Endangered Species

5.3.2.1 Fisheries

Due to the extreme variability of flows in the project area and lack of suitable substrate, use of the project area by anadromous and resident fish is highly unlikely as are the chances of successful reproduction by fish that may stray into the area. Nichols Branch has limited use by summer steelhead and resident trout at the lower end (Ryan 1984). The Project potentially provides macroinvertebrate food sources to steelhead immediately downstream of the project outlet (Ryan 1984).

Under natural conditions prior to the augmentation of stream flows by the Eagle Point irrigation system and the PacifiCorp Project, annual water yield was approximately 2 cfs and only available on an intermittent basis. This flow was not considered to be sufficient to maintain any viable fishery.

The addition of approximately 80 cfs from the PacifiCorp Project and the dimension of the stream channel have created a fish habitat that is considered to be marginal (Ryan 1984). Very high-water velocities occur at intervals over half the year. Based upon the channel gradient and flow, estimated average stream velocities exceed the maximum preferred velocities of all trout and steelhead life stages, thereby not readily making available any effective habitat in the project area under present flow conditions.

During EPID Project licensing in the mid-1980s, Oregon Department of Fish and Wildlife (ODFW) biologists speculated that stray steelhead (*Salmo gairdneri gairdnerii*) may have spawned downstream of the project area. However, use of the project area by spawning fish was considered highly unlikely due to the extreme flow conditions. In addition, the presence of a downstream barrier, a 15-foot-high irrigation diversion dam (Stanley Dam), effectively prevents fish from migrating into the project site.

A 2019 ODFW Hydroelectric Projects Status Report noted that “fish should not be found in this reach of irrigation ditch” (ODFW 2019).

5.3.2.2 Other Aquatic Species

USFWS (2020) suggests the potential for vernal pool fairy shrimp (*Branchinecta lynchi*) to occur within the area. This species is listed as a threatened species, and the project area is outside the final critical habitat of this species (USFWS 2020). The vernal pool fairy shrimp occurs only in

specific habitats such as seasonal wetlands, stagnant ditches and vernal pools. Due to specific habitat requirements, their population has declined due to habitat loss (USFWS 2019b).

5.3.2.3 Wildlife

The fisher (*Pekania Pennanti*) a proposed threatened species, the gray wolf (*Canis lupus*) an endangered species, and the northern spotted owl a threatened species could potentially occur in the project area (USFWS 2020).

The fisher is a proposed threatened species, yet no critical habitat has been designated yet. The fisher shows preference low to mid elevation coniferous and mixed hardwood forests. The fisher shows variability in preference of plant species, yet the most productive habitats are diverse with an abundance of prey species (USFWS 2016).

The gray wolf is an endangered species in the project area, yet this population of the gray wolf has been proposed for delisting. Most of the wolves in Oregon are concentrated in the northeastern corner of the state, yet wolves are expanding their range into the Oregon Cascade Mountains (USFWS 2019a).

The northern spotted owl was federally listed as a threatened species in 1990. The project location is outside the designated critical habitat for this species. The northern spotted owl lives in dense canopy forests of mature and old growth trees. While they may nest, roost, feed in a variety of habitats, they prefer the old forest stands with multi-layered canopies (USFWS 2005).

5.3.2.4 Botanical

A field inventory for possible threatened or endangered plant species was performed on the project site on May 7, 1984. Prior to field investigation, a review of relevant literature was conducted. In particular, the U.S. Fish and Wildlife Service (USFWS) listing of Threatened and Endangered Plant Taxa (CFR 12/15/80, Part IV) was screened to determine possible candidate species that may inhabit the project area (Ryan 1984).

The botanist at the Medford District Office of the U.S. Bureau of Land Management (BLM) indicated that one candidate species, wooly meadow foam (*Limanthes floccosa ssp. bellergiana*), may occur in vernal pools, though no vernal pools were observed in the project area. The Project area may also have a presence of the Large-flowered Woolly Meadowfoam (*Limnanthes pumila ssp. grandiflora*) (USFWS 2020).

Field investigation in early May 1984 did not locate any candidate species or species with a threatened or endangered classification. At the time the project was built, heavy cattle grazing of the project area, had caused extensive disturbance to the site's natural herbaceous flora.

The potential occurrence of Gentner's Fritillary (*Fritillaria gentneri*), an endangered species, may be in the project area, although no critical habitat has been designated for this species

(USFWS 2020). Gentner's Fritillary is known to occur in Jackson county, and occurs in small, widely scattered patched of about 1,700 flowering individuals. It occurs within a broad range of areas but is typically found in grassland and chaparral habitats on the edges of dry mixed-species woodlands. The species is mainly threatened by habitat loss due to its extremely small population size (USFWS 2003).

5.3.3 Resource Impacts and Proposed Measures

The existing 0.9 MW EPID Project operates under a FERC exemption because of its size and minimal impacts to the environment. As there are no changes to proposed operations under this application, EPID has not identified potential impacts and is not proposing any studies related to fish, wildlife, or botanical resources.

