

Evaluation and Findings Report: 401 Water Quality Certification Mason Dam Hydroelectric Project (FERC P-12686)

May 2014



State of Oregon
Department of
Environmental
Quality

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1. Introduction

The Oregon Department of Environmental Quality (DEQ) prepared this Evaluation and Findings Report in response to an application for water quality certification submitted by Baker County, Oregon (Applicant) for the proposed Mason Dam Hydroelectric Project (Project, FERC Project P-12686). The purpose of this report is to determine what effects, if any, the proposed Project may have on water quality. As allowed by Section 401 of the Clean Water Act, DEQ may condition the 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.

DEQ received the application on May 28, 2013. DEQ has one year from receipt of the application to render a decision on the Applicant’s request for water quality certification.

Mason Dam is a zone earth and rockfill embankment dam, 173 feet high and 895 feet long, built by the Bureau of Reclamation (BOR) from 1965-1968. Mason Dam impounds the Powder River at RM 131 near Sumpter, OR forming Phillips Reservoir (**Figure 1**). Phillips Reservoir has a maximum capacity of 95,500 acre feet (af) and a surface area of 2,235 acres. Water stored in Phillips Reservoir is released into the Powder River for diversion downstream into existing distribution canals and laterals which irrigate 18,500 acres of land along the Powder River north of Baker City. Operation and maintenance of Mason Dam and related facilities were transferred to the Baker Valley Irrigation District on August 23, 1968 (**Simonds, 1997**).

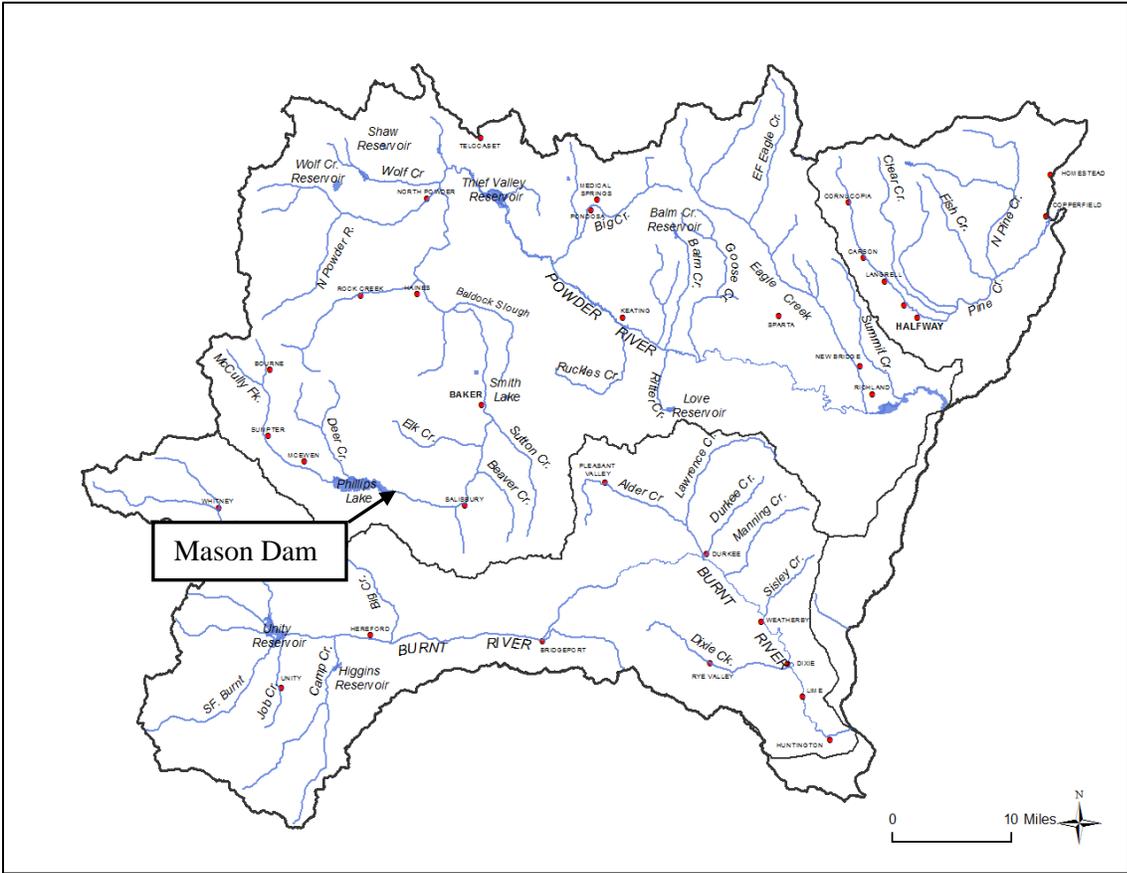


Figure 1: Project Location.

2. Requirements for Certification

2.1 Applicable Federal and State Law

Baker County has applied to the Federal Energy Regulatory Commission (FERC) to develop a 3.4 megawatt hydroelectric facility at Mason Dam. Section 401 of the Federal Clean Water Act requires that an applicant for a federal permit or license to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates, the water pollution control agency having jurisdiction over the navigable waters will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of the Clean Water Act.

The Oregon Department of Environmental Quality (DEQ) has jurisdiction for issuing a 401 Water Quality Certification in the State of Oregon. In order for DEQ to issue a 401 certification, the Applicant (Baker County) must ensure that any actions of project development and operations comply with the water quality standards set forth in OAR Chapter 340, division 041 as well as the applicable provisions of sections 301, 302, 303, 306, and 307 of the Clean Water Act.

Federal Requirements

Sections 301, 302, 303, 306, and 307 of the Federal Clean Water Act: 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

Oregon Administrative Rules (OAR) 340-041 and 340-048-0005 to 340-048-0050: These rules were adopted by the Environmental Quality Commission (EQC) to prescribe the state's water quality standards (OAR 340-041) and procedures for receiving, evaluating, and taking final action upon a §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 local land use plans and any other requirements of state law that have a direct or indirect relationship to water quality.

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.

Information which must be included in an application for §401 certification is presented in 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 §401 of the Federal Clean Water Act and state law:

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

3. Summary of Application

3.1 Applicant Information

3.1.1 Name and Address of Applicant

County of Baker
Fred Warner JR. Commission Chair
1995 Third Street
Baker City, OR 97814
541-523-8200

3.1.2 Name and Address of Applicant's Authorized Representative

Jason Yencopal
1995 Third Street
Baker City, OR 97814
541-523-9669

3.1.3 Documents Filed in Support of §401 Application

Baker County has filed the following documents in support of its §401 certification application for the licensing of the Project:

Pre-Application Document for the Mason Dam Hydroelectric Project P-12686, Baker County Board of Commissioners, Baker City, OR, April 2006.

ILP Proposed Study Plan for the Mason Dam Hydroelectric Project P-12686, Baker County Board of Commissioners, Baker City, OR, October 2006.

Initial Study Report for the Mason Dam Hydroelectric Project P-12686, Baker County Board of Commissioners, Baker City, OR, March 2008.

Preliminary Licensing Proposal for the Mason Dam Hydroelectric Project P-12686, Baker County Board of Commissioners, Baker City, OR, November 2009.

Application for License for the Mason Dam Hydroelectric Project P-12686, Baker County Board of Commissioners, Baker City, OR, April 2013.

Application for Clean Water Act Section 401 Water Quality Certification for the Mason Dam Hydroelectric Project P-12686, Baker County Board of Commissioners, Baker City, OR, May 2013.

3.2 Waters of the State

3.2.1 Waters Affected by the Project

The Powder River has headwater areas in the Elkhorn Mountains west of Baker City near the town of Sumpter, where Cracker Creek and McCully Fork join to form the Powder River. Mason Dam is located at RM 131 on the Powder River approximately 12 miles downstream of Sumpter. Below Mason Dam the Powder River flows east, and then north through the Baker Valley, and then southeast through the Keating Valley and reaches Brownlee Reservoir on the Snake River near the town of Richland (**Figure 1**). The total length of the Powder River is approximately 144 miles. Elevations in range from approximately 2,000 feet at the mouth, to over 9,000 feet in the Wallowa and Elkhorn Mountain Ranges.

3.2.2 Water Rights

All Phillips Reservoir water rights are owned by BOR. Baker County plans to apply for a non-consumptive water right to utilize releases from Mason Dam for an additional beneficial use (power generation). This water right would be jointly held with BOR and would be junior to all existing water rights on the Powder River.

3.2.3 Beneficial Uses

Designated beneficial uses for the Powder River and its tributaries are given in OAR-041-0260, Table 260A and apply to all waters within the Project area (**Table 1**)

Table 1: Powder River Beneficial Uses

Beneficial Uses	All Basin Waters
Public Domestic Water Supply ¹	X
Private Domestic Water Supply ¹	X
Industrial Water Supply	X
Irrigation	X
Livestock Watering	X
Fish & Aquatic Life ²	X
Wildlife and Hunting	X
Fishing	X
Boating	X
Water Contact Recreation	X
Aesthetic Quality	X
Hydro Power	
Commercial Navigation & Transportation	

¹ With adequate pretreatment (filtration and disinfection) and natural quality to meet drinking water standards.

² See also Figure 260A for fish use designations for this basin.

Beneficial uses in the Powder Basin are further defined by the Fish Use Designation maps in OAR Chapter 340, Division 041, Figure 260A. This map designates waters below Mason Dam as Redband/Lahontan Trout habitat. ODF&W has also determined that Redband trout spawning occurs below Mason Dam during the period of January 1 through May 15. Figure 260A also identifies headwater streams above Mason Dam as Bull trout spawning and rearing habitat. Bull trout streams include Silver Creek, Little Cracker Creek, and portions of Cracker Creek.

