

## DEQ Requests Comments on Opal Springs Hydro Project Certification

The Oregon Department of Environmental Quality invites the public to provide written comment on the proposed Section 401 water quality certification for the Opal Springs Hydroelectric Project.

### Summary

DEQ has finished a draft Section 401 water quality certification for the Opal Springs Hydroelectric Project. The Deschutes Valley Water District, which owns and operates the hydroelectric project, is seeking to amend its existing license from the Federal Energy Regulatory Commission. The license amendment will allow Deschutes Valley to install upstream and downstream fish passage facilities which the project currently does not have. The license amendment will also allow Deschutes Valley to increase the height of their reservoir by six feet to store and release extra water to help fish during upstream and downstream migration. The current FERC license expires in 2032.

Because adding fish passage changes how the project will store and discharge water, Section 401 of the Clean Water Act requires DEQ to determine if the changes will harm water quality.

In August 2016, DEQ completed its evaluation and determined the project will comply with Oregon water quality standards and other applicable environmental laws. DEQ proposes conditions which require Deschutes Valley to monitor water quality once fish passage facilities are built and are operational. If monitoring indicates standards are not met, DEQ can require Deschutes Valley to change operations to reduce effects on water quality.

### Where can I get more information?

DEQ's evaluation of the application and the proposed water quality certification are attached to this notice. You also contact Chris Stine to make an appointment to review the documents in person:

**Phone:** 541-686-7810 or 800-844-8467

**Fax:** 541-686-7551

**Email:** [stine.chris@deq.state.or.us](mailto:stine.chris@deq.state.or.us)

### How do I participate?

You may submit comments by mail, fax or email to:

Chris Stine, Hydroelectric Specialist

Oregon Department of Environmental Quality  
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Eugene, OR 97401

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**All comments are due by 5 p.m., Wednesday Oct. 19, 2016.** All comments will become part of the public record.

### About the facility and the receiving water

The Opal Springs Hydroelectric Project was licensed in 1982 and began operating in 1985. Because earlier construction of the Pelton Round Butte dam below the project had blocked upstream access to migrating fish, fish passage above and below the project was not required or provided.

In 2007 fish passage facilities were installed at Pelton which reintroduced salmon and steelhead into the Upper Deschutes River basin. Since 2011 Deschutes Valley has voluntarily passed adult steelhead and spring Chinook salmon above the dam using a trap and haul system. In 2011 Deschutes Valley entered into a settlement agreement, revised in 2015, with relevant resource agencies to provide permanent volitional upstream and downstream passage at Opal Springs. Under the proposed amendment, Deschutes Valley will increase the elevation of the reservoir by up to six feet. Deschutes Valley will manage this water in consultation with state and federal fish resource agencies to facilitate fish migration.

The Opal Springs project is located at river mile 7.2 on the Crooked River at the base of the Crooked River Gorge. Oregon's 303d list of impaired water bodies indicates the Crooked River does not meet water quality standards for pH and temperature from river mile 0 to 51, a segment which includes the project. Beginning about 4 miles upstream of the project, large quantities of groundwater enter the Crooked River which increases flow and generally improves water quality.

### What is DEQ's role?

In Oregon, DEQ has the sole authority under Section 401 of the Clean Water Act to issue a Section 401 water quality certification.



State of Oregon  
Department of  
Environmental  
Quality

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DEQ must identify effects which the proposed operation will have on water quality, and must propose conditions to ensure that water quality standards will still be met.

Should FERC issue an amended license, DEQ will work closely with Deschutes Valley to implement the conditions contained in the Section 401 water quality certification.

### **How may the Project affect water quality?**

Under the proposed license amendment, the project will provide fish passage, increase the height of the diversion dam and create an accrual account of water to facilitate seasonal fish migration. Raising the height of the dam will increase the time it takes for water to flow through the reservoir from about one hour to two hours. Because the increased residence time is small, DEQ believes this modification is unlikely to have a measurable adverse effect on water quality. No other changes are proposed which will likely impact water quality.

DEQ will require Deschutes Valley to conduct water quality monitoring for certain parameters including temperature, pH, and dissolved oxygen. If DEQ determines the Project causes a violation of Oregon's water quality standards DEQ can require Deschutes Valley to modify operations to reduce impacts on water quality.

### **What happens after the public comment period closes?**

DEQ will hold a public hearing if DEQ receives written requests for a hearing during the public comment period from at least 10 people or from an organization representing at least 10 people. DEQ will consider and respond to all comments received and may modify the proposed permit based on comments. DEQ gives equal weight to written and oral comments.

### **Accessibility information**

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email [deqinfo@deq.state.or.us](mailto:deqinfo@deq.state.or.us).

# Evaluation and Findings Report

## Section 401 Water Quality Certification for the Amendment to the Opal Springs Hydro Project

Prepared for  
Opal Springs Hydroelectric Project (FERC No. 5891)

*Pursuant to Oregon Administrative Rules Chapter 340, Division 48  
Submitted to: Deschutes Valley Water District*

**By: Chris Stine  
September 2016**



### **Water Quality Program**

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DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.



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# Table of Content

Table of Tables .....	iv
Table of Figures.....	iv
List of Attachments .....	iv
Glossary .....	v
1.0 Introduction .....	1
1.1 Project Description .....	1
1.2 Background.....	2
2.0 Requirements For Certification .....	4
2.1 Applicable Federal and State Law .....	4
3.0 Summary of Application .....	5
3.1 Applicant Information .....	5
3.1.1 Name and Address of Project Owner (Applicant).....	5
3.1.2 Name and Address of Owner’s Official Representative .....	5
3.1.3 Documents Filed in Support of § 401 Application.....	5
3.2 Waters of the State.....	6
3.2.1 Waters Affected by the Project .....	6
3.2.2 Water Rights Held by Applicant .....	6
3.2.3 Beneficial Uses.....	6
3.3 Project Lands .....	7
3.4 Ecological Setting.....	7
3.4.1 General Locale .....	7
3.4.2 Geology and Groundwater .....	7
3.4.4 Threatened and Endangered Species in the Lower Deschutes Basin .....	7
4.0 Project Description .....	8
4.1 Current Project Operation.....	8
4.2 Proposed Changes to Project and Operation .....	9
5.0 Water Quality Standards and Regulations.....	13
5.1 Beneficial Uses .....	13
5.2 Biologically-Based Numeric Criteria .....	13
5.3 Antidegradation Policy .....	13
5.4 Water Quality Impairment in the Crooked River .....	14
5.5 Water Quality Standards Not of Concern.....	14

5.6 Water Quality Standards Subject to Detailed Analysis .....	16
6.0 Water Quality Compliance Evaluation.....	17
6.1 Objectionable Discoloration, Scum, and Oily Sheens.....	17
6.1.1 Applicable Standard .....	17
6.1.2 Application of Standard .....	17
6.1.3 Present Conditions.....	17
6.1.4 Applicant Position.....	18
6.1.5 DEQ Evaluation .....	18
6.1.6 DEQ Findings.....	18
6.2 Biocriteria .....	19
6.2.1 Applicable Standard .....	19
6.2.2 Application of Standard .....	19
6.2.3 Present Conditions.....	20
6.2.4 Applicant’s Position .....	20
6.2.5 DEQ Evaluation .....	20
6.2.6 DEQ Findings.....	20
6.3 Hydrogen Ion Concentration (pH).....	21
6.3.1 Applicable Water Quality Standard .....	21
6.3.2 Application of Water Quality Standard.....	21
6.3.3 Present Conditions.....	22
6.3.4 Applicant’s Position .....	22
6.3.5 DEQ Evaluation .....	22
6.3.6 DEQ Findings.....	23
6.4 Dissolved Oxygen .....	24
6.4.1 Water Quality Standard.....	24
6.4.2 Application of Water Quality Standard.....	25
6.4.3 Present Conditions.....	25
6.4.4 Applicant’s Position: Dissolved Oxygen .....	25
6.4.5 DEQ Evaluation: Dissolved Oxygen.....	25
6.4.6 DEQ Findings: Dissolved Oxygen .....	26
6.5 Turbidity .....	27
6.5.1 Water Quality Standard.....	27
6.5.2 Application of Standard .....	27
6.5.3 Present Conditions.....	28
6.5.4 Applicant’s Position .....	28
6.5.5 DEQ Evaluation: Turbidity .....	28

6.5.6 DEQ Findings: Turbidity .....	28
6.6 Temperature.....	29
6.6.1 Applicable Standard .....	29
6.6.2 Application of Standard .....	31
6.6.3 Present Conditions.....	32
6.6.4 Applicant’s Position .....	34
6.6.5 DEQ Evaluation .....	35
6.6.6 DEQ Finding .....	35
6.7 Antidegradation .....	36
6.7.1 Water Quality Standard.....	37
6.7.2 Application of Standard .....	37
6.7.3 Present Conditions.....	37
6.7.4 Applicant’s Position .....	37
6.7.5 DEQ Evaluation .....	38
6.7.6 DEQ Findings.....	38
7.0 Evaluation of Compliance with Sections 301, 302, 303, 306 and 307 of the Federal Clean Water Act .....	38
8.0 Evaluation of Other Appropriate Requirements of State Law.....	39
8.1 Department of State Lands .....	40
8.2 Department of Fish and Wildlife.....	40
8.3 Department of Land Conservation and Development .....	41
8.4 Department of Environmental Quality .....	41
8.5 Oregon Water Resources Department .....	41
9.0 Public Comment .....	42
10.0 Conclusions and Recommendation for Certification.....	42

## Table of Tables

Table 1: Beneficial Uses .....	6
Table 2: Designated Beneficial Uses in the Crooked River.....	14
Table 3: Water Quality Standards Not Likely Affected by Project Operation .....	14
Table 4: Water Quality Standards Subject to Detailed Analysis .....	16

## Table of Figures

Figure 1: Project Vicinity Map .....	3
Figure 2: Project Features .....	8
Figure 3: Proposed Fish Passage Facilities .....	11
Figure 4. Water Temperature: 2009.....	33
Figure 5. Water Temperature: August 2011 .....	34
Figure 6. Reservoir Temperature Profiles.....	34

## List of Attachments

- Attachment A – Antidegradation Checklist
- Attachment B - Public Comments
- Attachment C - References

## Glossary

Acronym and Abbreviation	Definition
°C	degrees Centigrade
°F	degrees Fahrenheit
Section 401	Section 401 of the Clean Water Act (33 U.S.C. §1341)
7DAM	7-Day daily average maximum
Applicant	Deschutes Valley Water District
Application	Clean Water Act Section 401 Application for Water Quality Certification
BLM	United States Bureau of Land Management
Bull Trout	<i>Salvelinus confluentus</i>
CFS	Cubic Feet per Second
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>
Corps	US Army Corps of Engineers
CTWS	Consolidated Tribes of the Warm Springs
CWA	Clean Water Act
DO	dissolved oxygen
Deschutes Valley	Deschutes Valley Water District
EPA	U. S. Environmental Protection Agency
EQC	Oregon Environmental Quality Commission
FERC, Commission	Federal Energy Regulatory Commission
Fish Managers	Deschutes Valley, ODFW, and CTWS (provided CTWS become signatories to the Settlement Agreement)
License	FERC license
MSL	Mean sea level
NMFS	National Marine Fishery Service
NTU	Nephelometric Turbidity Units
DEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OERS	Oregon Emergency Response System
OWRD	Oregon Water Resources Department
pH	Hydrogen Ion Concentration
Project	Opal Springs Hydroelectric Project
Rainbow Trout	<i>Oncorhynchus mykiss</i>
RM	River Mile
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WQMP	Water Quality Management Plan

# 1.0 Introduction

On February 29, 2016, the Oregon Department of Environmental Quality received an application for water quality certification submitted on behalf of the Deschutes Valley Water District for their Opal Springs Hydroelectric Project (FERC Project No. 5891). Deschutes Valley currently operates the Project under a 50 year license issued by the Federal Energy Regulatory Commission in November 1982. In October 2015, Deschutes Valley applied to FERC for a non-capacity license amendment to amend operation of the Project in the following ways:

- Increase the maximum pool elevation from 2,004.21 feet to 2,010.21 feet;
- Construct a fish ladder to provide volitional upstream fish passage; and
- Modify the spillway to enable safe, timely, and effective downstream fish passage.

Because the proposed action will alter the manner in which the Project stores and discharges water, DEQ must consider the effects of the proposed action on water quality in accordance with Section 401 of the federal Clean Water Act (33 U.S.C. §1341). This report evaluates the effects proposed modifications may have on water quality. As allowed by Section 401 of the CWA, DEQ may condition operation of the Project, as necessary, to comply with Oregon water quality standards, applicable portions of the Clean Water Act, and other relevant provisions of state law.

## 1.1 Project Description

The Project is located southwest of the town of Culver in Jefferson County, at River Mile 7.2 on the Crooked River in Central Oregon. The dam is about 0.75 mile upstream of the head of Lake Billy Chinook in the northeast quarter of the northwest quarter of Section 33, Township 12S, Range 12E, Willamette Meridian . The upstream end of the diversion pool is located on Bureau of Land Management land in the northeast quarter of the northwest quarter of Section 4, Township 13S, Range 12E, WM.

The Opal Springs Hydroelectric Project consists of the following elements:

- a 21-foot-high, 175.2-foot-long, concrete-capped, rockfill diversion dam topped with 6 feet of flashboards that create a pool with a storage capacity of 106.4 acre-feet and a surface area of 11.1 acres at normal maximum pool elevation of 2004.21 feet;3,4
- a 44-foot by 33-foot rectangular concrete intake structure 32 feet in height on the left abutment of the diversion dam;
- two 12.5-foot-diameter, 1,157-foot-long buried corrugated metal conduits;
- a 30-foot-diameter steel surge-tank bifurcator;
- a 16-foot-diameter, 160-foot-long steel penstock;
- two turbine-driven pumps, one rated at 175 horsepower and the other at 480 horsepower;
- a powerhouse containing one turbine generating unit with a nameplate capacity of 4.3 MW at a power factor of 0.85 providing 1,800 cubic feet per second (cfs) of powerhouse capacity;
- a 250-foot-long, 20.8-kilovolt (kV) underground transmission line interconnecting to the Pacific Power and Light transmission system; and
- appurtenant facilities.

## 1.2 Background

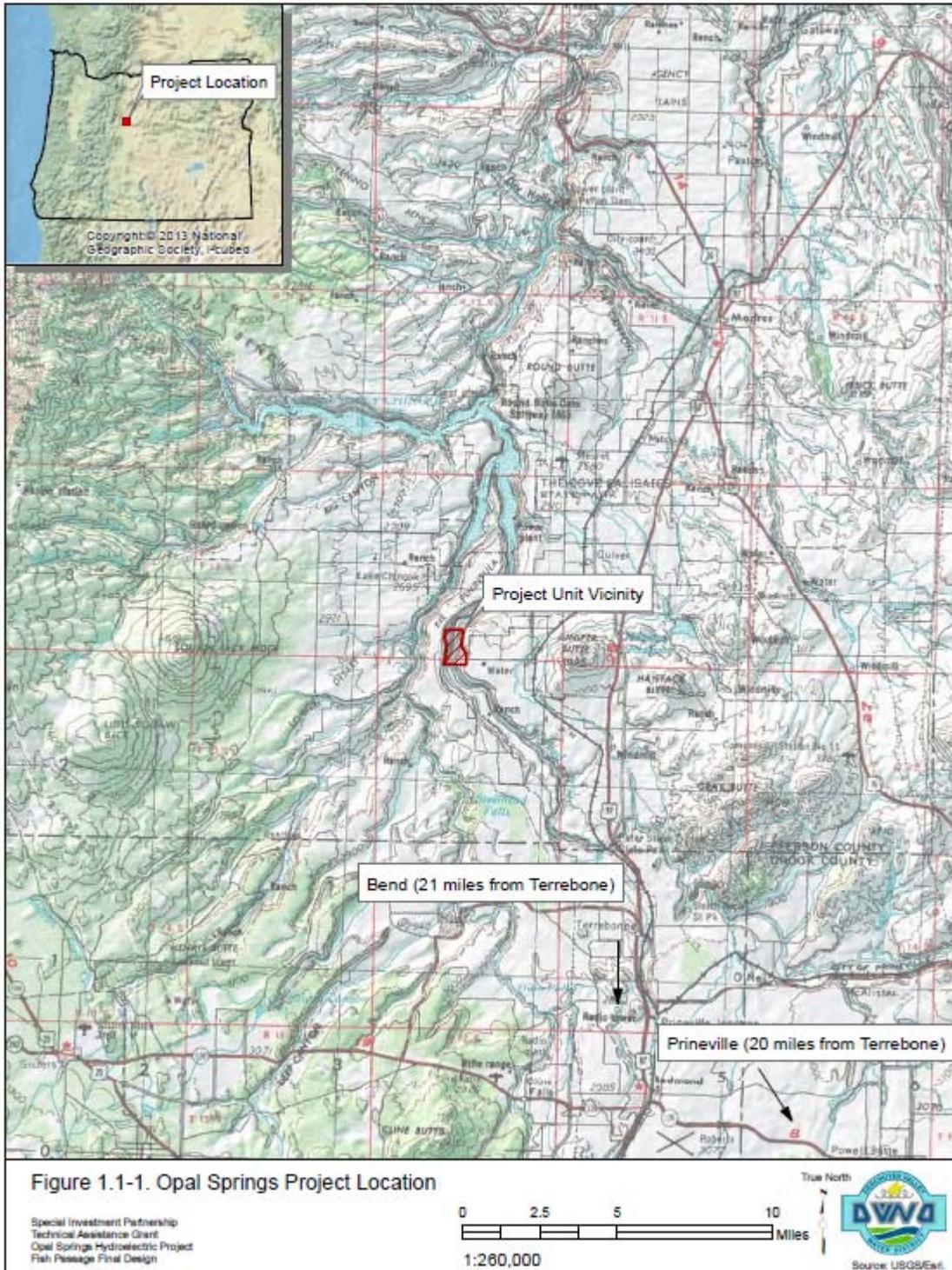
In 1982, FERC licensed the Project to a 50 year term. The Project was commissioned in 1985. Anadromous fish had been extirpated from the Upper Deschutes Basin since the 1960s following construction of the Pelton Round Butte Project (FERC No. 2030) about nine miles downstream of the Project . Because the presence of the Pelton Round Butte project obstructed anadromous fish migration at that time, the Opal Springs hydroelectric Project was not required nor did it provide fish passage at the time of license issuance.