5.4 HISTORICAL AND ARCHAEOLOGICAL

Under 54 USC 306108; hereinafter "Section 106," as amended, federal agencies are obligated to account for the effects of undertakings on historic property. Historic property is described under 36 CFR 800.16(l) as "prehistoric or historic sites, buildings, structures, NRHP objects, districts, or locations of traditional use or beliefs" which are eligible for listing in or listed in the NRHP. A historic property is evaluated for listing in the NRHP by criteria found at 36 CFR 60.4 and National Register Bulletin 15 "How to Apply the National Register Criteria for Evaluation."[2] Section 106 is implemented through the Advisory Council on Historic Preservation's regulations, "Protection of Historic Properties" (36 CFR Part 800).

There are no historical or archaeological resources known to occur within the project area. During the 1984 FERC exemption process, the State Historic Preservation Office (SHPO) determined that a cultural resource survey was not necessary, since the project utilized lands which had been previously disturbed, and records indicated that the area was not of historic significance. A letter documenting this finding (Ryan 1984) is included as Attachment B.

5.4.1 Existing Environment

According to the National Register of Historic Places and Oregon Historic Sites Database, there are no historical or archaeological resources within the project area (OSP 2020). However, a handful of significant sites exist within a few miles of the project area, although the Project does not have an impact on these sites.

- An 1872 water-powered gristmill (Butte Creek Mill) had operated in Eagle Point for more than 125 years. The Butte Creek Mill was located approximately 3 miles southwest of the EPID Project at 402 N. Royal Avenue. The Butte Creek Mill was added to the National Register of Historic Places in 1976 and destroyed by a fire on Christmas Day

[2] Bulletin 15 defines four types of significance for properties (A-D) and seven criteria considerations (A-G).

in 2015. Efforts are underway through the Butte Creek Mill Foundation to rebuild the Mill (Mann 2019).

- The Antelope Creek Covered Bridge/Little Butte Creek Pedestrian Bridge/Jackson County Bridge #202 (Antelope Creek Bridge) is approximately 3 miles from the Project. The Antelope Creek Bridge was constructed in 1922 by Jackson County bridge-building brothers Wesley and Lyal Hartman (OSP 2020). The Antelope Creek Bridge was added to the National Register of Historic Places in 2012,

5.4.2 Resource Impacts and Proposed Measures

The existing 0.9 MW EPID Project operates under a FERC exemption because of its size and minimal impacts to the environment. EPID proposes no changes to proposed operations therefore EPID has not identified potential impacts and is not proposing any studies related to historical or archaeological resources.

5.5 SOCIOECONOMIC RESOURCES

The EPID Project Area, encompassing all associated facilities and lands, is contained within Jackson County and the town of Eagle Point, Oregon. Jackson County is in southwestern Oregon, along the state's southern border with California and is surrounded by Josephine County to the west, Douglas County to the north, and Klamath County to the east. Of the 36 Oregon state counties, Jackson County is the sixth largest in population and the fourteenth largest in area (square miles). The county seat and largest nearby city to the Project is Medford, 14 miles southwest of the Project. The following sections provide a summary of selected socioeconomic characteristics for Jackson County and Eagle Point, Oregon.

The predominant land uses in the Project Vicinity are agricultural followed by rural/suburban/open space. The city of Eagle Point is approximately 3 miles southwest of the EPID Project. Eagle Point is a small city with a total area of 2.96 square miles, located at elevation 1,310 (Figure 5-1). Eagle Point, located near river mile 3 on Little Butte Creek, is the only incorporated city within the watershed, although the small rural communities of Brownsboro, Lake Creek and Climax provide a "neighborhood" focus on the tributaries (LBCWC 2003). The White City area, with a 2010 population of 7,975 is located in both the LBCW and the Bear Creek Watershed, though the percentage of the population base that is within the LBCW is unknown. The economic activity of White City affects the Little Butte Creek, Bear Creek and 7 Basins watersheds and is the major industrial area in the eastern Rogue Basin (LBCWC 2003).

5.5.1 Existing Environment

According to the U.S. Census Bureau estimates (2019), the population of Jackson County in 2019 was 220,940 which represented an 8.7 percent increase from 2010 (USCB 2020). In 2019, 97,266 housing units were available county-wide. Eagle Point is one of the 11 incorporated cities and towns in Jackson County, with a 2019 population estimate of 9,554 residents. With a small land area of only 2.96 square miles, there were 2,862 persons per square mile in Eagle Point, compared to 2,784 square miles in Jackson County with 73 persons per square mile.

5.5.2 Employment, Population and Personal Income Trends

The median household income in Eagle Point was $63,213, which is approximately $13,000 above the 2019 Jackson County median household income of $50,851 and $3,000 above the 2019 Oregon State household income of $59,393 (U.S. Census Bureau 2014-18, 5-year Estimates). The poverty rate is 8.9% in Eagle Point versus 14.8% in Jackson County and 12.6% in the State of Oregon.