3.3 Project Lands

The FERC Project boundary surrounds all Project facilities and construction work areas and includes a buffer zone to assure all Project activities are contained within the boundary. The proposed Project facilities include:

Intake bifurcation – approximately 30 feet from the downstream end of the existing 56” penstock through Mason Dam, where the penstock will be bifurcated to route water to the powerhouse.

Powerhouse – 40 by 28 foot metal building containing the turbine, generator, and ancillary equipment.

Tailrace – piping and flow control structures/earthworks to route discharge from the powerhouse back to the existing stilling basin in the Powder River.

Transmission Line – overhead transmission line from the powerhouse to the point of interconnect with the existing Idaho Power 138 kV line (approximately 0.8 miles long).

Substation – electrical facility at point of interconnect.

Construction staging area – area for temporary storage of construction equipment and materials (not part of the licensed facility)

The Mason Dam facilities, which are owned by the Bureau of Reclamation, are not included in the Project boundary except as required for the operation of the Project.

3.4 Fisheries in the Powder Basin

Table 2 is a list of native fish currently known to occur in the Powder Basin (includes Powder River, Burnt River, and Brownlee Reservoir Subbasins). Fishery resources have changed dramatically in the Powder Basin in the last 50-100 years. Four species of salmonids have been extirpated from the basin and several other species of fish have been introduced (**Table 3 and 4**). The anadromous fish (fish that migrate to the ocean, such as salmon and steelhead) listed in **Table 3** were eliminated from a majority of the Powder Subbasin by the construction of the Thief Valley Dam in 1932. Anadromous fish were eliminated from the rest of the Powder Basin and upstream Snake River tributaries after the construction of Brownlee, Oxbow, and Hells Canyon Dams on the Snake River in the late 1950s and 1960s.

Table 2. Native Fish Currently Known to Occur in the Powder Basin

Common Name	Scientific Name
Redband Trout	<i>Oncorhynchus mykiss gibbsi</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>
White Sturgeon	<i>Acipenser transmontanus</i>
Mountain Whitefish	<i>Prosopium williamsoni</i>
Bull Trout	<i>Salvelinus confluentus</i>
Mottled Sculpin	<i>Cottus bairdi</i>
Slimy Sculpin	<i>Cottus cognatus</i>
Torrent Sculpin	<i>Cottus rhotheus</i>
Shorthead Sculpin	<i>Cottus confuses</i>
Paiute sculpin	<i>Cottus beldingi</i>
Northern Pikeminnow	<i>Ptychocheilus oregonensis</i>
Chiselmouth	<i>Arocheilus alutaceus</i>
Peamouth	<i>Mylocheilus caurinus</i>
Longnose dace	<i>Rhinichthys cataractae dulcis</i>
Speckled Dace	<i>Rhinichthys osculus</i>
Ridside shiner	<i>Richardsonius balteatus</i>
Largescale Sucker	<i>Catostomus macrocheilus</i>
Mountain Sucker	<i>Catostomus platyrhynchus</i>
Bridgelip Sucker	<i>Catostomus columbianus</i>

(NWPCC, 2004a, NWPCC, 2004b)

Table 3. Fish Species Extirpated from the Powder Basin

Common Name	Scientific Name
Coho salmon	<i>Oncorhynchus kusutch</i>
Sockeye salmon	<i>Oncorhynchus nerka</i>
Chinook Salmon	<i>Orcorhynchus tshawytscha</i>
Steelhead	<i>Oncorhynchus mykiss</i>

(NWPCC, 2004a, NWPCC, 2004b)

Table 4: Fish Species Introduced to the Powder Basin

Common Name	Scientific Name	Common Name	Scientific Name
Brook Trout	<i>Savelinus fontinalis</i>	Bluegill	<i>Lepomis macrochirus</i>
Lake Trout	<i>Savelinus nanaycush</i>	Pumkinseed	<i>Lepomis gibbosus</i>
West Slope Cutthroat Trout	<i>Oncorhynchus clarki lewisi</i>	Warmouth	<i>Lepomis gulosus</i>
Carp	<i>Cyprinus carpio Poxomis</i>	Yellow Perch	<i>Perca flavescens</i>
Black Crappie	<i>nigromaculatus</i>	Channel Catfish	<i>Ictalurus punctatus</i>
White Crappie	<i>Poxomis annularis Micropterus</i>	Flathead Catfish	<i>Pylodictis olivaris</i>
Largemouth Bass	<i>salmoides Micropterus</i>	Brown Bullhead	<i>A,eiurus nebulosus</i>
Smallmouth Bass	<i>dolomieui</i>	Golden Trout	<i>Oncorhynchus aguabonita</i>
Walleye	<i>Stizostedion vitreum</i>		

(NWPCC, 2004a, NWPCC, 2004b)

Redband Trout and Bull trout were identified as important aquatic species in the Powder River Subbasin and Burnt River Subbasin reports (NWPCC, 2004a, 2004b). They are also some of the most sensitive aquatic species in the Powder Basin and therefore their habitat is one of the most sensitive beneficial water uses. Both species are present in Phillips reservoir and in upstream tributaries. Redband Trout are also present in the Powder River and tributaries downstream of Mason Dam. Ecological studies performed as part of the federal licensing project included habitat surveys for threatened and endangered and sensitive (TES) species in the Project study area. Potential species included the Columbia Spotted Frog and the Cryptochian Caddisfly. No TES species or potential habitats for TES species were identified in the assessment report (Baker County, 2009).

Redband Trout are present throughout the Powder Basin, however no specific information is available regarding population numbers. Population densities vary throughout the basin in response to habitat quality and connectivity. Redband Trout that migrate to the ocean are known as Steelhead. This life history was extirpated from the Powder River above Thief Valley Dam in 1932, and completely eliminated from the basin by the construction of the Hells Canyon complex of dams on the Snake River. In areas where there are no barriers to migration within the basin, there are population segments which exhibit fluvial (resident to rivers) and adfluvial (migrating between lakes and rivers) life histories (NWPCC, 2004a).

The Powder River has four distinct populations of Redband Trout: Powder River from mouth to Thief Valley Dam, Eagle Creek, Powder River from Thief Valley Dam to Mason Dam, and Powder River above Mason Dam. The limited available data indicate that Redband Trout are

widely distributed in the Powder Basin. Management and land use activities have affected the seasonal use of habitat within stream reaches (**NWPCC, 2004a**).

Bull Trout in the Powder Basin are part of the Hells Canyon Species Management Unit (SMU) designated by Oregon Department of Fish and Wildlife (ODF&W). This unit includes 14 populations in the Pine Creek (Snake River tributary) and Powder River watersheds.

Bull Trout are listed as Threatened under the federal Endangered Species Act throughout their range in the Pacific Northwest. Most of the Bull Trout Populations in the Hells Canyon SMU are characterized by extremely low abundances and restricted distributions. Productivity of Bull Trout in the Powder Basin is hampered by habitat quality and quantity and the lack of ability to express a migratory life history. The Hells Canyon Bull Trout SMU is classified “at risk” and generally passes only two of six population measurement criteria (**ODF&W, 2005**).

4. Project Description

4.1 Current Project Developments

4.1.1 Mason Dam and Phillips Reservoir

Mason Dam was built by BOR in order to store water for irrigation, water delivery, and flood control. Phillips Reservoir, formed from the damming of the Powder River by Mason Dam, covers 2,235 acres with a total capacity of 95,500 acre-feet at a full pool elevation of 4070.5 feet. The tributaries that drain into Phillips Reservoir include the Powder River, Deer Creek, Miners Creek, Smith Creek, Dean Creek, Clear Creek, and several unnamed creeks. The watershed is 105,345 acres.

BOR is responsible for the overall management of the Project facilities. Baker Valley Irrigation District (BVID) provides day-to-day operation of the facilities under an agreement with BOR. Water is released from Phillips Reservoir during the irrigation season April through September. During the irrigation season releases generally range from 100 to 200 cfs and can be as high as 350 cfs. The BVID has an agreement with the Oregon Department of Fish and Wildlife to release enough water to meet a 10 cfs minimum stream flow at Smith Dam, located approximately 5 miles downstream of Mason Dam. Due to the minimum flow requirement and the need to release water for flood storage during the spring, releases average approximately 10 cfs between October and January and increase to an average of 20 to 50 cfs during February and March.

Water is released through two slide gates located at the base of the dam. A spillway is located on the north side of the dam above the slide gates. To date, use of the spillway has not been required to manage water releases (**Baker County, 2013**).

4.1.2 Mason Dam Operation

The intake of Mason Dam is located within a 17.3 foot by 17.3 foot by 13.25 foot high cement structure. It contains large metal bars spaced 6-inches apart that act as a trash rack. The intake is located between 3,975 and 3,988 feet in elevation. The original streambed elevation at the axis of the dam is 3,918 feet. A deadpool of water with a maximum depth of approximately 57 feet and a capacity of approximately 3,500 acre-feet remains in the reservoir below the level of the outlet works.

There are two pipes that run through the dam that can be used to release water. The main pipe is 56 inches in diameter, and is split into two 33 inch pipes with high pressure slide gate valves at the outlet works. A concrete tailrace conducts the water to the stilling basin. The secondary pipe is 12 inches in diameter and uses a sleeve/weir valve to release water to the stilling basin (**Baker County, 2013**).

The spillway has an uncontrolled crest. It is concrete lined and has a maximum capacity of 1,210 cfs. The spillway discharges to the same stilling basin as the outlet works (**Figure 2**).



Figure 2: Mason Dam Spillway, Outlet Works, and Stilling Basin, August 2012.

4.2.1 Intake Structure

A new steel bifurcation will be installed just upstream from the existing Y branch in the conduit. This will allow connection of a new 72-inch diameter penstock which will extend approximately 105 feet to the powerhouse. A shutoff valve will be provided in the powerhouse to allow isolation of the turbine from the existing dam outlet works (**Baker County, 2013**).