In 2007, Portland General Electric, the owner/operator of the Pelton Round Butte project, modified the Pelton Round Butte project to provide upstream and downstream passage for migratory resident and anadromous fish. The fish passage project reintroduced fish populations into the Upper Deschutes River, the Metolius River, and Crooked River on which the Project is located. In 2011, Deschutes Valley entered into a Settlement Agreement with state, federal, and non-governmental stakeholders to provide fish passage at the Opal Springs Project. The Settlement Agreement provides a framework for connecting aquatic habitat in the upper Crooked River with the lower Deschutes Basin while recognizing the voluntary nature of Deschutes Valley participation and support for this action. In 2015 the Settlement Agreement was amended for consistency with the non-capacity license amendment application. A Project Vicinity Map is presented as Figure 1.

In October 2015, Deschutes Valley included the 2015 restated Settlement Agreement with its application for a non-capacity license amendment to FERC. Also in October 2015, Deschutes Valley filed with FERC an Applicant Prepared Environmental Assessment to assess environmental effects of the proposed action. On April 6, 2016, FERC adopted the APEA in its entirety as its own Environmental Assessment.

On January 20, 2016, FERC requested consultation with US Fish & Wildlife Service on the effects of the proposed action on bull trout (*Salvelinus confluentus*) and bull trout critical habitat. The request for consultation was made in accordance with Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*). On May 31, 2016, the USFWS filed with FERC its Biological Opinion on the effects of the proposed action on federally listed bull trout and their critical habitat.

Figure 1: Project Vicinity Map



Source: Kleinschmidt, October 2015.

# 2.0 Requirements For Certification

## 2.1 Applicable Federal and State Law

Section 401 of the Federal Clean Water Act, 33 USC §1341, establishes requirements for state certification of proposed projects or activities that may result in any discharge of pollutants to navigable waters. Before a federal agency may issue a permit or license for any project that may result in any discharge of pollutants to navigable waters, the state must certify that the proposed project will comply with applicable provisions of Sections 301, 302, 303, 306, and 307 of the CWA and any state regulations, including state water quality standards, adopted to implement these sections. The state is further authorized to condition any granted certificate to assure compliance with state water quality standards and other appropriate water quality-related requirements of state law.

DEQ is the agency of the State of Oregon authorized to carry out the certification functions prescribed by section 401 of the CWA for state waters. DEQ must act on an application for certification in a manner consistent with the following federal and state requirements:

### **Federal Requirements**

Sections 301, 302, 303, 306, and 307 of the CWA: These sections prescribe effluent limitations; water quality related effluent limitations; water quality standards and implementation plans; national standards of performance for new sources; and toxic and pretreatment effluent standards.

### **State Requirements**

OAR 340-041 and 340-048-0005 to 340-048-0050: These rules were adopted by the Environmental Quality Commission to prescribe the state's water quality standards (OAR 340-041) and procedures for receiving, evaluating, and taking final action upon a section 401 certification application (OAR 340-048). The rules include requirements for general information such as the location and characteristics of the project, as well as confirmation that the project complies with appropriate requirements of state law.

ORS 468B.040: This state statute prescribes procedural requirements and findings with which DEQ must comply as it makes a decision on a § 401-certification application. This statute makes reference to the federal law requirements, state water quality rules, and other requirements of state law regarding hydroelectric projects.

ORS 197.180(1): This statute requires state agency actions to be consistent with acknowledged land use plans and implementing regulations, or if a plan is not acknowledged, compatible with state land use goals. Findings must support the state agency action.

ORS 543A: This statute establishes procedures among state agencies in the reauthorization of federally licensed hydroelectric projects, including state certification of water quality.

Oregon Administrative Rules (OAR) identify the information that must be included in an application for § 401 certification (OAR 340-048-0020[2]). The application together with information provided during public comment and interagency coordination is essential to support the following determinations to be made by DEQ pursuant to section 401 of the CWA and state law:

- The determination whether to issue or deny certification.
- The determination of conditions appropriate to include in any granted certificate.
- Development of findings as required by ORS 468B.040 and ORS 197.180(1).

## 3.0 Summary of Application

### 3.1 Applicant Information

#### 3.1.1 Name and Address of Project Owner (Applicant)

Deschutes Valley Water District  
881 SW Culver Highway  
Madras, Oregon 97741  
(541) 546-6141

#### 3.1.2 Name and Address of Owner's Official Representative

Authorized Representative:  
Edson Pugh, General Manager  
Deschutes Valley Water District  
881 SW Culver Highway  
Madras, Oregon 97741  
(541) 546-6141

Alternate Contact:  
Finlay Anderson  
Kleinschmidt Associates  
1500 NW Irving Street, Suite 550  
Portland, Oregon 97232  
(503) 345-0517

#### 3.1.3 Documents Filed in Support of § 401 Application

Deschutes Valley has filed the following documents in support of its application for §401 water quality certification:

Biological Assessment for the Implementation of the Opal Springs Fish Passage and Protection Plan. Clearwater Biosciences, Inc. August 2015.

Opal Springs Fish Passage and Protection Plan. Deschutes Valley Water District. September 2015

Amended and Restated Settlement Agreement Concerning License Amendment for Fish Passage at the Opal Springs Hydro Project. Deschutes Valley Water District. October 2015

Applicant Prepared Environmental Assessment. Kleinschmidt Associates. October 2015.

## 3.2 Waters of the State

### 3.2.1 Waters Affected by the Project

The Project is located at River Mile 7.2 on the Crooked River in Jefferson County, Oregon. The project is in the Lower Crooked Subbasin of the Deschutes River Basin.

### 3.2.2 Water Rights Held by Applicant

Deschutes Valley has a non-consumptive water right to appropriate 1,772.5 cfs water year round from the Crooked River for hydropower generation. Oregon Water Resources Department Permit S 47951 issued on August 3, 1981 authorized the diversion of 1,500 cfs with a priority date of February 10, 1982 and for 272.5 cfs with a priority date of June 10, 1982. The permit authorizes development of up to 7,977 theoretical horsepower.

The proposed action will require Deschutes Valley to file an amendment to Permit 47591 pursuant to ORS 534.092 and update its exhibit drawings with the Oregon Water Resources Department to reflect the proposed pool elevation.

### 3.2.3 Beneficial Uses

Specific fish use designations that must be protected in the main stem Deschutes River and Crooked River are further described in OAR 340-041-0130, Table 130A and apply to all waters within the Project area. These uses are listed in Table 1.

**Table 1: Beneficial Uses**

<b>Beneficial Use</b>	<b>Deschutes River Main Stem from Pelton Regulating Dam to Ben Diversion Dam and for the Crooked River Main Stem</b>
Public domestic water supply <sup>1</sup>	X
Private domestic water supply <sup>1</sup>	X
Industrial Water Supply	X
Irrigation	X
Livestock Watering	X
Fish & Aquatic Life <sup>2</sup>	X
Wildlife and Hunting	X
Fishing	X
Boating	X
Water Contact Recreation	X
Aesthetic Quality	X
Hydro Power	X
Commercial Navigation & Transportation	
1 With adequate pretreatment and natural quality that meets drinking water standards	
2 See also Figures 130A and 130B for fish use designations for this basin.	

## 3.3 Project Lands

The FERC project boundary encompasses about 14.5 acres, all but one acre of which is located on federally owned lands administered by the US Bureau of Land Management. The conduit and powerhouse below the impoundment are located on approximately one acre of privately owned land.

## 3.4 Ecological Setting

### 3.4.1 General Locale

The Project is located in southern Jefferson County, Oregon, approximately 7 miles west of the town of Culver at RM 7.2 of the Crooked River. The project is in the northeast quarter of the northwest quarter of Section 33, Township 12S, Range 12E, Willamette Meridian. The diversion pool is at elevation 2,010 MSL. The Project is located in a steep, 846-foot-deep canyon. The current impoundment is bounded by a sheer, basalt cliff face on the west and a steep boulder slide on the east.

Measurements at the Madras meteorological station indicate the mean monthly temperature in the vicinity of the Project ranges from 30.8° F in December to 65.9 F in July<sup>1</sup>. The region receives about 10.45 inches of precipitation annually.

### 3.4.2 Geology and Groundwater

The upper Deschutes Basin encompasses about 4,500 square miles of the Deschutes River drainage basin in central Oregon and drains the eastern flank of the Cascade Range. Groundwater occurrence is controlled by the permeability of volcanic sequences. The Crooked River Gorge cuts through younger more permeable volcanic deposits exposing groundwater springs below

Beginning about 4.2 miles upstream of the Project, large quantities of groundwater discharge to the Crooked River providing stable flows and improved water quality. Groundwater discharge within this reach is estimated at 780 cfs. Average monthly discharge at the diversion dam ranges from a minimum of 1,000 cfs in July to 1,852 cfs in April with an annual average discharge of 1,307 cfs. Based on these estimates, groundwater represents 42 to 78 percent of average monthly flow at the diversion dam. Annually, groundwater inputs represent about 60 percent of flow through the Project.

### 3.4.4 Threatened and Endangered Species in the Lower Deschutes Basin

Fish species present in the Project area with special protection status are identified below.

#### Bull Trout (*Salvelinus confluentus*)

Bull trout are native to the Pacific Northwest and western Canada. Compared with other salmonids, bull trout have more specific habitat requirements that appear to influence their distribution and abundance. They need cold water to survive, so they are seldom found in waters where temperatures exceed 15°C to 18°C. They also require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors. Bull trout populations may exhibit resident or migratory life-history strategies. OAR 340-041-0028 establishes a temperature criterion of 12.0°C year-round to protect spawning and juvenile rearing use of bull trout.

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<sup>1</sup> <http://www.ncdc.noaa.gov/cdo-web/datatools/normals>

In October 2010 the USFWS published a final bull trout critical habitat designation for the coterminous United States. Designated bull trout critical habitat is of two primary types: 1) spawning and rearing; and, 2) foraging, migration, and overwintering (FMO). In Oregon, some 2,835 miles of shoreline and 30,255 miles of reservoirs and lakes were designated as critical habitat. This included the approximately 14 miles of the Crooked River from the head of Lake Billy Chinook to the Highway 97 bridge crossing, which were classified as historic but currently unoccupied FMO. The Project is located about one-mile upstream of the head of Lake Billy Chinook.

On May 31, 2016, the USFWS issued its Biological Opinion addressing the effects which the project may have on bull trout and their critical habitat. The USFWS concluded the proposed Project is not likely to jeopardize the continued existence of the bull trout and is not likely to destroy or adversely modify designated critical habitat.

#### Summer Steelhead (*Oncorhynchus mykiss*)

In the Deschutes Subbasin mid Columbia River steelhead currently range from its mouth at the Columbia River up to Pelton Round Butte, including east and west side tributaries. The historic range of steelhead included Crooked River Watershed. On the Deschutes River, the Pelton project dams were completed in 1958. By the time the Opal Springs Project was completed in 1985, mid Columbia River steelhead had been extirpated from the basin.

On March 25, 1999, NMFS published a final rule listing the mid Columbia River steelhead distinct population segment under the ESA as threatened. The mid Columbia River steelhead distinct population segment covers an area of approximately 35,000 square miles in the Columbia Plateau of eastern Oregon and eastern Washington.

#### Spring Chinook (*Oncorhynchus tshawytscha*)

Spring Chinook salmon historically spawned in the mainstem Deschutes River upstream from Pelton Round Butte including the Crooked River. Despite its extirpation from the upper Deschutes Basin and Crooked River Basin, NMFS determined the ESA listing status for Spring Chinook salmon was “not warranted” for all naturally spawned populations from the Deschutes River. Construction of the PRB Project blocked salmon from their historic habitats upstream. Chinook salmon fry and smolts have been released into the selected tributaries above Pelton, including the Crooked River, since 2008.

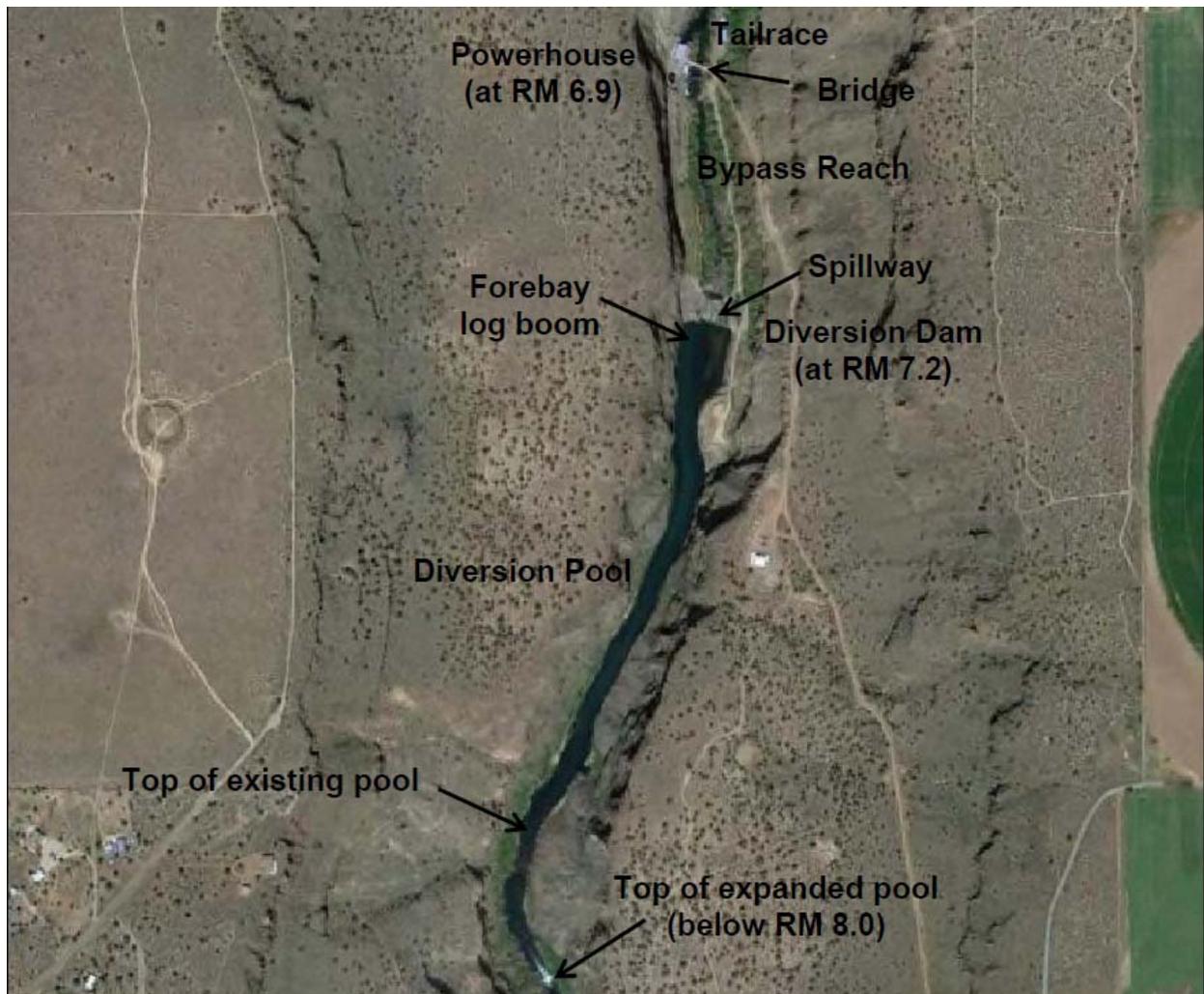
## 4.0 Project Description

### 4.1 Current Project Operation

Deschutes Valley operates the Project as a run-of-river facility and provides a minimum continuous discharge in the bypass reach of 50 cfs or the inflow to the diversion pool, whichever is less. The Project has a water right of 1,772.5 cfs, which may be fully used when river flows exceed 1,822.5 cfs. Once the powerhouse capacity of 1,772.5 cfs is reached, streamflow in excess of this amount passes over the stoplogs.