As of the estimated 2019 census, there were 220,944 people and 87,417 households, with an average of 2.41 persons per household living in Jackson County. The racial makeup of the county was 91.9% White, 13.2% Hispanic, 1.0% Black or African American, 1.6% Native

American, and 1.6% Asian. The age distribution of the county's population was 20.6% under the age of 18 and 22% 65 years of age or older, with 51.2% of the county being female persons.

Household/Family Distribution and Income, as well as Occupation Types data follows. Table 5-4 provides the family distribution and income statistics for households and families for Eagle Point and Jackson County from the 2014-2018 U.S. Census Bureau, 5-year estimates.

Table 5-4 Household Distribution and Income for Eagle Point and Jackson County

	Eagle Point	Jackson
Households	3,777	87,417
Percentage of Population in Civilian Labor Force	57.4%	57.4%
Median Household Income	$63,213	$50,851
Average Household Size	2.39	2.41

Source: U.S. Census Bureau, American Community Survey (ACS), 5-Year Estimates 2017

In terms of specific occupations, Table 5-5 provides a summary of occupation types for Eagle Point and Jackson County (USCB 2017).

Table 5-5 Distribution of Occupation Types in Eagle Point and Jackson County

	Eagle Point	Jackson County
Management Occupations	14%	9%
Sales & Related Occupations	12.6%	11.2%
Office & Administrative Support	11.4%	13.5%
Food Preparation & Serving	9%	7.3%
Education Instruction & Library	6.58%	4.87%

Source: U.S. Census Bureau, American Community Survey 5-Year Estimates, 2017

Table 5-6 provides a comparison of population changes from 2010 to 2019 in Eagle Point and Jackson County (USCB 2010, 2019).

Table 5-6 Comparison of Changes in Total Populations in the city of Eagle Point, Jackson County and the State of Oregon

City/County/State	2010 Census Population	2019 Population Estimates	% Change 2010-2019
Eagle Point City	8,469	9,554	+12.8%
Jackson County	203,206	220,944	+8.7%
Oregon	3,831,074	4,217,737	+10.1%

Source: USCB 2010, 2019

The largest industries in Eagle Point in 2017 were Health Care & Social Assistance (628 people), Accommodation & Food Services (466 people), and Manufacturing (355 people), while the largest industries in Jackson County were Health Care & Social Assistance (16,156 people), Retail Trade (12,741 people), and Manufacturing (8,703 people) (DataUSA 2017).

The highest paying industries in Eagle Point in 2017 were Public Administration ($112,932), Transportation & Warehousing, & Utilities ($70,238), and Manufacturing ($54,021), while the highest paying industries in Jackson County were Utilities ($62,202), Public Administration ($49,637), and Management of Companies & Enterprises ($47,868) (DataUSA 2017).

The largest businesses and top six employers in the area are Amy's Kitchen, Asante Health System, Harry & David, Lithia Motors Inc., Pacific Retirement Services and Providence Health System. Jackson County also takes pride in having nearly 36% women-owned businesses as of the 2012 census (Jackson County 2020)

The largest universities in Jackson County, OR are Southern Oregon University (1,222 degrees awarded in 2017), Northwest College-Medford (66 degrees), and Abdill Career College Inc (52 degrees) (DataUSA 2018). In Eagle Point, 17.7% of those 25years and older have a bachelor's degree or higher while that figure is 27.4% in Jackson County and 31.5% for Oregon State.

The EPID Project is located on private land. There is no substantial immigration of people in the project area and the area is surrounded by farmland.

5.5.3 Resource Impacts and Proposed Measures

EPID is proposing to continue to operate the EPID Project in a run-of-river mode. Continued operation of the EPID Project is not anticipated to have any effects on area socioeconomics. Therefore, EPID is proposing no changes to current operations. Continued operation of the EPID Project will result in no unavoidable adverse impacts on area socioeconomics.