4.2.2 Powerhouse

A 40-foot by 28-foot Powerhouse is proposed for the area south of the existing outlet works. The Powerhouse will contain a single horizontal shaft Francis turbine that will operate efficiently over a head range of 110 to 150 feet, and flows from 120 to 300 cfs. An extended downward tilted draft tube will discharge into a new tailrace. The draft tube will be fitted with aeration fittings to provide aspiration of air to increase dissolved oxygen in the discharge water if needed to meet dissolved oxygen water quality standards. Plant controls will include synchronous bypass signal to initiate operation of the BOR high pressure slide gates during turbine shut down (**Baker County, 2013**).

4.2.3 Tailrace

The existing tailrace will be modified to accommodate discharge from the Powerhouse without affecting the existing high pressure slide gate valve discharge area. A new concrete wall will tie in to the existing south tailrace wall forming the north wall of the powerhouse tailrace. Rip-rap will form the slope on the south side. A concrete floor will be constructed sloping into the existing stilling basin (**Baker County, 2013**).

4.2.4 Transmission Line

The proposed over-head power line would extend approximately 0.8 miles south from the Powerhouse along the face of the dam to Black Mountain Road and continuing to its intersection with the Idaho Power transmission line (**Baker County, 2013**).

4.2.5 Substation

The substation will be located at the connection with the Idaho power transmission line and will include a 12.47 KV by 138 KV, 4-5 MVA transformer as well as necessary circuit breakers and disconnects. A disconnect will also be placed at the powerhouse (**Baker County, 2013**).

4.2.6 Construction Staging Area

The recreational parking area located approximately 600 feet downstream of the stilling basin will be used as a temporary construction staging area (**Baker County, 2013**).

4.3 Proposed Project Operations

The proposed Mason Dam Hydroelectric Project will use flows released by BVID for irrigation and flood control in a “run of release” from the dam. Baker County will not have control of the releases of water from Philips Reservoir, and the Project will not change the timing or the manner of the water releases. The Project will operate when sufficient flows allow using automated controls. The Project will operate when flows exceed 100 cfs, which generally occurs during the April through September irrigation season and during flood control releases in late Winter/early Spring.

5. Water Quality Standards and Regulations

5.1 Biologically-Based Numeric Criteria

DEQ establishes numeric criteria for certain water quality parameters to provide support for biological functions of aquatic organisms. DEQ has adopted numeric criteria for temperature and dissolved oxygen (DO) which reflect life stage development of salmonid fish species.

The biologically-based numeric criteria for temperature and DO for the Powder River downstream of Mason Dam are presented in **Table 5**. The resident trout spawning use (January 1 through May 15) is based on input from ODF&W during the licensing process. The Cold Water Aquatic Life designation for the remainder of the year is based on the DEQ memo (**DEQ, 2010**) which describes the application of updated U.S. EPA eco-region maps used to determine appropriate DO criteria.

Table 5: Biologically-based Numeric Criteria for Temperature and DO for the Powder River Downstream of Mason Dam.

	January 1 through May 15	May 16 through December 31	Rule
Use	Resident trout spawning (Redband trout)	Redband trout habitat/Cold Water Aquatic Life	OAR 340-041, Figure 260A
Temperature	20° C/68° F	20° C/68° F	OAR 340-041-0028
Dissolved Oxygen	a) Not less than 11.0 mg/l. If IGDO \geq 8.0 mg/l, the DO spawning criterion is 9.0 mg/l; b) Where pressure, altitude or temperature preclude attainment of the 11.0 or 9.0 mg/l criteria, DO saturation must be at least 95 percent; c) Spatial median IGDO must be at least 8.0 mg/l.	Criterion is 8.0 mg/l. Where precluded by pressure, altitude or temperature, DO saturation must be at least 90 percent. At DEQ discretion, DO must not fall below 8.0 mg/l as a 30-day mean, 6.5 mg/l as a 7-day mean, and 6.0 mg/l as an absolute minimum.	OAR 340-041-0016

5.2 Antidegradation Policy

The purpose of Oregon's Antidegradation policy (OAR 340-041-0004) is to protect, maintain, and enhance the quality of existing surfaces. For waters which meet applicable water quality standards, the policy states that the existing water quality shall be maintained and protected unless the Oregon EQC makes certain rigorous findings of need. For water bodies which do not meet certain criteria, the policy prohibits further degradation.

The Antidegradation policy complements the use of water quality criteria. While criteria provide the absolute minimum values or conditions that must be met in order to protect designated uses, the Antidegradation policy offers protection to existing water quality, including instances where water quality meets or exceeds the criteria.

5.3 Water Quality Impairment in the Powder River

5.3.1 Water Quality Limited Waters

Waterbodies which fail to meet certain water quality criteria are designated as water quality limited pursuant to CWA §303(d). The EPA requires States to develop total maximum daily loads TMDLs 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 waste load allocations (WLAs) for point sources and load allocations (LAs) for non-point sources. For hydroelectric projects located on a water quality-limited waterbody, a §401 certification may serve as the means for implementing LAs assigned to the project. Rules for developing, issuing and implementing TMDLs are in OAR Chapter 340, Division 042.

The DEQ 2010 Integrated Report presents a database of water quality limited waters in Oregon. **Table 6** identifies the sections of rivers in or near the Project boundary currently identified as water quality limited in the 2010 Integrated Report.

Table 6: Water Quality Limited Stream Reaches in the Mason Dam Project Vicinity.

Water Body	River Mile	Parameter	Season	Criteria	Beneficial Use	Status	Assessment
Powder River	0 to 146.3	Arsenic	Year Around	Table 40 Human Health Criteria for Toxics	Human Health; Aquatic life	TMDL needed	Added 2012
Powder River	0 to 130	Dissolved Oxygen	January 1 to May 15	Spawning: Not less than 11.0 mg/l or 95% of saturation	Redband trout spawning	TMDL needed	Added 2012
Powder River	0 to 130	E. Coli	Fall/Winter/Spring	30-day log mean 126 org./100 ml; 406 single sample max.	Water contact recreation	TMDL needed	Added 2012
Powder River	115.6 to 130	Fecal Coliform	Summer	Log mean of 200 org./100ml; no more than 10% > 400/100 ml	Water contact recreation	TMDL needed	Added 1998
Powder River/Phillips Reservoir	130 to 138.2	Dissolved Oxygen	Year Around	Cold water: not less than 8.0 mg/l or 90% sat.	Cold water aquatic life	TMDL needed	Added 2012

Since no TMDLs have been developed for the Powder River, DEQ will use the §401 evaluation process to identify the Project’s contribution to the listed parameters and include management conditions in the §401 Certificate to address those contributions. These §401 conditions may be modified as necessary when a TMDL is approved or modified.

5.3.2 Oregon Health Authority Listings

On May 21, 2012, the Oregon Health Authority (OHA) issued a health advisory for yellow perch in Phillips Reservoir. A 2011 analysis conducted by the U.S. EPA found elevated mercury levels in these fish. It is recommended that people who eat yellow perch from Phillips Reservoir limit their consumption to two meals per month.

5.4 Water Quality Standards not of Concern

Water quality standards identified in **Table 7** 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 7** below will be met during operation of the proposed Project.

Table 7: Water Quality Standards Not Affected by Proposed Project Operations

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>	Mason Dam does not discharge substances which promote fungal growth. The proposed modification will not alter the current flow regime in a manner which contributes to fungal growth.
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>	DEQ knows of no reports of objectionable taste or odor or toxic conditions that are deleterious to fish or affect the palatability of water, fish, or shellfish. The proposed Project will not affect these characteristics.
Bottom or Sludge Deposits OAR 340-041-007(12)	<i>The formation of bottom or sludge deposits deleterious to habitat and aquatic life are not allowed.</i>	The proposed Project is not expected to generate sludge or bottom sediments.
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 Project will not create aquatic conditions that are offensive to the human senses of sight, taste, smell, or touch.
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 will not utilize, store, or produce radioactive material.
Toxic Substances OAR 340-041-0033	<i>Discharge of toxic material that affects aquatic life or human uses is not allowed.</i>	The Project may not discharge toxic material in amounts which violate toxic substances criteria.
pH OAR 340-041-0021	<i>pH values in the Powder Basin may not fall outside of the range</i>	The Project will not alter the current flow regime or reservoir withdrawal

	<i>6.5-9.0. When greater than 25% of ambient measurements taken between June and September are greater than pH 8.7, the Department will determine whether the values higher than 8.7 are anthropogenic or natural in origin (as resources allow).</i>	depth in a manner which contributes to changes in pH.
Temperature OAR 340-041-028	<i>Criteria is intended to minimize the risk to cold-water 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.</i>	The Project will not alter the current flow regime or reservoir withdrawal depth in a manner which contributes to changes in temperature.
Turbidity OAR 340-041-0036	<i>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.</i>	The Project will not alter the current flow regime or reservoir withdrawal depth in a manner which contributes to changes in turbidity.
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 will not discharge sewage or animal wastes into Project waters or engage in other activities which may contribute to bacterial pollution.
Nuisance Algae Growth OAR 340-041-0019	<i>Algal growth which impairs the recognized beneficial uses of the water body is not allowed.</i>	The Project will not alter the scheduled release of water or create conditions favorable to algal growth.
Total Dissolved Solids OAR 340-041-0032 & OAR 340-041-0345	<i>Standard generally prohibits TDS concentrations which exceed basin-specific criterion of 100 mg/l.</i>	The Project does not contribute organic or inorganic substances in molecular, ionized, or micro-granular form which may affect TDS in Project waters.

5.5 Water Quality Standards of Potential Concern

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 operating 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 violate Oregon water quality standards.

