

# **Evaluation and Findings Report**

on the

## **Application for Certification Pursuant to Section 401 of the Federal Clean Water Act**

Submitted by  
Symbiotics, LLC  
for the

### **Dorena Dam Hydroelectric Project (FERC No. 11945)**

Pursuant to  
Oregon Administrative Rules Chapter 340, Division 48

Prepared by:  
Oregon Department of Environmental Quality  
1102 Lincoln Street, Suite 210  
Eugene, Oregon 97401

January 18, 2008

This page intentionally left blank

## Table of Contents

Page		
1.0	INTRODUCTION.....	1
1.1	General.....	1
1.2	Project Location.....	1
2.0	REQUIREMENTS FOR CERTIFICATION.....	3
2.1	Applicable Federal and State Law.....	3
2.2	General Application of State Water Quality Standards.....	4
2.2.1	Beneficial Uses.....	4
2.2.2	Narrative and Numeric Criteria.....	5
2.2.3	Antidegradation Policy.....	5
2.2.4	Total Maximum Daily Loads (TMDLs).....	5
2.3	Notification of Complete Application.....	5
3.0	DESCRIPTION OF PROJECT.....	5
3.1	Applicant Information.....	5
3.2	Project Description and Proposed Operations.....	6
3.2.1	Existing Facilities.....	6
3.2.2	Proposed Facility.....	6
3.2.3	Documents Filed in Support of § 401 Application.....	8
3.3	Local Land and Water Resources.....	9
3.3.1	Waters of the State Potentially Impacted by Project.....	9
3.2.2	Adjacent Land Use and Ownership.....	10
4.0	BENEFICIAL USES AND WATER QUALITY STATUS OF THE ROW RIVER.....	10
4.1	Beneficial Uses in the Willamette Basin.....	10
4.2	Threatened and Endangered Aquatic Species in the Row River.....	11
4.3	Water Quality Impairment in the Row River.....	12
5.0	EVALUATION OF COMPLIANCE WITH STATE WATER QUALITY STANDARDS.....	13
5.1	Water Quality Standards Unlikely to Be Impacted by Project Operation.....	14
5.2	Water Quality Standards of Potential Concern for Project Operation.....	16
5.2.1	Temperature.....	18
5.2.2	Dissolved Oxygen.....	25
5.2.3	Turbidity.....	32
5.2.4	Total Dissolved Gas (TDG).....	37
5.2.5	Biocriteria.....	42
5.2.6	Oily Sheen; Oily Coatings.....	45
5.2.7	Toxic Substances.....	46
5.2.8	Antidegradation.....	49
6.0	Evaluation of Compliance with Sections 301, 302, 303, 306 and 307 of the Federal Clean Water Act.....	53
7.0	EVALUATION OF OTHER APPROPRIATE REQUIREMENTS OF STATE LAW.....	54
7.1	Division of State Lands.....	54
7.2	Department of Fish and Wildlife.....	54
7.4	Department of Environmental Quality.....	55
7.5	Department of Water Resources.....	55
7.6	Lane County.....	56
8.0	PUBLIC COMMENT.....	59
8.1	Issuance of Public Notice, Opportunity to Comment.....	59
8.2	Public Comment Received.....	59
9.0	CONCLUSIONS AND RECOMMENDATION FOR CERTIFICATION.....	59

**List of Tables**

Table 1. Dissolved Oxygen and Temperature Criteria for Row River ..... 11  
Table 2. Water Quality Limited Status of Row River ..... 12  
Table 3. Water Quality Standards not of Concern for Project Operations ..... 14  
Table 4. Water Quality Standards of Potential Concern for Project Operations ..... 17  
Table 5. Beneficial Use and Numeric Temperature Criteria..... 20  
Table 6. DO Criteria for Project Area ..... 26

**List of Figures**

Figure 1 – Coast Fork Willamette River Subbasin ..... 2  
Figure 2 – Project Boundary Map ..... 7  
Figure 3 - Streamflow and Temperature at USGS Gauging Station 14155500 ..... 22  
Figure 4 – Dorena Reservoir Temperature Profiles ..... 23  
Figure 5 - Dissolved Oxygen Profiles in Dorena Reservoir ..... 27  
Figure 6 - Water Monitoring Locations ..... 34  
Figure 7 - Turbidity Measurements in Dorena Reservoir ..... 34  
Figure 8 – Penstock cross Section Illustrating Inlet Approach Velocities..... 36  
Figure 9 – TDG and Flow Measurements Below Dorena Dam..... 39

## **1.0 INTRODUCTION**

### **1.1 General**

In June 2004 Symbiotics, LLC (Symbiotics; Applicant) submitted an application to the Federal Energy Regulatory Agency (FERC) for an original license to construct and operate a power generating facility at Dorena Lake Dam, an existing federally owned flood control facility administered by the US Army Corps of Engineers (Corps) located on the Row River, a tributary of the Coast Fork Willamette River in western Oregon, approximately six miles east of the town of Cottage Grove, in Lane County, Oregon. The application is identified by FERC Docket Number P-11945.

On January 19, 2007, the Applicant submitted an application to the Oregon Department of Environmental Quality (ODEQ) for certification of compliance with Oregon water quality law in accordance with Section 401 of the Federal Clean Water Act. Previously, Symbiotics had applied for a § 401 Water Quality Certificate from ODEQ on March 27, 2006. On December 15, 2006, ODEQ received additional information supportive of the application requested from Symbiotics. Although ODEQ deemed the application administratively complete, several technical deficiencies were identified. ODEQ determined that submittal and review of the requested additional technical information could not reasonably be completed prior to expiration of the application period. In correspondence dated January 9, 2007, ODEQ advised Symbiotics to voluntarily withdraw the current application. In correspondence dated January 19, 2007, Symbiotics withdrew its March 27, 2006, 401 application. In separate correspondence, also dated January 19, 2007, Symbiotics resubmitted the application.

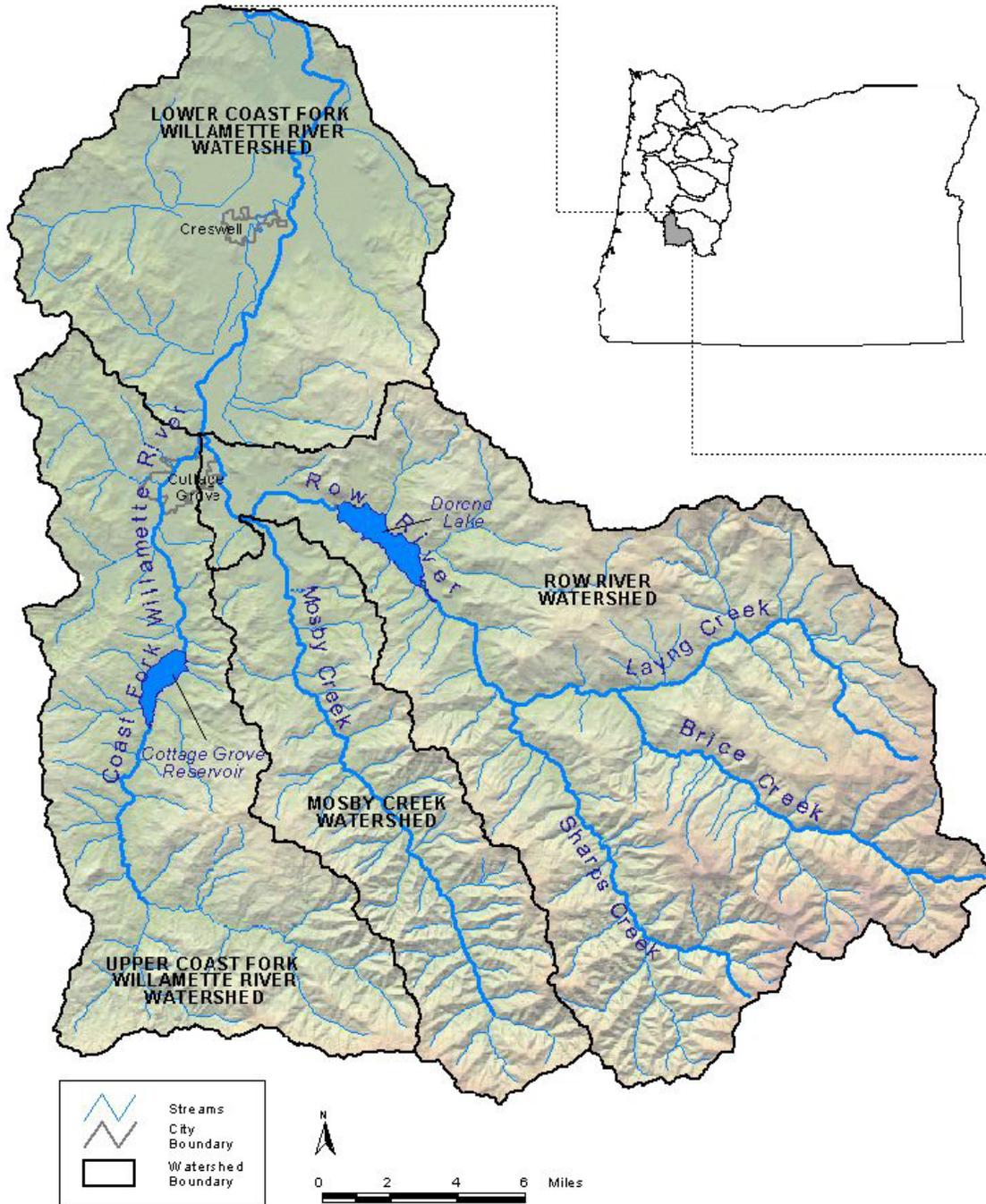
ODEQ has completed a review and evaluation of documentation filed in support of the Applicant's §401 Application. This Evaluation and Findings Report presents a review of the operational aspects of the application and a determination of compliance of the proposed project with applicable Oregon water quality rules and standards. ODEQ is not prepared to certify the constructional aspects of the project at this time, and a separate water quality certification will need to be obtained for project construction.

### **1.2 Project Location**

The proposed project is located at Dorena Lake dam, a federally owned water control facility administered by the Corps. Completed in 1949, Dorena Lake dam provides flood control, irrigation, water-based recreation, improved downstream navigation, and water quality preservation in the Willamette Valley. Dorena Lake Dam is located approximately six miles east of Cottage Grove, Oregon, and impounds a lower section of the Row River at river mile (RM) 7.5.

The Project is located in the Row River Watershed of the Coast Fork Willamette Subbasin (Hydrologic Unit Code 17090002) of the Willamette River Basin. The Row River Watershed is located approximately 20 miles southeast of Eugene and is the principal tributary of the Coast Fork Willamette River. The Row River watershed drains a 375 square mile (239,999 acres) area. The Dorena Dam impounds the river at river mile (RM) 7.5, forming Dorena Reservoir. Dorena Reservoir holds 72,050 acre feet of water and spans 2.7 square miles (1,749 acres) when full. The dam structure was constructed

in 1949 with flood control its primary purpose. Several major tributaries flow directly into Row River and include Layng, Brice, Sharps, and Mosby Creeks. Mosby Creek is the only major tributary to flow into Row River below the Dorena Reservoir spillway. Three small communities exist within the watershed boundaries: Disston, Culp Creek, and Dorena with part of the City of Cottage Grove stretching into the western portion of the watershed. A diagram illustrating the coast Fork Willamette River Subbasin is presented as Figure 1.



**Figure 1 – Coast Fork Willamette River Subbasin**

## **2.0 REQUIREMENTS FOR CERTIFICATION**

### **2.1 Applicable Federal and State Law**

Section 401 of the Federal Clean Water Act (Clean Water Act or CWA), 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 Clean Water Act 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 designated to carry out the certification functions prescribed by § 401 of the Clean Water Act for state waters. ODEQ 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 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.

Oregon Revised Statutes (ORS) 468B.040: This state statute prescribes procedural requirements and findings with which ODEQ 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 for coordination among state agencies in the reauthorization of federally licensed hydroelectric projects, including state certification of water quality.

EQC rules 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 ODEQ pursuant to § 401 of the Federal Clean Water Act and state law:

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

## **2.2 General Application of State Water Quality Standards**

Oregon water quality standards are contained in OAR Chapter 340, Division 41 entitled "Department of Environmental Quality Water Pollution Division 41 Water Quality Standards: Beneficial Uses, Policies, and Criteria for Oregon." The water quality standards in Division 41 are composed of three elements: beneficial uses, numeric and narrative criteria, and the antidegradation policy, and are further implemented through Total Maximum Daily Loads (TMDLs) as applicable. The role of each of these is explained below.

### **2.2.1 Beneficial Uses**

The Federal Clean Water Act and Oregon water quality standards are structured to require that water quality be protected and maintained so that existing and potential beneficial uses of public waters are not impaired or precluded by degraded water quality. The regulatory approach used is to:

- 1) Identify beneficial uses that are recognized as significant with regard to water quality protection;
- 2) Develop and adopt criteria for significant water quality parameters that are necessary to protect the identified beneficial uses;
- 3) Establish and enforce discharge limitations for each source that is permitted to discharge treated wastes into public waters to assure that water quality standards are not violated and beneficial uses are not impaired; and
- 4) Establish and implement "best management practices" for a variety of "land management" activities to minimize their contribution to lower water quality standards and impairment of beneficial uses.

Beneficial uses to be protected have been identified generally for each river basin in Oregon and specifically for significant stream reaches within some basins. The State's designated beneficial uses to be protected in the Coast Fork Subbasin, where the Dorena Dam Project is located, are listed in OAR 340-041-0340, Table 340A, and Figures 340A and 340B. These uses include public, private, domestic, and industrial water supply; irrigation; livestock watering; fish & aquatic life; wildlife & hunting; fishing; boating; water contact recreation; aesthetic quality; and hydropower.

## **2.2.2 Narrative and Numeric Criteria**

Generally, if water quality meets the numeric and narrative criteria for the most sensitive beneficial use, then the criteria protects all the beneficial uses. Water quality criteria have been adopted for water quality parameters that are most significant or useful in regulating pollution. These criteria take the form of both numeric limits and narrative statements and have been established based on best available information at the time they were adopted. Development of water quality standards is a continuing process. As new information becomes available, standards for additional parameters may be added and existing numeric and narrative criteria may be revised to better reflect the intent of protection of the identified beneficial uses.

## **2.2.3 Antidegradation Policy**

Oregon's antidegradation policy (OAR 340-041-0004) applies to all surface waters. In the case of bodies of water that meet water quality standards, it provides for the maintenance of existing water quality. Specifically, the policy states that the existing quality of high quality waters (i.e., waters meeting water quality standards) shall be maintained and protected unless the Environmental Quality Commission makes certain rigorous findings of need. For water quality-limited waters, water quality may not be lowered; that is, these waters have a no degradation status.

## **2.2.4 Total Maximum Daily Loads (TMDLs)**

DEQ also develops, and the U.S. Environmental Protection Agency approves, total maximum daily loads (TMDLs) for waters listed as water quality-limited pursuant to CWA §303(d). A TMDL identifies the amount of a specific pollutant that a water body can receive and still meet water quality standards and support the beneficial uses designated in that waterbody. A TMDL also identifies wasteload allocations for point sources of pollutants and load allocations for non-point sources. For a hydroelectric project located on a water quality-limited waterbody, a § 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 340-42-0025—0080.

## **2.3 Notification of Complete Application**

On November 16, 2007, ODEQ notified Symbiotics that it deemed the Application for §401 Certification received on January 19, 2007, for the Dorena Project to be administratively complete for processing.