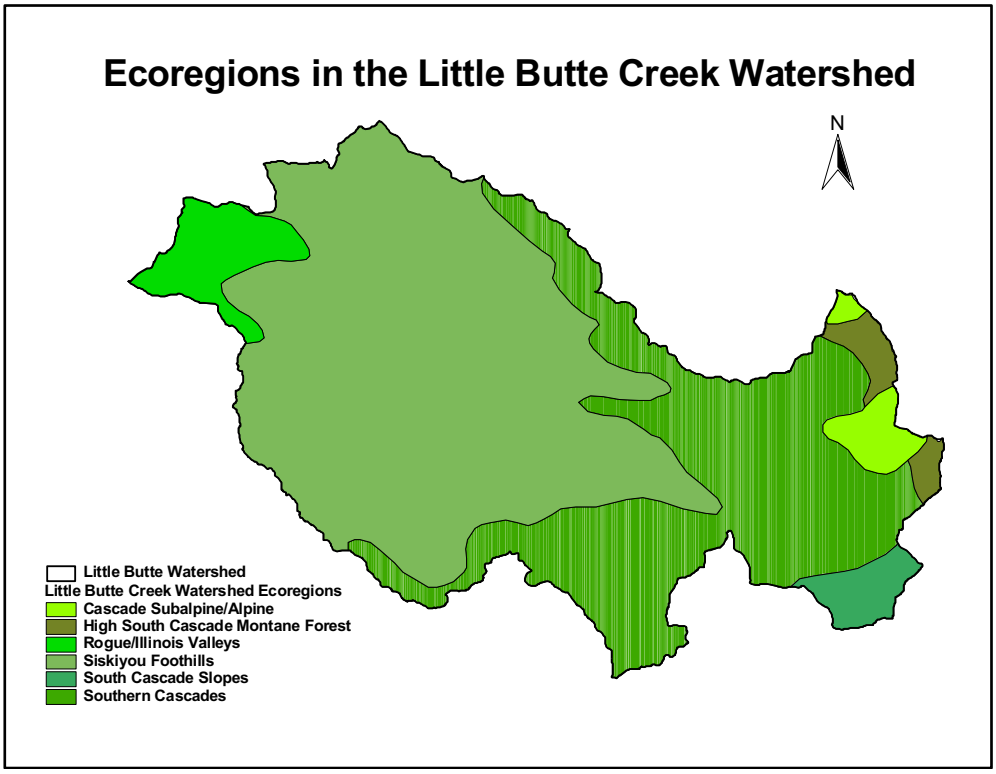
The existing 0.9 MW EPID Project operates under a FERC exemption because of its size and minimal impacts to the environment. EPID proposes no changes to project operations. Therefore, EPID has not identified potential impacts and is not proposing any studies related to socioeconomic resources.

5.6 GEOLOGICAL AND SOIL RESOURCES

5.6.1 Existing Environment

The EPID Project is located west of the Cascade Range and within the Klamath Mountains, in Oregon's southwestern valley. The area surrounding the EPID Project occupies a moderately steep canyon slope south of the area known as Nichols Gap (elevation 2,088 ft.). Project site elevations range between 1,500 to 1,650 feet and consists of a short linear valley which is exposed to the south. The slopes in the area range between 10 and 60 percent.

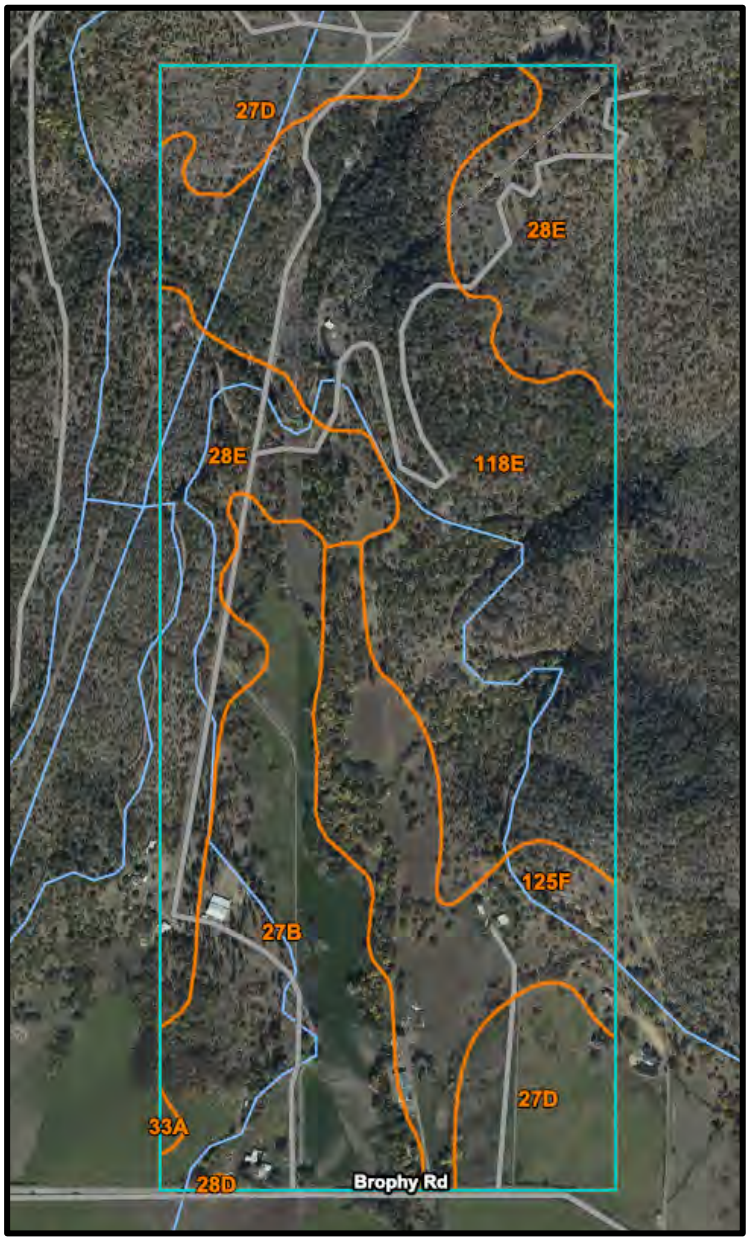
Two subregions split the Cascade Range province longitudinally from north to south: the High Cascades in the eastern third of the watershed and the dissected Western Cascades (Figure 5-9) (LBCWC 2003).