This evaluation is limited to the effects the operation of the Project under a new License may have on water quality. Project construction or other activities which necessitate in-water work may require separate water quality certifications issued by DEQ or pre-authorized pursuant to a dredge and fill permit issued by the Corps pursuant to Section 404 of the CWA.

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 affected by Project operations as proposed by the Applicant. **Table 8** identifies the water quality standards potentially impacted by the operation of the Project under a new FERC License. A detailed evaluation of the effects which Project operation may have these parameters is offered in **Section 6** of this report.

Table 8: Water Quality Standards of Potential Concern

Criterion	Standard	DEQ Evaluation
Dissolved Oxygen OAR 340-041-0016	<i>Sufficient concentrations of dissolved oxygen are necessary to support aquatic life.</i>	Passing the reservoir discharge water through the Project turbines may reduce aeration.
Total Dissolved Gas OAR 340-041-0031	<i>Protects aquatic life from gas bubble trauma caused by water that is super saturated with atmospheric gases.</i>	Turbine operation may cause gas entrainment in discharge waters.
Discoloration, oily sheen, oily coatings OAR 340-041-0007(13)	<i>Objectionable discoloration, scum, oily sheen, floating solids or coating aquatic life with oil films is not allowed.</i>	Oil is used in Project turbines and transformers. Fuels may be stored onsite to operate back-up electrical generators.
Antidegradation OAR 340-041-0004	<i>Protects existing water quality by preventing unnecessary additional water quality degradation.</i>	Must be addressed when a project is proposed that may lower existing water quality conditions, even though standard violations are not anticipated.
Biocriteria OAR 340-041-0011	<i>Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.</i>	Passing the reservoir discharge water through the Project turbines may reduce aeration and could affect biological communities.

6. Water Quality Compliance Evaluation

6.1 Dissolved Oxygen

6.1.1 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);*

The fish use map given in OAR 340, Division 041 Figure 260A indicates water bodies in the vicinity of the site are Redband/Lahontan trout habitat. In addition, ODF&W has indicated that Redband trout spawning occurs in the Powder River in a reach starting approximately 800 feet below Mason Dam. No spawning occurs in the reservoir. The biologically-based numeric DO criteria based on these uses are summarized in **Table 9** below:

Table 9: Biologically-Based Dissolved Oxygen Criteria

	Cold Water Aquatic Life	Resident Trout Spawning
Powder River	May 16 to Dec. 31	Jan. 1 to May 15
Phillips Reservoir	Year Round	---
Criteria	8.0 mg/l, or 90-percent saturation if unattainable due to barometric pressure, altitude, and temperature. OR Per Table 21: 8.0 mg/l as a 30-day mean minimum, 6.5 mg/l as a seven-day minimum mean, 6.0 mg/l as an absolute minimum.	(a) 11.0 mg/l, or 9.0 mg/l if IGDO spatial mean is 8.0 mg/l or greater. (b) 95-percent saturation if unattainable due to barometric pressure, altitude, and temperature. (c) IGDO spatial median must be at least 8.0 mg/l.
Rule	OAR 340-041-0016(2)	OAR 340-041-0016(1)

6.1.2 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 sensitive to reduced DO concentrations. Sensitivity also varies between various life stages (e.g., incubation, emergence, growth) and between different life processes (e.g., rearing and reproduction).

During spawning, salmonids will construct redds from suitable gravels to shelter eggs during incubation. Proper intergravel DO is critical for egg and embryo development. However, factors such as gravel porosity, substrate embeddedness, and sediment oxygen demand may reduce intergravel dissolved oxygen (IGDO) relative to DO in the water column. For this reason, DEQ establishes a biologically-based numeric criterion for IGDO to ensure adequate oxygen available to salmonids during early life stage development.

6.1.3 Present Conditions

Plots of dissolved oxygen data from various depths in Phillips Reservoir are presented in **Figures 4 through 9**. The data were collected May through October, covering the primary months when the hydroelectric facility would be presumed to be operating. The elevation of the dam discharge intake is shown on each of the dissolved oxygen figures 3,975 to 3,988 feet above mean sea level (MSL). The elevation of full pool of the reservoir is 4070.5 feet MSL, making the top of the intake 82.5 feet below the surface of the reservoir at full pool. The DO concentration near the surface of the reservoir is often at or near the cold water DO criteria of 8.0 mg/l, but it drops significantly with depth. With the exception of portions of the month of May, the dissolved oxygen concentration measured during the period of May through October at the intake for the facility was well below the DO cold water criteria of 8.0 mg/l. DO concentrations reach a low of less than 1.0 mg/l at this depth during the month of August.

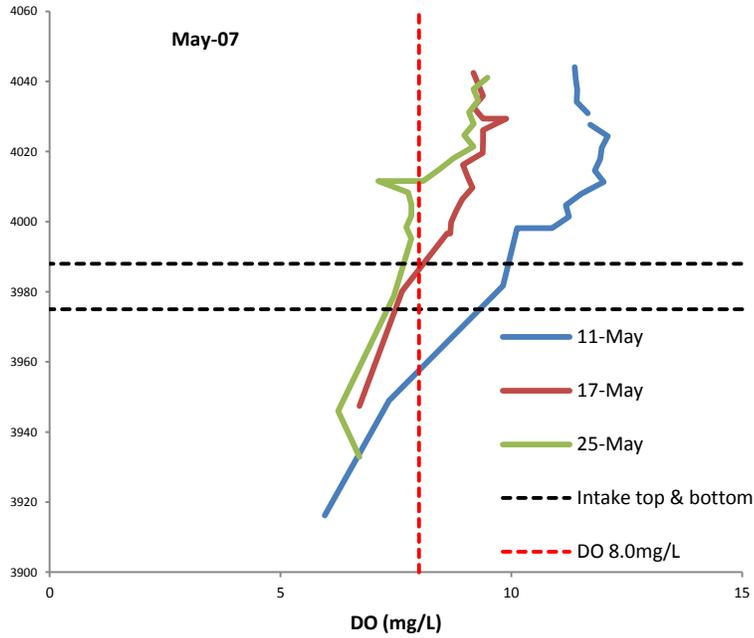


Figure 4: Dissolved Oxygen in Phillips Reservoir, May 2007 (Baker County, 2013).

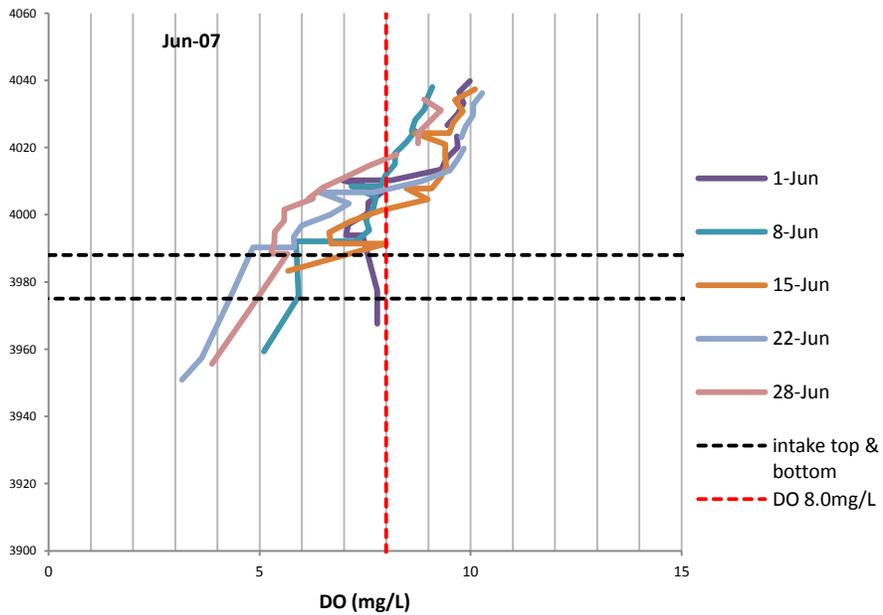


Figure 5: Dissolved Oxygen in Phillips Reservoir, June 2007 (Baker County, 2013).

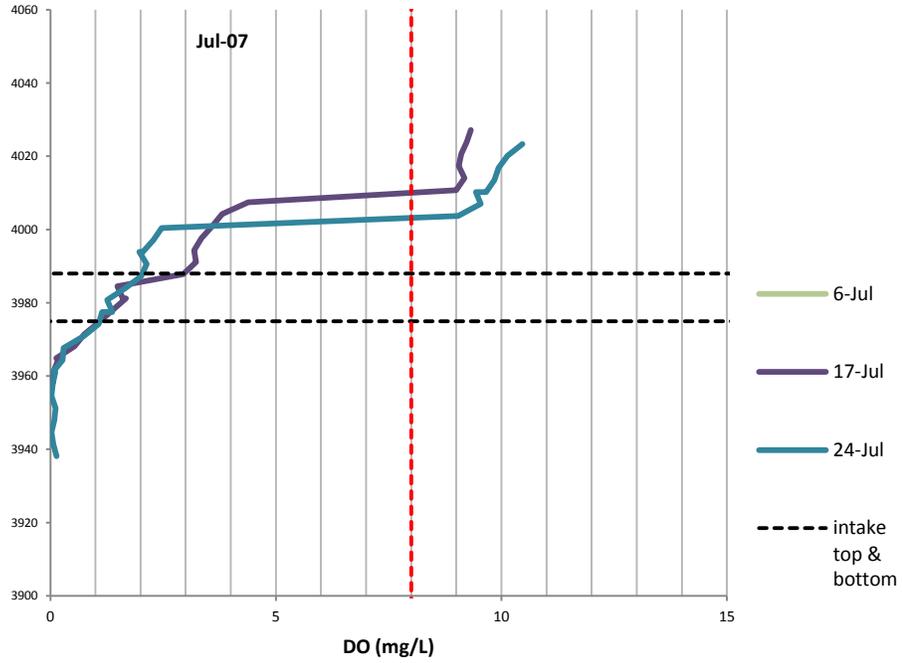


Figure 6: Dissolved Oxygen in Phillips Reservoir, July 2007 (Baker County, 2013).