Project features are identified in the aerial photograph presented as Figure 2.

#### **Figure 2: Project Features**



## 4.2 Proposed Changes to Project and Operation

Deschutes Valley seeks an amendment to their existing FERC license to authorize volitional upstream and downstream passage at the Project. Specifically, the license amendment consists of the following three components:

1. Construct a fish ladder to provide passage for migratory bull trout and anadromous summer steelhead, which both are listed as threatened according to the Endangered Species Act (ESA), into the Crooked River subbasin; and to provide passage for spring Chinook; the passage facilities also will reconnect populations of native redband trout upstream and downstream of the Project;
2. Modify the dam to raise the maximum operating diversion pool elevation from 2,004.21 feet to 2,010.21 feet. Deschutes Valley will establish a water reserve known as the Bypass Flow Accrual Account. The BFAA will be managed to supplement bypass reach flows as needed to facilitate fish migration. The Licensee would administer the BFAA, but decisions regarding its use would be

made by the Fish Managers (ODFW and CTWS, provided that the CTWS is a signatory to the Settlement Agreement).

3. Program to adaptively manage the Project to meet the fish passage performance objectives.

At the proposed increased water surface elevation, the Project impoundment will store 184.8 acre-feet and have a surface area of 15.0 acres. The proposed upstream extent of the pool will approach, but not encroach on, the downstream boundary of the Lower Crooked River Wild and Scenic River Area. The Project boundary would be amended to reflect the inclusion of additional BLM lands.

Proposed changes to the Project are illustrated in Figure 3.

**Figure 3: Proposed Fish Passage Facilities**



# 5.0 Water Quality Standards and Regulations

Water quality standards are comprised of three elements. These include the beneficial uses that shall be protected, the water quality criteria intended to protect those uses and the antidegradation policy which protects existing water quality from degradation. To support all beneficial uses, water quality criteria may apply to specific waterbodies and reaches within those waterbodies. This section of the Evaluation and Findings Report identifies the beneficial uses which have been designated for waters of the Crooked River and the numeric criteria necessary to support those uses. It also identifies known water quality impairments documented in the river. The detailed discussion regarding the Project impact on standards that are potentially affected is included in Section 6.0.

## 5.1 Beneficial Uses

The CWA and Oregon water quality standards require that water quality be protected and maintained such that existing and designated beneficial uses of public waters are not impaired or precluded by degraded water quality. The regulatory approach used is to: (1) identify existing and beneficial uses (2) develop and adopt numeric and narrative criteria necessary to protect beneficial uses; (3) establish and enforce protective discharge effluent limitations; and (4) establish and implement "best management practices" for land management activities to minimize water quality degradation and beneficial use impairment.

DEQ has designated beneficial uses for each river basin in Oregon. OAR 340-041-0130, Table 130A identifies designated beneficial uses in the main stem Crooked River. These uses include public and private domestic and industrial water supply; irrigation; livestock watering; fish & aquatic life; wildlife & hunting; fishing; boating; water contact recreation; aesthetic quality; and hydropower. Fish use and spawning designations within the basin are identified on Figures 130A and 130B. Fish use in the Lower Crooked Subbasin, including the Project area, is designated as Salmon and Trout Rearing and Migration. Figure 130B indicates salmon and steelhead spawning is excluded from the Lower Crooked Subbasin.

## 5.2 Biologically-Based Numeric Criteria

The Fish Use Designation maps and Salmon and Steelhead Spawning Use Designation maps in Figures 130A and 130B of OAR 340-041 define temperature criteria that apply in the Lower Crooked River Subbasin. The biologically-based temperature criteria is measured as the seven day rolling average of the daily maximum temperature (340-041-0002[56]). The designations described in Figures 130A and 130B also dictate which dissolved oxygen criteria apply.

## 5.3 Antidegradation Policy

Oregon's antidegradation policy (OAR 340-041-0004) applies to all surface waters. The goal of the antidegradation policy is to prevent unnecessary further degradation of water quality and to protect, maintain, and enhance the quality of existing surface waters to ensure the full protection of all existing beneficial uses. For waters which meet applicable water quality standards, the policy states that the existing water quality shall be maintained and protected unless the Environmental Quality Commission makes certain rigorous findings of need. For water bodies which do not meet certain criteria, the policy prohibits further degradation.

## 5.4 Water Quality Impairment in the Crooked River

Waterbodies which fail to meet certain water quality criteria are designated as water quality limited pursuant to CWA §303(d). The U.S. Environmental Protection Agency requires States to develop total maximum daily loads for waters identified as water quality-limited. A TMDL identifies the maximum pollutant load which a water body may receive from combined point and non-point sources and still meet water quality standards necessary to support all designated beneficial uses. TMDLs quantify wasteload allocations for point sources and load allocations for non-point sources. For hydroelectric projects located on a water quality-limited waterbody, a section 401 certification may serve as the means for implementing load allocations assigned to the project. Rules for developing, issuing and implementing TMDLs are in OAR 340-042-0025-0080.

Table 2 identifies the segments of the Lower Crooked River identified as water quality limited in the 2010 Integrated Report.

**Table 2: Designated Beneficial Uses in the Crooked River**

River	River Mile	Parameter	Period	Criteria	Beneficial Use	Status
Lower Crooked	0 to 51	pH	Fall-Spring	6.5 - 8.5 SU	Resident fish and aquatic life; Anadromous fish passage; Salmonid fish rearing; Water contact recreation; Salmonid fish spawning	TMDL needed
Lower Crooked	0 to 51	pH	Summer	6.5 to 8.5 SU		TMDL needed
Lower Crooked	0 to 51	Temp	Year round	18 C	Salmonid fish rearing; Anadromous fish passage	TMDL needed

## 5.5 Water Quality Standards Not of Concern

Water quality standards identified in Table 3 are typically not negatively affected by the operation of hydroelectric facilities. For this reason, and as further explained below, DEQ is reasonably assured that the water quality standards identified in Table 3 below will be met during operation under an amended license.

**Table 3: Water Quality Standards Not Likely Affected by Project Operation**

Criterion	Standard	DEQ Evaluation

Fungi OAR 340-041-007(10)	<i>The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or that are injurious to health, recreation, or industry may not be allowed.</i>	Water quality in the Project area is clear and free of aquatic growths, including fungi. Project operation under an amended license will not fundamentally alter water management or create conditions which favor the growth of aquatic fungi.
Taste & Odors OAR 340-041-007(11)	<i>The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the palatability of drinking water or the palatability of fish or shellfish may not be allowed.</i>	Project operations do not result in objectionable tastes, odors, or conditions which adversely impact the palatability of water, fish, or shellfish. DEQ expects no change to this condition under an amended license.
Sediment OAR 340-041-007(12)	The formation of bottom or sludge deposits deleterious to habitat and aquatic life are not allowed.	The Project will not alter sediment transport under the amended license.
Aesthetic conditions OAR 340-041-007(14)	<i>Aesthetic conditions offensive to human sight, taste, smell or touch may not be allowed.</i>	The proposed changes to project operation will not fundamentally alter water management. The aesthetic quality of water in the Project area is currently good. DEQ expects no change to this condition under an amended license.
Nuisance Algae Growth OAR 340-041-0019	Algal growth which impairs the recognized beneficial uses of the water body is not allowed.	Under the amended license, the residence time of the diversion pool will increase to 1.6 hours. DEQ believes this period is too brief to allow algal communities to proliferate.
Radioisotopes OAR 340-041-007(15)	<i>Radioisotope concentrations may not exceed maximum permissible concentrations in drinking water, edible fishes or shellfishes, wildlife, irrigated crops, livestock and dairy products, or pose an external radiation hazard.</i>	The Project does not utilize, store, or discharge radioactive material. DEQ expects no change to this condition under an amended license.
Bacteria OAR 340-041-009	<i>Limits in-water concentration of bacterial cells, discharge of raw sewage, animal waste runoff, sewer overflows, and other sources of bacterial pollution.</i>	The Project does not discharge sewage or animal wastes into Project waters or engage in other activities which may contribute to bacterial pollution. DEQ expects no change to this condition under an amended license.
Total Dissolved Gas OAR 340-041-0031	Protects aquatic life from gas bubble trauma caused by water that is supersaturated with atmospheric gases.	Bypass reach is characterized by shallow rock conditions and turbulent flow. These conditions do not support entrainment of gases. DEQ expects no change to this condition under an amended license.
Total Dissolved Solids OAR 340-041-0032 &	<i>Standard generally prohibits TDS concentrations which</i>	The Project does not contribute organic or inorganic substances in

OAR 340-041-0345	<i>exceed basin-specific criterion of 100 mg/l.</i>	molecular, ionized, or micro-granular form which may affect TDS in Project waters. DEQ expects no change to this condition under an amended license.
Toxic Substances OAR 340-041-0033	<i>Toxic substances may not be introduced above natural background levels.</i>	Project does not discharge toxic substances. No actions proposed under an amended license will result in toxic discharge. DEQ expects no change to this condition under an amended license.

## 5.6 Water Quality Standards Subject to Detailed Analysis

Water quality standards which may potentially be impacted by proposed hydroelectric operations are evaluated in Section 6.0. This section provides an evaluation of potential Project effects over the range of conditions proposed by the Applicant. Based on this evaluation, DEQ determines whether proposed activities will likely comply with each water quality standard. DEQ may provide conditions on the operation of the facility, as necessary, to provide assurance that proposed operations do not cause or contribute to a violation of Oregon water quality standards.

This evaluation is limited to the effects that operation of the Project under an amended License may have on water quality. The implementation of activities which necessitate in-water work may require separate water quality certifications issued by DEQ or pre-authorized pursuant to an Army Corps of Engineers Section 404 dredge and fill permit.

Based on information provided by the Applicant coupled with a general understanding of the impact of hydroelectric operations on water quality, DEQ has identified water quality standards which may be influenced by Project operations as proposed by the Applicant. Table 4 identifies the water quality standards potentially impacted by the operation of the Project under an amended FERC License.

**Table 4: Water Quality Standards Subject to Detailed Analysis**

<b>Criterion</b>	<b>Description of Standard</b>	<b>DEQ Evaluation</b>
Oily sheen, oily coatings OAR 340-041-0007(13)	Objectionable discoloration, scum, oily sheen, floating solids or coating aquatic life with oil films is not allowed.	Incidental spills or leaks of oils and petroleum products used at the Project may impact water quality.
Biocriteria OAR 340-041-0011	Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.	Changes in flow regimes or reservoir storage may alter the ecological integrity necessary to support an adaptive biological community.
Dissolved Oxygen OAR 340-041-0016	Sufficient concentrations of dissolved oxygen are necessary to support aquatic life.	Actions proposed under an amended license will alter the methods of discharge which may affect the dissolved oxygen content below the facility.
pH OAR 340-041-0021 & OAR 340-041-0345	pH values may not fall outside the basin-specific range of 6.5-8.5.	Actions proposed under an amended license may alter conditions which influence hydrogen ion activity in Project waters.

Temperature OAR 340-041-0028	Water temperature must support all life stages of temperature-sensitive aquatic communities.	Changes to reservoir storage under an amended license can affect temperature of water discharged below the Project.
Turbidity OAR 340-041-0036	Numeric criterion generally prohibits turbidity increases which exceed 10-percent above background.	The modified release mechanisms under an amended license may affect turbidity below the facility.
Antidegradation OAR 340-041-0004	Protects existing water quality by preventing unnecessary additional water quality degradation.	Must be addressed when a project is proposed that may lower existing water quality conditions, even though standard violations are not anticipated.

## 6.0 Water Quality Compliance Evaluation

Pursuant to Section 401 of the CWA, States are required to determine if actions authorized by federal permits will comply with state water quality standards. In this section, DEQ evaluates the effect which Project operations under an amended FERC License may have on the water quality standards identified in Table 4. DEQ may consider information from multiple sources including material submitted by the Applicant, data collected by DEQ, site-specific modeling results, knowledge of process, and publically available information in scientific literature.

For this evaluation, DEQ considers only the effects which the proposed activity, under the proposed license amendment, may have on water quality.

### 6.1 Objectionable Discoloration, Scum, and Oily Sheens

#### 6.1.1 Applicable Standard

The standard is given in OAR 340-041-0007(13):

*Objectionable discoloration, scum, oily sheens, or floating solids, or coating of aquatic life with oil films may not be allowed.*

#### 6.1.2 Application of Standard

This narrative standard extends protections to surface waters against conditions which humans may reasonably find objectionable or which be harmful or deleterious to aquatic life.

#### 6.1.3 Present Conditions

Hydroelectric projects commonly operate mechanical equipment such as turbines, pumps, and generators that may contain oil, lubricants, or other chemical liquids. Deschutes Valley reportedly stores diesel fuel

and lubricating oil at the Project site in quantities below the threshold established by EPA for requiring a Spill Prevention Control and Countermeasure Plan given in 40 CFR part 112. DEQ knows of no reported spills or incidents resulting in the introduction of hazardous substances into waters of the state. In the event a spill of hazardous materials is suspected or confirmed, Deschutes Valley must undertake spill response procedures given in ORS 466.605.

#### **6.1.4 Applicant Position**

Deschutes Valley did not address the potential effect of Project operation on this narrative water quality standard.

#### **6.1.5 DEQ Evaluation**

Petroleum products such as lubricants, fuels, and hydraulic oils are commonly used to operate and maintain mechanical equipment at hydropower facilities. The greatest risk to aquatic resources is from the accidental release of liquid petroleum or chemical products used, transported, or stored adjacent to open waterways. The remote location of the Project relative to first responders underscores the need to maintain employee training and awareness programs and adequate stores of spill response equipment necessary to contain and control releases of hazardous materials.

The proposed Project modifications will require limited duration construction activity at the Project site including in-water locations. The use of heavy equipment increases the potential for incidental spills or releases during this work period. DEQ will address measures to protect aquatic resources from spills associated with temporary construction activities during the environmental review and certification process associated with the Army Corps of Engineers Section 404 permit application.

#### **6.1.6 DEQ Findings**

DEQ knows of no reported petroleum releases related to Project operation under the current license. DEQ expects the storage and management of petroleum products under an amended license to remain similar to current procedures. Although Deschutes Valley is not required to develop an SPCC Plan, adequate procedures are necessary to guide response actions in the event of a spill. DEQ is reasonably assured Project operation under an amended FERC license will maintain compliance with the narrative criteria described in OAR 340-041-0007(12) provided the following measures are implemented:

##### Best Management Practices

Deschutes Valley must employ Best Management Practices appropriate to the task being performed when handling, storing, or using materials which may, if spilled, result in adverse or objectionable conditions in violation of this water quality standard. All materials must be used in a manner and for a purpose which reflects their intended application. Deschutes Valley may consult the manufacturer for guidance related to appropriate application methodology, recommended cleanup procedures, appropriate storage, and acceptable disposal protocols.