Source: LBCWC 2003

Figure 5-9 Ecoregions in the Little Butte Creek Watershed

According to the 1993 U.S. Department of Agriculture Soil Conservation Service, Soil Survey of Jackson County, the Project area is primarily made up of the Medco-McMullin complex and McNull-Medco complex soil type. These are moderately deep and shallow, moderately well drained and well drained soils that have a surface layer of cobbly clay loam or gravely loam (Figure 5-10) (USDA 1993).



Source: 1993 USDA Soil Conservation Service, Soil Survey of Jackson County

Figure 5-10 USDA Soil Conservation Service, Soil Survey of Jackson County

Map Unit Symbol	Map Unit Name
118E	McNull-Medco complex, 12 to 50 percent slopes
125F	Medco-McMullin complex, 12 to 50 percent slopes
27B	Carney clay, 1 to 5 percent slopes
28E	Carney cobbly clay, 20 to 35 percent slopes

Source: 1993 USDA Soil Conservation Service, Soil Survey of Jackson County

Below 4,800 ft. the watershed lies mostly in the Western Cascade region, which is geologically much older than the High Cascades. The land surface in this region is a deeply dissected,

irregular plateau underlain by 3,000 to 4,000 feet of lava. This part of the watershed is characterized by rugged topography with many moderately steep-walled canyons, a few gentle-sloping canyons, and high sharp ridges (LBCWC 2003).

A well-developed dendritic drainage pattern has occurred over the watershed area in response to approximately 25-30 inches of annual precipitation. Basin streams descend rather gently on the surface of the upland plateau, but plunge steeply down the western slope before leveling out on the Mainstem. Steep gradients of 200 to 300 feet/mile on the upper reaches of the North and South Forks have resulted in deep canyons cut mostly in jointed lava of the western slope. In areas underlain by softer, more easily eroded materials, such as tuff or tuff-breccia, broad canyons have developed with rather gently sloping walls. The gradient of Little Butte Creek averages about 25 feet of drop per mile (LBCWC 2003).

The soils of the lower portion of the watershed are used intensively for agriculture and home sites. Derived from volcanic alluvium, these soils are generally deep, but may contain a clay hardpan that restricts drainage. The soils usually contain a high proportion of clay and water infiltration is often slow. Drainage tiles have been used to facilitate the removal of excess irrigation water. These soils produce a variety of crops including forage crops, grains, and pears (LBCWC 2003).

The same soil characteristics that affect the irrigation drainage patterns also limit the use of these soils for septic tanks. The use of larger drain fields can often compensate for the slow percolation rates, but as the population in the watershed continues to increase, the capacity of the soil to effectively absorb the effluent may be exceeded (LBCWC 2003).

5.6.2 Resource Impacts and Proposed Measures

The existing 0.9 MW EPID Project currently operates under a FERC exemption because of its size and minimal impacts to the environment. EPID proposes no changes to project operations. EPID has not identified potential impacts and is not proposing any studies related to geological or soil resources.

5.7 RECREATION RESOURCES

5.7.1 Existing Environment

The EPID Project area is not recognized by any Federal, State, or local agency as a significant recreational area and no dispersed or developed recreational resources lie within the project area.

The EPID Project site occupies privately held properties and public access is limited. No recreational facilities are located on or near the EPID Project. No are any future recreational facilities are proposed.

Numerous state, county, and private recreational facilities are available for public use. Public recreation facilities include:

- Chamberlain Park, Little Butte Creek Covered Bridge, and Mattie Brown Park, all in Eagle Point, approximately 3 miles southwest of the EPID Project
- Dodge Bridge and Takelma County Parks on the Rogue River and the Rogue River Preserve, all within 4 to 6 miles northwest of the EPID Project
- TouVelle State Recreation Site, approximately 8.5 miles southwest of the EPID Project
- Butte Falls, approximately 10 miles northeast of the EPID Project
- Upper and Lower Table Rock hiking areas, 9 to 11 miles east of the EPID Project
- Willow Lake County Park, approximately 27 miles east of the EPID Project
- Fish Lake, approximately 27 miles east of the EPID Project

5.7.2 Applicable Laws

5.7.2.1 Wild and Scenic Rivers Act of 1968

The National Wild and Scenic Rivers System was created by the Wild and Scenic Rivers Act of 1968 was enacted to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations (Public Law 90-542). The act is notable for safeguarding the special character of these rivers while recognizing the potential for their appropriate use and development. The act encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection.

The Rogue River in southwestern Oregon in the United States flows about 215 miles (346 km) in a generally westward direction from the Cascade Range to the Pacific Ocean. Known for its salmon runs, whitewater rafting, and rugged scenery, the Rogue River was one of the original eight rivers named in the Wild and Scenic Rivers Act of 1968.