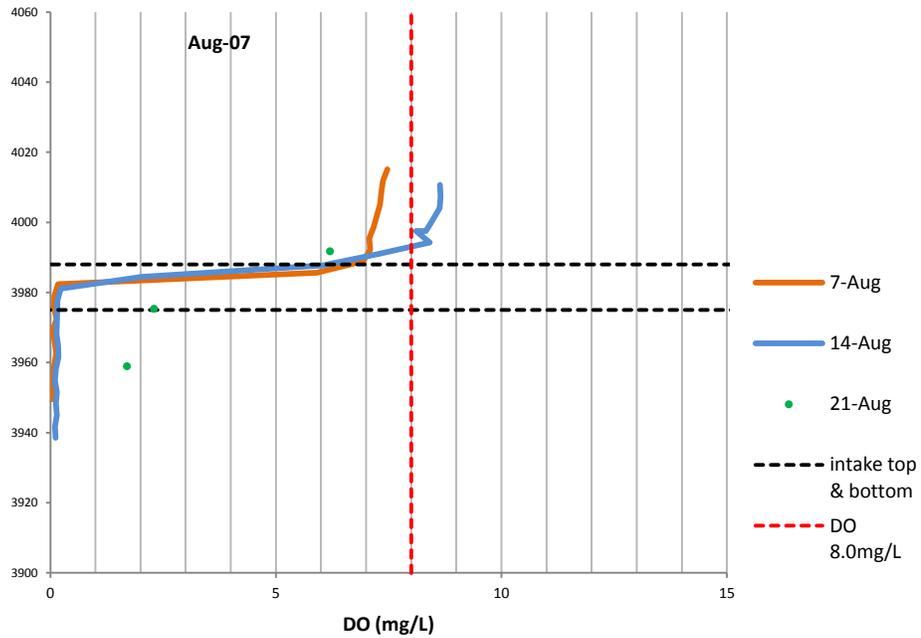


Figure 7: Dissolved Oxygen in Phillips Reservoir, August 2007 (Baker County, 2013).

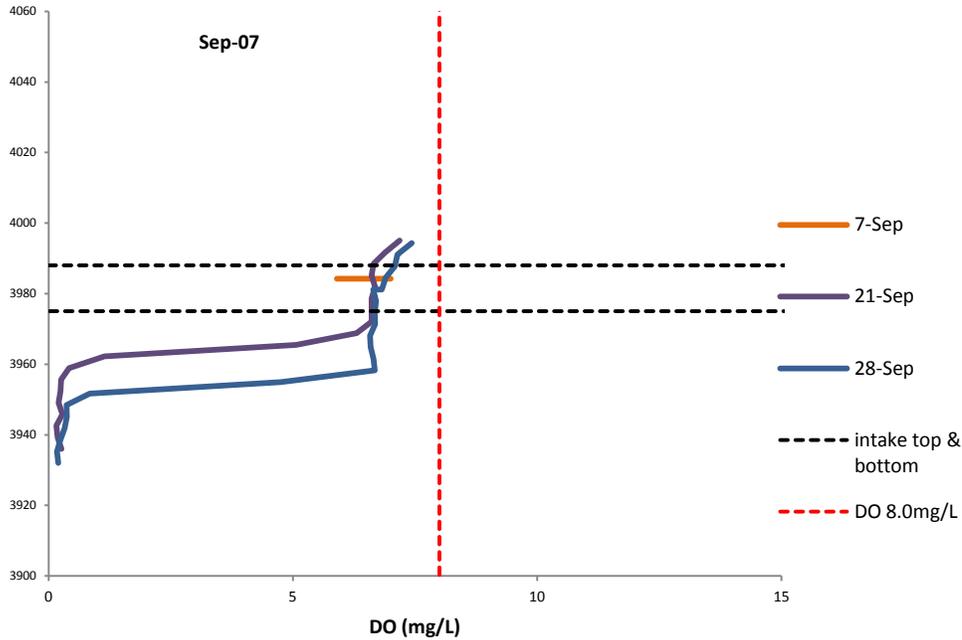


Figure 8: Dissolved Oxygen in Phillips Reservoir, September 2007 (Baker County, 2013).

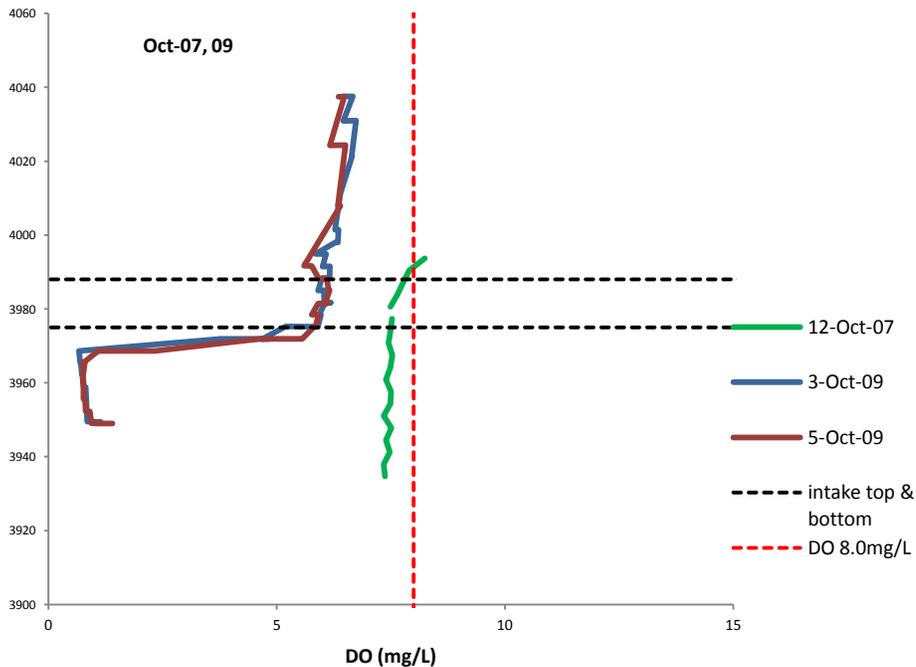


Figure 9: Dissolved Oxygen in Phillips Reservoir, October 2007/2009 (Baker County, 2013).

Dissolved oxygen measurements were made in May through October 2007 at four locations in the Powder River downstream of the Mason Dam as part of the pre-licensing work on the Project. These data are presented in **Figures 10 and 11 (Baker County, 2013)**. From the

limited data available, it appears that the Cold Water DO Criteria of 8.0 mg/l is met at Station 4, located immediately below the dam, in the month of May, and July through October. The June measurements are the lowest with some of them slightly below the 8.0 mg/l Cold Water Criterion. The data presented in **Figure 11** show that the alternate 90% DO saturation criterion is also not met in the month of June.

These data are based on a limited number of one-time “grab” samples, a more robust data set of continuous DO measurements would be needed to measure compliance with the DO criteria. There are no measurements during the January 1 through May 15 time period when the DO spawning criteria of 11.0 mg/l would apply.

Based on these available data it is not possible to confirm when the applicable DO criteria are currently being met in the Powder River below Mason Dam. However, it does appear that sensitive beneficial uses, such as the Redband trout fishery that is present below the Mason Dam, are being supported.

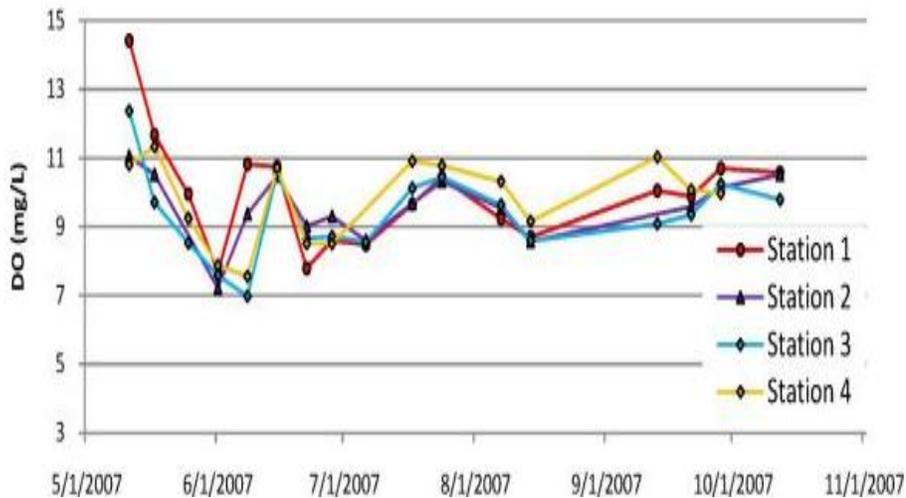


Figure 10: Dissolved oxygen data for the Powder River approximately 0.0, 1.2, 1.7 and 2.8 miles downstream of Mason Dam, Stations 4, 3, 2, and 1 respectively (Baker County, 2013).