##### Notification

In the event of a spill or release or threatened spill or release to waters of the state of petroleum or other hazardous substances at or above reportable quantities as specified in applicable state and federal

regulations, Deschutes Valley must implement appropriate spill response procedures, notify OERS, and comply with ORS Chapters 466 and 468, as applicable.

### Recordkeeping

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

## **6.2 Biocriteria**

### **6.2.1 Applicable Standard**

The standard is given in OAR 340-041-0011:

*Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.*

### **6.2.2 Application of Standard**

This narrative criterion recognizes that compliance with individual criteria may not fully capture synergistic effects resulting from multiple stressors and cumulative impacts on aquatic species and resident biological communities. The biocriteria standard complements parameter-specific standards by extending broad protections to all designated beneficial uses with the implicit assumption that if the most sensitive beneficial use is protected, then all uses will be protected. Application of the biological criteria standard is intended to assess the overall impact to the aquatic community from water quality changes attributable to an anthropogenic activity.

Definitions applicable to the biocriteria standard include (OAR 340-041-0002):

(5) "Appropriate Reference Site or Region" means a site on the same waterbody, or within the same basin or ecoregion that has similar habitat conditions, and represents the water quality and biological community attainable within the areas of concern.

(6) "Aquatic Species" means plants or animals that live at least part of their life cycle in waters of the state.

(17) "Designated Beneficial Use" means the purpose or benefit to be derived from a water body, as designated by the Water Resources Department or the Water Resources Commission.

(19) "Ecological Integrity" means the summation of chemical, physical and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region.

(50) "Resident Biological Community" means aquatic life expected to exist in a particular habitat when water quality standards for a specific ecoregion, basin, or water body are met. This must be established by accepted biomonitoring techniques.

(75) "Without Detrimental Changes in the Resident Biological Community" means no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region.

### **6.2.3 Present Conditions**

In 1982 Deschutes Valley received a license to construct and operate the Opal Springs Hydroelectric Project. Because anadromous fish had been extirpated from the Upper Deschutes Basin in the 1960s following the construction of the downstream Pelton Round Butte Project, FERC did not require fish passage at Opal Springs.

In 2007 upstream and downstream fish passage facilities were completed at Pelton Round Butte located downstream of the Project. Upstream passage for reintroduced fish is now blocked by the Opal Springs dam. This passage barrier blocks access by migrating fish to about 108 miles of upstream fish habitat in the Lower Deschutes Basin. Non-anadromous native fish, including bull trout, are also expected to use the proposed fish ladder to migrate upstream of the Project.

In 2011, Deschutes Valley entered into a Settlement Agreement with state, federal, and non-governmental stakeholders to provide fish passage above and below the Project dam. The Settlement Agreement, amended and restated in 2015, includes the following principle elements:

- Construct a vertical-slot fish ladder to provide volitional upstream passage;
- Raise the maximum operating elevation of the Project diversion pool from 2,004.21 feet elevation to 2,010.31 feet NGVD 29, through modifications to the existing dam;
- Establish a water credit system, known as the Bypass Flow Accrual Account, which may be used to facilitate downstream passage or provide additional upstream attraction flows.

### **6.2.4 Applicant's Position**

Deschutes Valley has observed migrating steelhead at the base of the Project dam shortly after passage was provided at Pelton Round Butte. The presence of fish below the dam suggests the Crooked River represents a preferred migratory corridor for steelhead. Deschutes Valley expects the objectives of the Settlement Agreement will provide successful reintroduction of migratory fish into previously inaccessible portions of their historic range.

### **6.2.5 DEQ Evaluation**

Providing upstream passage at the Project will restore access to more than 100 miles of historic habitat range which has been blocked for more than 50 years. DEQ supports increasing connectivity within the historic range of anadromous and native migratory fish.

Raising the height of the dam by 6.0 feet will increase the area of the diversion pool from 10.9 to 15.5 acres and submerge existing shoreline area during periods of maximum pool elevation. The river is at the base of a deep canyon characterized by steep walls and sparse vegetation. The existing shoreline is rocky with lesser quantities of fine grained material. DEQ expects the resultant shoreline to be characteristically similar to current conditions with no net change to functional riparian or open water habitat. For this reason, DEQ believes the proposed expansion of the diversion pool will not negatively affect water quality or cause detrimental changes in the resident biological communities or their habitat addressed by this water quality standard.

### **6.2.6 DEQ Findings**

DEQ is reasonably assured that the operation of the Project under an amended FERC license will comply with the Biological Criteria water quality standard provided the following measures are implemented:

### BFAA

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

### Fish Passage

Deschutes Valley shall construct, operate, and maintain a volitional upstream fish ladder located at the Project dam structure to provide salmon and steelhead access to historic spawning and rearing habitats in the Crooked River basin upstream of the Project. Fish passage facilities shall be developed according with methodology described in proposed License Article 2 of the 2015 Amended and Restated Settlement Agreement.

### Minimum Instream Flow

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

## **6.3 Hydrogen Ion Concentration (pH)**

### **6.3.1 Applicable Water Quality Standard**

The applicable pH standard is given in 340-041-0021:

#### **pH**

*(1) Unless otherwise specified in OAR 340-041-0101 through 340-041-0350, pH values (Hydrogen ion concentrations) may not fall outside the following ranges:*

*(a) Marine waters: 7.0 – 8.5;*

*(b) Estuarine and fresh waters: 6.5 – 8.5.*

*(2) Waters impounded by dams existing on January 1, 1996, which have pHs that exceed the criteria are not in violation of the standard, if the Department determines that the exceedance would not occur without the impoundment and that all practicable measures have been taken to bring the pH in the impounded waters into compliance with the criteria.*

Basin-specific criteria are given in 340-041-0130:

#### **Water Quality Standards for the Deschutes Basin**

*(1) pH (hydrogen ion concentration). pH values may not fall outside the following ranges:*

*(a) All other Basin streams (except Cascade lakes): 6.5-8.5;*

*(b) Cascade lakes above 3,000 feet altitude: pH values may not fall outside the range of 6.0 to 8.5.*

### **6.3.2 Application of Water Quality Standard**

The balance of acid and alkaline substances in water is indicated by the pH value. Values range from 1 (very acid) to 14 (very alkaline). Most streams in Oregon have pH values falling somewhere between 6.5 and 8.5. There may be seasonal fluctuations in the pH number due to substances entering the water from land or bio-chemical activity in the water, including influences from in-water plant growth. Since fish and other aquatic life in any particular stream have evolved under specific pH conditions, it is important to set a pH standard that reflects natural conditions and will prevent any intolerable acid/alkalinity levels. The Willamette Basin pH criterion has been set at a tolerance range of 6.5 to 8.5 to coincide with the locally natural range.

The potential impact that hydroelectric projects have on pH in aquatic systems usually occurs as a result of altering hydrology that impacts the aquatic community. Hydroelectric plants do not discharge pollutants that alter the acidity or alkalinity of water. If plants impact the pH of the water in the area, it is generally by creating conditions that encourage lush growth of aquatic plants. Altering hydrology may slow down water velocities, increase water temperatures and ultimately influence the concentration of available nutrients. All of these conditions have the potential to increase algal and aquatic plant growth. As they use light energy to convert carbon dioxide into sugars and thus chemical energy, plants alter the carbon dioxide and associated carbonate concentrations dissolved in water which lead to changes in pH of the water. Construction activities involving alkaline materials such as un-cured concrete and grouts have some potential to impact instream pH.

This standard applies to the Project-affected waters for surface waters in waterways and streams, and in Project impoundments. The Project does not encompass or affect marine waters. The Project does not encompass or affect Cascade lakes above 3000 feet altitude.

### **6.3.3 Present Conditions**

The Lower Crooked River is identified on DEQ's 303d list of impaired waterbodies as exceeding the range of numeric criteria for pH. These measurements were recorded between RM 29.6 and RM 47.9, considerably upstream of the Project. The Crooked River begins to receive groundwater inputs from numerous springs along the base of the gorge upstream of the Project which represents about 60 percent of base flow on an average annual basis.

While large inputs of cool, high quality groundwater generally improve overall water quality, the groundwater enters the system at a relatively high pH ranging from about 8.1 to 8.2 standard units. Thus, groundwater inputs do not significantly decrease the pH of surface water flowing through the Project area. Measurements collected on behalf of Deschutes Valley in July and August 2011 indicated pH ranging from 8.2 to 8.4 SU at the upper end of the impoundment. At the outflow from the pool, pH ranged from 8.1 to 8.6 SU with hourly mean values near 8.4 SU.

### **6.3.4 Applicant's Position**

Relatively high pH values are a natural occurrence in the Crooked River. Measurements recorded above the influence of groundwater accretion indicate pH exceeding DEQ's numeric range of 6.5 to 8.5 SU. Data collected on behalf of Deschutes Valley suggest slightly higher pH levels exiting the impoundment than entering suggesting the possibility of a Project-related effect on water quality.

Under an amended license, the area and residence time of the impoundment will increase. Deschutes Valley expects the effects of this action may place additional upward pressure on current pH conditions. However, Deschutes Valley believes any Project-related influence would quickly be obscured below the Project because of high volumes of groundwater entering the system between the bypass reach and Opal Springs.

### **6.3.5 DEQ Evaluation**

Stream pH above the Project may occasionally exceed criteria. Beginning about four miles upstream of the Project, numerous groundwater springs enter the river greatly increasing streamflow. The pH of groundwater entering the system is estimated at 8.1 to 8.2 SU. Groundwater accounts for about 60 percent

of base stream volume on an annual basis. Under well-mixed conditions, the volume of local groundwater accretion can significantly influence the pH character of the stream.

DEQ believes pH within the diversion pool is directly influenced by the characteristics of nearby groundwater inputs. Data provided by Deschutes Valley confirm mean hourly pH measurements ranging from 8.3 to 8.4 SU during July and August 2011. These figures generally agree with a weighted pH average determination based on the combined characteristics of upstream and groundwater sources. DEQ attributes measurements confirming occasional excursions from these figures as representative of unmixed or partially mixed zones within quiescent portions of the diversion pool.

DEQ believes it is unlikely that the changes proposed to Project operation will negatively affect pH in the Project area. Elevated pH is commonly associated with biological mechanisms such as the effects of algal respiration and physical changes such as increased temperature which may occur in stratified reservoirs. The Project impoundment residence time is currently less than one hour and may increase up to 1.6 hours under an amended license. DEQ believes the short residence time will not support algal growth sufficient to alter pH or allow for the occurrence of measurable thermal change. Based on this assessment, DEQ does not expect changes to Project operation under an amended license to result in physical and/or biological changes necessary to cause pH impairment or reduce support for existing and designated beneficial uses.

To confirm this expectation DEQ will require water quality monitoring upstream of the dam while the diversion pool is operated at or near the maximum proposed elevation. DEQ will also require monitoring in the upper bypass reach near the entrance to the proposed fish ladder. This location represents an area of reduced flow and strong solar exposure and is, therefore, representative of maximum potential Project-related effects.

### **6.3.6 DEQ Findings**

DEQ is reasonably assured that the proposed changes to Project operation will not contribute to violations of the pH criteria. To confirm this expectation Deschutes Valley shall measure pH as described below:

1. Water Quality Management Plan: Within 6 months of receiving an amended FERC license issuance, Deschutes Valley shall submit a WQMP to DEQ, for review and approval, which addresses the pH monitoring and reporting requirements presented below. Upon DEQ approval, Deschutes Valley shall submit the WQMP to FERC for approval. Upon FERC approval, Deschutes Valley shall implement the WQMP.
2. pH Monitoring and Reporting
  - a. Project Impoundment

Deschutes Valley shall measure pH at upstream and downstream locations in the diversion pool for a minimum of 30 days during the first July and August when the diversion pool is maintained at an average elevation of at least 2,009.01 feet MSL (i.e., 80 percent of the proposed increase in elevation).
  - b. Bypass Reach

Concurrent with the measurements described in Section 2a above, Deschutes Valley shall measure pH in the upper bypass reach in the vicinity of the proposed ladder entrance.

c. Within 90 days of completing monitoring efforts described above, Deschutes Valley shall file a report with DEQ presenting the data and analyzing the effects, if any, of Project operation on the pH water quality standard. Following review and approval of the report by DEQ, Deschutes Valley shall file the report with FERC.

If monitoring indicates pH criteria are not met, DEQ may require Deschutes Valley to submit a report analyzing the situation. DEQ may require additional monitoring and/or adaptive management of the Project to reduce the negative influence of Project operations on water quality. Strategies to achieve this objective may include reducing the operating elevation of the diversion pool, increasing flow in the bypass reach, or other operational adjustments to ensure Project operation does not contribute to violations of water quality standards.

## 6.4 Dissolved Oxygen

### 6.4.1 Water Quality Standard

The standard is set forth in OAR 340-041-0016:

#### Dissolved Oxygen

*Dissolved oxygen (DO): No wastes may be discharged and no activities must be conducted that either alone or in combination with other wastes or activities will cause violation of the following standards: The changes adopted by the Commission on January 11, 1996, become effective July 1, 1996. Until that time, the requirements of this rule that were in effect on January 10, 1996, apply:*

- (1) For water bodies identified as active spawning areas in the places and times indicated on the following Tables and Figures set out in OAR 340-041-0101 to OAR 340-041-0340: Tables 101B, 121B, 180B, 201B and 260B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B, 300B, 310B, 320B, and 340B, (as well as any active spawning area used by resident trout species), the following criteria apply during the applicable spawning through fry emergence periods set forth in the tables and figures:
  - (a) The dissolved oxygen may not be less than 11.0 mg/l. However, if the minimum intergravel dissolved oxygen, measured as a spatial median, is 8.0 mg/l or greater, then the DO criterion is 9.0 mg/l;*
  - (b) Where conditions of barometric pressure, altitude, and temperature preclude attainment of the 11.0 mg/l or 9.0 mg/l criteria, dissolved oxygen levels must not be less than 95 percent of saturation;*
  - (c) The spatial median intergravel dissolved oxygen concentration must not fall below 8.0 mg/l.**
- (2) For water bodies identified by the Department as providing cold-water aquatic life, the dissolved oxygen may not be less than 8.0 mg/l as an absolute minimum. Where conditions of barometric pressure, altitude, and temperature preclude attainment of the 8.0 mg/l, dissolved oxygen may not be less than 90 percent of saturation. At the discretion of the Department, when the Department determines that adequate information exists, the dissolved oxygen may not fall below 8.0 mg/l as a 30-day mean minimum, 6.5 mg/l as a seven-day minimum mean, and may not fall below 6.0 mg/l as an absolute minimum (Table 21);*

For waters designated as trout rearing habitat, the trout DO spawning criterion (11.0 mg/l) applies from January 1 to May 15 (ODEQ, 2004). During the balance of the year, the cold-water DO criterion of 8.0 mg/l applies to waters within the Project area.

#### **6.4.2 Application of Water Quality Standard**

Dissolved oxygen is one of the principal parameters used to determine water quality in support of aquatic life. Maintaining adequate concentrations of DO is vital to the support of fish, invertebrates, and other aquatic life. Some aquatic species such as the salmonids are very sensitive to reduced concentrations of DO. Sensitivity also varies between various life stages (egg, larvae, and adults), and between different life processes (feeding, growth, and reproduction).

DO levels within gravels (intergravel DO, or IGDO) directly influence the survival of salmonid embryos. The critical DO levels for developing embryos occur in gravels surrounding the eggs. High water column DO levels are not necessarily indicative of adequate IGDO levels, and may vary depending on factors including water column concentrations, the percentage of fine sediment in the gravel pores, sediment oxygen demand, and oxygen demand of the eggs.

#### **6.4.3 Present Conditions**

Deschutes Valley collected continuous DO measurements at the Project in July and August 2011. The measurements were collected near the head of the diversion pool to measure incoming water quality conditions and at downstream locations near the log boom intake and at the powerhouse tailrace. Sensor malfunctions reduced the set of valid data. However, all data considered valid during this period demonstrated DO concentrations within the diversion pool exceeding the minimum numeric criterion of 8.0 mg/l.

Deschutes Valley also collected a series of six DO profiles in July and August 2011 from a location near the log boom in the Project forebay. The DO profiles during each event display uniform DO throughout the water column suggesting well-mixed conditions. Between July 1 and August 31, DO ranged from about 9.5 mg/l to 10.7 mg/l.