## **3.0 DESCRIPTION OF PROJECT**

### **3.1 Applicant Information**

The legal name and address of the Applicant is:

Symbiotics, LLC  
PO Box 535  
Rigby, Idaho 83442  
Phone: (208) 745-0834  
Fax: (208) 745-0835

The legal name and address of the Applicant's Authorized Representative is:

Mr. Brent L. Smith, President  
Northwest Power Services Incorporated  
PO Box 535  
Rigby, Idaho 83442  
Phone: (208) 745-0834  
Fax: (208) 745-0835

### **3.2 Project Description and Proposed Operations**

#### **3.2.1 Existing Facilities**

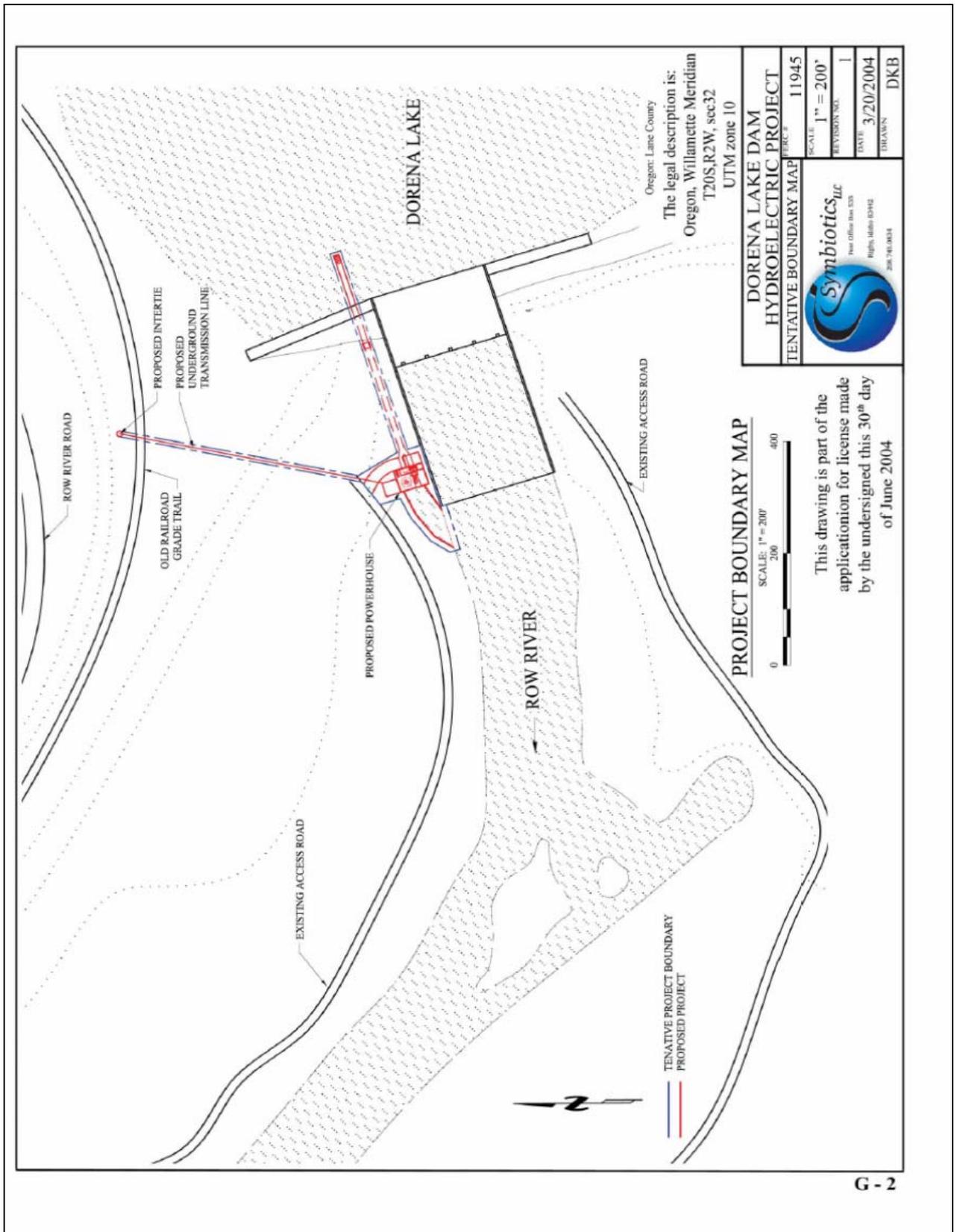
Completed in 1949, Dorena dam is a gravel fill embankment structure located at RM 7.5 of the Row River approximately six (6) miles east of Cottage Grove, Oregon. The crest of the dam measures 2,600 feet in length and is 145 feet vertically above the streambed elevation at 720.5 feet National Geodetic Vertical Datum (NGVD). Construction of the impoundment resulted in Dorena Reservoir which has a reservoir capacity of 77,600 acre-feet at full pool. Administered by the Corps, the dam is used principally to provide flood control, irrigation, water-based recreation, and improved downstream navigation.

#### **3.2.2 Proposed Facility**

The proposed project consists of the following:

- 1) A 9-foot-diameter steel pipe (penstock), approximately 350 feet long, extending from the reservoir through the north dam abutment;
- 2) A new powerhouse near the existing spillway stilling basin 250 feet downstream from the concrete section of the dam. The proposed generating facility consists of one 3.8-MW horizontal-shaft, Kaplan-type generating unit and one 4.5-MW vertical shaft, Francis-type generating unit, having a total installed capacity of 8.3 MW;
- 3) A new concrete-lined channel (tailrace) to discharge flows into the river channel immediately below the existing stilling basin;
- 4) A new valve house near the existing stilling basin for directing flow back to the existing outlet works;
- 5) A new 15-kilovolt transmission line approximately 500 feet long;
- 6) Two-inch trash rack screening on the penstock intake;
- 7) A tailrace fish exclusion barrier; and
- 8) Appurtenant facilities.

A Project Boundary Map, illustrating the primary features of the proposed Project, is presented as Figure 2. Specific elements of the proposed project are described in the following sections.



G - 2

Figure 2 – Project Boundary Map

## **Conduit**

The Applicant proposes to install and operate a 9-foot diameter steel penstock that will pass through the north concrete dam abutment. The proposed penstock will connect the inlet structure located within the reservoir to a powerhouse located downstream of the dam near the existing spillway stilling basin. The upstream section, 100 feet in length, will be placed on the floor of the reservoir with appropriate support structures. The intake trash racks will be located slightly below minimum pool elevation. A valve house with a shutoff valve and siphon equipment will be located at the apex of the penstock on the downstream side of the dam. Installation of the penstock will result in a second outlet structure independent in location and operation of the existing outlet works currently maintained by Corps.

## **Powerhouse**

The powerhouse will be located approximately eight (8) feet north of the present spillway stilling basin 250 feet downstream of the concrete section of the dam. The 40 by 50 feet low profile structure will consist of a concrete substructure and concrete block building containing a vertical Francis type turbine/generator unit and a horizontal Kaplan turbine/generator unit. The operations center and system control equipment will also be located within the powerhouse building. Eight-foot diameter butterfly isolation valves will be located within the powerhouse upstream of each turbine intake.

## **Draft Tubes**

The turbine discharge will be directed into the river channel immediately below the existing project stilling basin through a concrete-lined channel oriented to be in concert with current river flow.

## **Proposed Turbines and Generators**

Initial computations of various installed capacities with annual daily flows and corresponding reservoir elevations (head) resulted in a recommended installed capacity of 8.3 MW, and an estimated average annual generation of 17.5 gWh. In order to avoid over-stressing the outlet conduit (penstock) by dynamic pressure resulting from rapid gate closure following a load rejection to the generating equipment, it is proposed to use slow-closing gates with equipment to withstand corresponding runaway speed.

The Applicant proposes to operate the Project in a run-of-release mode in which Corps retains authority over the schedule, management, and operation of Dorena Dam. Symbiotics assumes no discretionary authority over the schedule and/or timing of dam releases. Using historical reservoir elevations and stream flows, the monthly estimated power generation indicates that the lowest monthly power production would occur in July and August (0 MWh) and the highest production in February (2,300 MWh). On average, the annual production would be 17,500 MWh.

### **3.2.3 Documents Filed in Support of § 401 Application**

Symbiotics has filed the following documents in support of its § 401 application for a new operating license for the Dorena Lake Dam Project:

June 2007	Hazardous Substances and Spill Prevention and Cleanup Plan
January 19, 2007	§401 Certification Application

January 19, 2007	Withdrawal of §401 Certification Application dated March 27, 2006
December 2006	Response to Incomplete Application for §401 Certification DRAFT Final Water Quality Monitoring Report DRAFT Water Quality Monitoring and Management Procedures
March 2006	Hazardous Substances and Spill Prevention and Cleanup Plan
October 2005	Interstitial Void Measurement Final Report Benthic Aquatic Invertebrate Study Final Report
June 2005	Juvenile Salmonid Study Final Report
January 2005	Final License Application: Addendum #3 Mercury Contamination Study Report Rainbow Trout Spawning Study Report
November 2004	Final License Application: Addendum #2
October 2004	Soil Erosion Control Plan
August 2004	Final License Application: Addendum #1
June 2004	Final License Application, Stage 3 Consultation Document
April 2004	Draft License Application, Stage 2 Consultation Document
January 2004	Resource Monitoring and Field Investigations
April 2003	First Stage Consultation Document
April 2001	Preliminary Permit Application

Reports used in this §401 Evaluation are referenced individually, and identified in Section 10, References.

### **3.3 Local Land and Water Resources**

#### **3.3.1 Waters of the State Potentially Impacted by Project**

The project consists of a proposed hydroelectric generating facility at Dorena Dam, an existing gravel-fill impoundment located at RM 7.5 of the Row River approximately six (6) miles east of Cottage Grove, Oregon. The existing facility impacts water quality within Row Reservoir upstream of the dam as well as portions of the Row River downstream of the dam. Operation of the proposed hydroelectric Project may impact certain water quality parameters downstream of the dam relative to existing conditions.

### **3.2.2 Adjacent Land Use and Ownership**

The property is located on a 37.5-acre portion of a 970.71-acre parcel owned by the Corps identified on Lane County Assessor's Map 21-02-06-00 as Tax Lot 1700.<sup>1</sup> The Corps parcel was developed between approximately 1942 and 1949 with the Dorena Dam which impounded waters of the Row River and created the Dorena Reservoir. The Subject Property is located north of the centerline of the thread of the Row River; west of the Dorena Reservoir and a line extended due north from the northerly terminus of the Dorena Dam structure to Row River Road; south of Row River Road; and east of the RR-5 exception area that is located east of the intersection of Row Rover Road and Shoreline Drive.

## **4.0 BENEFICIAL USES AND WATER QUALITY STATUS OF THE ROW RIVER**

In order to issue a § 401 Water Quality Certificate, ODEQ must make a finding that there is reasonable assurance that the proposed activity will comply with water quality standards and that proposed activities will not result in impairment to water quality in the Project area. This Evaluation Report includes a review of the Project's operational impacts on each applicable water quality standard. The report does not, however, evaluate the Project's constructional impacts on water quality, which will need to be evaluated in concert with a separate water quality certification application prior to construction. This section of the Evaluation Report identifies beneficial uses identified in the Row River, threatened and endangered species identified in the Row River subbasin, and water quality impairments documented in the River.

### **4.1 Beneficial Uses in the Willamette Basin**

Water quality in the Willamette Basin must be managed to protect the designated beneficial uses identified in Table 340A of OAR 340-041-0340. The Row River is located in the Coast Fork Subbasin of the Willamette River Basin. Designated beneficial uses for tributaries in the Willamette Basin include: public and private domestic water supply, irrigation, livestock watering, wildlife and hunting, fishing, boating, water contact recreation, and aesthetic quality.

Beneficial uses which protect fish rearing, migration, and spawning habitat are further defined in Figures 340A and 340B of OAR 340, Division 0041. Figure 340A designates the Row River upstream and downstream of Dorena Dam as year-round rearing and migration habitat for anadromous salmonids. However, since no upstream passage is provided for anadromous salmonids, rearing, migration, and spawning habitat for anadromy in the Row River and tributaries upstream of Dorena Dam are not existing beneficial uses. Figure 340B identifies the lower reach of the Row River from the mouth to RM 6 as spawning habitat for anadromous salmonids from January 1 to May 15. Row River from RM 6 to the Dorena Dam tailrace is identified as spawning habitat from October 15 to May 15. The Coast Fork Willamette River, downstream of the Row River's Confluence at RM 0, is also identified as spawning habitat for anadromous salmonids, but over a shorter time period of January 1 to May 15.

---

<sup>1</sup> Although the site is identified on Lane County Assessor's Map 21-02-06-00, the subject property is located in Section 32, Township 20, Range 2 West, Willamette Meridian.

The beneficial uses for aquatic habitat determine the numeric temperature and dissolved oxygen criteria. Table 1 summarizes the beneficial uses and numeric criteria which apply to reaches of the Row River that are affected by the Project.

**4.2 Threatened and Endangered Aquatic Species in the Row River**

The lower Row River and Mosby Creek include areas of critical habitat for upper Willamette River (UWR) spring chinook and UWR winter steelhead. Both species are listed as threatened under the Federal Endangered Species Act (ESA). Completion of the dam eliminated access to approximately 80 miles of potential habitat upstream of the dam. The presence of the dam has not eliminated historical migratory routes in Mosby Creek which confluences with the Row River below the dam. Spring chinook were known to have spawned historically in the Row River & Mosby Creek.

**Table 1. Dissolved Oxygen and Temperature Criteria for Row River**

Location	Fish Use	Dates	Temperature (Degrees C)	DO (mg/L)
Row River Below	Spawning	Oct 15 to May 15	13.0	11.0
Dorena Dam (RM 6.0 to 7.5)	Rearing & Migration	May 16 to Oct 14	18.0	8.0
Mouth to River Mile 6	Spawning	Jan 1 to May 15	13.0	11.0
	Rearing & Migration	May 16 to Dec 31	18.0	8.0
Above Dorena Dam	Rearing & Migration	All year	18.0	8.0
Notes:				
(1) 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. Where conditions of barometric pressure, altitude, and temperature preclude attainment of the 11.0 mg/l or 9.0 mg/l, DO must not be less than 95 percent saturation.				
(2) Where conditions of barometric pressure, altitude, and temperature preclude attainment of the 8.0 mg/l criterion, DO must not be less than 90 percent saturation.				

Although both Spring Chinook and Winter Steelhead were successful in the system, few if any populations were likely present at the time of dam construction. The majority of the spring chinook that currently enter the system currently are thought to be hatchery strays from the Coastal Fork. The run of winter steelhead on the Row River is estimated to be minimal or nonexistent. The lower Row River occasionally includes adult strays or rearing juveniles originating from the Middle Fork of the Willamette River. However,

Oregon's water quality standards apply to all fish species whether they are native or non-native.

Oregon chub (*Oregonichth crameri*) are endemic to the Willamette Valley and historically were found throughout the valley including the Row River Basin. They are currently listed as endangered under the Endangered Species Act. Oregon chub prefer off-channel habitats such as beaver ponds, oxbows, backwater sloughs, and flooded marshes. Currently there is no critical habitat or population of Oregon chub in the lower Row River. Populations of Oregon chub were introduced in October of 2003 in the upper Row watershed where suitable habitat existed.

**4.3 Water Quality Impairment in the Row River**

ODEQ is required to maintain a list of waters that have poor water quality and thus fail to support their beneficial uses. This list is required under the federal Clean Water Act Section 303(d) and in Oregon Administrative Rule (OAR 340-41-0046), and is commonly referred to as either the list of water quality limited waters, or the 303(d) list. Waterbodies included on this list may be subject to specified treatment under some ODEQ actions, such as developing permit conditions, antidegradation review, et cetera. In addition, ODEQ must develop Total Maximum Daily Loads (TMDL) for these water bodies. TMDLs establish pollutant load allocations that will protect that waterbody from violating water quality standards, thus re-establishing support for the beneficial uses. Procedures for the issuance and implementation of TMDLs are described in OAR 340, Division 042.

The Row River is included on the state's 2004/2006 303(d) list, as shown in Table 2. Dorena Lake is also included on the 2004/2006 303(d) list. In order to issue a § 401 Water Quality Certificate, ODEQ will evaluate the § 401 Application to determine whether the Project, as operated under the proposed conditions, will contribute to water quality violations. When a hydroelectric project is operated on a waterbody that has impaired water quality, operations must comply with the allocations provided for the project in the TMDL. If no TMDL has been approved, then ODEQ 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 if necessary when an approved TMDL is adopted.

**Table 2. Water Quality Limited Status of Row River**

Parameter	River Miles	Season for Listing	Date of TMDL Issuance
Temperature	0 to 20.8	Summer	September 2006
Mercury	7.4 to 11.3 (Dorena Lake)	Year Round	September 2006

## **5.0 EVALUATION OF COMPLIANCE WITH STATE WATER QUALITY STANDARDS**

Symbiotics has applied to ODEQ for certification pursuant to CWA Section 401 that activities associated with the proposed project, both construction and operation, will comply with Oregon water quality standards given in OAR Chapter 340, Division 041. ODEQ has determined, however, that the constructional aspects of the Project are still too vague and subject to change to evaluate and certify at this time. The Corps has requested the Applicant first obtain a FERC operating license before before engaging the Corps in detailed discussion regarding allowable construction and prior to applying to the Corps for a CWA §404 permit. Symbiotics' application to the Corps for a §404 permit will trigger the requirement to seek a §401 certification from ODEQ for the construction aspects of the Project. Thus, this evaluation of compliance with state water quality standards is specific to the operational aspects of the Project.

The Applicant proposes to install a nine-foot diameter penstock through the north abutment of the Dorena dam structure. Completion of the Project will result in a second outlet works that would be operated independently of the existing structure currently operated by the Corps. Water released through the penstock will be directed through a powerhouse and returned to the Row River below the existing stilling basin.

The Applicant has stated that the schedule and volume of water releases will continue to be dictated solely by the Corps, the federal agency which administers the dam. In correspondence dated May 25, 2007, the Corps reiterated its authority to retain control over the magnitude, frequency, ramping rate, and general operation of Dorena Dam:

*“The Corps will continue to operate its projects for the full range of their authorized, statutory purposes, whether a FERC license has been issued or not. The FERC license provides an applicant only with water not otherwise used to meet federally-authorized project purposes, which Congress reserves the right to amend at any time. There is absolutely no guarantee or warranty as to the financial prospects or results of any FERC licensed project due to how the Corps may change the dam operations in the future.”*

As stated above, the Corps will retain authority over the magnitude, frequency, and general operation of the dam. For this reason, the Corps is solely responsible for existing and future water quality impairments in Dorena Reservoir and affected downstream reaches of Row River resulting from the presence and operation of the dam. Waters in the vicinity of the Project are currently 303(d) listed for temperature and mercury impairments. ODEQ has identified the Corps as a designated management agency (DMA) responsible for implementing reduction strategies necessary to comply with TMDL load allocations (LAs). The Corps is currently drafting a water quality management plan (WQMP) to address management strategies designed to comply with the TMDL conditions.

Given the Corps' stated ongoing control over the magnitude, frequency, and general operation of the dam, and given Symbiotics' proposed run-of-release operations of the Project, ODEQ views Symbiotics' potential to alter water quality in relation to that impacted by Corps via existing dam and Corps operations as limited. Nonetheless, ODEQ will need to ensure that Symbiotics not undertake actions which would restrict the ability of the Corps to construct, operate, or modify TMDL implementation measures or

strategies or otherwise hinder the ability of the Corps to achieve and maintain compliance with current and/or future TMDL requirements. Since the Corps will retain authority over future dam releases, Symbiotics is encouraged to work cooperatively with the Corps to facilitate the design, construction, operation, and modification of the proposed Project in such a manner which allows the Corps to meet their TMDL obligations and/or the objectives set forth in current and/or future Corps WQMPs.

Notwithstanding the above referenced obligations, Symbiotics is also responsible for water quality impacts occurring solely as a result of Project operations. The findings and conditions addressed by this §401 water quality certification are restricted exclusively to potential impacts related to Project operation.