The EPID Project is on the Unnamed Tributary, approximately 5 miles from, and eventually draining into the Rogue River. The EPID Project is not within the National Wild and Scenic Rivers System. The Rogue River reach from Crater Lake National Park to Rogue River National Forest boundary (~44 miles) and, the Rogue River reach from Applegate River to Lobster Creek (~83 miles) is within the National Wild and Scenic Rivers System (OSP 2020).

5.7.2.2 The Oregon Scenic Waterway Program of 1970

The Oregon Scenic Waterway Act was passed in 1970 to enable federal, state and local agencies, individual property owners and recreational users to work together to protect and wisely use Oregon’s special rivers (State of Oregon 2020). Oregon's Scenic Waterway system includes 22

rivers and one mountain lake, located from the south coast to the northeast corner of the state (OSP 2020).

The EPID Project is not within the Oregon Scenic Waterway Program. The Rogue River from Crater Lake National Park to Rogue River National Forest boundary (~44 miles) is a State Scenic Waterway. The Rogue River from Applegate River to Lobster Creek (~83 miles) is a State Scenic Waterway and within the National Wild and Scenic Rivers System (OSP 2020).

5.7.2.3 The National Trails System of 1971

National Historic Trails (The Oregon Recreation Trails System Act of 1971) follow past routes of exploration, migration, struggle, trade, and military action. National Historic Trails offer the opportunity to re-trace these past events through historic sites, points of interests, trail segments, and waterways (NPS 2020).

The EPID Project is not part of the National Trails System.

The Oregon Recreation Trails Advisory Council (ORTAC) was established in 1971 as part of the Oregon Recreation Trails System Act. The Act provided the means for the state to establish a system of recreation trails that would provide for the ever-increasing outdoor recreation needs of an expanding resident and tourist population and promote public access to outdoor areas (OSP 2020a).

The EPID Project is not part of the Oregon Recreation Trails System Act.

5.7.2.4 Oregon Natural Heritage Conservation Areas

Dedicated Natural Heritage Conservation Areas in Oregon must be registered by the Institute for Natural Resources (INR) Oregon Biodiversity Information Center. Registered areas must have a management plan describing how the key biological resources will be managed (OSU 2020). Natural Heritage Conservation Areas are similar to federal Research Natural Areas in that they are designed to serve educators, researchers, resource managers, and the general public with access to Oregon's natural heritage resources far into the future.

The Project is not within a dedicated Natural Heritage Conservation Area in Oregon.

5.7.2.5 Wilderness Act of 1964

Congress passed The Wilderness Act of 1964 in order to preserve and protect certain lands “in their natural condition” and thus “secure for present and future generations the benefits of wilderness areas that are “untrammeled by man.”

The Project is not within a Wilderness Act designated wilderness area.

5.7.3 Resource Impacts and Proposed Measures

The existing 0.9 MW EPID Project operates under a FERC exemption because of its size and minimal impacts to the environment. EPID proposes no changes operations. Therefore, EPID has not identified potential impacts and is not proposing any studies related to recreational resources.

5.8 AESTHETIC RESOURCES

5.8.1 Existing Environment

Views of the EPID Project area are limited due to distance and topography. The EPID Project area is agrarian. Land management activities such as agricultural production and irrigation works are visible from limited private and county roadways.

State Highway 140 passes 2 miles south of the project area. State Highway 62 (Crater Lake Highway) passes the site 3 miles to the west. Oregon Route 234 (Sams Valley Highway) passes the site 3 miles to the west. The EPID Project site is obscured from view by highway users by topography, vegetation, and distance.

Several distant aesthetic resources within approximately 9 to 50 miles of the EPID Project include:

- Upper and Lower Table Rock hiking areas, 9 to 11 miles east
- Lost Creek Lake, approximately 12 miles north
- Mount Mcloughlin, approximately 23 miles southeast
- Upper Klamath Lake, approximately 40 miles southeast
- Crater Lake National Park, approximately 42 miles northwest

The EPID Project area is not located within a designated scenic corridor nor does it occupy any sensitive scenic or aesthetic resources.

5.8.2 Maps, Drawings and Photographs

See Sections 5.0 and 5.1, Figure 5-1, Figure 5-2, Figure 5-3, for a geographic overview of the project area.

5.8.3 Resource Impacts and Proposed Measures

The existing 0.9-MW EPID Project operates under a FERC exemption because of its size and minimal impacts to the environment. EPID proposes no changes operations. Therefore, EPID has not identified potential impacts and is not proposing any studies related to recreational resources.