No data were collected to characterize DO during the trout spawning period of January 1 to May 15 when the DO criterion to protect trout spawning is 11.0 mg/l.

#### **6.4.4 Applicant's Position: Dissolved Oxygen**

Deschutes Valley used a scaled, mass balance model to estimate the effect expanding the Project forebay would have on water quality, including DO. The model results suggested the proposed expansion may decrease DO by 0.1 mg/l; however, Deschutes Valley acknowledged the magnitude of influence was uncertain because of imprecise groundwater input measurements and incomplete monitoring data of DO entering and leaving the Project area. Under no scenario did modeling indicate a violation of the DEQ dissolved oxygen criterion.

#### **6.4.5 DEQ Evaluation: Dissolved Oxygen**

Monitoring data collected on behalf of Deschutes Valley in July and August 2011 indicate the DO water quality criterion of 8.0 mg/l was met in the diversion pool during this period. DEQ applies the 11.0 mg/l DO criterion to the period from January 1 through May 15 to protect egg incubation during resident trout spawning. No data were collected during this period.

The proposed changes to project operation may affect water quality parameters including DO. Under an amended license, the Project will expand the area of the diversion pool, increase residence time, and

increase the depth of the impoundment. These changes may increase solar exposure, lengthen the period for biological activity, and induce mild thermal stratification within impounded waters.

While these actions are all known to influence oxygen saturation potential, DEQ expects the proposed Project operation will result in little measureable DO reduction. This position is based on the expectation that increasing total residence time to a maximum of 1.6 hours will be insufficient to allow biological activity to reduce dissolved oxygen by measureable levels. DEQ expects similarly minor effects from other mechanisms which influence oxygen saturation, such as the effects of reduced saturation potential due to higher temperature. Furthermore, DEQ believes changes to dissolved oxygen content, if any, will likely be obscured by the effects of groundwater entering the area. Deschutes Valley estimates the Crooked River gains 263 cfs between the diversion dam and Opal Springs just below the tailrace. Groundwater temperature ranges from 12°C to 13°C and corresponds to a dissolved oxygen saturation potential ranging from approximately 9.7 to 10.0 mg/l. Based on this evaluation, DEQ believes the enhanced water quality characteristics provided by groundwater entering the Project area likely compensates for any potential DO reduction above the diversion dam.

DEQ does not expect changes to Project operation under an amended license to cause physical and/or biological changes necessary to cause DO impairment or reduce support for existing and designated beneficial uses. To confirm this expectation DEQ will require continuous DO monitoring upstream of the dam while the diversion pool is operated near the maximum proposed elevation. DEQ will also require corresponding measurements in the upper bypass reach near the entrance to the proposed fish ladder.

#### **6.4.6 DEQ Findings: Dissolved Oxygen**

For the reasons addressed in the previous section, DEQ is reasonably assured that the proposed changes to Project operation will not contribute to violations of the DO criteria. To confirm this expectation Deschutes Valley shall measure DO as described below:

1. Water Quality Management Plan: Within 6 months of receiving an amended FERC license issuance, Deschutes Valley shall submit a WQMP to DEQ, for review and approval, which addresses the DO monitoring and reporting requirements presented below. Upon DEQ approval, Deschutes Valley shall submit the WQMP to FERC for approval. Upon FERC approval, Deschutes Valley shall implement the WQMP.

2. DO Monitoring and Reporting

- a. Project Impoundment

Deschutes Valley shall continuously measure DO at upstream and downstream locations in the diversion pool for a minimum of 30 days during the first July and August when the diversion pool is maintained at an average elevation of at least 2,009.01 feet MSL (i.e., 80 percent of the proposed increase in elevation).

Beginning no later than May 7, Deschutes Valley shall continuously measure DO at the above referenced locations for at least 15 consecutive days during the first May in which the diversion pool is maintained at an average elevation of at least 2,009.01 feet MSL.

- b. Bypass Reach

Concurrent with the measurements and schedules described in Section 2a above, Deschutes Valley shall measure DO in the upper bypass reach in the vicinity of the proposed ladder entrance.

c. Within 90 days of completing monitoring efforts described above, Deschutes Valley shall file a report with DEQ presenting the data and analyzing the effects, if any, of Project operation on dissolved oxygen levels. Following review and approval of the report by DEQ, Deschutes Valley shall file the report with FERC.

If monitoring indicates DO criteria are not met, DEQ may require Deschutes Valley to submit a report analyzing the situation. DEQ may require additional monitoring and/or adaptive management of the Project to reduce the negative influence of Project operations on water quality. Strategies to achieve this objective may include reducing the operating elevation of the diversion pool, increasing flow in the bypass reach, or other operational adjustments to ensure Project operation does not contribute to violations of water quality standards.

## 6.5 Turbidity

### 6.5.1 Water Quality Standard

The applicable standard is set forth in OAR 340-041-0036:

*Turbidity (Nephelometric Turbidity Units, NTU): No more than a ten percent cumulative increase in natural stream turbidities may be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity. However, limited duration activities necessary to address an emergency or to accommodate essential dredging, construction or other legitimate activities and which cause the standard to be exceeded may be authorized provided all practicable turbidity control techniques have been applied and one of the following has been granted:*

- (a) Emergency activities: Approval coordinated by the Department with the Oregon Department of Fish and Wildlife under conditions they may prescribe to accommodate response to emergencies or to protect public health and welfare;*
- (b) Dredging, Construction or other Legitimate Activities: Permit or certification authorized under terms of section 401 or 404 (Permits and Licenses, Federal Water Pollution Control Act) or OAR 141-085-0100 et seq. (Removal and Fill Permits, Division of State Lands), with limitations and conditions governing the activity set forth in the permit or certificate.*

### 6.5.2 Application of Standard

Turbidity is an optical property which measures the lack of water clarity caused by the presence of suspended particles. Turbidity causes light to be scattered and absorbed rather than transmitted through water. Turbidity can increase light extinction and reduce photosynthesis and primary production. Reduced visibility caused by turbid waters can also cause behavioral changes such as prey identification, foraging, and social interaction by visually-oriented species such as salmonids (DEQ 2005).

Turbidity may occur naturally through channel erosion, organic loading, dust deposition, and nutrient influences. Turbidity loading can also come from a variety of anthropogenic point and non-point discharge sources. Oregon applies the numeric turbidity criterion to protect broad classes of beneficial

uses including drinking water, safety, aesthetics, recreation, and agricultural and industrial uses from unwanted or potentially harmful degradation.

### **6.5.3 Present Conditions**

Waterbodies in the vicinity of the Project are not identified on the 2004/2006 Integrated Report §303d list for turbidity. DEQ is not aware of other data sources which include information on natural turbidity conditions in the Project area.

### **6.5.4 Applicant's Position**

Deschutes Valley did not provide turbidity monitoring data in support of its application for an amended license. Deschutes Valley maintains that normal project operations are not a source of sediment or turbidity.

### **6.5.5 DEQ Evaluation: Turbidity**

Turbidity commonly affects water quality at hydropower facilities when project operations cause rapid changes in water elevation or quickly change the rate of discharge. Aggressive ramping effects can mobilize sediment at shorelines causing suspended or dissolved material to enter waterways thus increasing turbidity.

Under the non-capacity license amendment, Deschutes Valley will continue to operate the Project as a run-of-river facility. Project operation will allow for discretionary releases of reserve water to the bypass reach in accordance with the BFAA to facilitate attraction and upstream movement of migratory fish. Neither the USFWS Biological Opinion nor the Settlement Agreement place restrictions on ramping which limit the allowable rate of stage change in the bypass reach during BFAA releases. Similarly, DEQ will not restrict ramping rates in the bypass reach. DEQ believes the rocky nature of the canyon is not a large source of fine-grained material which may be prone to mobilization during changes in discharge. Because this reach is located at the base of a steep basaltic canyon characterized by erosionally resistant rock, restricting the rate of stage change in this reach is not required to avoid temporary turbidity increases.

DEQ knows of no reported occurrences of elevated turbidity upstream of the diversion dam. Under an amended license, the elevation of the Project impoundment may increase up to five feet although the mode of operation (i.e., run-of-river) will remain unchanged. The expanded area of the diversion pool will invade portions of the existing shoreline. However, because facility operation will remain unchanged DEQ believes operating the Project at the proposed elevation will have little effect on turbidity relative to current conditions.

This proposed §401 certification specifically addresses changes to water quality which may reasonably be anticipated during operation of the Project. Before performing any construction activity requiring in-water work, Deschutes Valley must first obtain a CWA §401 water quality certification issued in conjunction with an Army Corps of Engineers Section 404 permit.

### **6.5.6 DEQ Findings: Turbidity**

DEQ is reasonably assured that changes to project operation under the proposed license amendment will not violate the turbidity water quality standard. If visual evidence of turbidity is observed in the bypass

reach during BFAA releases which may cause delay or harm to migrating fish, Deschutes Valley, shall contact DEQ. Deschutes Valley, in consultation with DEQ and the Fish Managers, shall develop adaptive release strategies to reduce turbidity to levels which allow fish unimpeded access and entry to the fish ladder. These strategies may include adjusting the rate of BFAA releases, the use of alternate spillway gates, or other methods which reduce impacts to water quality during scheduled BFAA releases.

## 6.6 Temperature

### 6.6.1 Applicable Standard

The applicable standard is given in 340-041-0028:

#### Temperature

- (1) *Background.* Water temperatures affect the biological cycles of aquatic species and are a critical factor in maintaining and restoring healthy salmonid populations throughout the State. Water temperatures are influenced by solar radiation, stream shade, ambient air temperatures, channel morphology, groundwater inflows, and stream velocity, volume, and flow. Surface water temperatures may also be warmed by anthropogenic activities such as discharging heated water, changing stream width or depth, reducing stream shading, and water withdrawals.
- (2) *Policy.* It is the policy of the Commission to protect aquatic ecosystems from adverse warming and cooling caused by anthropogenic activities. The Commission intends to minimize the risk to coldwater aquatic ecosystems from anthropogenic warming, to encourage the restoration and protection of critical aquatic habitat, and to control extremes in temperature fluctuations due to anthropogenic activities. The Commission recognizes that some of the State's waters will, in their natural condition, not provide optimal thermal conditions at all places and at all times that salmonid use occurs. Therefore, it is especially important to minimize additional warming due to anthropogenic sources. In addition, the Commission acknowledges that control technologies, best management practices and other measures to reduce anthropogenic warming are evolving and that the implementation to meet these criteria will be an iterative process. Finally, the Commission notes that it will reconsider beneficial use designations in the event that man-made obstructions or barriers to anadromous fish passage are removed and may justify a change to the beneficial use for that water body.
- (3) *Purpose.* The purpose of the temperature criteria in this rule is to protect designated temperature sensitive beneficial uses, including specific salmonid life cycle stages in waters of the State.
- (4) *Biologically Based Numeric Criteria.* Unless superseded by the natural conditions criteria described in section (8) of this rule, or by subsequently adopted site-specific criteria approved by EPA, the temperature criteria for State waters supporting salmonid fishes are as follows:
  - (a) The seven-day-average maximum temperature of a stream identified as having salmon and steelhead spawning use on subbasin maps and tables set out in OAR 340-041-0101 to OAR 340-041-0340: Tables 101B, and 121B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B, 300B, 310B, 320B, and 340B, may not exceed 13.0 degrees Celsius (55.4 degrees Fahrenheit) at the times indicated on these maps and tables;
  - (b) The seven-day-average maximum temperature of a stream identified as having core cold water habitat use on subbasin maps set out in OAR 340-041-101 to OAR 340-041-340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 16.0 degrees Celsius (60.8 degrees Fahrenheit);
  - (c) The seven-day-average maximum temperature of a stream identified as having salmon and trout rearing and migration use on subbasin maps set out at OAR 340-041-0101 to OAR 340-041-

- 0340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit);
- (d) *The seven-day-average maximum temperature of a stream identified as having a migration corridor use on subbasin maps and tables OAR 340-041-0101 to OAR 340-041-0340: Tables 101B, and 121B, and Figures 151A, 170A, and 340A, may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit). In addition, these water bodies must have coldwater refugia that are sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body.*
- e) *The seven-day-average maximum temperature of a stream identified as having Lahontan cutthroat trout or redband trout use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 121B, 140B, 190B, and 250B, and Figures 180A, 201A, 260A and 310A may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit);*
- (f) *The seven-day-average maximum temperature of a stream identified as having bull trout spawning and juvenile rearing use on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130B, 151B, 160B, 170B, 180A, 201A, 260A, 310B, and 340B, may not exceed 12.0 degrees Celsius (53.6 degrees Fahrenheit). From August 15 through May 15, in bull trout spawning waters below Clear Creek and Mehlhorn reservoirs on Upper Clear Creek (Pine Subbasin), below Laurance Lake on the Middle Fork Hood River, and below Carmen reservoir on the Upper McKenzie River, there may be no more than a 0.3 degrees Celsius (0.5 Fahrenheit) increase between the water temperature immediately upstream of the reservoir and the water temperature immediately downstream of the spillway when the ambient seven-day-average maximum stream temperature is 9.0 degrees Celsius (48 degrees Fahrenheit) or greater, and no more than a 1.0 degree Celsius (1.8 degrees Fahrenheit) increase when the seven-day-average stream temperature is less than 9 degrees Celsius.*
- (12) *Implementation of the Temperature Criteria.*
- (a) *Minimum Duties. There is no duty for anthropogenic sources to reduce heating of the waters of the State below their natural condition. Similarly, each anthropogenic point and nonpoint source is responsible only for controlling the thermal effects of its own discharge or activity in accordance with its overall heat contribution. In no case may a source cause more warming than that allowed by the human use allowance provided in subsection (b) of this rule.*
- (b) *Human Use Allowance. Insignificant additions of heat are authorized in waters that exceed the applicable temperature criteria as follows:*
- (B) *Following a temperature TMDL or other cumulative effects analysis, waste load and load allocations will restrict all NPDES point sources and nonpoint sources to a cumulative increase of no greater than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria after complete mixing in the water body, and at the point of maximum impact.*
- (h) *Other Nonpoint Sources. The department may, on a case-by-case basis, require nonpoint sources (other than forestry and agriculture), including private hydropower facilities regulated by a 401 water quality certification, that may contribute to warming of State waters beyond 0.3 degrees Celsius (0.5 degrees Fahrenheit), and are therefore designated as water-quality limited, to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or an applicable load allocation in a TMDL pursuant to OAR 340-042-0080.*
- (A) *Each plan must ensure that the nonpoint source controls its heat load contribution to water temperatures such that the water body experiences no more than a 0.3 degrees Celsius (0.5 degree Fahrenheit) increase above the applicable criteria from all sources taken together at the maximum point of impact.*
- (B) *Each plan must include a description of best management practices, measures, effluent trading, and control technologies (including eliminating the heat impact on the stream)*

*that the nonpoint source intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure.*

*(C) The Department may periodically require a nonpoint source to revise its temperature management plan to ensure that all practical steps have been taken to mitigate or eliminate the temperature effect of the source on the water body.*

*(D) Once approved, a nonpoint source complying with its temperature management plan is deemed in compliance with this rule.*

*(i) Compliance Methods. Anthropogenic sources may engage in thermal water quality trading in whole or in part to offset its temperature discharge, so long as the trade results in at least a net thermal loading decrease in anthropogenic warming of the water body, and does not adversely affect a threatened or endangered species. Sources may also achieve compliance, in whole or in part, by flow augmentation, hyporheic exchange flows, outfall relocation, or other measures that reduce the temperature increase caused by the discharge.*

*(j) Release of Stored Water. Stored cold water may be released from reservoirs to cool downstream waters in order to achieve compliance with the applicable numeric criteria. However, there can be no significant adverse impact to downstream designated beneficial uses as a result of the releases of this cold water, and the release may not contribute to violations of other water quality criteria. Where the Department determines that the release of cold water is resulting in a significant adverse impact, the Department may require the elimination or mitigation of the adverse impact.*

## **6.6.2 Application of Standard**

The temperature standard protects waters of the state against anthropogenic thermal loading which may impair water quality or undermine support for existing and designated beneficial uses. Water temperatures that are acutely or chronically above biologically based levels can harm aquatic organisms that depend upon cold water to live or reproduce. This is particularly true of Oregon's native "cold-water" fish such as salmon, bull trout, rainbow trout, cutthroat trout, steelhead trout and certain amphibians including frogs and salamanders. Elevated water temperature may produce negative physiological effects including decreased spawning success, impaired feeding and growth, reduced resistance to disease and parasites, increased sensitivity to toxic substances, diminished migration tendencies, reduced ability to compete with more temperature-resistant species, and increased vulnerability to predation. If water temperatures are high enough for sustained periods, mortality occurs. Elevated temperatures may also adversely affect other important water quality parameters including dissolved oxygen, pH, and increased algae and fungi productivity.