**5.1 Water Quality Standards Unlikely to Be Impacted by Project Operation**

As with any proposed activity that requires a § 401 water quality certificate, some water quality standards are more likely to be affected than others. This section identifies which water quality standards are not likely to be violated (Standards not of Concern) by Project operations. Section 5.2 provides more detailed analysis for those standards for which there may be greater potential for violation (Standards of Potential Concern) as a result of proposed Project operations.

ODEQ is reasonably assured the water quality standards identified in Table 3 will not be adversely impacted by activities associated with operation of the Project. Table 3 identifies the standard criteria, the rule implementing the criteria, a summary of the rule, and ODEQ’s basis for its expectation for non-impact.

**Table 3. Water Quality Standards not of Concern for Project Operations**

<b>Criterion</b>	<b>Brief Description</b>	<b>Project Impact not Expected</b>
Aesthetic conditions	Aesthetic conditions offensive to human sight, taste, smell or touch shall not be allowed. [OAR 340-041-007(14)]	There are no physical or biological processes associated with the proposed Project operations that would be expected to alter aesthetic conditions.
Bacterial Pollution	Limits in-water concentration of bacterial cells, because bacteria can cause or be an indicator of vectors that cause disease. [OAR 340-041-009]	There is no reason to suspect that the proposed Project will affect bacteria concentrations, since there are no proposed discharges of raw or treated sewage or animal waste into Project waters.
Creation of Taste & Odors	Tastes, odors and other conditions that are deleterious or toxic, or that affect palatability of drinking water or fish are not	There are no physical or biological processes associated with the proposed Project operations that would be

	allowed OAR 340-041-007(11)	expected to cause tastes or odors.
Development of fungi	The development of fungi or other deleterious growth not allowed [OAR 340-041-007(10)]	Nutrient concentrations, cycling, and primary production within or downstream of the reservoir would not be expected to be altered by Project operations given proposed run-of-release operations and the Corps control over operations. The proposed Project is not expected to discharge nutrients to the water.
Hydrogen Ion Concentration (pH)	pH values may not fall outside the ranges 6.5 to 8.5 [OAR 349-041-0345(1).	Operation of the Project will not alter the existing flow regime and the new inlet will draw water from the same depth interval and pH as the existing outlet works.
Nuisance Phytoplankton Growth	For reservoirs and streams, phytoplankton levels should not impair recognized beneficial uses [OAR 340-041-0019)]	Nutrient concentrations, cycling, and primary production within or downstream of the reservoir would not be expected to be altered by Project operations given proposed run-of-release operations and the Corps control over operations. The proposed Project is not expected to discharge nutrients to the water.
Radioisotopes	Not allowed above maximum permissible concentrations in drinking water, or in fish, shellfish, or wildlife tissue [OAR 340-041-007(15)]	The proposed Project operation is not expected to add radioactive substances to water.
Sediment	Bottom deposits deleterious to habitat and aquatic life are not allowed [OAR 340-041-007(12)].	Operation of the Project will not alter the existing flow regime or reservoir level management. The new inlet will draw water from the same depth interval as the existing outlet works and would not be expected to entrain and deliver bottom sediment

		downstream. The presence or absence of the Project will not impact the manner in which suspended sediments are conveyed downstream.
Total Dissolved Solids	Limit of 100 mg/L in freshwater and tributaries [OAR 340-041-0245(2)]	The proposed Project operation is not expected to add anything to water that would increase total dissolved solids.

**5.2 Water Quality Standards of Potential Concern for Project Operation**

Water quality standards which may be affected during operation of the proposed Project are identified in Table 4. ODEQ provides an evaluation of these standards in the following subsections. The evaluation includes the text of the standard, a description of the current water quality conditions, the potential impact which the Project may have on water quality, ODEQ's evaluation of the Project impacts, and ODEQ findings. In certain instances, the findings may be conditioned on activities deemed necessary by ODEQ to ensure operations comply with specific water quality standards.

The evaluation may be based on water quality data drawn from multiple sources including sampling data collected and submitted by the Applicant, archived data collected by ODEQ, relevant data from published sources, information from similar or related projects, site-specific study results, results from predictive modeling studies, and information from studies in the scientific literature.

As discussed previously, the findings and conditions addressed by this §401 water quality certification are restricted exclusively to potential impacts related to Project operations. Construction of the Project will necessitate a §404 permit issued by the Corps and a subsequent §401 water quality certification issued by ODEQ pursuant to OAR 340, Division 048. The Corps has conditioned the application for a §404 permit to the Applicant first securing a FERC operating license. For this reason, ODEQ will evaluate potential construction-related water quality impacts once the Applicant completes an application for a Corps §404 construction permit.

Symbiotics has prepared and submitted a Draft Water Quality Monitoring and Management Plan (WQMMP, Symbiotics June 2007) which proposes a schedule of monitoring and reporting activities to monitor certain water quality parameters for compliance during Project operation. Within 12 months of receiving a FERC operating license, Symbiotics shall prepare an Adaptive Water Quality Management and Monitoring Plan (AWQMMP), based on the Draft WQMMP, which addresses the adaptive measures identified in the Conditions to this §401 water quality certification. ODEQ may, as deemed necessary, direct Symbiotics to revise or expand the scope of monitoring activities performed during operation of the Project to ensure compliance with Oregon water quality standards.

**Table 4. Water Quality Standards of Potential Concern for Project Operations**

<b>Standard</b>	<b>Brief Description</b>	<b>Potential Impact</b>
Temperature	Water temperature must be protective of aquatic communities [OAR 340-041-0028].	Symbiotics must allow the Corps to implement temperature management strategies to comply with TMDL load allocation.
Dissolved Oxygen	Sufficient concentrations of dissolved oxygen are necessary to support aquatic life [OAR 340-041-0016].	Turbines reduce water turbulence and, therefore, the capacity for water to retain dissolved gases.
Turbidity	Generally not to exceed 10% over background; limited-duration activities permitted in a § 404 or § 401 certificate are allowed, even when increases exceed this level [OAR 340-041-0036].	Applicant has modeled intake velocities in vicinity of the proposed penstock inlet. Turbidity monitoring is warranted to confirm these assumptions were correct and determine if Project contributes to scour.
Total Dissolved Gas	Protects aquatic life from gas bubble disease, caused by water that is supersaturated with atmospheric gases [OAR 340-041-0031].	Measurements recorded below dam stilling basin confirm concentrations of TDG exceed applicable criteria over a broad range of flow rates.
Biocriteria	Protects aquatic communities from cumulative impacts of all potential impairment [OAR 340-041-0011].	DO and TDG are below and above their target concentrations, respectively. Evaluation of biocriteria is warranted to evaluate scope of impacts on biological community.
Toxic material	Buildup of toxic material that affects aquatic life or human uses is not allowed [OAR 340-041-0033].	The Row River is 303(d) listed for mercury impairments resulting from historical mining practices in upstream watersheds.
Oily sheen, oily coatings	Objectionable discoloration, scum, oily sheen, floating solids or coating aquatic life with oil films is not allowed [OAR 340-041-0007(13)].	Petroleum products used for routine maintenance are stored in powerhouse. Applicant has prepared a Spill Plan to address response measures to small volume petroleum and hazardous materials spills.
Antidegradation	Protects existing water quality by preventing unnecessary additional water quality degradation [OAR 340-041-0004].	Must be addressed when a project is proposed that may lower existing water quality conditions, even though standard violations are not anticipated.

## 5.2.1 Temperature

### Applicable Standard

The applicable standard is given in OAR 340-041-0028. Pertinent excerpts of the applicable State standard for temperature are included here. The salmonid uses and related temperature criteria present in the affected reaches of the Row River are listed in Table 5 of this subsection.

- (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;*
  - ...
  - (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);*
  - ...

- (8) *Natural Conditions Criteria.* Where the department determines that the natural thermal potential of all or a portion of a water body exceeds the biologically-based criteria in section (4) of this rule, the natural thermal potential temperatures supersede the biologically-based criteria, and are deemed to be the applicable temperature criteria for that water body.

...

(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) *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.

Water temperature has a profound effect on organisms that live or reproduce in the water. When water temperature becomes too high, salmon and trout (salmonids) suffer a variety of ill effects. With increasing temperature, salmonids experience sub-lethal effects of impaired feeding, decreased growth rates, reduced resistance to disease and parasites, increased sensitivity to toxics, intolerance during migration, reduced ability to compete with more temperature-resistant species and increased vulnerability to predation. If temperatures are high enough for sustained periods, mortality occurs. Elevated temperatures may also adversely affect other important water quality parameters such as dissolved oxygen and may promote increased algae and fungi productivity.

Beneficial uses of waters in the Project area are given in Table 340A of OAR Chapter 340, Division 041. These uses include: public, private, and industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water-based recreation, and aesthetic quality. Of these, the fish and aquatic life beneficial use presents the most restrictive application of the temperature water quality standard.

ODEQ uses a biologically-based temperature criteria intended to protect fish species during specific salmonid life stages. The distribution of designated fish use within the Willamette Basin is given in Figure 340A of OAR 340-041-0340 which indicates the entire Row River is designated as Salmon and Trout Rearing and Migration waters. Seven-day average temperatures for these waters must not exceed 18.0° C. The biologically-based temperature criteria are further defined during periods within specific reaches used for spawning. Figure 340B, OAR 340-041-0340, indicates the river immediately downstream of Dorena dam is designated Salmon and Steelhead Spawning Use between October 15 to May 15. The seven-day average maximum temperature must not exceed 13° C in Row River downstream of Dorena Lake during this period. A summary of beneficial uses and numeric temperature criteria for waters in the vicinity of the Project are presented in Table 5.

**Table 5. Beneficial Use and Numeric Temperature Criteria**

<u>Beneficial Use</u>	<u>Applicable Reach</u>	<u>Citation</u>	<u>Period</u>	<u>Numeric Criteria</u>
Salmon and trout rearing and migration	Entire Row River	OAR 340-041-340 Figure 340A	Year round	Not to exceed 18 degrees C
Salmon and Steelhead spawning	RM 6 to Dorena Dam	OAR 340-041-340 Figure 340B	October 15 to May 15	Not to exceed 13 degrees C

The narrative criteria that apply to the Coast Fork Willamette Subbasin describe the conditions under which numeric criteria may be superseded. The criteria acknowledge that the natural thermal condition of the stream may exceed the biologically based numeric criteria. When background temperatures exceed the appropriate biologically

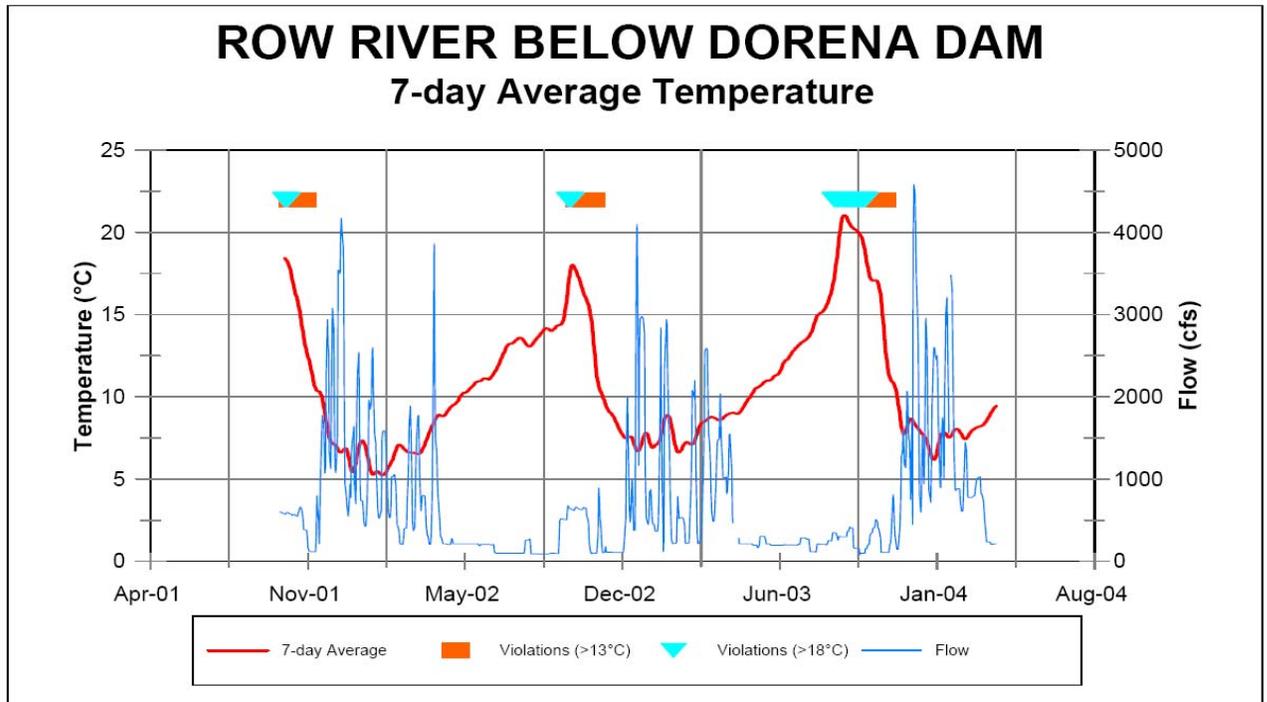
based criterion, the temperature standard restricts cumulative temperature increases to no greater than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria.

The temperature standard which applies to the Row River in the vicinity of the Project is further conditioned by the Willamette Basin TMDL which provides prescriptive remedies for reducing heat loads in 303(d) listed surface waters. In addition to the numeric and narrative temperature criteria given in OAR 340-041-0028 and 340-041-0340, the temperature TMDL identifies the loading capacity permissible as a result of human activity. Specifically, the TMDL states that the maximum increase in stream temperature above the applicable biological criteria or the natural condition criteria as a result of human activities shall not exceed 0.3°C.

The Corps is designated as the DMA responsible for implementing reduction strategies necessary to comply with TMDL conditions. The Corps is responsible for preparing a water quality management plan (WQMP) to address management strategies designed to comply with the TMDL conditions. Since the Corps administers the operation of Dorena Dam, temperature impairment resulting from the impoundment of water within Dorena Reservoir remains the responsibility of the Corps. Providing that operation of the proposed Project does not increase water temperature in excess allowed by Oregon water quality rules, Symbiotics is not required to correct for temperature impairments resulting from conditions created by the dam. Notwithstanding the preceding statement, Symbiotics shall not propose or undertake actions which restrict the ability of the Corps to construct, operate, or modify TMDL implementation strategies or otherwise hinder the ability of the Corps to achieve and maintain compliance with current and/or future TMDL requirements. Symbiotics shall accept the implementation of remedies approved by ODEQ which allow the Corps to meet their TMDL obligations and/or the objectives set forth in current and/or future WQMPs.

#### Current Water Quality Status

Gauging Station #14155500 is located on Row River approximately two (2) miles downstream of Dorena Dam. Figure 3 presents the 7-day average daily maximum (7DADM) temperature recorded by USGS at this location between October 2001 and March 2004. The data indicate the spawning criteria of 13°C was exceeded during the last half of October of each year. These exceedences occur shortly after the temperature criterion decreases to reflect the spawning beneficial use but before the seasonal inversion of the lake which typically occurs in late October. Water temperatures downstream of Dorena Dam also exceed the rearing and migration temperature criterion of 18°C in late summer. These exceedences reflect increased warming through reduced flows and extended periods of late summer solar radiation.



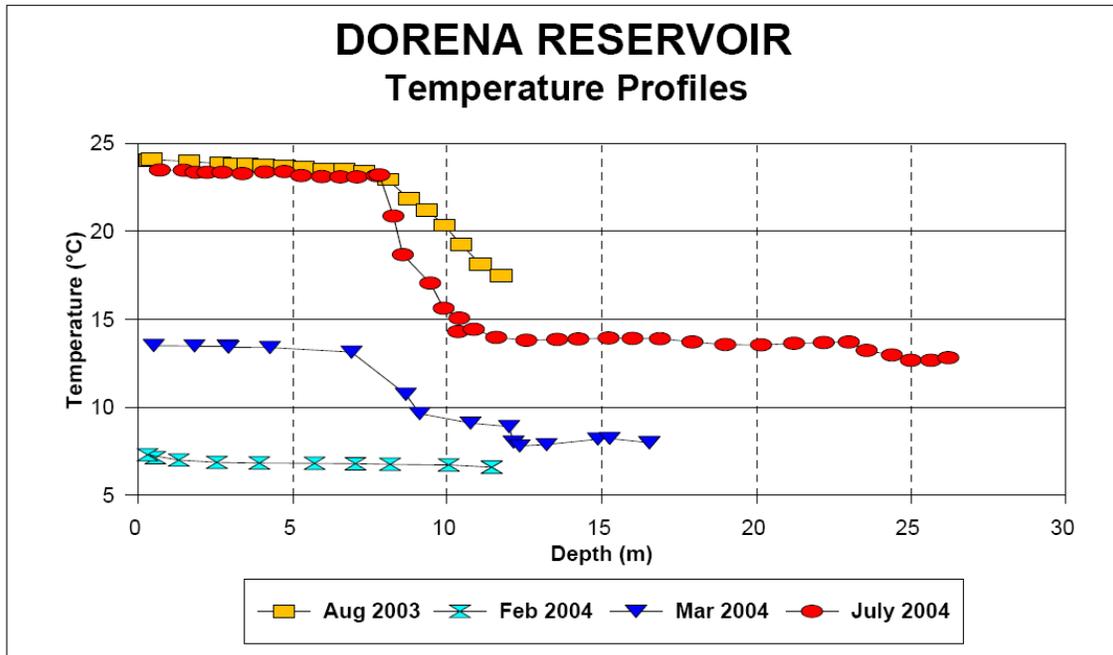
**Figure 3 - Streamflow and Temperature at USGS Gauging Station 14155500**

Additional temperature monitoring was performed in Dorena Reservoir by the Applicant beginning in 2003. Vertical temperature measurements were recorded in the reservoir in August 2003, February, March and July 2004. Temperature profiles prepared from these data are presented graphically in Figure 4 and demonstrate moderate thermal stratification during summer months. The effects of stratification are less pronounced during cooler periods.