5.9 LAND USE

5.9.1 Existing Environment

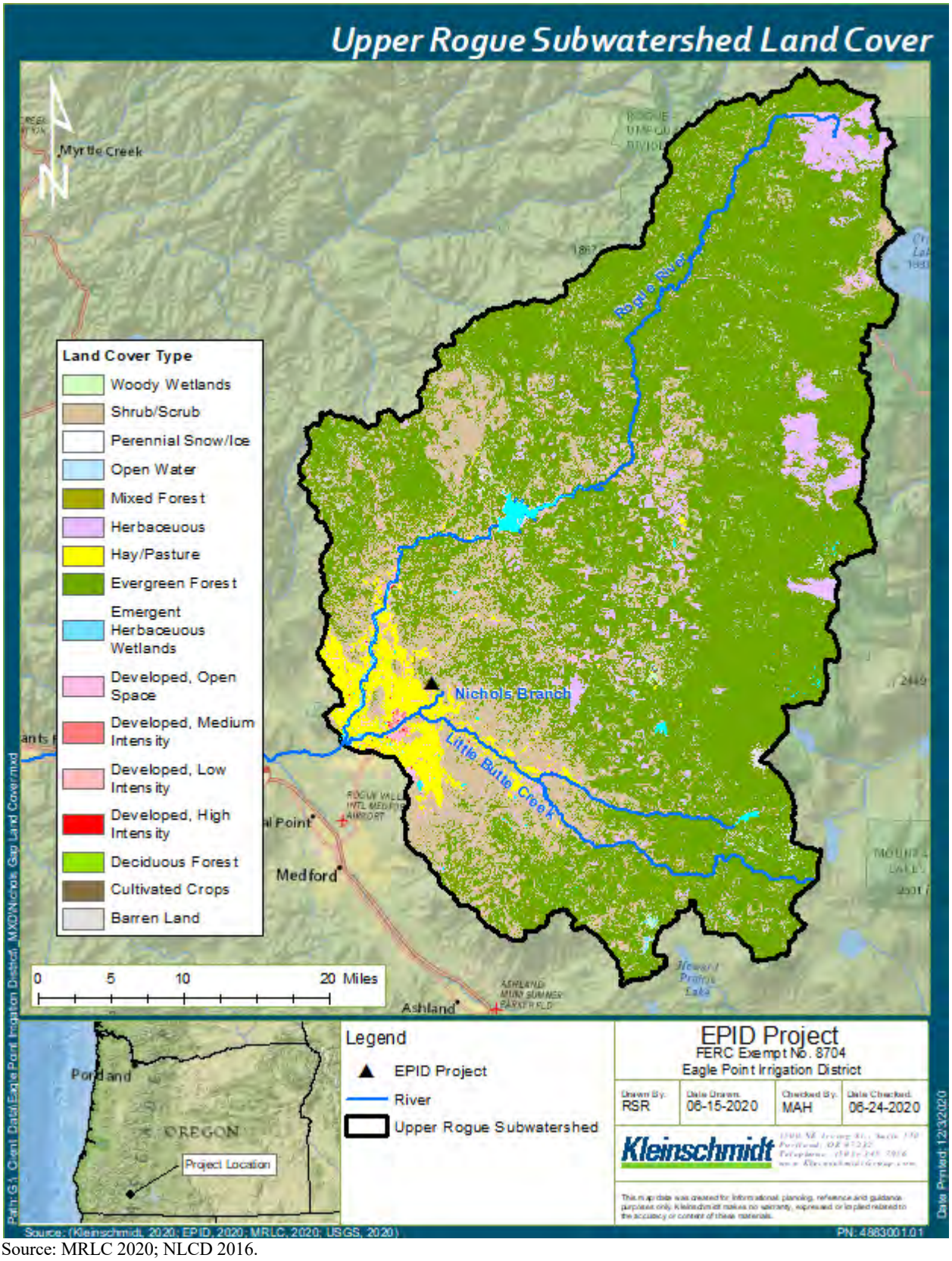
The EPID Project is located entirely within Jackson County, Oregon in the Rogue River Watershed. The EPID Project is approximately 14 miles northeast of the county seat and principal town of Jackson County, Medford and is located within the town of Eagle Point, Oregon, which is approximately 3 miles southwest of the EPID Project.

The top five land cover types in the Upper Rogue Sub-watershed which contains the Project area are outlined in Table 5-7. Land cover types that dominate the watershed are outlined in Figure 5-11.

Table 5-7 Prominent Upper Rogue Sub-watershed/Project Land Cover Types

Land Cover Type	Area (acres)	Percent
Evergreen Forest	700,599	67.8%
Shrub/Scrub	217,356	21.0%
Herbaceous	45,997	4.5%
Hay/Pasture	35,696	3.5%
Open Space	9,705	0.9%

Source: MRLC 2020; NLCD 2016



Source: MRLC 2020; NLCD 2016.

Figure 5-11 Land Cover in Upper Rogue Sub-watershed

5.9.2 Existing Land Use in the Project Area

Over two thirds of the Upper Rogue Sub-watershed is forested with a total of almost 90 percent of the land being forested, shrub or herbaceous land cover and only 3.5 percent of the land being hay or pasture land. According to the Jackson County current Comprehensive Plan the majority of the land surrounding the EPID Project area is forest land/open space with some agricultural development lands (Jackson County Development Services 2020). Primary land uses within the EPID Project area include dryland pasture, water conveyance facilities, irrigated agricultural, and hydroelectric power generation.