DEQ adopts biologically based numeric temperature criteria to support specific life stage and development activities of species which may currently occupy or have historically occupied certain ranges. The temperature criterion is based on a calculation of the seven-day average maximum temperature. The 7DAM metric is the average of the daily maximum temperatures from seven consecutive days made on a rolling basis.

The Fish Use Designation and Salmon and Steelhead Spawning Use Designation for the Deschutes Basin Maps presented as Figures 130A and 130B of OAR 340, Division 041, designate the Crooked River upstream of Pelton Round Butte, including the entire Project area, as salmon and trout rearing and migration. Figure 130B indicates no salmonid spawning in the Project area. The appropriate biologically-based maximum temperature for the Crooked River flowing through and below the Project is 18.0 degrees Celsius year round (OAR 340-041-0028(4)(c)).

In 2007, following completion of the Pelton Round Butte project, salmon and steelhead were reintroduced into Lake Billy Chinook. If successful, upstream passage provided at the Opal Springs Project will provide additional access to more than 100 miles of upstream habitat. In the future, DEQ, in consultation with other state and federal resource agencies, may evaluate the range and extent of upstream habitat successfully utilized by migratory fish for spawning, rearing, and migration following reintroduction. Based on this information, DEQ may revise existing fish use and spawning maps and apply appropriate biologically-based numeric criteria to these areas to provide support for existing beneficial uses.

### **6.6.3 Present Conditions**

Oregon's 2010 303d list identifies the Crooked River as impaired for temperature from RM 0 at Pelton Round Butte dam upstream to RM 51. Much of the impairment occurs above about RM 12 below which a series of groundwater springs enter the river. Above the diversion dam, groundwater accretion accounts for about 60 percent of total stream flow on an annualized basis. Because the temperature of groundwater ranges from about 12°C to 13°C, stream temperature gradually decreases downstream through the Crooked River Gorge.

Deschutes Valley monitored Project water temperature during August and September 2009 and again from July to August 2011. Figure 4 illustrates data collected during August and September 2009. The data show very little temperature variation between water entering the Project (Inflow) and discharge below the Project tailrace (Outflow). However, temperature variation is evident between these boundaries. For example, water temperature near the upper end of the bypass reach is about 0.5°C above inflow conditions. Along the length of the bypass reach water temperature decreases about 1.0°C to 1.5°C in response to inputs of cold groundwater. All data indicate compliance with the 18°C criterion.

Figure 4. Water Temperature: 2009

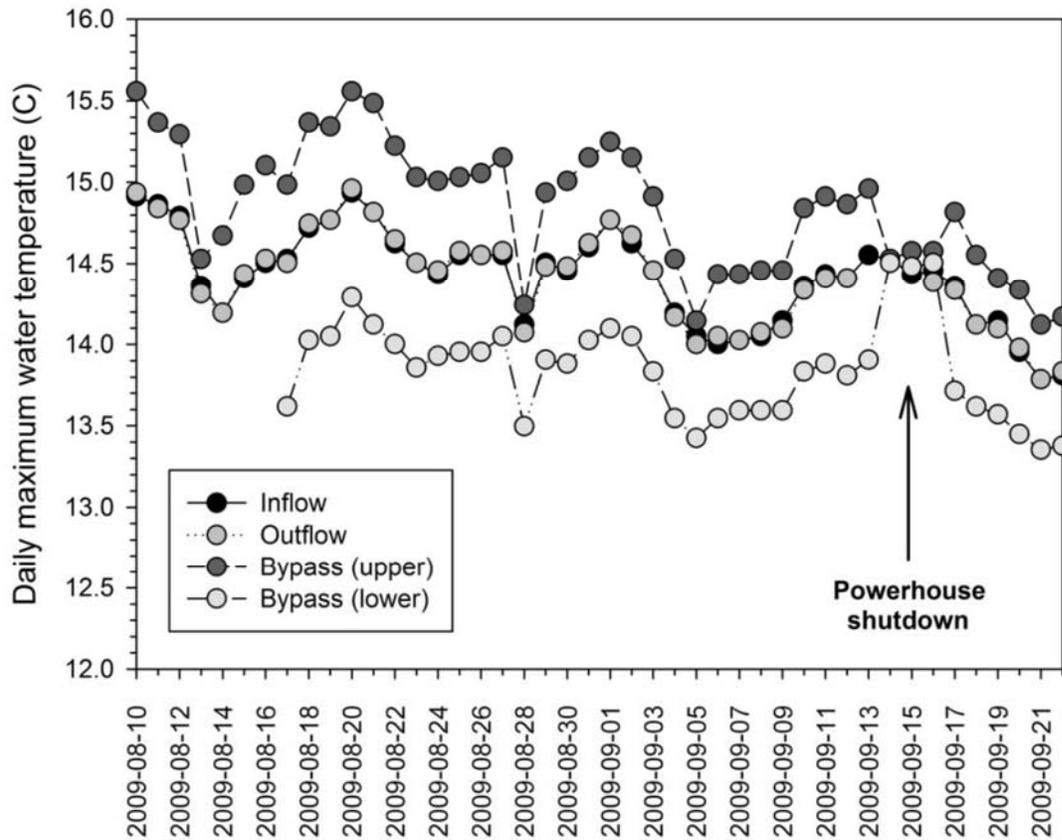


Figure 5 illustrates water temperature data collected at the upstream and downstream ends of the diversion pool in August 2011. Available data indicate close agreement during upstream and downstream locations in late September 2011. Data confirm water temperature was below 16.0°C during the 2009 and 2011 monitoring events.

Figure 5. Water Temperature: August 2011

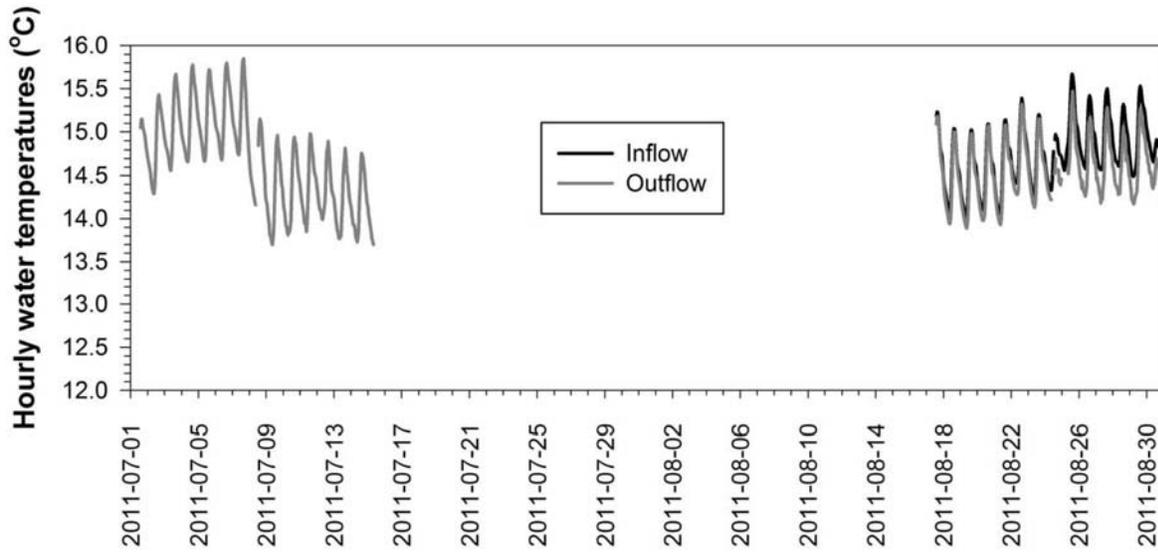
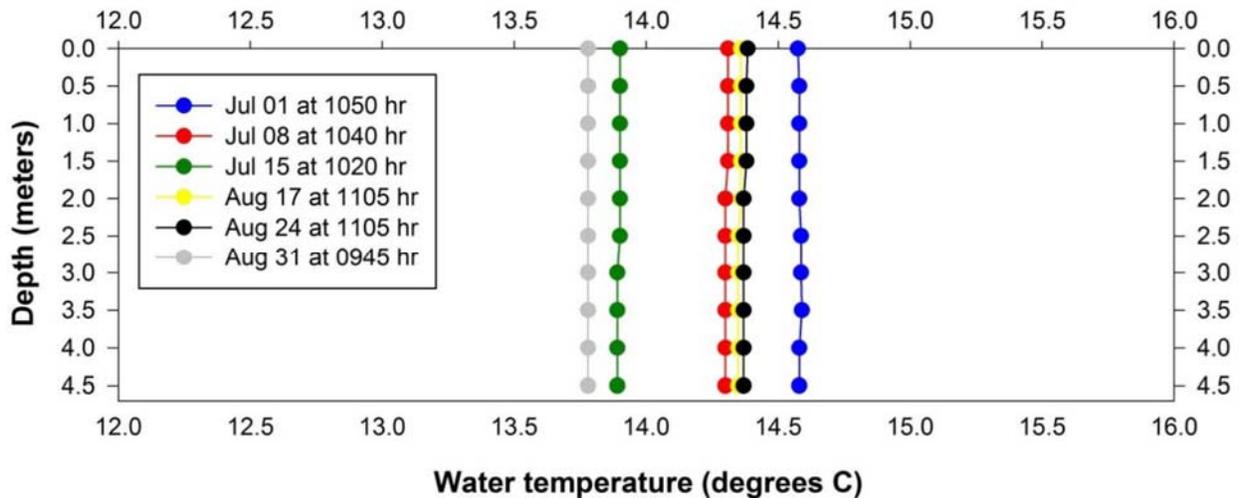


Figure 6 illustrates pool temperature profiles recorded in July and August 2011. All profiles display nearly constant temperature throughout the water column suggesting well-mixed conditions within the diversion pool. All data indicate compliance with the 18°C criterion.

Figure 6. Reservoir Temperature Profiles



#### 6.6.4 Applicant's Position

Deschutes Valley conducted a scaled, mass balance modeling exercise to estimate the effect which the expanded diversion pool under the proposed license amendment would have on water temperature. The study concluded that Project-related effects would likely be on the order of 0.1°C or less although precise estimates are difficult because of uncertainty regarding the temperature and volume of groundwater contributions within the impoundment. Below the Project tailrace, it is likely that any Project effects

would be obscured by gains from Opal Springs which contributes about 240 cfs of groundwater to Crooked River within 100 yards downstream of the tailrace.

### **6.6.5 DEQ Evaluation**

DEQ expects the temperature criterion upstream of the diversion dam to continue to be met. Under an amended license, the Project will expand the area of the diversion pool, increase residence time, and increase the depth of the impoundment. While these changes tend to increase solar exposure, DEQ believes the residence time remains comparatively short and will prevent appreciable thermal gain. Furthermore, DEQ believes that Project-related thermal effects may be offset by the addition of cooler groundwater from as many as six springs identified in the impounded area.

Under an amended license, the Project will continue the release at least 50 cfs to the bypass reach. These flows include 30 cfs through the upstream fish ladder and at least 20 cfs over the modified spillway. Deschutes Valley may also augment bypass flows with BFAA releases to enhance conditions during fish migration.

DEQ expects the temperature criterion in the bypass reach to be met under the proposed Project modifications. This position is based on our understanding that flows in the bypass reach will remain at or above current operational levels. Because reduced flows decreases the ability of a waterbody to withstand increases in temperature, DEQ does not anticipate that proposed operations will cause thermal impairment or reduce support for existing and designated beneficial uses.

To confirm our evaluation, DEQ will require temperature monitoring upstream of the dam while the diversion pool is operated near the maximum proposed elevation. DEQ will also require monitoring in the upper bypass reach near the entrance to the proposed fish ladder.

### **6.6.6 DEQ Finding**

DEQ is reasonably assured that operation of the Project under an amended FERC license will not violate the temperature standard, provided that the following measures are implemented:

1. Water Quality Management Plan: Within 3 months of an amended FERC license issuance, Deschutes Valley shall submit a WQMP to DEQ which addresses the temperature monitoring and reporting requirements presented below. Upon DEQ approval, Deschutes Valley shall submit the WQMP to FERC for approval. Upon FERC approval, Deschutes Valley shall implement the WQMP.
2. Temperature Monitoring and Reporting
  - a. Project Impoundment

Deschutes Valley shall measure temperature at upstream and downstream locations in the diversion pool from May 1 through September 30 beginning with the first year after completion of activities proposed under the proposed license amendment. Monitoring shall include a minimum of 30 days during the July and August when the diversion pool is maintained at an average elevation of at least 2,009.01 feet MSL (i.e., 80 percent of the proposed increase in elevation).
  - b. Bypass Reach

Concurrent with the measurements and schedules described in Section 2a above, Deschutes Valley shall measure temperature in the upper bypass reach in the vicinity of the proposed ladder entrance.

c. Within 90 days of completing monitoring efforts described above, Deschutes Valley shall file a report with DEQ presenting the data and analyzing the effects, if any, of Project operation on the temperature water quality standard. Following review and approval of the report by DEQ, Deschutes Valley shall file the report with FERC.

If monitoring indicates the temperature water quality standard is not met, DEQ will require Deschutes Valley to submit a report analyzing the situation and may require additional monitoring and/or adaptive management of the Project to ensure Project operation does not contribute to violations of water quality standards.

3. Adaptive Management

If water quality monitoring demonstrates that Project operations contribute to exceedances of the applicable temperature standard, Deschutes Valley shall prepare a plan in consultation with DEQ which proposes measures to reduce Project-related thermal loading. The plan may consider measures to alter the timing and/or magnitude of BFAA releases to minimize temperature increases in the bypass reach, lowering the elevation of the diversion pool to decrease retention time, or other measures intended to reduce Project-related thermal impacts. Deschutes Valley must submit the plan within six months of identifying temperature exceedances. Upon DEQ approval, Deschutes Valley shall submit the plan to FERC for approval. Upon FERC approval, Deschutes Valley shall implement the plan.

## 6.7 Antidegradation

Water quality standards have three main elements; the beneficial uses that are protected by the standard, numeric and narrative criteria which support these uses and an antidegradation policy that governs how and when existing water quality may be lowered. When the Department considers issuing a permit or a water quality certificate that would allow the existing water quality to be diminished in some way, the Department action must comply with the antidegradation provisions of the water quality standards.

EPA rules adopted pursuant to Section 303 of the federal Clean Water Act require state water quality standards to contain a statewide antidegradation policy. This policy must, at a minimum, provide that existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

The policy must provide that where existing quality exceeds that necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, the existing quality shall be maintained and protected unless the state determines that lowering the quality without impairing existing uses is appropriate.

The policy must also provide that where high quality waters constitute an outstanding National resource, such as waters of national parks, state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, the existing high quality water shall be maintained and protected.

### **6.7.1 Water Quality Standard**

The applicable standard is set forth in 340-041-0004:

#### **Antidegradation**

- (1) *Purpose.* The purpose of the Antidegradation Policy is to guide decisions that affect water quality such that unnecessary further degradation from new or increased point and nonpoint sources of pollution is prevented, and to protect, maintain, and enhance existing surface water quality to ensure the full protection of all existing beneficial uses. The standards and policies set forth in OAR 340-041-0007 through 340-041-0350 are intended to supplement the Antidegradation Policy.

### **6.7.2 Application of Standard**

The federal Clean Water Act requires states to adopt water quality standards including an antidegradation policy to prevent the unnecessary lowering of water quality. EPA rules governing antidegradation policy and its implementation are given in 40 CFR 131.12 and include the following elements:

- (1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
- (2) Where water quality meets or exceeds levels necessary to support existing and designated beneficial uses, that level of water quality must be maintained and protected.

DEQ has developed an antidegradation policy consistent with EPA regulations. DEQ characterizes existing water quality using the following system of classification:

Tier 1: Extends protections to all uses attained in the waterbody on or after November 28, 1975.