Stratification often occurs when dams impound deep pools of water for extended periods of time. The effects of stratification are most pronounced in summer months when flows are lowest and the opportunity for surface warming is greatest. Since water density and temperature are inversely related, thermally distinct zones develop as illustrated in Figure 4. The warmest and least dense zone, the epilimnion, is located in the surface waters. The hypolimnion consists of the coldest, densest, and deepest waters. These zones are separated by the metalimnion, or transition, zone. The outlet structures of Dorena Dam release water from deep portions of the reservoir resulting in cooler temperatures during summer months. These cooler waters during the summer may conflict with the thermal regime favored by resident and anadromous fishes during rearing and migration.

Thermally stratified reservoirs may undergo thermal inversion in the Fall when declining ambient temperatures and solar radiation no longer sustain the epilimnion. Under these

conditions, downstream temperatures may increase during later months. Warmer temperatures in the Fall again conflict with cooler thermal regimes required during late season spawning periods of resident and anadromous fishes.



**Figure 4 – Dorena Reservoir Temperature Profiles**

During summer stratification, the measured depth of the epilimnion was approximately eight meters in thickness and ranged from about 23°C to 24°C. The survey results revealed a metalimnion extending down from the epilimnion to a depth of about 12 meters with temperatures decreasing to about 14°C in summer. It appears that the hypolimnion temperatures were cold year-round and seasonally ranged from 7°C to 14°C. Based upon the years examined, the 18.0°C temperature criterion for trout appears to be met throughout the depth of the reservoir except the upper five to ten meters during the summer months.

Potential Impact of New License

In the Corps correspondence dated May 25, 2007, the Corps reiterated its authority to continue operation of the dam pursuant to its original federally mandated project objectives. In accordance with this authority, the Corps retains sole discretion to dictate the magnitude, frequency, and ramping rate of releases and otherwise conduct all dam operations in a manner which achieves the overall objectives of their reservoir management goals. Correspondingly, Symbiotics has proposed that it will operate the Project in a run-of-release mode, whereby the Applicant will neither exercise discretion over the timing and/or delivery of water released from the dam, nor influence the quantity, quality, or thermal condition of water retained within the reservoir. With respect to thermal condition of the water discharged downstream of the Project, Symbiotics identifies that its proposed withdrawal of water from the same depth and vicinity of the existing Corps outlet structure, will ensure downstream temperatures will not be altered by operation of the proposed hydroelectric facilities relative to current Corps operations without hydroelectric facilities.

Symbiotics has submitted a Draft Water Quality Management and Monitoring Plan (WQMMP) in association with its §401 application, inclusive of temperature monitoring and reporting proposals.

#### ODEQ Evaluation

Monitoring data collected in the Row River downstream of Dorena Dam confirm water temperatures often fail to achieve biologically based temperature criteria in late summer and early fall. The observed temperature impacts are related to the impoundment of water upstream of Dorena Dam which results in significant temperature stratification until late October when flows increase, incident solar radiation decreases, and seasonal temperature inversion of the reservoir occurs.

In correspondence dated May 25, 2007, the Corps maintained its authority to continue operation of the dam pursuant to the original federally mandated project objectives. Since Symbiotics may not exercise discretion over the timing magnitude, or ramping rate of flows released from Dorena Dam, Symbiotics is not responsible for the quality, quantity, or thermal condition of water received by the Project. For this reason, temperature impacts resulting from the presence of Dorena Dam are the responsibility of the Corps, the agency which administers operation of the facility.

Notwithstanding the temperature evaluation presented above, Symbiotics has specific obligations to comply with certain TMDL requirements. The Row River and Dorena Reservoir are 303(d) listed for temperature impairment. The Corps is responsible for developing and implementing a water quality management plan to comply with a TMDL load allocation related to temperature impacts associated with operation of Dorena Dam. Although Symbiotics is not responsible for the thermal condition of water it receives from the dam, Symbiotics' must allow the Corps to implement measures deemed necessary, including structural modification of the intakes, to achieve compliance with TMDL load allocation obligations.

In addition, Symbiotics must also comply with the TMDL loading capacity requirements for potential thermal contributions related to Project operations. TMDL loading capacity requirements are given in OAR 340-041-0028 (12)(b)(B) and state that human activities may not result in a stream temperature increase of more than a 0.3°C above the applicable biological criteria or the natural condition criteria.

#### DEQ Finding

ODEQ is reasonably assured that operation of the proposed Project will not violate the temperature standard providing the following conditions are met:

1. Run-of-Release Operation  
Throughout the life of the FERC license, Symbiotics shall operate the Project in a "run-of-release" mode. The Corps shall retain sole authority over the magnitude, frequency, and ramping rates of releases. Symbiotics may not dictate or exercise influence over the schedule of flows released from Dorena Dam.
2. TMDL Implementation and Temperature Management Plans  
Under CWA §303, the Corps is responsible for developing and implementing a water quality management plan to comply with a TMDL load allocation related to temperature impacts associated with operation of Dorena Dam. Symbiotics must

allow the Corps to implement measures deemed necessary to achieve compliance with TMDL load allocation obligations. Symbiotics is responsible for TMDL loading capacity requirements for potential thermal contributions related to Project operations.

3. Temperature Monitoring and Management

Symbiotics shall conduct temperature monitoring and reporting in accordance with a AWQMMP submitted and approved by ODEQ. The AWQMMP shall be developed in consultation with ODEQ and submitted within 12 months of FERC license issuance. The AWQMMP shall identify temperature monitoring and reporting sufficient to identify temperature violations and shall identify adaptive measures that will be implemented by Symbiotics in the event violations are identified.

## 5.2.2 Dissolved Oxygen

### Applicable Standard

The applicable standard is given in OAR 340-041-0016. Pertinent excerpts of the applicable State standard for temperature are included here.

*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);*

Dissolved oxygen (DO) is one of the principal parameters used to characterize water quality. Maintaining adequate concentrations of DO is vitally important for supporting 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 the developing embryos occur in the gravel surrounding the eggs at these redds. High water column DO levels are not necessarily indicative of adequate IGDO levels, and vary depending on several interrelated factors including water column concentrations, the percentage of fine sediment in the gravel pores, sediment oxygen demand, and oxygen demand of the eggs.

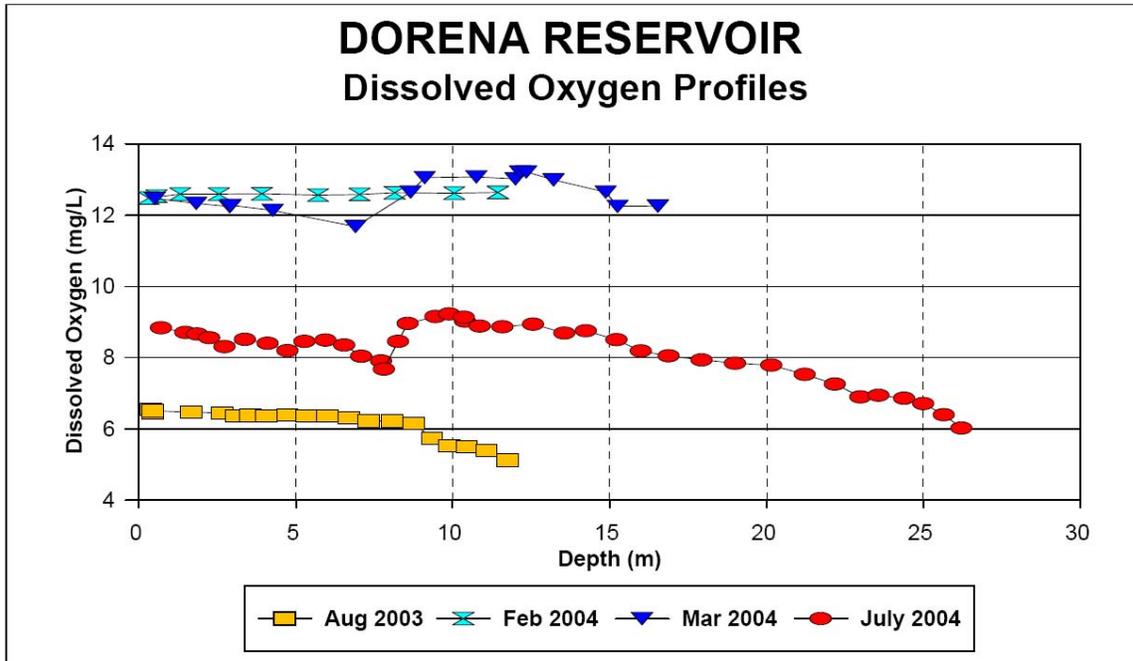
**Current Water Quality Condition**

ODEQ establishes minimum in-stream DO concentrations to protect habitat of resident and anadromous fish populations. DO criteria may vary seasonally based on critical spawning periods. Figures 340A and 340B of OAR Division 340, Chapter 041, identify the entire Row River as year-round Salmon and Trout Rearing and Migration waters. Row River immediately downstream of Dorena Dam is further identified as Salmon and Steelhead Spawning Use between October 15 and May 15. The DO criteria established to protect these beneficial uses are summarized in Table 6 below.

**Table 6. DO Criteria for Project Area**

<b>Period</b>	<b>Minimum Criteria</b>	<b>Conditions</b>
May 15 to October 15	8.0 mg/L	(1) 90% saturation if 8.0 mg/L cannot be met due to temperature and barometric pressure. (2) DO may not be less than: 8.0 mg/L based on 30-day mean 6.5 mg/L based on 7-day mean 6.0 mg/L as absolute minimum
October 15 to May 15	11.0 mg/L	(1) If minimum IDGO is 8.0 mg/L or higher, the DO criterion is 9.0 mg/L (2) 95% saturation if 11.0 mg/L cannot be met due to temperature and barometric pressure. (3) Spatial median IDGO must not be below 8.0 mg/L

The Applicant performed a series of monitoring events in August 2003, and February, March, and July 2004 to measure several water quality parameters, including DO, at various depths within Dorena Reservoir. Monitoring data were collected at two (2) locations. Sampling data are presented graphically in Figure 5.



**Figure 5 - Dissolved Oxygen Profiles in Dorena Reservoir**

DO levels vary seasonally with higher concentrations occurring during colder periods and lower concentrations occurring during warmer months. As indicated in Figure 5, DO concentrations are generally above 12.0 mg/L during February and March. DO concentrations display little variation with depth during this unstratified period of the year. DO concentrations decline overall and decrease with depth as waters thermally stratify during summer months. These data further indicate that DO levels at deeper portions of the reservoir decline below 6.0 mg/l during mid to late summer.

Though data are unavailable, it appears likely that DO concentrations near the penstock intake are below the 8.0 mg/l criterion for much of the summer. The difference between DO concentrations and the applicable criterion widens further on October 15 when the DO spawning criterion increases to 11.0 mg/l. In mid Fall, DO concentrations increase in response to lower ambient temperatures, thermal inversion of the reservoir, and increased flow. Additional data are necessary to evaluate at what time of year DO levels increase above the 11.0 mg/l spawning criteria.

No data were collected to evaluate IDGO concentrations in gravels in affected reaches of Row River downstream of Dorena Dam.

Potential Impact of New License

The Corps currently releases water through rectangular outlet structures located near the base of the dam. High velocity dam releases generate turbulent conditions which entrain atmospheric air including oxygen. Dam releases under current Corps operating conditions, therefore, tend to increase the concentration of dissolved gases, including DO, relative to incoming conditions.

In contrast, turbine operations convert hydraulic energy into electrical energy. The hydraulic energy withdrawn from the water tends to reduce turbulence and lowers the potential DO concentrations in the tailrace discharge. The degree to which the Project will reduce DO concentrations is not known. However, measurements recorded by the Applicant in Dorena Reservoir indicate DO levels are at or below the DO criterion of 8.0 mg/L for much of the summer and decrease below the absolute minimum concentration of 6.0 mg/L at depth in late summer. The difference between ambient conditions and the DO criterion further increases on October 15 when the DO criterion increases to 11.0 mg/L to protect spawning habitat in the portion of Row River downstream of the dam. Further DO reductions during this period will, therefore, likely result in violations of the ODEQ water quality criterion for DO.

To address concerns regarding reduced DO concentrations, Symbiotics has proposed the following measures:

#### *Air Admission System*

The Applicant has proposed the installation of an air admission system (AAS) to introduce ambient air through the turbine blades. The purpose of the AAS is to increase the concentration of DO in the discharge. The Applicant estimates operation of the AAS will increase DO by as much as 3.5 mg/L. Symbiotics proposes to monitor DO concentrations closely during initial six (6) months operation of the AAS.

#### *Adaptive Management*

Upon completion of the initial six (6) month operating period, Symbiotics will submit a report to ODEQ which evaluates the performance of the AAS. The report will offer engineering or operation recommendations to correct any violations of ODEQ water quality standards. The following adaptive modifications may be considered:

- System shutdown: Symbiotics may consider suspending operation of the Project when discharge from the Project fails to meet appropriate ODEQ water quality criteria.
- Oxygen Injection: Symbiotics may evaluate substituting pure oxygen in place of ambient air to increase DO concentrations in water discharged from the Project.
- Operation: Symbiotics may base a decision on the operation of the AAS on DO measurements recorded upstream of the powerhouse.

#### *Monitoring*

Symbiotics has proposed to monitor DO levels continuously during project operation at the following stations:

- Reservoir bottom at intake;
- Row River immediately below dam, but above the hydroelectric project tailrace;
- Tailrace immediately prior to Row River entrance; and
- Row River one-quarter (0.25) mile below tailrace.

Symbiotics will record minimum, maximum, and average values continuously during operation. The WQMMP states that monitoring data will be summarized in annual reports submitted to ODEQ.

### ODEQ Evaluation

The Project proposes to withdraw water from a penstock installed through the north abutment of Dorena Dam. The Applicant intends to place the penstock near the base of the reservoir at an elevation similar to the existing Corps outlet structure. Although monitoring data are limited, it appears that DO concentrations are at or below the applicable DO criterion (i.e., 8.0 mg/L) near the depth of the penstock during much of the summer and early fall. DO concentrations increase following thermal inversion of the reservoir in late October. High flow and colder ambient conditions appear to sustain DO concentrations above the applicable DO criterion of 11.0 mg/L during February and March. However, it is uncertain at what point DO concentrations achieve this criterion.

ODEQ recognizes that operation of the proposed Project has the potential to lower DO concentrations relative to levels presently discharged through existing Corps outlet structures. Presently, water discharges from Corps outlet structures under turbulent conditions which tend to entrain atmospheric gases thus increasing DO concentrations relative to inlet conditions. In contrast, lower energy water exiting the powerhouse has a reduced capacity for dissolved gases. The magnitude of DO reduction as a consequence of Project operations is not known. However, based on available seasonal monitoring data, it appears likely that Project operations may result in violations of applicable DO criteria during a portion of the year.

The Applicant proposes several measures to address potential Project impacts on DO concentrations. These are addressed below:

#### *Air Admission System*

The Applicant proposes installation of an AAS to introduce ambient air into water exiting the turbines. The Applicant estimates that operation of the AAS will contribute up to 3.5 mg/L DO to the water. However, engineering studies and/or technical estimates were not submitted to support this figure. The Applicant proposes to conduct evaluation studies between June and November when DO concentrations in the hypolimnion are typically at minimum levels. The Applicant proposes several operational strategies over a range of operating conditions to gauge the effectiveness of this system.

ODEQ is in general agreement that supplemental air entrainment may enhance DO concentrations in water during critical periods of the year. Despite the stated benefits of this system, ODEQ has several concerns which are discussed below:

1. The Applicant indicates the AAS will be tested over a range of operating flows during a six (6) month evaluation period. During this period, changes in operation may necessitate starting and stopping flows through the penstock. Symbiotics shall document explicitly how interruption in flows through the Project during AAS testing will be coordinated with the Corps such that total discharge from the dam will be managed in accordance with the Corps' operational schedule. In addition, the six month evaluation period proposed by Symbiotics shall be performed during a period characterized by deficient DO conditions (e.g., April through October).
2. The introduction of air will increase the concentration of TDG in the receiving water. TDG water quality criteria are given in OAR 340-041-0031 and discussed in Section 5.2.4 of this Evaluation and Findings Report. The

Applicant shall specifically address monitoring and countermeasures to avoid violating Oregon TDG water quality criteria during the proposed six (6) month AAS evaluation.

#### *Adaptive Management*

ODEQ will require an adaptive management plan to address potential violations of applicable DO water quality criteria. Symbiotics has identified several adaptive strategies which may be employed to correct non-compliant water quality conditions. These include suspending operation during periods of low DO concentrations, and replacing ambient air with pure oxygen as a feed gas in the AAS during periods in which DO concentrations fall below applicable DO criteria.

Within 12 months following issuance of a FERC operating license, Symbiotics shall prepare and submit to ODEQ a WQMMP which proposes adaptive management measures to address and correct violations of water quality criteria. The WQMMP shall include a description and evaluation of potential actions, conditions under which each action may be implemented, a notification schedule, and conditions under which adaptive measures may be rescinded or modified.

#### *Monitoring*

ODEQ will require monitoring of DO and other water quality parameters to evaluate potential effects of Project operations on downstream water quality. Within 12 months following issuance of a FERC operating license, Symbiotics shall prepare and submit to ODEQ a WQMMP which proposes a strategy for monitoring DO concentrations at representative locations upstream and downstream of the Project. The WQMMP shall propose monitoring and assessment methodology, monitoring locations, monitoring frequency and duration, and evaluation procedures.