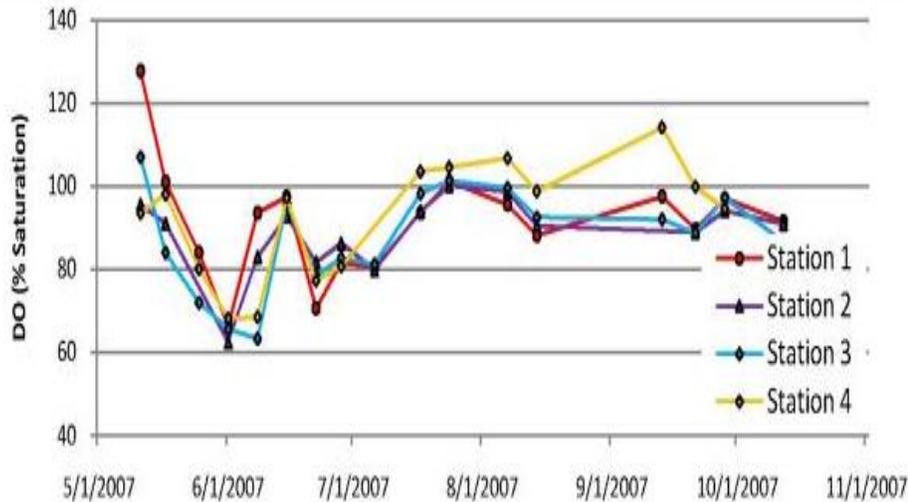


Figure 11: Dissolved oxygen percent saturation data for the Powder River approximately 0.0, 1.2, 1.7 and 2.8 miles downstream of Mason Dam, Stations 4, 3, 2, and 1 respectively (Baker County, 2013).

6.1.4 Applicant's Position

The Project is expected to operate during the irrigation season of April through September. The current release of water under highly turbulent conditions in the slide gates aerates the discharge and allows the applicable Cold Water DO criteria to be met during the May-October time period that was monitored during the pre-licensing period. There are no data available that were collected during the January 1-May 15 period when the spawning DO criteria applies. The Applicant has stated that running water through the turbine will reduce the aeration that is now occurring in the slide gates. The proposed DO management plan describes the use of draft tube aeration within the turbine along with releases of water through the slide gates as necessary to meet the cold water DO standard of 8.0 mg/l or 90% saturation, as well as the seasonal spawning requirement of 11.0 mg/l or 95% saturation. Compliance will be measured at the monitoring station located approximately 800 feet downstream of Mason Dam. This is the location of the current Bureau of Reclamation flow and temperature measurement station. If these measures are not sufficient to meet the DO standards, rock weirs will be added to the river channel to increase aeration. In the event that all these measures fail to increase DO sufficiently, all flow will be passed through the slide gates, eliminating all impacts from the Project.

6.1.5 DEQ Evaluation

During Project operation, discharge through the existing outlet will be reduced by the magnitude of flow through the Project. DEQ believes it is reasonable to anticipate reduced DO in the Project discharge during operation. However, the expected DO reductions in turbine discharge will be offset by implementation of the proposed turbine venting system as well as releasing water through the slide gates, and installation of rock weirs in the river channel as needed.

To measure for Project effects on DO levels, DEQ will require Baker County to monitor DO continuously during Project operation to confirm that the DO standard is met at the monitoring station located below the Powerhouse. DEQ anticipates that applicable DO criteria will be met during Project operation and DO levels will be sufficient to support all existing beneficial uses. As specified in the 401 Certification conditions, the Project will be shut down if the DO criteria cannot be met.

6.1.6 DEQ Findings

DEQ is reasonably assured that operation of the proposed Project under a new FERC License will comply with the DO standard, provided the following measures are implemented:

Water Quality Monitoring and Management Plan

Within 90 days of FERC License issuance, Baker County shall submit a revised WQMMP to DEQ which addresses the DO monitoring and reporting requirements presented below. Upon DEQ approval, the WQMMP becomes part of the § 401 Certification Conditions for the Project for the purposes of any federal license or permit.

DO Monitoring

Baker County shall measure DO at the downstream stream gage location continuously during Project operations. Concurrent with DO measurements, Baker County shall also record flow and power generation. DO data will be downloaded and evaluated by the operator on a weekly basis.

DO Reporting

Baker County shall submit a report to DEQ within 90 days of completing the first season of monitoring activities or by December 30, whichever comes first. If monitoring indicates the DO water quality standard is not met, DEQ may require Baker County to submit a report analyzing the situation and may require additional monitoring or adaptive management of the Project, or both, to ensure water quality standards are met below the Project. Subsequent year's reports will be submitted to DEQ by March 31 of each year, covering the previous year's operations, unless otherwise specified by DEQ.

6.2 Total Dissolved Gas

6.2.1 Applicable Water Quality Standard

The applicable water quality standard is set forth in 340-041-0031:

Total Dissolved Gas

- (1) Waters will be free from dissolved gases, such as carbon dioxide hydrogen sulfide, or other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation, or other reasonable uses made of such water.*
- (2) Except when stream flow exceeds the ten-year, seven-day average flood, the concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection may not exceed 110 percent of saturation. However, in hatchery-receiving waters and other waters of less than two feet in depth, the concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection may not exceed 105 percent of saturation.*

6.2.2 Application of Water Quality Standard

Releases from hydropower facilities may cause the entrainment of atmospheric gases at levels which exceed saturation. This condition may occur when the momentum from a high volume discharge stream enters a receiving water body and entrains air below the water surface in the process. Under certain conditions, entrained air may dissolve into the water column at levels which exceed normal atmospheric equilibrium concentrations. Conditions which favor air entrainment include deep, non-turbulent receiving waters which provide the necessary hydrostatic pressure and quiescent conditions to form and maintain dissolved gases at supersaturated levels.

At levels above 110 percent saturation, the concentration of dissolved atmospheric gases in water may cause a variety of debilitating or lethal conditions in fish. The Total Dissolved Gas (TDG) standard is designed to prohibit discharges or activities that result in atmospheric gases reaching known harmful concentrations once dissolved in water. The use of air in turbine intakes to avoid cavitation or to increase DO levels can create supersaturation of TDG, a condition that can be avoided if identified.

6.2.3 Present Conditions

Clean Water Act § 303d Listings

Waterbodies in the vicinity of the Project are not identified on the 2010 Integrated Report §303d list for TDG.

Under current conditions, water is released through the high pressure slide gates with great force, creating very turbulent and aerated water which could exceed the TGD criteria. No TDG monitoring has been conducted.

6.2.4 Applicant's Position

The Applicant believes that TDG concentrations will be reduced during Project operation by eliminating some or all of the water going through the slide gates where there is considerable water turbulence. Under hydroelectric project operating conditions, the water would be released from the powerhouse into the stilling basin under the water surface. It would not create a plunge pool that could cause gas entrainment and or supersaturation. No TGD mitigation is proposed.

6.2.5 DEQ Evaluation

During Project operation, discharge through the existing outlet will be reduced by the magnitude of flow through the Project. DEQ believes it is reasonable to anticipate lower gas saturation in turbine discharge and, for this reason, expects reduced TDG in The Powder River during Project operation. However, the expected TDG reductions in turbine discharge may be partially offset by operation of the proposed turbine venting system which is intended to provide supplementary DO.

To measure for Project effects on gas saturation levels, DEQ will require Baker County to monitor TDG over a range of generation levels and operational conditions to confirm that the TDG standard is met below the powerhouse.

6.2.6 DEQ Findings

DEQ is reasonably assured that operation of the proposed Project under a new FERC License will comply with the TDG standard, provided the following measures are implemented:

Water Quality Monitoring and Management Plan

Within 90 days of FERC License issuance, Baker County shall submit a revised WQMMP to DEQ which addresses the TDG monitoring and reporting requirements presented below. The WQMMP will also include adaptive management steps which will ensure compliance with applicable TDG criteria. Upon DEQ approval, the WQMMP becomes part of the § 401 Certification Conditions for the Project for the purposes of any federal license or permit.

TDG Monitoring

Baker County shall measure TDG in the powerhouse tailrace and the downstream stream gage location for a minimum of 72 hours under each of the following operational scenarios:

- Minimum Flow
- Maximum Flow

Concurrent with TDG measurements, Baker County shall also record flow and power generation. Baker County must conduct a portion of each test to measure the influence of the air admission system on TDG.

TDG Reporting

Baker County shall submit a report to DEQ within 90 days of completing the first season of monitoring activities or by December 30, whichever comes first. If monitoring indicates the TDG water quality standard is not met, Baker County will consult with DEQ and implement the adaptive management actions in the WQMMP to meet water quality standards.

6.3 Biocriteria

6.3.1 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.

6.3.2 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. In practice, the biological criteria standard uses biomonitoring techniques to assess biological health, integrity, and complexity of resident biological communities within the Project area relative to comparable reference locations.

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.

6.3.3 Present Conditions

Mason Dam has significantly altered the biological, physical, and chemical characteristics of aquatic environments below the dam resulting in a general reduction in habitat complexity and resident biological communities. The dam fundamentally alters the natural hydrograph resulting in geomorphic changes which contribute to reduced habitat complexity and off-channel development. The dam further interrupts sediment transport resulting in a general coarsening of the substrate below the dam as finer material continues to be transported downstream.

Phillips reservoir thermally stratifies in the summer. Bottom-draw releases invert the natural thermal regime resulting in cooler downstream summer temperatures and warmer fall conditions.

Invertebrates sensitive to these changes may experience a reduction in health and abundance resulting in a population shift toward more tolerant taxa.

Reservoir stratification may also negatively impact water chemistry. Microbial degradation of organic matter near the sediment interface is the process primarily responsible for the depletion of oxygen in the lower portions of the reservoir. Reduced DO may decrease support for macrofaunal populations within the reservoir and below the dam. Anaerobic conditions near the sediment interface also influence phosphorus cycling from sediments into the water column creating nutrient imbalances and increased algal productivity.