Tier 2: Provides maintenance and protection for high quality waters.

Tier 3: Provides maintenance and protection to waters identified as Outstanding National Resource Waters.

EPA requires antidegradation policies must maintain and protect existing uses. Where water quality is better than levels necessary to support existing and designated beneficial uses, water quality must be maintained at these levels unless the state concludes the proposed action will not reduce support for existing or designated beneficial uses.

DEQ's antidegradation policy provides a means for maintaining and protecting water quality of surface waters by requiring that all activities with the potential to affect existing water quality undergo review and comment prior to any decision to approve or deny a permit or certificate for the activity. The antidegradation policy complements the use of water quality criteria. DEQ's antidegradation policy implementation document and other associated documents may be viewed at:

<http://www.oregon.gov/deq/WQ/Pages/Standards/antidegradation.aspx>

### **6.7.3 Present Conditions**

Existing water quality conditions are described in this Evaluation and Findings Report, and the §401 Application.

### **6.7.4 Applicant's Position**

Deschutes Valley did not offer a position on how Project operation would meet the Antidegradation water quality standard.

### **6.7.5 DEQ Evaluation**

DEQ has completed an antidegradation review for activities considered under the proposed amended FERC license. Our review includes completion of the Anti-degradation Review Worksheet for a Proposed Hydropower Section 401 Certification which is included in Appendix A.

Changes to a project which do not increase discharge loadings are not considered to lower water quality relative to the existing authorized condition. In correspondence dated October 1, 1982, DEQ stated it was reasonably assured the Project would not violate water quality standards. Based on a review of available information, DEQ concludes that current discharge from the Project is protective of designated beneficial uses. Furthermore, DEQ is unaware of existing uses within the Project area other than those already designated. Therefore, DEQ concludes that existing and beneficial uses are currently protected and the proposed discharge complies with DEQ's antidegradation policy.

#### Tier 1 Antidegradation Review

Tier 1 antidegradation regulations provide protection and maintenance for existing uses "attained in the waterbody on or after November 28, 1975." The basic protection provided by Tier 1 applies to all waters, regardless of use designation. There has been no change to the fish use designations in the Deschutes Basin given in Figure 130A of OAR 340-041 since DEQ first promulgated these rules in 2003. For this reason, existing uses in the Deschutes River basin, including the Project area, are equivalent to the designated uses. DEQ has determined that the Project operations, following implementation of the section 401 water quality certification with conditions, will provide support for these designated uses.

#### Tier 2 Antidegradation Review

Tier 2 protection prevents water quality degradation in waters which meet or exceed minimum conditions needed to support existing beneficial uses. If an activity will result in a lowering of water quality, DEQ must demonstrate that allowing degradation is necessary to accommodate economic or social development and will not reduce support for beneficial uses.

### **6.7.6 DEQ Findings**

DEQ finds that federal requirements at 40 CFR 131.12 have been met; that state requirements at OAR 340-041-0004 have been met and that Tier 1 and 2 protections are afforded with the Project operations subject to the conditions in the section 401 water quality certification. These findings are based on the conclusions reached in the preceding sections of this evaluation report which indicate attainment of water quality criteria under current and proposed project operation. Based on this determination, the Department is reasonably assured the Antidegradation standard will be met for operation of the Project under an amended FERC license provided Deschutes Valley protects water quality through implementation of the conditions in the Section 401 water quality certification.

## **7.0 Evaluation of Compliance with Sections 301, 302, 303,**

# 306 and 307 of the Federal Clean Water Act

In order to certify a project pursuant to § 401 of the federal Clean Water Act, DEQ must find that the project complies with applicable provisions of Sections 301, 302, 303, 306 and 307 of the Act and state regulations adopted to implement these sections. Sections 301, 302, 306 and 307 of the federal Clean Water Act deal with effluent limitations, water quality related effluent limitations, national standards of performance for new sources and toxic and pretreatment standards. All of these requirements relate to point source discharges and are the foundation for conditions to be incorporated in National Pollutant Discharge Elimination System permits issued to the point sources. Point source discharges at hydroelectric projects may include cooling water discharges, stormwater, and sewage discharges.

Section 303 of the Act relates to Water Quality Standards and Implementation Plans. EPA has adopted regulations to implement Section 303 of the Act. The EQC has adopted water quality standards consistent with the requirements of Section 303 and the applicable EPA rules. The EQC standards are codified in Oregon Administrative Rules Chapter 340, Division 41. EPA has approved the Oregon standards pursuant to the requirements of Section 303 of the Act. Therefore, the Project must comply with Oregon Water Quality Standards to qualify for certification. As discussed above in this report, the proposed Project will comply with Oregon Water Quality Standards and therefore Section 303 of the Clean Water Act, provided the conditions to the § 401 Certification are satisfied.

## Required NPDES Permits

DEQ requires stormwater permits for certain industries based on Standard Industrial Classification (SIC) codes. The Occupational Safety and Health Administration assigns SIC Code 4911 to Electric Services facilities engaged in “electric power generation, transmission, and distribution.” DEQ does not regulate stormwater discharge from facilities with SIC Code 4911 under NPDES General Permit 1200-Z. Based on the SIC Code assigned to the Project, DEQ does not require Deschutes Valley to obtain coverage under NPDES 1200-Z.

Facilities engaged in upland construction activities which will disturb more than one acre of land and which may reasonably result in surface water discharge to waters of the state must obtain a construction stormwater permit from DEQ. Actions required to implement the measures proposed under an amended FERC license may require that Deschutes Valley obtain a NPDES 1200-C construction stormwater permit prior to construction. DEQ will condition this §401 water quality certification to require Deschutes Valley to obtain all applicable permits prior to engaging in activities which may result in discharge to waters of the state.

## 8.0 Evaluation of Other Appropriate Requirements of State Law

Pursuant to § 401(d) of the Clean Water Act, DEQ may identify condition the certification as appropriate to assure compliance with other appropriate requirements of state law. Such requirements are

“appropriate” if they have any relation to water quality, *Arnold Irrigation Dist. v. DEQ*, 79 Or.App. 136 (1986), *PUD No.1 of Jefferson Co. v. Washington Dept. of Ecology*, 511 U.S. 700 (1994).

## 8.1 Department of State Lands

ORS 196.810 requires that permits be obtained from the Oregon Department of State Lands (DSL) prior to any fill and removal of material from the bed or banks of any stream. Such permits, if issued, may be expected to contain conditions to assure protection of water quality so as to protect fish and aquatic habitat.

The proposed new license will include some construction activities which may require a removal-fill permit from DSL, a dredge and fill permit from the U.S. Army Corps of Engineers pursuant to § 404 of the Clean Water Act, and a §401 water quality certification from DEQ. Deschutes Valley must first obtain all applicable permits, certificates, and authorizations prior to engaging in activities required under the terms of an amended FERC license.

## 8.2 Department of Fish and Wildlife

The state laws summarized below are administered by the Department of Fish and Wildlife and pertain to providing and maintaining passage around artificial obstructions, protecting aquatic habitat and protecting and restoring native fish stocks.

- **ORS 541.405** Oregon Plan for Salmon and Watersheds  
Restore native fish populations and the aquatic systems that support them, to productive and sustainable levels that will provide environmental, cultural and economic benefits.
- **ORS 496.012** Wildlife Policy  
This statute establishes ODFW’s primary directive to prevent serious depletion of any indigenous species and to maintain all species of fish and wildlife at optimum levels.
- **ORS 496.435** Policy to Restore Native Stocks  
Restore native stocks of salmon and trout to historic levels of abundance.
- **ORS 509.580 - 509.645** ODFW’s Fish Passage Law  
Provide upstream and downstream passage at all artificial obstructions in Oregon waters where migratory native fish are currently or have historically been present.
- **OAR 635-007-0502 through 0509** Native Fish Conservation Policy
- **OAR 635-500-0100-0120** Trout Management  
Maintain the genetic diversity and integrity of wild trout stocks; and protect, restore and enhance trout habitat.
- **OAR 635-500-1800-1940** Crooked River and Metolius River Subbasins Fish Management
- **OAR 635-415-0000-0030** Fish and Wildlife Habitat Mitigation Policy

## 8.3 Department of Land Conservation and Development

ORS Chapter 197 contains provisions of state law requiring the development and acknowledgement of comprehensive land use plans. This chapter also requires state agency actions to be consistent with acknowledged local land use plans and implementing ordinances. Deschutes Valley's §401 Application contains affirmative statements of land use compatibility from Jefferson County. No §401 certification condition is necessary in relation to ORS Chapter 197.

## 8.4 Department of Environmental Quality

### Onsite Septic Systems

On-site disposal of sewage is governed by ORS 454.705 et. seq. and OAR Chapter 340, Divisions 71 and 73. The purpose of these rules is to prevent health hazards and protect the quality of surface water and groundwater.

### Hazardous Materials

ORS 466.605 et. seq. establishes requirements for reporting and cleanup of spills of petroleum products and hazardous materials.

ORS 466.605 et. seq. and ORS 468B.300-335 establish requirements for reporting and cleanup of spills of petroleum products and hazardous materials. ORS 468B.055 requires submittal of plans and specifications for water pollution control facilities to ODEQ for review and approval prior to construction.

### NPDES Permits

Prior to engaging in future construction activities which may disturb more than one acre and which will result in stormwater discharge to surface waters, Deschutes Valley must first obtain an NPDES 1200-C construction stormwater permit from DEQ.

## 8.5 Oregon Water Resources Department

Under ORS 468B.045(2) DEQ is required to make findings that its approval or denial is consistent with the standards established in ORS 543A.025(2) to (4).

These standards can be summarized into the following five areas:

- (1) Standards that mitigate, restore and rehabilitate fish and wildlife resources adversely affected by the project;

*Finding:* ODFW has participated in the settlement agreement to implement fish passage at the Opal Springs Hydroelectric Project. The benefits of the additional habitat protections in Crooked River will promote restoration and rehabilitation of fish and wildlife resources in accordance with the goals, plans, guidelines, and policies of the Oregon Fish and Wildlife Commission.

- (2) Any plan adopted by the Pacific Northwest Electric Power and Conservation Planning Council; the Environmental Quality Commission's water quality standards;

*Finding:* DVWD will continue to comply with the mitigation measures contained in the existing FERC license including bypass flows. The amendment will not change the effectiveness of any of those measures. The more efficient use of water at existing Project sites is consistent with the NPCC planning documents.

(3) Operational standards that ensure project does not endanger public health or safety, including “practical protection from vulnerability to seismic and geologic hazards,”;

*Finding:* The Opal Springs dam is about 0.8 miles upstream of Lake Billy Chinook. That very large reservoir would minimize impacts from any unregulated spill from the dam. The dam is in a location that has very limited public access. Annual reviews by FERC have shown no upstream or downstream circumstances that would endanger life, health or property. Therefore the dam is rated as a low hazard potential to public health and safety. The low hazard rating will be maintained with the addition of the weirs to raise the normal pool elevation. This is shown in Appendix 4-K of the 90% Supporting Design Report, by CH2M Hill, November 2012.

(4) Standards that protect, maintain, or enhance wetland resources such that reauthorization may not result in a net loss to existing wetland resources; and

*Finding:* DVWD will continue to comply with the mitigation measures contained in the existing DEQ Section 401 certification including bypass flows. As amended, additional flows will be bypassed to the Crooked River to protect, maintain or enhance wetland resources.

(5) Standards that protect, maintain, or “enhance other resources in the project vicinity including recreational opportunities, scenic and aesthetic values, historic, cultural and archaeological sites, and botanical resources” such that reauthorization may not result in net loss to these existing resources.

*Finding:* DVWD will continue to implement all protection, mitigation and enhancement measures contained in the existing FERC license. The amendment will not change the effectiveness of any part of those measures.

In May 2016, OWRD published a Proposed Final Order for the Project. The proposed order presents findings of fact and conclusions of law to demonstrate that the standards of ORS 543.092, ORS 543A and OAR 690-053 have been met with regards to the proposed Project amendment. Based on these findings, OWRD proposes to issue an amended water right for hydroelectric use for this Project.

## 9.0 Public Comment

# 10.0 Conclusions and Recommendation for Certification

DEQ has evaluated Deschutes Valley’s application for a §401 water quality certification and related supporting documents and considered public comments. DEQ has determined that the proposed activity

will comply with the applicable provisions of Sections 301, 302, 303, 306 and 307 of the Clean Water Act, Oregon Administrative Rules, Chapter 340, Division 41 and other appropriate requirements of state law, provided Deschutes Valley implements the § 401 conditions proposed in this document.

Based on the preceding analysis and findings, it is recommended that pursuant to § 401 of the Federal Clean Water Act and ORS 468B.040, the Director, or assigned signatory, conditionally approve the application for certification of the Opal Springs Hydro Project, FERC Project No. 5891, consistent with the findings of this document.

# **ATTACHMENT A**

## **ANTIDEGRADATION CHECKLIST**

**Attachment A: Anti-degradation Review Worksheet  
for a  
Proposed Hydropower section 401 certification**

Applicant: Deschutes Valley Water District

What is the name of the surface water that receives the discharge? Crooked River

1. Briefly describe the proposed activity: Applicant seeks an amendment to their existing FERC license to construct and operate fish passage facilities, increase reservoir elevation, and modify spillway at their Opal Springs Hydroelectric project.

This review is for a:  Renewal  New

[Go to Step 2.](#)

2. Are there any existing uses associated with the water body that are not included in the list of designated uses? Example: DEQ's Fish Use Designation Maps identify the waterbody as supporting salmonid migration; however ODFW has determined that it also supports salmonid spawning.

Yes. Identify additional use(s), the basis for conclusion, and the applicable criteria: . Go to [Step 3.](#)

No. Go to [Step 3.](#)

3. Was the analysis of the impact of the proposed activity performed relative to criteria applicable to the most sensitive beneficial use?

Yes. Go to [Step 4.](#)

No. Re-do analysis to develop permit limits using correct criteria, and modify permit as necessary. Go to [Step 4.](#)

4. Is this surface water an **Outstanding Resource Water** or **upstream** from an **Outstanding Resource Water**? Note: No waters in Oregon have been designated as Outstanding Resource Waters. OAR 340-041-0004(8)(a) contains criteria for designating such waters. Example: they are found in State or National parks.

Yes. [Go to Step 7.](#)  No. [Go to Step 5.](#)

5. Is this surface water a **High Quality Water**? A High Quality Water is one for which none of the pollutants are Water Quality Limited. To determine, go to the database at <http://www.deq.state.or.us/wq/assessment/rpt2010/search.asp> and under Listing Status, select "Water Quality Limited – All (Categories 4 and 5)".

Yes. [Go to Step 10.](#)  No. [Go to Step 6.](#)

6. Is this surface water a **Water Quality Limited Water**? To determine, use the same database query as Step 5.

Yes. [Go to Step 16.](#)  No. [Go to Step 4](#) (you must answer "yes" to either question 4, 5, or 6)

Note: The surface water must fall into one of 3 categories: Outstanding Resource Water ([Step 4](#)), High Quality Water ([Step 5](#)), or Water Quality Limited Water ([Step 6](#)).

7. Will the proposed activity result in a permanent new or expanded source of pollutants directly to or affecting the **Outstanding Resource Water**? [see OAR 340-041-0004(3)-(5) for a description in rule of discharges that do not result in lowering of water quality or do not constitute a new and/or increased discharge or are otherwise exempt from anti-degradation review; otherwise see “Is an Activity Likely to Lower Water Quality?” in *Anti-degradation Policy Implementation Internal Management Directive for NPDES Permits and Section 401 Water Quality Certifications*.]
- Yes, Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23](#).
- No. Please provide basis for conclusion: [Go to Step 8](#).
8. Will the proposed activity result in a lowering of water quality in the **Outstanding Resource Water**? [see OAR 340-041-0004(3)-(5) for a description in rule of discharges that do not result in lowering of water quality or do not constitute a new and/or increased discharge or are otherwise exempt from antidegradation review; otherwise see “Is an Activity Likely to Lower Water Quality?” in *Antidegradation Policy Implementation Internal Management Directive for NPDES Permits and Section 401 Water Quality Certifications*.]
- Yes. Provide basis for conclusion: [Go to Step 9](#).
- No. Provide basis for conclusion: [Go to Step 20](#).
9. If the proposed activity results in a non-permanent new or expanded source of pollutants directly to or affecting an **Outstanding Resource Water**, will the lowering of water quality in the **Outstanding Resource Water** be on a short-term basis in response to an emergency or to protect human health and welfare?
- Yes. Proceed with Application Process to Interagency Coordination and Public Comment. [Go to Step 23](#).
- No. Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 20](#).
10. Will the proposed activity result in a Lowering of Water Quality in the **High Quality Water**[see OAR 340-041-0004(3)-(5) for a description in rule of discharges that do not result in lowering of water quality or do not constitute a new and/or increased discharge or are otherwise exempt from antidegradation review; otherwise see “Is an Activity Likely to Lower Water Quality?” in *Antidegradation Policy Implementation Internal Management Directive for NPDES Permits and Section 401 Water Quality Certifications*.]
- Yes. [Go to Step 11](#).
- No. Proceed with Permit Application. Applicant should provide basis for conclusion: [Go to Step 23](#).
11. OAR 340-041-0004(6)(c) of the *High Quality Waters Policy* requires that the Department evaluate the application to determine that all water quality standards will be met and beneficial uses protected after allowing discharge to **High Quality Waters**. Will all water quality standards be met and beneficial uses protected?
- Yes. Provide basis for conclusion: Proceed with Application Process to Interagency Coordination and Public Comment. [Go to Step 12](#).