Add information here about the monitoring equipment and malfunction prevention plan so that you introduce the concept before the Evaluation

#### ODEQ Findings

ODEQ is reasonably assured that operation of the proposed Project will comply with applicable ODEQ DO water quality criteria provided Symbiotics meets the following conditions:

1. Mode of Operation

Throughout the life of the FERC license, Symbiotics shall operate the Project in a "run-of-release" mode in which the Corps retains sole authority over operation of Dorena Dam. Symbiotics shall coordinate with the Corps such that combined releases from the two (2) dam outlets conform to the Corps' operating schedule and overall management objectives of Dorena Dam. Issuance of a FERC operating license does not confer upon Symbiotics discretion to influence or dictate the magnitude, frequency, or ramping rates of releases, nor may Symbiotics intervene in the Corps' operations which may negatively impact the ability of the Corps to manage water quantity and quality of dam releases.

2. Adaptive Management

Within 12 months following issuance of a FERC operating license, Symbiotics shall prepare and submit to ODEQ for approval an AWQMMP. The AWQMMP shall present procedures for collecting, evaluating and reporting monitoring data

necessary to demonstrate compliance with the DO water quality standard. The AWQMMP shall discuss how Symbiotics may modify Project operations and/or monitoring activities in response to measured or anticipated violations to the DO water quality standard.

3. Air Admission System:

Symbiotics has proposed installing an AAS to introduce ambient air into water exiting the turbines. The Applicant estimates that operation of the AAS will contribute up to 3.5 mg/L DO to the water. Within 12 months following issuance of the FERC operating license, Symbiotics shall submit a AAS Management Plan (AASMP). The AASMP shall provide ODEQ with engineering and technical specifications on the operation of the AAS system including models or other predictive methods to estimate concentrations of DO and other gases under a variety of flow and temperature conditions. The AASMP shall also propose methodology for a limited-duration pilot test to verify the operational assumptions of this system. The AASMP shall propose the conditions under which operation of the AAS is proposed. Finally, the AASMP shall propose a monitoring program to evaluate the use and operation of this system.

4. Project Shutdown due to Dissolved Oxygen Violations:

If ODEQ or Symbiotics determine that Project operations are contributing to violations in applicable DO criteria, or the antidedgradation standard, Symbiotics shall immediately suspend Project operations and conduct a review of operating conditions to identify the source(s) contributing to the violation. Prior to resuming operation, Symbiotics shall submit a summary report to ODEQ describing the source and nature of the violation, corrective actions to remedy the condition, and additional monitoring activities, if any, proposed to ensure compliance. Following a review of a DO violation, ODEQ may request modifications to the AWQMMP which condition authorization to restart the Project with implementation of measures or controls deemed necessary to ensure continued compliance with water quality standards.

5. Monitoring Equipment Malfunction Prevention and Response Plan:

Symbiotics shall develop a Monitoring Equipment Malfunction Prevention and Response Plan to address water quality monitoring equipment malfunctions during operation of the Project. This plan shall be developed within 12 months after issuance of the FERC operating license and shall be submitted as a section to the AWQMMP. The plan shall specify the following:

- a. Procedures and measures that will be implemented to prevent monitoring equipment malfunctions;
- b. Procedures for identifying the occurrence and nature of any monitoring equipment malfunctions that may occur;
- c. Plan, schedule, and corrective measures that will be implemented to address monitoring equipment malfunctions;
- d. Procedures for notifying ODEQ of the occurrence and nature of monitoring equipment malfunctions, corrective measures implemented, and recommencement of operation.
- e. Procedures and timelines for Project shutdown as may be necessitated by Condition 6, below.

6. Project Shutdown due to Monitoring Equipment Malfunctions:  
Symbiotics shall notify ODEQ immediately in the event of field instrumentation failure. Upon evaluation of the condition, ODEQ may direct Symbiotics to suspend operation of the Project until instrumentation can be repaired or replaced. ODEQ will make this determination based on a review of in-stream DO monitoring data prior to the instrument failure, a review of historical monitoring data, and the applicable DO criterion at the time of the event. Symbiotics shall receive written authorization from ODEQ prior to resuming Project operations. ODEQ may condition authorization to restart the facility on a review of the response to the malfunction which provides ODEQ with reasonable assurance that an adequate remedial response has been implemented.
  
7. Dissolved Oxygen Monitoring and Reporting  
Within 12 months following issuance of a FERC operating license, Symbiotics shall submit an AWQMMP to ODEQ which presents a monitoring strategy for measuring DO at representative locations upstream and downstream from the Project. The AWQMMP shall propose monitoring and assessment methodology, monitoring locations, monitoring frequency and duration, and evaluation procedures

Symbiotics shall submit annual water quality monitoring reports to ODEQ by January 31 of each year. Each report shall include an analysis of DO monitoring data from each station including graphical representation of daily minimum, maximum, and average temperature measurements. To evaluate DO data with the applicable criteria given in Table 21 of OAR 340-041-0016, Symbiotics shall also present data as 30-day mean minimum (30D), 7-day mean minimum (7D), and 7-day minimum mean (7-Mi).

### **5.2.3 Turbidity**

#### Applicable Standard

The applicable standard is given in OAR 340-041-00336

*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 14I-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.*

Turbidity is a measure of the amount of light intercepted by a given volume of water due to the presence of suspended and dissolved matter and microscopic biota. Increasing the turbidity of the water decreases the amount of light that penetrates the water column. High levels of turbidity are harmful to aquatic life. The standard is designed to minimize the addition of soil particles or any other suspended substances that would cause significant increases in the river's normal, seasonal turbidity pattern. Increases in suspended sediment generally correlate with increases in turbidity.

### Current Water Quality Status

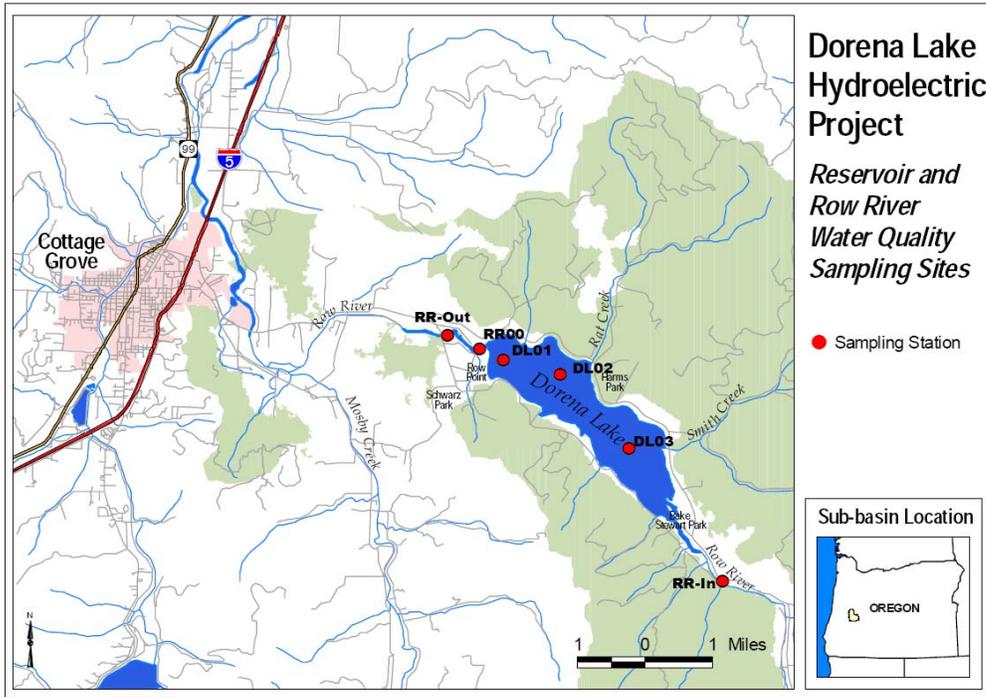
The Applicant performed a series of monitoring events in August 2003, and February, March, and July 2004 to measure several water quality parameters, including turbidity, at various depths within Dorena Reservoir. Monitoring data were collected at three (3) locations, identified as DL01, DL02, and DL03 on Figure 6. Sampling data from these locations were pooled and plotted collectively in Figure 7 to illustrate turbidity as a function of depth in the reservoir.

The data indicate generally low turbidity conditions within the lake water column. Mean turbidity levels in August 2003, February 2004, and March 2004 were 9.0 NTU, 18.6 NTU, and 2.4 NTU, respectively.<sup>2</sup> Measurements during these months displayed little variability with depth. Turbidity measurements were lowest during July 2004, averaging approximately 1.0 NTU. However, Figure 7 indicates turbidity increased slightly with depth during this period. Turbidity data from downstream locations were not recorded during these intervals.

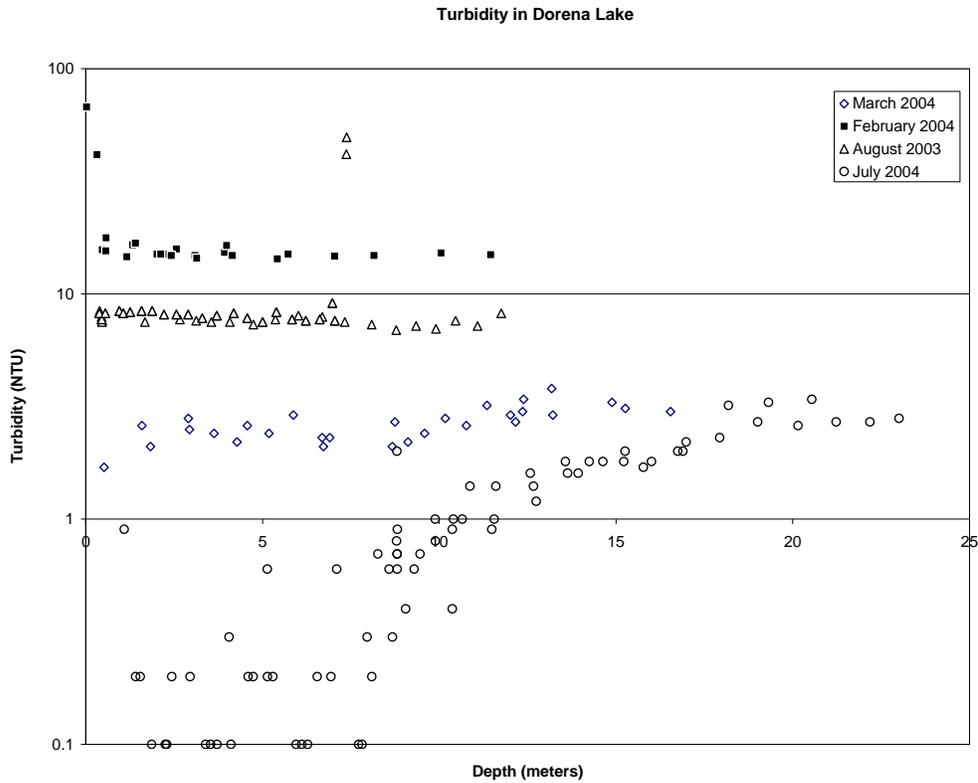
Neither the Row River nor Dorena Reservoir is identified as water quality limited for turbidity.

---

<sup>2</sup> Mean turbidity values for August 2003 and February 2004 were calculated following the exclusion of two (2) outlying measurements.



**Figure 6 - Water Monitoring Locations**



**Figure 7 - Turbidity Measurements in Dorena Reservoir**

### Potential Impact of New License

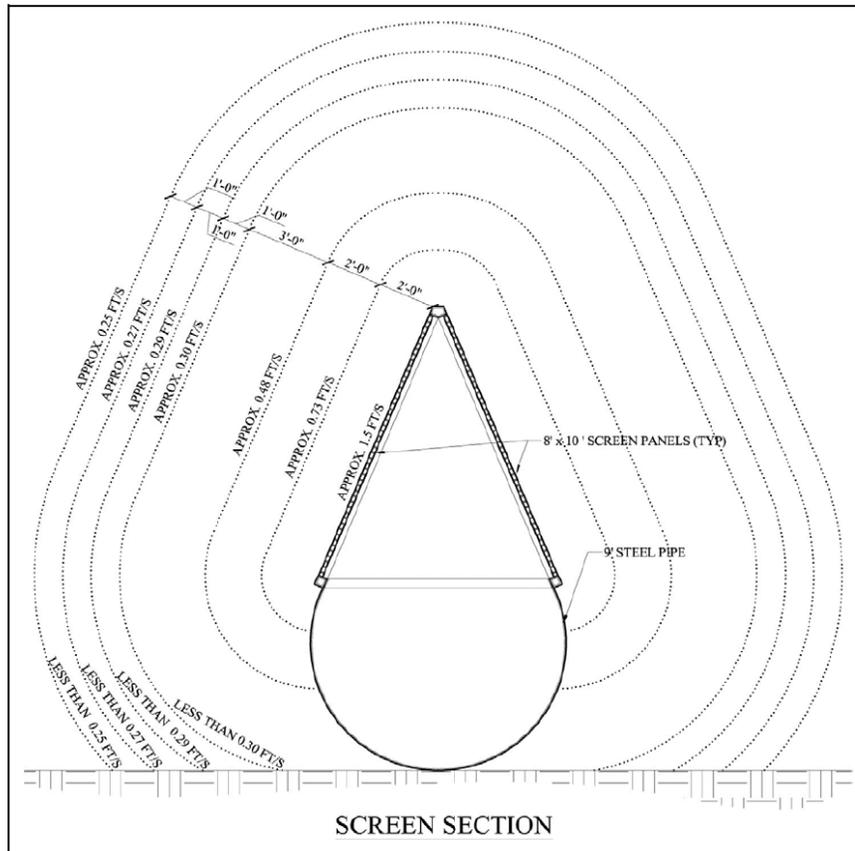
Project construction will have the potential to elevate turbidity within the reservoir near the dam and in the river downstream of the dam. However, since ODEQ does not have a well-defined or finalized proposal regarding Project construction, the agency is not evaluating or certifying the construction related aspects of the Project at this time. At such time as Symbiotics applies to the Corps for a § 404 permit, Symbiotics will need to apply to ODEQ for a separate § 401 certification for Project construction. Following the potential issuance of a license for the Project by FERC ODEQ expects that Symbiotics will refine its construction proposal in consultation with the Corps, and ODEQ will be provided a more specific construction proposal to evaluate. Such future § 401 certification would need to address requirements to ensure compliance with turbidity and other water quality standards that may be affected by construction activities.

With respect to operations, Symbiotics proposes to withdraw power generation water from Dorena Reservoir via a new outlet structure, as opposed to the existing Corps outlet structure on the dam. The new outlet structure would withdraw water from the reservoir forebay, approximately 100 feet out from the dam. Symbiotics indicates that water would be withdrawn from the same depth as the existing outlet structure and routed through a penstock to the powerhouse turbines on the downstream side of the dam. As identified earlier, Symbiotics proposes to operate its hydroelectric facilities in a “run-of-release” mode, whereby Symbiotics will neither cause deviation from requirements dictated by the Corps for magnitude, frequency, and ramping rates of streamflow, nor adversely impact the Corps’ management of water quality being discharged from Dorena Dam.

The inlet structure to the proposed penstock represents a potential source of increased turbidity. The proposed structure consists of a nine-foot diameter steel pipe placed at or near the base of the reservoir. Water enters the structure through a series of 8-foot by 10-foot intake panels attached to the top of the penstock in a steep sided A-frame arrangement. Symbiotics estimates the vertical distance between the base of the screen sections and the reservoir floor will be approximately 7 feet. A cross section schematic of the penstock is presented as Figure 8.

Water accelerates as it approaches the entry to the penstock which creates the potential for sediment mobilization and scour of the reservoir floor. To assess the effects of Project operations on sediment mobilization, the Applicant modeled entry velocities into the proposed penstock based on the maximum rated plant capacity of 812 cfs. Contours depicting the entry velocity of water entering the screen structure are presented in Figure 8. Under these conditions, Symbiotics estimates the maximum approach velocity near the base of the reservoir will not exceed 0.3 feet per second (fps). Symbiotics concludes that this velocity will produce no scouring of reservoir bottom sediments and bases this position on observations recorded from a similarly designed operating facility in Idaho (i.e., FERC No. 2973).

Symbiotics proposes to conduct visual reconnaissance of the penstock inlet in the event turbidity monitoring in the tailrace confirms turbidity violations. Should visual inspections confirm the occurrence of sediment scour, Symbiotics will prepare a report for submittal to ODEQ within 60 days. The report will characterize the extent of sediment scour and present recommendations for corrective actions.



**Figure 8 – Penstock cross Section Illustrating Inlet Approach Velocities**

DEQ Evaluation

Modeling studies performed by the Applicant indicate entrance velocities to the penstock will not exceed 0.3 fps near the reservoir floor under maximum flow conditions. The Applicant indicates that penstock inlets operating under similar conditions at similar projects result in no measurable scour to reservoir sediments. ODEQ does not expect that this low velocity, expected only under conditions of maximum capacity turbine operation, would be sufficient to cause sediment scour adjacent to the new intake structure. However, ODEQ considers it appropriate to monitor turbidity during operation to confirm this expectation and require corrective modifications if scour and excessive turbidity is identified.

Aside from the potential concern for scour-related turbidity, ODEQ is reasonably assured that Project operations will have no or negligible affect on turbidity levels within or downstream of the reservoir given that the new penstock will withdraw water from the same depth as the existing Corps outlet and from the same reservoir region (forebay). Additionally, the proposed run-of-release operations will ensure no change in downstream ramping rates, flow, or reservoir level management from that which the Corp will continue to dictate, that might otherwise influence turbidity.