The 2017 Census of Agriculture estimated that there were approximately 2,136 Jackson County farms. Jackson County farmers placed 170,298 acres under production with an average farm/ranch size of 80 acres (AgCensus 2017).[3] From 2012 to 2017, the Jackson County agricultural land base declined by 20% (declining by 170,298 acres) leaving 9.5% of the land base in agricultural production. In 1964, 36% of the Jackson County land base was in agricultural production. Despite the overall decline in agricultural land use, the number of Jackson County farms has increased 24% since 2012 (Flanagan Battistella 2019).

895 Jackson County farms are between 1 and 9 acres, and 784 farms are between 10 and 49 acres.. The majority of farms (747) raise livestock and 28 farms grow some combination of corn and cereal grains (AgCensus 2017). In 2017, nuts and fruits (largely pears) represented $38.5 million in sales, up from $26 million in 2012, cattle represented $9.9 million in sales, down from $19.9 million in 2012, and vegetables represented $5.3 million in sales compared to $1.7 million in 2012 (Flanagan Battistella 2019).

The 2010 U.S. Census Bureau recorded 203,206 people living within Jackson County while, in 2019, the U.S. Census survey population estimates recorded approximately 220,944 people, an approximate eight percent increase (US Census Bureau). Population density is approximately 73 people per square mile county-wide with approximately 83,969 households in the county.

5.9.3 Project Aerial Photographs, Maps, Drawings or Graphics

See Figure 8-1, Land Cover in Upper Rogue Sub-watershed, above. Also please see Figure 5-2, Hydroelectric Projects on the Unnamed Tributary; Figure 5-3, EPID Project Overview; and Attachment A for photos of the EPID Project and EPID Project area.

[3] The 2017 Census of Agriculture is the 29th Federal census of agriculture and the fifth conducted by the U.S. Department of Agriculture. The census of agriculture provides a detailed picture of U.S. farms and ranches every five years.

5.9.4 Resource Impacts and Proposed Measures

The existing 0.9 MW EPID Project currently operates under a FERC exemption because of its size and minimal impacts to the environment. EPID proposes no changes to operations. Therefore, EPID has not identified potential impacts and is not proposing any studies related to land use resources.

5.10 ALTERNATIVE LOCATIONS, DESIGNS, ENERGY SOURCES

The EPID Project is an existing facility therefore, portions of this section (e.g., alternative sites considered; alternative facility designs) are not applicable.

5.10.1 Consequences if the License Application is Denied

The EPID Project generates an average annual electrical load of 2.66 million kWh. This is carbon-free renewable power for Oregon equivalent to approximately 4,350 barrels of oil or 1,190 tons of coal per year. This renewable energy resource helps displace the nation's dependency on oil, coal, and other nonrenewable resources. Currently, output is sold through a Purchase Power Agreement (PPA) to PacifiCorp. If the License application is denied, 0.9 MW of renewable power would be lost for the state of Oregon.

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ATTACHMENT A

PROJECT PHOTOS

EPID Project Dam & PacificCorp Tailrace and Project Above
Date Taken: 3/18/19

EPID Project Diversion & Penstock
Date Taken: 3/18/19

EPID Project Tailrace and Unnamed Tributary
Date Taken: 3/18/19

EPID Project Bypass outfall
Date Taken: 3/18/19

EPID Project Power House
Date Taken: 3/18/19

Vegetation adjacent to EPID Project Powerhouse looking South
Date Taken: 4/4/19 12:07 P.M.


GILKES
1986
EPID Project Turbine
Date Taken: 3/18/19

ATTACHMENT B

SHPO LETTER (1984)

File R1243.03

VICTOR ATIYEH
GOVERNOR

Department of Transportation

STATE HISTORIC PRESERVATION OFFICE

Parks and Recreation Division

525 TRADE STREET S.E., SALEM, OREGON 97310

July 24, 1984

RECEIVED
JUL 25 1984
OTT WATER ENGINEERS
REDDING

Richard C. Hunn
Ott Water Engineers Incorp.
2334 Washington Avenue
Redding, CA 96001

Dear Richard:

RE: Ryan Hydroelectric Project
Nichols Gap
Jackson County

This letter is in response to your request for official comment from the State Historic Preservation Office regarding impact of your federally funded project on cultural resources.

After a careful review of your proposed project, our office can offer the following comments. We feel the area of the project is not of historic significance and since ground disturbance of previously undisturbed ground is minimal, this office feels that there will be no likely impact to archeological resources. We therefore feel no cultural resource surveys are required and that the project is in compliance with Public Law 89-665 and Executive Order 11593.

For further information regarding projects, contact Leland Gilsen, state preservation archeologist, at 378-5023.

Sincerely,

D.W. Powers III
Deputy SHPO

DWP/LG:tsb
3173C

Form 734-3122