As part of the pre-application process, the Applicant conducted a study of vegetation and threatened and endangered and sensitive species. Field surveys were conducted in October 2007 and July 2008. Of the more than 200 vascular plant species were observed, none of them are considered sensitive species. Thirty wildlife species/sign (22 birds, 7 mammals, and one fish) were observed during the surveys. Targeted surveys for sensitive aquatic invertebrates resulted in no observations of sensitive mussels or the cryptochian caddisfly (**Baker County, 2009**).

6.3.4 Applicant's Position

The Applicant maintains the Project will not influence the schedule, magnitude, or timing of releases from the dam and will, therefore, not contribute to environmental stressors which may negatively influence biological communities or reduce support for the biocriteria water quality standard.

The Applicant believes that the proposed actions in the Water Quality Management Plan being developed will allow the facility to operate while also meeting dissolved oxygen and other water quality standards and supporting beneficial uses of the Powder River.

6.3.5 DEQ Evaluation

The biocriteria standard extends broad protections to all beneficial uses. This standard complements other criteria-specific water quality standards while examining cumulative impacts from multiple stressors associated with Project developments and operations.

Biological metrics suggest the presence and operation of the dam have diminished the quality and quantity of biological habitat in the Powder River. This position is further supported by the findings of the ecological surveys which identified no sensitive aquatic invertebrate species below the dam. DEQ believes the Project will not contribute to additional habitat degradation principally because flow releases under a new FERC license will continue to be directed by BVID under agreement with BOR for the existing primary purpose of irrigation and flood control.

6.3.6 DEQ Findings

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

Water Quality Monitoring and Management Plan

Within 90 days of FERC License issuance, Baker County shall submit a revised WQMMP to DEQ which addresses the DO and TDG monitoring and reporting requirements presented previously. Upon DEQ approval, the WQMMP becomes part of the § 401 Certification Conditions for the Project for the purposes of any federal license or permit.

6.4 Discoloration, Oily Sheen, Oily Coatings

6.3.1 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.

6.4.2 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.

6.4.3 Present Conditions

DEQ knows of no reports of objectionable discoloration, scum, oily sheens, or floating solids in waters associated with the proposed Project. The Applicant provided no data with which to assess this water quality standard.

6.4.4 Applicant Position

Hydroelectric projects require certain oil and chemical liquids for operation and maintenance. To manage materials stored at the facility, Baker County developed a Hazardous Substances Spill Prevention and Cleanup Plan within the 401 certification application (**Baker County, 2013**). The objective of the Hazardous Substances Spill Prevention and Cleanup Plan is to provide guidance on the storage and use of chemicals stored onsite, and prescribe emergency response procedures to be followed in the event of a release.

During the construction phase, temporary storage of hazardous materials and fuel will be stored onsite in the staging area. The staging area will be located in the current recreational parking area. All equipment will be fitted with spill-proof caps and checked regularly for leaks. Hazardous substances will be stored in a trailer which will be removed from the site at the end of construction activities.

The Hazardous Substances Spill Prevention and Cleanup Plan indicates that small volumes of petroleum-based liquids will be maintained within the powerhouse in an area designated for hazardous material storage. Containers will be located on a concrete pad with a six-inch high perimeter berm to contain incidental spillage. A supply of petroleum absorbent material will be maintained nearby for use in the event of a spill. The Plan further describes spill containment, cleanup, and reporting procedures to be implemented in the event of a chemical spill.

Baker County believes the spill prevention and response procedures contained in the Hazardous Substances Spill Prevention and Cleanup Plan are adequate to safeguard aquatic resources from adverse consequences related to spills of hazardous materials.

6.4.5 DEQ Evaluation

The use of greases and lubricants in small quantities is necessary to maintain proper equipment function and operation. Appropriate management of hazardous materials stored onsite is addressed in the Hazardous Substances Spill Prevention and Cleanup Plan.

The greatest risk to aquatic resources is from the accidental release of liquid petroleum products used 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.

6.4.6 DEQ Findings

DEQ is reasonably assured Project operation under a new FERC License will not violate the State narrative criteria for objectionable discoloration, scum, and oily sheens provided the following measures are implemented:

Hazardous Substances Spill Prevention and Cleanup Plan

Baker County must implement the spill prevention and response measures as presented in the Hazardous Substances Spill Prevention and Cleanup Plan. Baker County must periodically update that plan as warranted to reflect changes in Project operation, use of materials, or strategic change in response procedures.

Best Management Practices

During use of materials which may, if spilled, result in adverse or objectionable conditions in violation of this water quality standard, Baker County must employ Best Management Practices appropriate to the task being performed. All materials must be used in a manner and for a purpose which reflects their intended application. Baker County 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, Baker County must implement the spill response procedures in the Hazardous Substances Spill Prevention and Cleanup Plan, notify the Oregon Emergency Response System (OERS), and comply with ORS Chapters 466 and 468, as applicable.

Recordkeeping

For the term of the new FERC License, Baker County shall retain records for the period of time required by law which document: modifications to the Hazardous Substances Spill Prevention and Cleanup Plan; reportable releases; visual observations and photographic documentation of hazardous material releases which impact aquatic resources; remedial activities undertaken by Baker County or a designated contractor to address hazardous material releases; correspondence and conversation records which document agency notification, as warranted regarding hazardous material releases; other records as deemed appropriate.

6.5 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 DEQ considers issuing a permit or a water quality certificate that would allow the existing water quality to be diminished in some way, the DEQ 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 provide that existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

6.5.1 Water Quality Standard

The applicable standard is set forth in 340-041-0004, with only applicable sections summarized below:

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.
- (2) *Growth Policy,* is not applicable
- (3) *Nondegradation Discharges.* The following new or increased discharges are subject to this Division. However, because they are not considered degradation of water quality, they are not required to undergo an Antidegradation review under this rule:
 - ((a-b), not applicable)
 - (c) *Temperature.* Insignificant temperature increases authorized under OAR 340-041-0028(11) and (12) are not considered a reduction in water quality.
 - (d) *Dissolved Oxygen.* Up to a 0.1 mg/l decrease in dissolved oxygen from the upstream end of a stream reach to the downstream end of the reach is not considered a reduction in water quality so long as it has no adverse effects on threatened and endangered species.
- (4-6) *Recurring Activities, Exemptions to the Antidegradation Requirement, High Quality Waters Policy,* are not applicable
- (7) *Water Quality Limited Waters Policy:* Water quality limited waters may not be further degraded except in accordance with section (9)(a)(B), (C) and (D) of this rule.
- (8) *Outstanding Resources Waters Policy,* is not applicable
- (9) *Exceptions.* The Commission or Department may grant exceptions to this rule so long as the following procedures are met:
 - (a) *In allowing new or increased discharged loads, the Commission or Department must make the following findings:*
 - (A) *The new or increased discharged load will not cause water quality standards to be violated;*
 - (B) *The action is necessary and benefits of the lowered water quality outweigh the environmental costs of the reduced water quality. This evaluation will be conducted in accordance with DEQ's "Antidegradation Policy Implementation Internal Management Directive for NPDES Permits and section 401 water quality*

certifications,” pages 27, and 33-39 (March 2001) incorporated herein by reference; and

- (C) The new or increased discharged load will not unacceptably threaten or impair any recognized beneficial uses or adversely affect threatened or endangered species. In making this determination, the Commission or Department may rely upon the presumption that if the numeric criteria established to protect specific uses are met the beneficial uses they were designed to protect are protected. In making this determination the Commission or Department may also evaluate other State and federal agency data that would provide information on potential impacts to beneficial uses for which the numeric criteria have not been set;*
- (D) The new or increased discharged load may not be granted if the receiving stream is classified as being water quality limited under OAR 340-041-0002(62)(a), unless:
 - (i) The pollutant parameters associated with the proposed discharge are unrelated either directly or indirectly to the parameter(s) causing the receiving stream to violate water quality standards and being designated water quality limited; or*
 - (ii) Total maximum daily loads (TMDLs), waste load allocations (WLAs) load allocations (LAs), and the reserve capacity have been established for the water quality limited receiving stream; and compliance plans under which enforcement action can be taken have been established; and there will be sufficient reserve capacity to assimilate the increased load under the established TMDL at the time of discharge; or*
 - (iii) Effective July 1, 1996, in water bodies designated water-quality limited for dissolved oxygen, when establishing WLAs under a TMDL for water bodies meeting the conditions defined in this rule, the Department may at its discretion provide an allowance for WLAs calculated to result in no measurable reduction of dissolved oxygen (DO). For this purpose, "no measurable reduction" is defined as no more than 0.10 mg/L for a single source and no more than 0.20 mg/L for all anthropogenic activities that influence the water quality limited segment. The allowance applies for surface water DO criteria and for Intergravel dissolved oxygen (IGDO) if a determination is made that the conditions are natural. The allowance for WLAs applies only to surface water 30-day and seven-day means; or*
 - (iv) Under extraordinary circumstances to solve an existing, immediate and critical environmental problem, the Commission or Department may, after the completion of a TMDL but before the water body has achieved compliance with standards, consider a waste load increase for an existing source on a receiving stream designated water quality limited under subsection (a) of the definition of "Water Quality Limited" in OAR 340-041-0002. This action must be based on the following conditions:
 - (I) That TMDLs, WLAs and LAs have been set; and*
 - (II) That a compliance plan under which enforcement actions can be taken has been established and is being implemented on schedule; and*
 - (III) That an evaluation of the requested increased load shows that this increment of load will not have an unacceptable temporary or permanent adverse effect on beneficial uses or adversely affect threatened or endangered species; and*
 - (IV) That any waste load increase granted under subparagraph (iv) of this paragraph is temporary and does not extend beyond the TMDL compliance deadline established for the water body. If this action will***

result in a permanent load increase, the action has to comply with subparagraphs (i) or (ii) of this paragraph.