## DEQ Findings

ODEQ is reasonably assured that operation of the proposed Project will comply with the turbidity standards provided that Symbiotics meets the following conditions:

1. Run-of-Release Operations: Throughout the life of the FERC license, Symbiotics shall operate the Project in a “run-of-release” mode. The Corps shall retain sole authority over the magnitude, frequency, and ramping rates of releases. Symbiotics may not dictate or exercise influence over the schedule of flows released from Dorena Dam.

Furthermore, Symbiotics shall operate the Project in a manner which does not interfere with the efforts by the Corps to comply with current and/or future TMDL load allocations.

2. Turbidity Monitoring and Reporting: Symbiotics shall conduct turbidity monitoring and reporting in accordance with an AWQMMP submitted and approved by ODEQ. The turbidity monitoring and reporting shall be sufficient to identify turbidity violations that may potentially result from any water withdrawal-induced sediment scour adjacent to the hydropower penstock intakes.
3. Turbidity Management: Symbiotics shall undertake and complete investigative actions in the event turbidity monitoring confirms Project-related violations to Oregon’s turbidity standard. The investigations shall include visual inspection to measure for the occurrence of sediment scour or erosion in the vicinity of the penstock inlets. The investigation shall also include a review of operating conditions, including flow rates, through the penstock prior to the violation. The investigation shall provide an analysis of the violation including, if applicable, a discussion of similar historical occurrences, a discussion of likely or probable causes, turbidity trends preceding the violation, and proposed measures to prevent future occurrences. A report presenting the findings of the investigation shall be submitted to ODEQ within 60 days of the occurrence. Upon ODEQ approval, Symbiotics shall implement the proposed measures.

### **5.2.4 Total Dissolved Gas (TDG)**

#### Water Quality Standard

The standard is given in OAR 340-041-0031:

*(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.*

In a riverine environment, total dissolved gas concentrations should be in relative balance with atmospheric conditions. As water is released over spillways, atmospheric

gases become entrained in the spill flow and are forced into solution below the surface and under pressure which may result in supersaturated TDG concentrations. Supersaturated levels of atmospheric gases may cause crippling or lethal gas bubbles to form in the tissues of fish.

The TDG standard is designed to prohibit discharges or activities that will 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 dissolved oxygen levels can create supersaturation of TDG, a condition that can be avoided if identified.

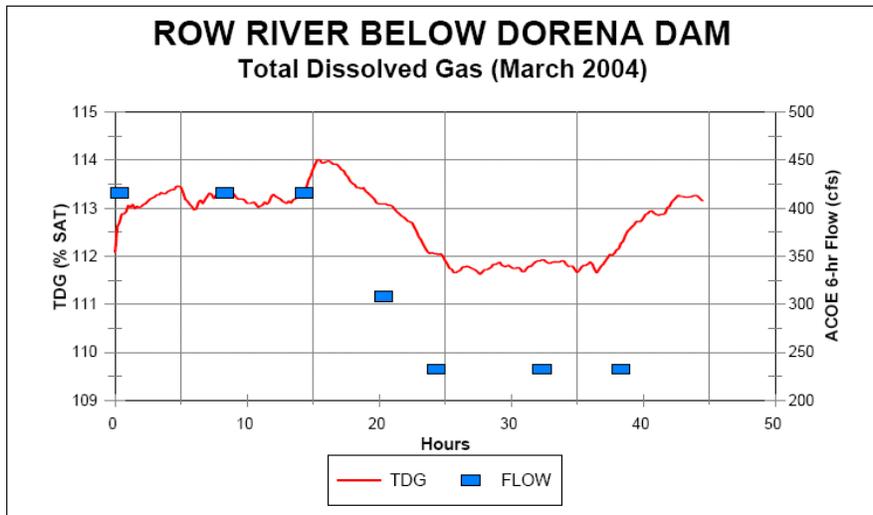
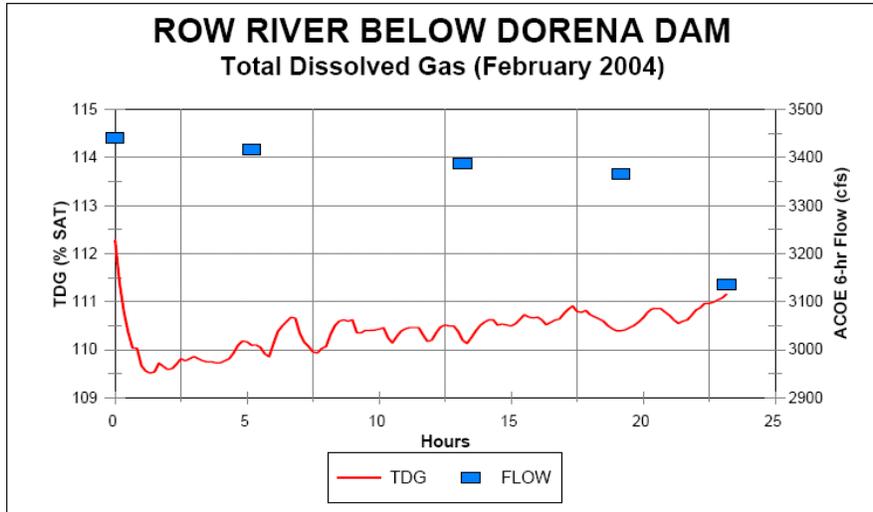
ODEQ has established a TDG numeric criterion of 110 percent of saturation. In waters less than two (2) feet in depth or in hatchery receiving waters, the concentration of TDG may not exceed 105 percent saturation. The area of the Project does not include hatchery receiving waters. Furthermore, the Applicant estimates the water in the vicinity of the Project ranges between eight (8) and 15 feet in depth. Based on conditions in the area of the Project the numeric criterion of 110 percent of saturation shall be used to evaluate TDG concentrations for compliance.

#### Current Water Quality Condition

The Applicant monitored TDG over 24 hours in February 2004 and over 48 hours in March 2004. TDG measurements were recorded continuously during these periods at a location in the Row River downstream of the dam. Flow measurements recorded by the Corps during this period were also obtained for reference. Sampling data recorded during these events are presented graphically in Figure 9.

The data indicate the TDG criterion of 110% was exceeded nearly 75 percent of the time in February 2004 and over the entire monitoring period in March 2004. Furthermore, TDG measurements were generally lower during the high flow (i.e., more than 3,000 cfs) conditions recorded in February 2004 than during low flow (i.e., up to 450 cfs) conditions recorded in March 2004. A broader relationship between TDG concentrations and flow cannot be drawn due to the limited data and the dynamic flow conditions observed particularly during the March 2004 event.

The Applicant believes that operation of the Project will result in a net decrease of TDG concentrations. This position is based on lower anticipated turbulence in tailrace waters exiting the powerhouse. As discussed in Section 5.2.2, Symbiotics has proposed operating an AAS during portions of the year to supplement deficient DO concentrations known to occur during late summer and fall. The admission of air to augment DO concentrations will also increase the partial concentrations of other atmospheric gases. The use of the AAS to comply with the DO criterion, therefore, may have the undesirable effect of exacerbating elevated TDG levels.



**Figure 9 – TDG and Flow Measurements Below Dorena Dam**

To monitor gas entrainment in the vicinity of the Project, Symbiotics has proposed recording hourly minimum, maximum, and average TDG measurements at four (4) locations in the Project area. Symbiotics has further proposed preparing an adaptive WQMMP to develop and implement alternative strategies for correcting water quality violations. Remedial measures to reduce elevated TDG concentrations may include modifying the texture of the tailrace surface to promote the stripping of dissolved gases, operating the AAS using pure oxygen to avoid introducing non-target atmospheric gases (e.g., nitrogen), and temporarily suspending operation of the Project during periods when compliance is not achievable.

Potential Impact of New License

Measurements recorded in February and March 2004 confirm TDG concentrations immediately downstream from Dorena Dam at levels exceeding the numeric TDG criterion. Limited data were collected during these monitoring events and it is not known how broadly distributed these conditions exist. However, it appears reasonable to

conclude that dam releases from the existing outlet structures offer the potential to create TDG conditions in violation of the ODEQ numeric criterion over a range of operating conditions. Gas entrainment occurs when atmospheric gases are forced into solution under pressure. The structural design of the outlet may exacerbate the condition by contributing to excessive turbulence.

The proposed Project will not discharge water from the existing outlet structure currently operated by the Corps but rather from a separate, independent tailrace constructed to serve the proposed hydroelectric facility. Consequently, it is not known how Project operations will impact TDG downstream of the Project. However, it appears reasonable to believe that operation of the Project offers the potential to reduce TDG concentrations relative to levels at the existing Corps outlet works by reducing the velocity and turbulence of water discharged through the powerhouse.

In the Draft WQMMP, Symbiotics identified several adaptive strategies, including operation of an AAS, to address seasonally low DO concentrations. The admission of air to augment DO concentrations will also increase the partial concentrations of other atmospheric gases including nitrogen. The use of the AAS to comply with the DO criterion, therefore, may have the undesirable effect of exacerbating elevated TDG levels.

#### ODEQ Evaluation

Measurements recorded by the Applicant indicate releases from the existing outlet structures offer the potential to create TDG conditions in violation of the ODEQ numeric criterion over a broad range of operating conditions. Although limited data are available, the measurements may indicate the structural design of the existing outlets may contribute to excessive turbulence thus increasing dissolved gases.

The Project as proposed by the Applicant will not utilize the existing outlet structures. Rather, a nine-foot diameter penstock will be installed through the dam to convey water to the powerhouse. It is not yet known how discharge from the proposed tailrace will impact TDG in waters below the Project. However, it is anticipated that Project operations will reduce the turbulence and velocity of the discharge and thus decrease the potential for elevated TDG conditions.

As presented in Section 5.2.2, the Applicant has also discussed the possibility of operating an AAS to augment seasonally low DO concentrations in an effort to comply with this water quality standard. ODEQ recognizes that the introduction of atmospheric gases to supplement DO will necessarily increase the fraction of other dissolved gases, including nitrogen. Since the net impact of proposed Project operations on TDG concentrations is unknown, the Applicant shall employ an adaptive management plan to modify operations, based on continuously recorded measurements from multiple locations, such that operation of the Project does not violate the TDG numeric criterion.

#### ODEQ Findings

ODEQ is reasonably assured that operation of the proposed Project will not result in a violation of the TDG criterion conditioned by the following requirements:

1. Mode of Operation: Throughout the life of the FERC license, Symbiotics shall operate its hydroelectric facilities in a "run-of-release" mode, in which Symbiotics will neither cause deviation from requirements dictated by the Corps for

magnitude, frequency, and ramping rates of streamflow, nor adversely impact the Corps' management of water quality being discharged from Dorena Dam.

2. TDG Monitoring: Within 12 months following issuance of a FERC operating license, Symbiotics shall prepare and submit an AWQMMP to ODEQ for approval to measure for TDG impacts resulting from operation of the proposed Project. The AWQMMP shall propose monitoring and assessment methodology, monitoring locations, sampling frequency and duration, applicable ODEQ water quality criteria, and evaluation procedures.

ODEQ may direct Symbiotics to modify the AWQMMP in such manner which provides monitoring data deemed necessary to adequately evaluate Project operations for potential impacts to water quality standards

3. Adaptive Management: Within 12 months following issuance of a FERC operating license, Symbiotics shall develop adaptive management strategies to address potential violations of the TDG numeric water quality criteria. Adaptive management strategies shall be presented in the AWQMMP referenced previously in this report and shall address the following:

- i) Air Admission System:

Operation of the AAS is intended to augment DO concentrations by introducing air into the water through the turbine blades. However, the use of air to increase DO concentrations will also increase TDG concentrations. If environmental conditions are such that not using the AAS will cause DO violations, but using the AAS will cause violations to the TDG criterion, Symbiotics shall immediately suspend operation of the Project and notify ODEQ. Within 60 days of the violation, Symbiotics shall submit a report documenting conditions preceding the violation. At that time Symbiotics may propose a remedial solution to the exceedence and seek authorization from ODEQ to restart the facility under modified operating conditions. Examples of such conditions include operating the AAS using pure oxygen as opposed to air, and/or adjusting airflow rates to achieve compliance with both the DO and TDG numeric criteria.

- ii) Project Shutdown due to Monitoring Equipment Malfunctions:

Symbiotics shall notify ODEQ immediately in the event of field instrumentation failure. Upon evaluation of the condition, ODEQ may direct Symbiotics to suspend operation of the Project until instrumentation may be repaired or replaced. ODEQ will make this determination based on a review of in-stream TDG monitoring data prior to the instrument failure and a review of historical monitoring data. Symbiotics shall receive written authorization from ODEQ prior to resuming Project operations. ODEQ may condition authorization to restart the facility on a review of the response to the malfunction which provides ODEQ with reasonable assurance that an adequate remedial solution has been implemented.

## 5.2.5 Biocriteria

### Water Quality 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.*

Additional definitions applicable to the biocriteria standard are given in:

OAR 340-041-0002 defines several terms related to the Biological Criteria standard:

(5) *“Appropriate reference site or region” means a site on the same water body, or within the same basin or eco-region that has similar habitat conditions, and represents the water quality and biological community attainable with the areas of concern.*

(6) *“Aquatic Species” means any plants or animals which 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 [Environmental Quality] 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 for the region.*

(44) *“Resident Biological Community” means aquatic life expected to exist in a particular habitat when water quality standards for a specific eco-region, basin or water body are met. This shall be established by accepted biomonitoring techniques.*

(67) *“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.*

The biocriteria standard is intended to complement the other parameter-specific criteria in the following manner. The parameter-specific criteria are designed to give full protection to the most sensitive beneficial use, with the implicit assumption that if the most sensitive beneficial use is protected, then all uses will be protected. However, the application of these criteria is very limited in considering multiple stressors and cumulative effects. By contrast, the biological criteria enable the assessment of total impact to the community in situ. The applicable State standard for Biological Criteria is as follows:

### Current Water Quality Condition

Symbiotics proposes to retrofit Dorena Dam, an existing flood control facility administered by the Corps, to generate hydroelectric power from existing releases. The

Project will be operated in a run-of-release mode in which the Corps retains authority over the magnitude, frequency, and ramping rate of water released from the dam. Since operation of the Project will not change the existing flow regime in Row River downstream of the dam nor will it alter the pool elevation or storage volume of Dorena Reservoir, Symbiotics maintains aquatic life will continue to be supported within the Project boundary without causing significant detrimental changes attributable to Project operation.

A review of existing biological studies performed in the Project area is presented in the following sections.

#### Project Dam

Dorena Dam is a federally owned flood control facility completed in 1949. There are no structures at the facility which allow upstream passage of migratory fish.

#### Resident Fish

Native fish species found in the Row River watershed include chinook salmon, rainbow trout, steelhead, cutthroat trout, mountain whitefish, western lamprey, pacific lamprey, various species of dace, shiners, suckers, and sculpin.

A number of fish species have been introduced to the Project area including carp, tench, yellow bullhead, channel catfish, mosquitofish, bluegill, largemouth and smallmouth bass, and white crappie.

#### Endangered Species

The Upper Willamette River spring chinook and upper Willamette River winter steelhead are listed as threatened under the Federal Endangered Species Act (ESA). Spring chinook spawned historically in the Row River & Mosby Creek which still includes areas of critical habitat for these species. Completion of the Dorena Dam eliminated access to approximately 80 miles of potential upstream habitat. However, historical runs of these fish are believed to have been small at the time the dam was constructed. Currently, spring chinook and winter steelhead entering the Row River watershed are thought to be hatchery strays from the Coastal and Middle Forks of the Willamette River.

Oregon chub are native to the Willamette Valley and are currently ESA listed as endangered. In 2003, efforts were undertaken to reintroduce Oregon chub to suitable habitat in the Row River watershed.

#### Amphibians

Ten species of amphibians are known to exist in Lane County. None are listed as ESA endangered or threatened. None are located within one mile of Dorena Dam.

#### Macroinvertebrates

The findings of a study on substrate conditions, periphyton, and benthic invertebrate in the vicinity of the Project are presented below:

- Surficial substrate is relatively armored averaging one cobble diameter to the underlying embedded layer;
- Periphyton data indicate enriched conditions particularly below Dorena Dam. Nutrient enrichment is typical in streams below reservoirs;

- The dominant invertebrate taxa observed in the Project area are consistent with the benthic fauna observed in many North American streams;
- Chironomids dominated the benthic macroinvertebrate community in the spring. Blackflies, mayflies, and caddisflies were more abundant in July and November.
- The macroinvertebrate study concluded overall water quality was fairly good and generally improved toward autumn.

### ODEQ Evaluation

ODEQ applies the biological criteria standard to provide protection for aquatic species that is not limited to reliance upon individual water quality standards. Our evaluation is based both on compliance with the other water quality standards and on the water-quality related measures.

A review of biological criteria in the Project area indicates water quality is generally good and supports the existing designated beneficial uses identified in the vicinity of the Project. Since operation of the proposed Project will not alter the impoundment of water in Dorena Reservoir or the rate of discharge from Dorena Dam, the Project has limited potential to impact existing biological criteria.

With the exception of DO and, potentially, TDG, Project operations are not expected to significantly impact water quality criteria addressed by the numeric and narrative standards evaluated in this report. As discussed in Section 5.2.2, measurements recorded in Dorena Dam indicate DO concentrations decrease in mid to late summer to levels below applicable biologically based numeric criteria. Operation of the turbines reduces velocity and turbulence which may further lower DO concentrations. ODEQ conditioned the operation of the Project to require an adaptive management strategy to address seasonally low DO concentrations. Management strategies may include an AAS to introduce air into the tailrace discharge, injection of pure oxygen, and the temporary suspension of Project operations during periods when one (1) or more water quality criteria cannot be obtained.

Operation of the Project will not alter the impoundment of water in Dorena Reservoir or the rate of discharge from Dorena Dam. Based on an evaluation of biological criteria, ODEQ is reasonably assured that Project operation in accordance with the identified conditions and adaptive management strategies will not result in detrimental changes to the resident biological communities.