No. Provide basis for conclusion. Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23.](#)

12. OAR 340-041-0004(6)(a) of the High Quality Waters Policy requires that the Department evaluate the application to determine if no other reasonable alternatives exist except to discharge to High Quality Waters. At a minimum, the following list must be considered:

- Improved operation and maintenance of existing treatment system
- Recycling or reuse with no discharge
- Discharge to on-site system
- Seasonal or controlled discharges to avoid critical water quality periods
- Discharge to sanitary sewer
- Land application

Were any of the alternatives feasible?

Yes. Provide basis for conclusion (see below for information requirements): Recommend  
Preliminary Decision that applicant use alternative. [Go to Step 10.](#)

No. Provide basis for conclusion (see below for information requirements): [Go to Step 13.](#)

In a separate statement to this application, please explain the *technical feasibility* of the alternative, explain the *economic feasibility* of the alternative, and provide an *estimated cost* of NPDES permit alternative for a five-year period from start-up.

13. OAR 340-041-0004(6)(b) of the *High Quality Waters Policy* requires that the Department evaluate the application to determine if there are social and economic benefits that outweigh the environmental costs of allowing discharge to High Quality Waters. Do the social and economic benefits outweigh the environmental costs of lowering the water quality?

Yes. Provide basis for conclusion (see below for information requirements): [Go to Step 14.](#)

No. Provide basis for conclusion (see below for information requirements): [Go to Step 23.](#)

The basis for conclusion should include a discussion of whether the lowering of water quality is necessary and important. “Necessary” means that the same social and economic benefits cannot be achieved with some other approach. “Important” means that the value of the social and economic benefits due to lowering water quality is greater than the environmental costs of lowering water quality.

Benefits can be created from measures such as:

- Creating or expanding employment (provide current/expected number of employees, type & relative amount of each type)
- Increasing median family income
- Increasing community tax base (provide current/expected annual sales, tax info)

Evaluation and Findings Report – Opal Springs Hydro Project

- Providing necessary social services
- Enhancing environmental attributes

Environmental Costs can include:

- Losing assimilative capacity otherwise used for other industries/development
- Impacting fishing, recreation, and tourism industries negatively
- Impacting health protection negatively
- Impacting societal value for environmental quality negatively

14. OAR 340-041-0004(6)(d) of the *High Quality Waters Policy* requires that DEQ prevent federal threatened and endangered aquatic species from being adversely affected. Will lowering the water quality likely result in adverse effects on federal threatened and endangered aquatic species?

Yes, please provide basis for conclusion (see below for information requirements): [Go to Step 23.](#)

No, please provide basis for conclusion (see below for information requirements): [Go to Step 15.](#)

15. Will lowering water quality in the **High Quality Water** be on a short-term basis in response to an emergency or to protect human health and welfare?

Yes, [go to Step 20.](#)

No, recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23](#)

16. Will the proposed activity result in a lowering water quality in the **Water Quality Limited Water**? [see OAR 340-041-0004(3)-(5) for a description in rule of discharges that do not result in lowering of water quality or do not constitute a new and/or increased discharge or are otherwise exempt from anti-degradation review; otherwise see “Is an Activity Likely to Lower Water Quality?” in *Anti-degradation Policy Implementation Internal Management Directive for NPDES Permits and Section 401 Water Quality Certifications.*]

Yes, [go to Step 17.](#)

No, proceed with Permit Application. Permit writer should provide basis for determination in permit evaluation report: [Go to Step 23.](#)

17. OAR 340-041-0004(9)(a)(A) of the *Water Quality Limited Waters Policy* requires that the Department evaluate the application to determine that all water quality standards will be met. Will all water quality standards be met?

Yes, please provide basis for conclusion: [Go to Step 18.](#)

No, please provide basis for conclusion. Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23.](#)

18. OAR 340-041-0004(9)(a)(C) of the *Water Quality Limited Waters Policy* requires that the Department evaluate the application to determine that all recognized beneficial uses will be met and that threatened or

endangered species will not be adversely affected. Will all beneficial uses be met and will threatened or endangered species be protected from adverse effects?

Yes, please provide basis for conclusion: [Go to Step 19.](#)

No, please provide basis for conclusion: Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23.](#)

19. OAR 340-041-0004(9)(a)(D)(i-iv) of the *Water Quality Limited Waters Policy* requires that the Department evaluate the application for **one of the following**:

- 19A. Will the discharge be associated (directly or indirectly) with the pollution parameter(s) causing the waterbody to be designated a Water Quality Limited Water?

Yes, please provide basis for conclusion: . Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23.](#)

No, please provide basis for conclusion: [Go to Step 20.](#)

- 19B. Have TMDLs, WLAs, LAs, and reserve capacity been established, compliance plans been established, and is there sufficient reserve capacity to assimilate the increased load under the established TMDL?

Yes, please provide basis for conclusion: [Go to Step 20.](#)

No, please provide basis for conclusion: Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23.](#)

- 19C. Will the proposed activity meet the requirements, as specified under OAR 340-041-0004(9)(a)(D)(iii) of the *Water Quality Limited Waters Policy*, for dissolved oxygen?

Yes, please provide basis for conclusion: [Go to Step 20.](#)

No, please provide basis for conclusion: Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23.](#)

- 19D. Will the activity solve an existing, immediate, and critical environmental problem?

Yes, please provide basis for conclusion: [Go to Step 20.](#)

No, please provide basis for conclusion: Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23.](#)

20. Is the proposed activity consistent with local land use plans?

Yes, [go to Step 21.](#)

No, please provide basis for conclusion: Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23.](#)

21. OAR 340-041-0004(9)(c)(A) requires the Department to consider alternatives to lowering water quality. At a minimum, the following list must be considered:

- Improved operation and maintenance of existing treatment system
- Recycling or reuse with no discharge
- Discharge to on-site system
- Seasonal or controlled discharges to avoid critical water quality periods
- Discharge to sanitary sewer
- Land application

Were any of the alternatives feasible?

Yes, please provide basis for conclusion (see below for information requirements): Recommend Preliminary Decision that applicant use alternative. [Go to Step 16.](#)

No, please provide basis for conclusion (see below for information requirements): [Go to Step 22.](#)

In a separate statement to this application, please explain the *technical feasibility* of the alternative, explain the *economic feasibility* of the alternative, and provide an *estimated cost* of NPDES permit alternative for a five-year period from start-up.

22. OAR 340-041-0004(9)(c)(B) of the *Water Quality Limited Waters Policy* requires the Department to consider the economic effects of the proposed activity, which in this context consists of determining if the social and economic benefits of the activity outweigh the environmental costs of allowing a lowering of water quality. Do the social and economic benefits outweigh the environmental costs of lowering the water quality?

Yes. Provide basis for conclusion: Proceed with Application Process to Interagency Coordination and Public Comment. [Go to Step 23.](#)

No. Provide basis for conclusion: Recommend Preliminary Decision to deny proposed activity (subject to Interagency Coordination and Public Comment). [Go to Step 23.](#)

The basis for conclusion should include a discussion of whether the lowering of water quality is necessary and important. “Necessary” means that the same social and economic benefits cannot be achieved with some other approach. “Important” means that the value of the social and economic benefits due to lowering water quality is greater than the environmental costs of lowering water quality.

Benefits can be created from measures such as:

- Creating or expanding employment (provide current/expected number of employees, type & relative amount of each type)
- Increasing median family income
- Increasing community tax base (provide current/expected annual sales, tax info)
- Providing necessary social services

Evaluation and Findings Report – Opal Springs Hydro Project

- Enhancing environmental attributes

Environmental Costs can include:

- Losing assimilative capacity otherwise used for other industries/development
- Impacting fishing, recreation, and tourism industries negatively
- Impacting health protection negatively
- Impacting societal value for environmental quality negatively

23. On the basis of the Anti-degradation Review, the following is recommended:

- Proceed with Application to Interagency Coordination and Public Comment Phase.
- Deny Application; return to applicant and provide public notice

ACTION APPROVED

Review prepared by

DEQ, [go to DEQ info](#)

Other, [go to Other info](#)

**DEQ info**

Name: Chris Stine

Phone: 541-686-7810

Date Prepared: 08/22/2016

**Other info**

Name:

Name of Company:

Address:

Phone:

Fax:

Email:

Date prepared:

**ATTACHMENT B**

**PUBLIC COMMENTS**

# **ATTACHMENT C**

## **REFERENCES**

## Evaluation and Findings Report – Opal Springs Hydro Project

BLM 2015. Opal Springs Fish Passage Project, Wild and Scenic Rivers Act Section 7a Analysis. United States Department of Interior, Bureau of Land Management. October 16, 2015.

DEQ 2004. Oregon Responses to EPA Questions RE: State's water quality temperature standards. Michael T. Llewellyn. Oregon Department of Environmental Quality. February 4, 2004.

DEQ 2005. Technical Basis for Revising Turbidity Criteria. Prepared by Tom Rosetta, Oregon Department of Environmental Quality. October 2005.

DEQ 2009. Water Monitoring and Assessment Mode of Operations. Laboratory and Environmental Assessment Division, Oregon Department of Environmental Quality. DEQ03-LAB-0036-SOP. March 10, 2009.

DVWD 2015. Amended and Restated Settlement Agreement Concerning License Amendment for Fish Passage at the Opal Springs Hydroelectric Project FERC NO. 5891. Deschutes Valley Water District. October 2015.

EPA 2000. Ambient water quality criteria recommendations: information supporting the development of state and tribal nutrient criteria for lakes and reservoirs in nutrient ecoregion II. EPA-822-B-00-007. EPA, Office of Water and Office of Science and Technology, Health and Ecological Criteria Division, Washington, D. C. December 2000.

EPA 2001. Ambient water quality criteria recommendations: information supporting the development of state and tribal nutrient criteria for rivers and streams in nutrient ecoregion I. EPA-822-B-01-012. Prepared by EPA, Office of Water and Office of Science and Technology, Health and Ecological Criteria Division, Washington, D. C. December 2001.

EPA. 2004. National Recommended Water Quality Criteria. EPA 822-R-02-047. EPA, Office of Water and Office of Science and Technology, Health and Ecological Criteria Division, Washington, D.C. 2004.

FERC 2015. Notice of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Comments, Recommendations, Terms and Conditions, and Fishway Prescriptions. Federal Energy Regulatory Commission, Office of Energy Projects. November 5, 2015.

FERC 2016. Notice of Availability of Environmental Assessment, Deschutes Valley Water District – FERC No. 5891-009. Federal Energy Regulatory Commission, Office of Energy Projects. April 6, 2016.

Huntington 2016. Technical Water Quality Exhibit Related to Clean Water Act Section 401 Certification for Deschutes Valley Water District's Proposal to Implement the Opal Springs Fish Passage and Protection Plan. Clearwater BioStudies, Inc. January 31, 2016.

Kleinschmidt 2015. Applicant Prepared Environmental Assessment, Opal Springs Hydro Project, FERC No. 5891. October 2015.

Kleinschmidt 2016. Application for Certification Pursuant to Section 401 of the Federal Clean Water Act. Kleinschmidt. Portland, Oregon. February 2016.

NCEI 2016. 1981-2010 US Climate Normals. NOAA National Centers for Environmental Information. <http://www.ncdc.noaa.gov/>

USFWS 2016. Biological Opinion, Opal Springs Hydro Project. US Department of Interior, US Fish and Wildlife Service. Reference: 01EWF00-2016-F-0300.

**Clean Water Act Section 401 Certification  
for the  
Deschutes Valley Water District  
Opal Springs Hydroelectric Project  
(FERC No. 5891)  
Crooked River Subbasin,  
Jefferson County, Oregon**

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

**1. Water Quality Management Plan**

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

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

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

a) Bypass Reach Flows

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

b) Bypass Flow Accrual Account (BFAA)

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

c) Fish Passage

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

d) Beneficial Use

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

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

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

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

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

#### **a) Best Management Practices**

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

#### **b) Notification**

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

#### **c) Recordkeeping**

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

### **4. Dissolved Oxygen**

#### **a) Water Quality Monitoring Plan**

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

(1) Impoundment

Deschutes Valley Water District shall continuously measure DO at upstream and downstream locations in the diversion pool for a minimum of 30 consecutive days during the first July and August when the diversion pool is maintained at an average elevation of at least 2,009.01 feet MSL (i.e., 80 percent of the proposed increase in elevation).

Beginning no later than May 1, Deschutes Valley Water District shall continuously measure DO at the above referenced locations for at least 15 consecutive days during the first May in which the diversion pool is maintained at an average elevation of at least 2,009.01 feet MSL.

(2) Bypass Reach

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

b) Duration

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

c) Reporting

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

d) Adaptive Management

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

## **5. Hydrogen Ion Concentration (pH)**

a) Water Quality Monitoring Plan

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

(1) Impoundment

Deschutes Valley Water District shall measure pH at upstream and downstream locations in the diversion pool for a minimum of 30 consecutive days during the first July and

August when the diversion pool is maintained at an average elevation of at least 2,009.01 feet MSL.

(2) Bypass Reach

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

b) Duration

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

c) Reporting

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

d) Adaptive Management

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

## 6. Temperature

a) Water Quality Monitoring Plan

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

(1) Impoundment

Deschutes Valley Water District shall measure temperature at upstream and downstream locations in the diversion pool from May 1 through September 30 beginning with the first year after completion of activities proposed under the proposed license amendment. Monitoring shall include a minimum of 30 days during the July and August when the diversion pool is maintained at an average elevation of at least 2,009.01 feet.

(2) Bypass Reach

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

b) Duration

Water quality monitoring is required for three consecutive years beginning in the first year following completion of fish passage facilities identified in Condition 2c. Based on the results of the first and second year of required monitoring, DEQ will determine whether monitoring may be discontinued or additional data collection is required. If DEQ determines that additional data collection is required, DEQ will require additional monitoring and adaptive management. .

c) Reporting

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

d) Adaptive Management

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

## 7. General Conditions

a) Certification Modification

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

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

b) Other Federal Permits

Upon applying for any federal license or permit authorizing a discharge to waters of the United States other than the new or amended FERC license, Deschutes Valley Water District shall provide DEQ written notice of such application and of any proposed changes or new activity requested to be authorized under the application since issuance of this § 401 Certification. DEQ will notify Deschutes Valley Water District and the applicable federal agency either that: (1) this § 401 Certification is sufficient for purposes of the federal license or permit; or (2) in light of new information related to the water quality impacts of the activity requested to be authorized under the application, there is no longer reasonable assurance of compliance with state water quality

standards. In the latter event, ODEQ will consider the new information, solicit and consider public and agency comment as required by law, and issue a 401 certification determination for purposes of the federal license or permit.

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

c) Project Modification

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

d) Repair and Maintenance

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

e) Inspection

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

f) Posting

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

## 8. Project Specific Fees

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

a) Oregon Department of Environmental Quality

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

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

b) Annual Adjustment

Fee amounts shall be adjusted annually, according to the following formula:

$$AD = D \times (CPI-U)/(CPI-U-June 2010)$$

Where:

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

c) Payment Schedule

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

d) Credits

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

e) Expenditure Summary

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

f) Duration

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

## OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

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Keith Andersen  
Western Region Administrator

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Date