- (b) The activity, expansion, or growth necessitating a new or increased discharge load is consistent with the acknowledged local land use plans as evidenced by a statement of land use compatibility from the appropriate local planning agency.*
- (c) Oregon's water quality management policies and programs recognize that Oregon's water bodies have a finite capacity to assimilate waste. Unused assimilative capacity is an exceedingly valuable resource that enhances in-stream values and environmental quality in general. Allocation of any unused assimilative capacity should be based on explicit criteria. In addition to the conditions in subsection (a) of this section, the Commission or Department may consider the following:*
 - (A) Environmental Effects Criteria:*
 - (i) Adverse Out-of-Stream Effects. There may be instances where the non-discharge or limited discharge alternatives may cause greater adverse environmental effects than the increased discharge alternative. An example may be the potential degradation of groundwater from land application of wastes;*
 - (ii) Instream Effects. Total stream loading may be reduced through elimination or reduction of other source discharges or through a reduction in seasonal discharge. A source that replaces other sources, accepts additional waste from less efficient treatment units or systems, or reduces discharge loadings during periods of low stream flow may be permitted an increased discharge load year-round or during seasons of high flow, so long as the loading has no adverse affect on threatened and endangered species;*
 - (iii) Beneficial Effects. Land application, upland wetlands application, or other non-discharge alternatives for appropriately treated wastewater may replenish groundwater levels and increase streamflow and assimilative capacity during otherwise low streamflow periods.*
 - (B) Economic Effects Criteria. When assimilative capacity exists in a stream, and when it is judged that increased loadings will not have significantly greater adverse environmental effects than other alternatives to increased discharge, the economic effect of increased loading will be considered. Economic effects will be of two general types:*
 - (i) Value of Assimilative Capacity. The assimilative capacity of Oregon's streams is finite, but the potential uses of this capacity are virtually unlimited. Thus it is important that priority be given to those beneficial uses that promise the greatest return (beneficial use) relative to the unused assimilative capacity that might be utilized. In-stream uses that will benefit from reserve assimilative capacity, as well as potential future beneficial use, will be weighed against the economic benefit associated with increased loading;*
 - (ii) Cost of Treatment Technology. The cost of improved treatment technology, non-discharge and limited discharge alternatives may be evaluated.*

6.5.2 Application of Standard

The Antidegradation Policy describes the intent and focus of the EQC in applying water quality standards to new or modified sources and anthropogenic activities that may adversely affect water quality or beneficial uses. The policy outlines a review process to be completed before DEQ may assign additional assimilative capacity in Oregon waters to a new or modified source of pollution.

In applying the Antidegradation Policy to this §401 Application, DEQ evaluates the operating conditions of the Project under a new License to determine whether there is reasonable assurance that no degradation of existing water quality will occur unless the identified degradation complies with the Antidegradation Policy.

Generally, compliance with the water quality standards in OAR 340-041 would be considered sufficient to assure that beneficial uses will be protected. However, if a standard has not been adopted for a pollutant, or if new information indicates that an existing standard does not adequately support a given beneficial use, DEQ is required to revise the water quality standard to protect the recognized beneficial use.

6.5.3 Present Conditions

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

6.5.4 Applicant's Position

Baker County believes operation of the Project will comply with Oregon water quality standards and other relevant provisions of state law, will not reduce support for designated beneficial uses, and thus complies with Oregon's Antidegradation Policy.

6.5.5 DEQ Evaluation

The Project will operate as a run-of-reservoir facility using a portion of scheduled releases for hydropower generation. Baker County is not responsible for correcting water quality impairments which originate upstream of the Project. However, the Applicant has proposed infrastructure modifications which may improve or degrade certain aspects of water quality during operation. For example, hydropower operation reduces turbulence in tailwater discharge which may decrease oxygen concentration. The net effect of this reduction may be compounded by reduced outflow through the existing structures which aggressively aerate flows upon discharge. To compensate, Baker County proposes to provide supplemental aeration through turbine venting to maintain compliance with applicable DO criteria.

Supplemental aeration will assure water quality supports existing beneficial uses and meets water quality standards. Under these conditions DEQ feels the Project meets Antidegradation criteria.

This Antidegradation evaluation is limited to potential water quality impacts resulting from operations under a new FERC License for the Mason Dam Hydroelectric Project. Subsequent Antidegradation reviews may be required to process separate water quality actions such as §401 water quality certificates issued in conjunction with §404 of the CWA for in-water construction or maintenance projects.

7. 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 that 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 Pollution Discharge Elimination System (NPDES) 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. The federal Environmental Protection Agency (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 OAR 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 (OSHA) 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 Baker County to obtain an NPDES 1200-Z industrial stormwater permit.

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. Certain actions required of Baker County pursuant to a new FERC License may require that Baker County obtain a NPDES 1200-C construction stormwater permit prior to construction. DEQ will condition this §401 water quality certification to require Baker County to obtain all applicable permits prior to engaging in activities which may result in discharge to waters of the state.

8. Evaluation of Compliance with Other Requirements of State Law

Once a Project is determined to qualify for a §401 certification, additional determinations may be made to identify additional conditions that are appropriate in a certification to assure compliance with other appropriate requirements of state law, pursuant to §401(d) of the Clean Water Act. Such requirements are “appropriate” if they have any relation to water quality, see *Arnold Irrigation Dist. v. DEQ*, 79 Or App 136 (1986), and may include requirements as to water quantity if necessary to protect a beneficial use. See *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 construction activities which may require a removal-fill permit from DSL, a dredge and fill permit from the Corps pursuant to § 404 of the Clean Water Act, and a §401 water quality certification from DEQ. Baker County must first obtain all applicable permits, certificates, and authorizations prior to engaging in activities required under the terms of a new FERC License.

8.2 Department of Fish and Wildlife

The state laws summarized below are administered by the Oregon 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 ODF&W’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** ODF&W’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 635-415-0000-0030** Fish and Wildlife Habitat Mitigation Policy

Fish passage and screening requirements for Mason Dam are triggered by significant modifications of the dam, such as the installation of the hydroelectric project. Baker County has developed mitigation plans for the lack of fish passage and screening at Mason Dam in consultation with ODF&W, U.S. Fish and Wildlife, and the U.S. Forest Service. The mitigation plans call for fish passage and fish screening mitigation projects at alternate locations in the Powder River watershed. DEQ also participated in this process and agrees that the fish passage and fish screening mitigation plans meet the requirements of the ODF&W administered statutes that are described above.

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. A land use Compatibility Statement signed by the Baker County Planning Department, is included in the 401 Certification application. The form and a letter (dated December 1, 2009) from the County indicate that the Project is located on National Forest Lands where the county has no land use authority, and that no applicable local land use provisions would be affected.

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.

Baker County indicates there are no plans for waste facilities at the Project location.

Hazardous Materials

ORS 466.605 et. seq. and ORS 468.780-815 establish requirements for reporting and cleanup of spills of petroleum products and hazardous materials. ORS 468.742 requires submittal of plans and specifications for water pollution control facilities to DEQ for review and approval prior to construction. One of the purposes of these statutes and rules is to prevent contamination of surface or groundwater.

The Applicant submitted a Hazardous Substances Spill Prevention and Cleanup Plan pursuant to ORS Chapter 466.

NPDES Permits

Oregon rule (OAR 340-045-0015) requires facilities that discharge to water to secure NPDES permits for discharges of pollutants to surface water.

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

8.5 Water Resources Department

Under ORS 468.045(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;
2. Any plan adopted by the Pacific Northwest Power and Conservation Planning Council; the Environmental Quality Commission's water quality standards;
3. Operational standards that ensure the Project does not endanger public health or safety, including "practical protection from vulnerability to seismic and geologic hazards,";
4. Standards that protect, maintain, or enhance wetland resources such that the Project may not result in a net loss to existing wetland resources; and
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.

Baker County has applied for a water right to allow use of water released from Mason Dam for irrigation purposes to be used for generating electricity. This water right change would not alter the quantity of flow from the dam at any point during the year and would maintain the current 10 cfs minimum flow requirement.

On February 7, 2014, the Oregon Fish and Wildlife Commission approved the Mason Dam Hydro Project Fish Passage Waiver Application and Fish Screening Exemption that was submitted by Baker County. This agreement includes mitigation measures that were developed with the cooperation of a multi-agency workgroup consisting of members from state and federal agencies. Mitigation for fish passage and fish screening requirements for Mason Dam triggered by the Project. The passage and screening mitigation actions are included in a settlement agreement being prepared for signature by the Oregon Water Resources Department, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, U.S. Fish and Wildlife Service, U.S. Forest Service, and Baker County on (Settlement Agreement). This agreement also addresses the Project's potential impacts to water quality, public health and safety, wetlands, recreational opportunities, scenic and aesthetic values, historic cultural and archaeological sites, and botanical resources. The Oregon Department of Water Resources has determined that the requirements of ORS 543A.025 have been met by the conditions in the Settlement Agreement. DEQ agrees with this determination.

9. Public Comment

On March 10, 2014, DEQ issued a notice inviting public review and comment on the proposed certification decision. DEQ has scheduled a public hearing to discuss the decision at in Baker City, OR. The public comment period concluded at 5:00 pm on April 25, 2014. No comments were received.

10. Conclusions and Recommendation for Certification

DEQ has evaluated Baker County's application for §401 water quality certification and related supporting documents and considered public comments. DEQ has determined that the proposed Project will comply with the applicable provisions of Sections 301, 302, 303, 306 and 307 of the Clean Water Act, OAR Chapter 340, Division 41 and other appropriate requirements of state law provided Baker County implements the 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 Mason Dam Hydroelectric Project, FERC Project No. 12686, consistent with the findings of this document.

11. References

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Simonds, William, Joe, 1997, Baker Project, Bureau of Reclamation History Program, Denver, Colorado, Research on Historic Reclamation Projects.