### ODEQ Findings

ODEQ is reasonably assured that the proposed Project will comply with the Biocriteria standard provided that Symbiotics meets the following conditions:

1. Symbiotics shall implement the conditions and adaptive management strategies identified for numeric and narrative criteria evaluated in Section 5.2 of this report.

## 5.2.6 Oily Sheen; Oily Coatings

### Water Quality Standard

The standard is given in OAR 340-041-0007:

- (1) *Notwithstanding the water quality standards contained in this Division, the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels.*
- (13) *Objectionable discoloration, scum, oily sheens, or floating solids, or coating of aquatic life with oil films may not be allowed.*

This standard is intended to protect aquatic life from oil films as well as protect against objectionable waterway conditions characterized by discoloration, scum, oily sleek or floating solids. Many industrial and domestic wastewater discharges could cause these conditions to occur in receiving streams. Spills of petroleum products or hazardous materials could also bring about the conditions. The impact of such discharges or spills could vary from human annoyance to adverse effects or mortality on aquatic life. Oil spills are regulated by several state and federal agencies depending upon respective jurisdictions in Oregon. ODEQ oil spill rules, OAR 340 Division 47, apply statewide.

### Current Water Quality Condition

There are no documented reports of water quality impairments related to the release of petroleum or hazardous substances to surface waters in the Project area. The Row River is not identified on the 2004/2006 303(d) list as water quality limited for this standard. A search of ODEQ Facility Profiler database identified no petroleum underground storage tank (UST) facilities or UST cleanup sites within one (1.) mile of Dorena Dam.

### Potential Impacts and Proposed Measures

The Applicant indicated that small quantities (i.e., up to five-gallons) of petroleum-based lubricants may be used in routine maintenance of equipment during operation of the Project. Lubricants will be stored inside the powerhouse on a concrete pad with a six-inch concrete containment berm located around the perimeter. Absorbent materials will be maintained in close proximity to the oil storage area. Procedures to address cleanup and response to small releases of petroleum products are presented in a document titled *Hazardous Substances and Spill Prevention and Cleanup Plan* prepared by Symbiotics dated June 2007.

### ODEQ Evaluation

The methods and procedures for responding to incidental spills of petroleum products is adequately addressed in the *Hazardous Substances and Spill Prevention and Cleanup Plan* (Spill Plan).

### ODEQ Findings

ODEQ is reasonably assured that operation of the proposed Project will comply with the Oily Sheen/Coatings narrative standard provided that Symbiotics meets the following conditions:

1. Symbiotics shall respond to incidental spills of petroleum or hazardous materials in accordance with the procedures presented in the Spill Plan;
2. Should Symbiotics significantly alter the nature and/or quantity of materials maintained for routine maintenance, Symbiotics shall submit a revised Spill Plan to ODEQ for approval;
3. In the event a spill or release of petroleum or hazardous material impacts or threatens to impact the Row River, Symbiotics shall immediately implement the plan and notify the Oregon Emergency Response System (OERS) at 1-800-452-0311.

### **5.2.7 Toxic Substances**

The applicable standard is given in OAR 340-041-0033:

*(1) Toxic substances may not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations that may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare or aquatic life, wildlife, or other designated beneficial uses.*

*(2) Levels of toxic substances in waters of the state may not exceed the applicable criteria listed in Tables 20, 33A, and 33B. Tables 33A and 33B, adopted on May 20, 2004, update Table 20 as described in this section.*

*(a) Each value for criteria in Table 20 is effective until the corresponding value in Tables 33A or 33B becomes effective.*

*(A) Each value in Table 33A is effective on February 15, 2005, unless EPA has disapproved the value before that date. If a value is subsequently disapproved, any corresponding value in Table 20 becomes effective immediately. Values that are the same in Tables 20 and 33A remain in effect.*

*(B) Each value in Table 33B is effective upon EPA approval.*

*(b) The department will note the effective date for each value in Tables 20, 33A, and 33B as described in this section.*

*(3) To establish permit or other regulatory limits for toxic substances for which criteria are not included in Tables 20, 33A, or 33B, the department may use*

*the guidance values in Table 33C, public health advisories, and other published scientific literature. The department may also require or conduct bio-assessment studies to monitor the toxicity to aquatic life of complex effluents, other suspected discharges, or chemical substances without numeric criteria.*

The standard protects humans, wildlife, and aquatic conditions from the adverse effects resulting from the presence of toxic substances above background levels.

#### Current Water Quality Status

Historical mining activities in watersheds upstream from Dorena Lake have impacted upstream reaches of Row River with mercury. In February 1997, the Oregon Department of Human Services (ODHS) issued a mercury advisory for consumption of largemouth bass, smallmouth bass, and northern pikeminnow in Dorena Lake. In September 2006, ODEQ issued a mercury TMDL for the Willamette Basin which includes Dorena Lake and the Row River watershed.

Several studies have been conducted to characterize the nature, magnitude, and extent of mercury present upstream of Dorena Dam. In 2002 and 2003, ODEQ collected water samples for analysis in support of the mercury TMDL development. Water samples were collected four (4) times between October 2002 and June 2003 in the Row River upstream and downstream of the dam, as well as in the reservoir. The average and highest concentrations of total recoverable mercury for Dorena Lake were 1.90 ng/L and 3.87 ng/L, respectively. These values are below ODEQ mercury standards for the protection of aquatic species (2.4 ng/L acute) and protection of human health (144 ng/L fish and water ingestion; 146 fish consumption only; 0.002 mg/L Federal maximum contaminant limit [MCL]). These values exceeded the ODEQ mercury standard for the protection of aquatic life (0.012 ng/L chronic), and the mercury TMDL water column guidance value of 0.92 ng/L.

In 2004 and 2005, studies were completed on behalf of the Applicant to document the presence of mercury in fish tissue in Dorena Lake, sediments in Dorena Lake and below Dorena Dam, and benthic invertebrates below Dorena Dam. The findings are summarized below:

#### Dorena Lake

- The concentration of mercury sediment in Dorena Lake ranged up to 0.07 mg/kg;
- The concentration of mercury in most zooplankton samples was below the laboratory method reporting limit of 0.03 mg/kg;
- The concentration of total mercury in largemouth bass (whole fish) ranged up to 0.23 mg/kg;
- The concentration of total mercury in largemouth bass (fillet) ranged up to 0.33 mg/kg.

#### Immediately Below Dorena Dam

- Concentrations of total mercury in rainbow trout whole fish and fillet samples were below the laboratory MRL of 0.2 mg/kg.

#### Approximately 0.2 Miles Below Dorena Dam

- Concentrations of total mercury in sediment ranged up to 0.08 mg/kg;
- The concentration of mercury in benthic invertebrate (one sample) was below the laboratory MRL of 0.04 mg/kg

#### Approximately 1.0 Mile Below Dorena Dam

- Concentrations of total mercury in sediment ranged up to 0.08 mg/kg

#### Approximately 4.5 Mile Below Dorena Dam

- Concentrations of total mercury in sediment were below the laboratory MRL of 0.2 mg/kg

The findings of the studies completed on behalf of the Applicant confirmed the presence of mercury in fish tissue taken from Dorena Lake, but at concentrations below the ODHS advisory limit of 0.35 mg/kg. ODEQ (2005) reported average values of 0.53, 0.34, and 0.64 mg/kg for largemouth bass collected from Dorena Lake in 1994, 1995, and 1999, respectively. The concentration of mercury in sediments in Dorena Lake and below the dam ranged up to 0.08 mg/kg and was not present at detectable concentrations in the limited sampling performed on benthic macroinvertebrates.

#### ODEQ Evaluation

Sampling data confirm the presence of mercury in surface water, sediment, and fish tissue in the Row River watershed. Water sampling data indicate total recoverable mercury levels in Dorena Lake exceed the mercury TMDL water column guidance value of 0.92 ng/L. The primary source of mercury present in the Row River watershed appears to be from historical mining activities performed in the drainages of tributaries located upstream of Dorena Lake.

Activities proposed by the Applicant do not result in the use or discharge of mercury to surface waters.

In correspondence dated May 25, 2007, the Corps reiterated its authority over operation of the dam. Should a FERC license be issued, the Applicant may utilize only that water not otherwise used by the Corps to meet federally-authorized project objectives. Furthermore, activities proposed by the Applicant do not impact water quality upstream of the dam. Symbiotics is not responsible, therefore, for the quantity or quality of the water released from the dam and received by the Project.

For this reason, ODEQ is reasonably assured that operation of the Project will not impact the level of mercury downstream of Dorena Dam.

#### ODEQ Findings

ODEQ is reasonably assured the Project will meet the Toxic substances water quality standard.

## 5.2.8 Antidegradation

### Water Quality Standard

The narrative standard is given in 340-041-0004:

- (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 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 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 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 sub-section (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 sub-paragraphs (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.*

Environmental Protection Agency (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 goes through an intergovernmental coordination and public participation process to conclude 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.

#### Current Water Quality Status

Several miles of the Row River are included on the state's 2004/2006 list of water quality impaired waters. The entire reach of Row River, from the mouth at RM 0.0 to RM 20.8, is listed as impaired for temperature during the summer. A temperature TMDL was approved by EPA and issued in December 2006. Dorena Reservoir, from the dam at RM 7.4 to the upstream reach at RM 11.3, is listed as impaired for mercury year round. The mercury TMDL, approved by EPA, was issued in December 2006. The Corps is responsible for developing and implementing measures to comply with TMDL load allocations issued by ODEQ. Symbiotics shall not interfere with actions undertaken by the Corps to implement measures intended to comply with these obligations.

Symbiotics receives only that water which the Corps releases from the dam. Symbiotics may not control or influence the availability of water to the Project. Since Symbiotics may not control the quantity, quality, or condition of water provided to the Project, Symbiotics is not responsible for implementing corrective measures to remedy existing water quality deficiencies. However, to the extent the operation of the proposed Project directly or indirectly alters water quality, Symbiotics must monitor and correct for the adverse effects of Project operations on water released to the Row River.

#### ODEQ Evaluation

This Evaluations and Findings Report evaluates the potential for proposed Project operations to impact the numeric and narrative water quality criteria given in OAR 340, Division 041. Where ODEQ finds that a potential exists for adverse impact, ODEQ may condition the operation of the Project by requiring monitoring, adaptive management strategies, or temporary suspension of operation to ensure these criteria are met throughout the life of the FERC operating license.

ODEQ is reasonably assured operation of the Project will not impact the water quality standards presented in Table 3 of this report. Project operations have little or no direct relationship to the water quality standards identified in these sections.

ODEQ is also reasonably assured Project operations will not result in downstream violations to the following water quality criteria: temperature, turbidity, pH, TDG, or biocriteria. Thus, the proposed Project is considered compliant with the antidegradation policy relative to these parameters.

Project operations may impact DO concentrations in water discharged from the hydroelectric facility. As discussed in Section 5.2.2, Project operations reduce the capacity for water to retain dissolved gases which may decrease DO concentrations. Resource degradation due to reduced DO concentrations is defined in OAR 340-041-0004(3)(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.*

A reduction of DO by up to 0.1 mg/L which does not adversely affect threatened or endangered species is not considered a degradation of the resource. Activities which result in a DO reduction exceeding 0.1 mg/L or which adversely affect threatened or endangered species may be subject to an antidegradation review pursuant to subparts 7 and 9 of OAR 340-041-0004.

ODEQ has conditioned operation of the Project to require measures to ensure compliance with the ODEQ DO water quality standard. Symbiotics must undertake monitoring activities to measure for potential Project effects on DO. Symbiotics must also implement adaptive management practices as necessary to correct for impacts related to Project operations. These practices may include the injection of air, the injection of oxygen, or temporary suspension of Project operations during periods when applicable water quality criteria cannot be attained.

#### ODEQ Findings

ODEQ is reasonably assured that the construction and operation of the proposed Project will comply with the antidegradation policy provided that Symbiotics meets the following conditions:

##### 1. Run-of-Release Operation

Throughout the life of the FERC license, Symbiotics shall operate the Project in a “run-of-release” mode. The Corps shall retain sole authority over the magnitude, frequency, and ramping rates of releases. Symbiotics may not dictate or exercise influence over the schedule of flows released from Dorena Dam.

##### 2. Antidegradation

If either ODEQ or Symbiotics determine that Project operations are contributing to downstream violations of the antidegradation policy relative to dissolved oxygen, Symbiotics shall, within 60 days of request, develop and submit for ODEQ approval a plan and schedule to prevent further violations. Upon approval of the remedial plan by ODEQ, Symbiotics shall implement the plan in accordance with the approved schedule.

## **6.0 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, ODEQ 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 address 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 (NPDES) permits issued to the point sources. Point source discharges at hydroelectric projects may include cooling water discharges, discharges from hatchery operations, and sewage discharges.

Symbiotics has identified that there will be no wastewater facilities servicing the powerhouse, thus no wastewater discharge requiring a NPDES permit. Similarly, Symbiotics proposes no fish hatchery facilities, thus there is no need for a hatchery operations NPDES permit.

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 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.

## **7.0 EVALUATION OF OTHER APPROPRIATE REQUIREMENTS OF STATE LAW**

ODEQ has reviewed the information in the record and the requirements of other state laws to determine the water quality related requirements of state law that may be considered potentially applicable to the proposed Project. Such requirements are “appropriate” if they have any relation to water quality.

### **7.1 Division of State Lands**

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

This § 401 water quality certification specifically addresses only those activities related to operation of the Project. Project construction will require a removal-fill permit from DSL which is administratively coordinated with issuance of a dredge and fill permit by the U.S. Army Corps of Engineers under § 404 of the Clean Water Act.

### **7.2 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 496.435 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 635-007-0510 General Fish Management Goals  
Manage fish to take full advantage of the productive capacity of natural habitats and address losses in fish productivity due to habitat degradation through habitat restoration.
- OAR 635-007-0521-0524 Natural Production Policy  
Protect and promote natural production of indigenous fishes.
- OAR 635-007-0525-0529 Wild Fish Management Policy  
Protect genetic resources of wild fish.
- OAR 635-007-0536-0538 Wild Fish Gene Resource Conservation Policy  
Manage wild fish to maintain their adaptiveness and genetic diversity.
- 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  
Require or recommend mitigation for losses of fish and wildlife habitat. Applying these state laws, ODFW, in its recommendations to FERC under Section 10(j) of the Federal Power Act, identified certain measures as necessary for the protection, mitigation and enhancement of fish resources.

#### **7.4 Department of Environmental Quality**

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. No onsite systems is proposed at the Project facilities, therefore no § 401 certification condition is necessary in relation to ORS 454.705 et seq.

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 ODEQ for review and approval prior to construction. One of the purposes of these statutes and rules promulgated pursuant thereto is to prevent contamination of surface or groundwater. Per Section 5.2.7 of this evaluation, ODEQ will require a Spill Plan to guard against downstream violation of the oily sheens and coatings standard. Requirement of this plan will also address requirements of these state statutes.

#### **7.5 Department of Water Resources**

ORS 543.017 requires that minimum standards for development of hydroelectric power be met including preservation of anadromous salmon and steelhead species, wild game fish, and recreational opportunities.

## **7.6 Lane County**

OAR 340-048-0020(2)(i) requires that applicants for certification pursuant to § 401 of the CWA obtain an exhibit from the local planning jurisdiction which demonstrates the proposed project conforms to local land use laws. The instrument used by Lane County, Oregon, the local municipality, to demonstrate this compliance is a Land Use Compatibility Statement (LUCS). In the event a LUCS has not or cannot be issued, compatibility with local land use may alternatively be demonstrated pursuant to OAR 340-048-0020(2)(B,C):

*If land use compatibility findings have not been obtained, (the applicant may provide an exhibit which) identifies the specific provisions of the local land use plan and implementing regulations applicable to the activity and describes the relationship between the activity and each of the land use provisions identified in paragraph (A) of this subsection; and discusses the potential direct and indirect relationship to water quality of each finding or land use provision.*

In August 2004, Symbiotics applied to Lane County Land Management Division for a LUCS for the Project. This application was initially rejected when it was determined the land proposed for the Project remained unzoned following a 1984 reorganization of land use designations. On August 20, 2006, the Lane County Board of Commissioners voted to zone land in the project area as F-2, or impacted forest land. Activities allowed on land zoned F-2 include utility facilities and placement of electrical transmission lines.

In a written decision dated February 16, 2007, Lane County Management Division was unable to issue an affirmative LUCS based on the absence of the following two necessary Special Use Permits:

- Special Use Permit for Riparian Modification per Lane Code 16.253(3);
- Special Use Permit for Riparian Setback Area Development Plan per Lane Code 16.253(5)(a).

The Corps has conditioned its signing the Special Use Permit applications necessary to complete the LUCS to Symbiotics first obtaining a FERC operating license. The Corps indicates this position is necessary to allow the development and/or modification of plans in consultation with other agencies during a period post issuance of the license. Symbiotics has prepared the necessary attachments to apply for the above Special Use Permits. The requirement to obtain a FERC operating license as a condition of the permits effectively prohibits Symbiotics from obtaining a completed LUCS prior to issuance of a FERC operating license.

Symbiotics has prepared material pursuant to the above referenced Special Use Permit applications which provides an exhibit which may be used to interpret compliance with local land use requirements and water quality criteria pursuant to OAR 340-048-0020(2). Information submitted by Symbiotics in conjunction with the application is summarized in the following sections.

### **Riparian Modification: Lane Code LC 16.253(3)**

Lane Code LC 16.253(3)(a) limits the extent of development within the riparian setback zones. Based on a linear river frontage of 3,435 feet, projects may not impact more than

10,000 square feet and 100 linear feet of river frontage. Information submitted by the Applicant indicates the Project will impact 5,665 square feet and 70 linear feet of stream frontage within the riparian setback zone. Based on this information, the proposed project appears to conform to Lane Code LC 16.253(3).

Lane County LC 16.253(3)(b) allows modification to riparian setback requirements if it can be demonstrated that riparian vegetation does not extend into the riparian setback area in the vicinity of the proposed structure. The additional information submitted by Symbiotics indicates Project developments will be sited on previously disturbed areas characterized by rip-rap fill placement. Vegetation surveys conclude that approximately 58 percent of plant species in the Project area are noxious or introduced.

Lane County LC 16.253(3)(c) allows modification to riparian setback requirements if it can be demonstrated an "unduly burden would be placed on the property owner if the structure was not allowed to be located within the riparian setback area." The application submitted by Symbiotics indicates that hydropower facilities, by nature of their operation, require direct access to river frontage.

#### ODEQ Evaluation

Symbiotics is unable to obtain a completed LUCS without certain Special Use Permits allowing modification to Lane County restrictions on development within riparian setback areas. As landowner and administrator of the Dorena Lake Dam, the Corps must participate in the permitting process as signatory to the required permits. Since the Corps has conditioned their participation in the permitting process to a FERC operating license, Symbiotics will be unable to obtain a LUCS as required by OAR 340-048-0020.

Information presented in the Special Use Permit applications prepared by Symbiotics and referenced above maintains the proposed activities comply with the requirements of Lane County Code regarding the modification of restrictions on development within riparian setback areas. Symbiotics references information in previously submitted reports (i.e., Soil Erosion Control Plan, October 2004, and a Hazardous Substances and Spill Prevention and Cleanup Plan, June 2007) as additional support of the request to modify riparian setback restrictions

This § 401 water quality evaluation specifically addresses the potential impact of Project operations on water quality standards. Water quality criteria which may be impacted by Project operations, including activities conducted within riparian setback zones, are evaluated in Section 5.2 of this document. ODEQ conditions proposed activities, as warranted, to provide reasonable assurance that these activities will comply with applicable water quality criteria.

Construction of the Project, including work performed within the riparian setback zone, may necessitate a DSL permit pursuant to ORS 196.810 prior to displacement of material from the bed or banks of any stream, a § 404 permit issued by the Corps, and ODEQ certification, pursuant to § 401 of the CWA and in accordance with OAR 340 Division 048. The development and review of construction plans, including the completion of Special Use Permits, has not been coordinated between Symbiotics and the Corps. For this reason, this § 401 water quality certification cannot evaluate construction activities, including those performed within the riparian setback zone, for impacts to water quality.

ODEQ Finding:

As landowner and administrator of the Dorena Lake Dam, the Corps must participate in the permitting process as signatory to the required permits. Since the Corps has conditioned their participation in the permitting process to a FERC operating license, Symbiotics is unable at this time to obtain a LUCS as required by OAR 340-048-0020. ODEQ believes the material submitted by Symbiotics in support of the LUCS application adequately identifies and addresses specific provisions of local land use and the implementing regulations applicable to the proposed activity. Furthermore, ODEQ is reasonably assured that operation of the Project, including actions performed within the riparian setback zone, will not violate the water quality standards given in OAR 340, Division 041 conditioned on the implementation of specific monitoring and management requirements presented in Sections 5.2 of this Evaluations and Findings Report. ODEQ believes the Special Use Permit applications prepared by Symbiotics adequately represent an exhibit as defined by OAR 340-048-0020(2)(i) which demonstrates Project conformity with local land use regulations.

Floodplain Combining Zone: Lane Code LC 16.244

The purpose of Lane Code LC 16.244 is to promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas. The provisions of this section are designed to:

- (a) Protect human life and health.
- (b) Minimize expenditure of public money and costly flood control projects.
- (c) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public.
- (d) Minimize prolonged business interruptions.
- (e) Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, and streets and bridges located in areas of special flood hazards.
- (f) Help maintain a stable tax base by providing for the sound use and development of areas as special flood hazard so as to minimize future flood blight areas.
- (g) Ensure that potential buyers are notified that property is in an area of special flood hazard.
- (h) Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Lane County does not have a formal application or approval process for development within designated floodplains. However, director approval of proposed development within floodplains requires consistency with the Floodplain Combining Zone provisions as outlined above.

ODEQ Evaluation:

Portions of the Lane Code LC 16.244 with direct or indirect implications to water quality include subsections a, c, and h. Consistency with these portions of Lane Code will require implementation of the provisions and contingencies presented in the Hazardous Substances and Spill Prevention and Cleanup Plan (Spill Plan), Draft Water Quality Monitoring and Management Procedures (Draft WQMMP), and the Soil Erosion Control Plan.

#### ODEQ Finding:

Director approval for proposed development within floodplains requires consistency with the Floodplain Combing Zone provisions as outlined above. ODEQ is reasonably assured that implementation of the provisions presented in the Spill Plan, Draft WQMMP, and Soil Erosion Control Plan, and the conditions to activities presented in Section 5.2 of this report will comply with the requirements of ODEQ water standards given in OAR 340, Division 041.

## **8.0 PUBLIC COMMENT**

ODEQ will to solicit input from interested parties on the proposed § 401 water quality certification from December 3, 2007, through 5:00 pm PST January 9, 2008. ODEQ will host an informational meeting from 7:00 to 9:00 pm on December 20, 2007, and from 6:00 to 7:00 pm on January 3, 2008. A public hearing will be held from 7:30 to 9:00 pm on January 3, 2008. All meetings will be held at the Village Green Resort, 725 Row River Road, in Cottage Grove, Oregon.

### **8.1 Issuance of Public Notice, Opportunity to Comment**

On December 3, 2007, ODEQ issued a notice of public hearing for the proposed issuance of a § 401 certification for the Dorena Dam Hydroelectric Project. ODEQ hosted an informational meeting from 7:00 to 9:00 pm on December 20, 2007, and from 6:00 to 7:00 pm on January 3, 2008. ODEQ also held a public hearing from 7:30 to 9:00 pm on January 3, 2008. All meetings were held at the Village Green Resort, 725 Row River Road, in Cottage Grove, Oregon.

### **8.2 Public Comment Received**

ODEQ received oral testimony from one (1) party at the hearing held on January 3, 2008. ODEQ received five (5) written comments by the close of public comment on January 9, 2008. A summary of written and oral public comments is attached. The summary also includes ODEQ responses to these comments. ODEQ revised the proposed certification conditions, as appropriate and where warranted, in response to comments received within the public comment period.

## **9.0 CONCLUSIONS AND RECOMMENDATION FOR CERTIFICATION**

ODEQ has evaluated Symbiotics' Project proposal identified in its § 401 application and supporting documents and considered public comments. ODEQ 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, Oregon Administrative Rules, Chapter 340, Division 41 and other appropriate requirements of state law, given the proposed § 401 requirements identified 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 Dorena Dam Hydroelectric Project, consistent with the findings of this document.

# Attachment 1

Summary of Public Comment Received and ODEQ Responses  
for the  
Dorena Dam Hydroelectric Project  
Proposed 401 Certification Conditions

Comment No. 1

Presented By:

Jan C. Wellman  
Public Works Director - City of Cottage Grove  
400 Main Street  
Cottage Grove, Oregon 97424

*Comment 1a. The city of Cottage Grove maintains a raw water intake on the Row River. The City is expanding the Row River Water Treatment Plant (RRWTP) while abandoning the Layng Creek Water Treatment Plant. By November 2008, the RRWTP will represent the sole source of potable water for approximately 10,000 people. The City recognizes that operation of the Project has the potential to impact temperature, turbidity, total dissolved gas, and dissolved oxygen.*

ODEQ Response: ODEQ is reasonably assured that operation of the Project in accordance with the conditions presented in the 401 certification will not result in violation of the water quality standards for the above referenced water quality criteria. Furthermore, these criteria were established to protect aquatic beneficial uses and, therefore, do not represent human health limits.

*Comment 1b. The City seeks the opportunity for further input if and when the Project enters the construction phase.*

ODEQ Response: ODEQ will notify the City of Cottage Grove of all public notices regarding the Project.

*Comment 1c. The City has concerns regarding the potential mobilization of mercury sediment during construction activities.*

Response: This 401 certification is restricted exclusively to potential impacts related to the operation of the Project. Project construction will require a removal-fill permit from DSL which is administratively coordinated with issuance of a dredge and fill permit by the U.S. Army Corps of Engineers under § 404 of the Clean Water Act. Impacts related to construction will be evaluated by ODEQ through a water quality certification conducted concurrent with the Corps § 404 permit.

Comment No. 2

Presented By:

Chuck Missar  
P.O. Box 567  
Cottage Grove, Oregon 97424

*Comment 2a. Monitoring data should be made immediately available to the public in an understandable and accessible format.*

ODEQ Response: ODEQ will continue to rely on the submittal of monitoring reports as the required primary method for delivery of water quality monitoring data. However, ODEQ recognizes the advantages inherent in facilitating data transparency and accessibility for regulatory and quality control purposes. Further, ODEQ believes it is reasonable to anticipate that continued advances in data collection and transmission technology during the life of the FERC operating license will simplify the timely transfer of water quality monitoring data into the public domain. Symbiotics is encouraged to explore emerging technologies to expedite data transmittal in a manner which facilitates electronic access to recent and historical water quality monitoring data. Should ODEQ determine that electronic transmittal of provisional field data is necessary to evaluate compliance with Project operations, ODEQ may direct Symbiotics to amend the AWQMMP to include electronic data submittal for certain monitoring parameters.

*Comment 2b. Symbiotics should install additional turbidity monitoring stations to capture downstream effects of dam operations.*

ODEQ Response: Symbiotics is responsible for measuring for impacts related to Project operations. Symbiotics is not responsible for measuring or correcting for water quality impairments resulting from dam operations or upstream conditions. ODEQ has requested Symbiotics prepare and submit for approval an Adaptive Water Quality Monitoring and Management Plan within 12 months following issuance of a FERC operating license. The Plan shall propose locations of monitoring stations necessary to monitor and evaluate potential impacts related to Project operations. ODEQ may direct to modify the Plan in the future to ensure data captured during monitoring activities adequately characterizes operational impacts.

*Comment 2c. Will construction of the Project preclude or otherwise impair the future addition of a fish ladder?*

ODEQ Response: 401 certification grants ODEQ the authority to condition operation of hydroelectric facilities in manners deemed necessary to ensure compliance with Oregon water quality standards given in OAR 340, Division 041. ODEQ has no prescriptive authority to require fish passage facilities, screening devices, or other mechanisms intended to protect or restore fisheries. The fisheries agencies, including the NMFS, USFWS, ODFW, among other stakeholders, have provided FERC significant comment regarding needs for fish passage. In the Final Environmental Assessment (EA) dated January 19, 2007, FERC recommended against the installation of fish passage facilities.

*Comment 2d. The findings report the absence of migratory fishes in the approximately 80 miles of upstream tributaries prior to the construction of the dam. Additional research could be done to verify these reported findings.*

ODEQ Response: The historic extent of migratory fishes in the Row River subbasin is presented for reference and relies on the accuracy of published documents including the *Willamette River Subbasin Salmon and Steelhead Production Plan* (September 1990).

Comment 2e. *Conditions to the 401 certification require immediate response by Symbiotics in the event of equipment failure. ODEQ should strengthen this condition to require annual calibration and maintenance of field testing equipment.*

ODEQ Response: ODEQ agrees that regular maintenance and calibration of field test equipment is necessary and warranted. Accurate data measurement is an essential component of field research and provides the basic foundation on which to evaluate Project compliance. ODEQ has amended the 401 certification conditions to require Symbiotics to develop a field test equipment calibration and maintenance program as a component of the AWQMMP. The AWQMMP shall be submitted to ODEQ for approval within 12 months of issuance of the FERC operating license. Symbiotics shall include calibration results and maintenance records as part of Annual Monitoring Reports.

Comment No. 3

Presented By:

Sue Brown  
P.O. Box 75  
Dorena, Oregon 97434

Comment 3a. How will Project affect aesthetics?

ODEQ Response: 401 certification does not grant ODEQ authority to regulate visual consequences of the Project. In the *Final License Application* (June 2004), Symbiotics addresses the subject of visual aesthetics associated with the Project:

*Even though no formal comments were made associated with visual resources, Symbiotics anticipated during the planning process that there might be concerns with the proposed powerhouse site being in the vicinity of Schwarz Park and the Row River Trail. The powerhouse and associated facilities will be completed in a manner that minimizes any effects to visual resources.*

Further, the Applicant recommends developing a landscaping plan consisting of the following elements:

- 1) plantings of big leaf maple and black cottonwood to replace those removed during construction and provide a visual barrier for the powerhouse;
- 2) plantings of native shrubs to channel foot traffic and contribute to a visual barrier; and,
- 3) demarcated areas for foot traffic to allow appropriate access to the powerhouse and discourage trampling of planted and reseeded areas.

Comment 3b. How will Project operations affect water quality?

ODEQ Response: ODEQ is reasonably assured that operation of the Project, as conditioned by ODEQ requirements presented in this 401 certification, will not result in violations to Oregon water quality standards.

Comment No. 4

Presented By:

Erik Steimle  
Symbiotics, LLC  
1001 SW 5<sup>th</sup> Avenue, Suite 1100  
Portland, Oregon 97204

Comment 3a. Draft Certification Condition #1 states that:

*Upon applying for a federal permit or permits for Project construction, including a dredge and fill permit from the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act (§ 404 permit), Symbiotics shall provide written notice to ODEQ of such application and shall also apply to ODEQ for a § 401 certification for Project construction activities in accordance with OAR 340-48.*

Symbiotics agrees that additional exhibits, unavailable until after the final engineering efforts have been completed, will be necessary to evaluate the effects of project construction on local water quality. However, Symbiotics claims they have already formally applied for the 401 Certification of project construction activities and disagrees that the additional exhibits necessary for 404 permitting should necessitate reapplying for 401 certification and an additional 12 month assessment period allocated in accordance with OAR 340-48. Symbiotics requests that these additional exhibits be considered an addendum to the original application.

ODEQ Response: Symbiotics has submitted information which will be helpful in future evaluations of construction-related water quality impacts. However, absent a formal agreement between the Corps and Symbiotics and the development of engineering plans approved by the Corps for the construction of the Project, neither the proposed construction activities nor the best management practices identified by Symbiotics may be accurately assessed with respect to their affect on water quality. The 401 application dated January 19, 2007, is deemed insufficient to process a dredge and fill 401 water quality certification. ODEQ is, therefore, not certifying Project construction at this time. The Department has not yet made a determination regarding construction-related water quality impacts and looks forward to review and evaluation of a subsequent 401 application for Project construction. ODEQ retains the language of Condition #1 which requires Symbiotics to apply for a 401 Certification for construction activities pursuant to a Corps 404 permit.

Comment No. 5:

Presented By:

John Steele  
34882 Spillway Road  
Cottage Grove, Oregon 97424

Comment 5a. *It would be useful to have at least three years of baseline sampling data to evaluate TSS, sediment transport, DO, temperature, and TDG. Periodic instrument calibration should be performed during this period.*

ODEQ Response: ODEQ does not believe that three years of baseline sampling data prior to operation are necessary to ensure Project compliance. Symbiotics is responsible for monitoring changes in water quality which may occur as a consequence

of Project operations. Further, Symbiotics must correct violations of water quality standards caused by Project operations. ODEQ has identified turbidity, temperature, DO, and TDG as parameters which may potentially be affected by operations of the proposed hydroelectric facility. Pursuant to Condition #9, Symbiotics must develop a AWQMMP to monitor these parameters for water quality compliance.

ODEQ strengthened the language in Condition #5 (Monitoring Equipment Malfunction Prevention and Response Plan) to require appropriate calibration of field instrumentation.

*Comment 5b. No temperature data was taken in October when temperature violations are suspected.*

ODEQ Response: Symbiotics collected temperature profiles in Dorena Lake in August 2003 and February, March, and July 2004. The profiles confirmed temperature stratification in the summer. Thermal inversion of the lake occurs in mid October.

Symbiotics does not regulate the quantity or quality of water released from the dam and is, therefore, not responsible for correcting impairments of existing water quality. Thermal impairment resulting from the presence of Dorena Dam is the responsibility of the Corps which owns and operates the dam. The Corps is responsible for developing and implementing a water quality management plan to comply with a TMDL load allocation related to temperature impacts associated with operation of Dorena Dam.

*Comment 5c. TSS was measured at a concentration of 24 mg/l at a flowrate of 3,950 cfs. Additional baseline data would be valuable to determine if the Project would violate the 10 percent limit during operations.*

ODEQ Response: The 10 percent criterion refers to the maximum allowable increase in turbidity, not TSS. Symbiotics must develop a AWQMMP which proposes methodology to monitor increases in turbidity caused by Project operations.

*Comment 5d. The FERC EA refers to flow data from several different periods (i.e., 1950 to 2004 and 1977 to 2004). Why is one set selected over another?*

ODEQ Response: ODEQ did not participate in the development of the FERC EA. Hydrologic data from the two sampling periods are presented presumably to compare historic discharge rates from the facility. The median daily flow between 1950 and 2004 was 393 cfs. The median daily flow between 1977 and 2004 was 388 cfs.

*Comment 5e. The Applicant indicates use of the AAS will increase downstream DO concentrations by 3.5 mg/l. No data is provided to support this assertion.*

ODEQ Response: Within 12 months following issuance of the FERC operating license, Symbiotics shall submit engineering and technical specifications regarding the operation of the AAS including models or other predictive methods to estimate concentrations of DO and other gases under a variety of flow and temperature conditions.

*Comment 5f. No turbidity data was collected in 2003 and 2004. How will turbidity impacts be evaluated if no comparative background data are available?*

ODEQ Response: The Oregon turbidity standard is evaluated relative to a control point immediately upstream of the activity causing turbidity. The standard is not evaluated relative to historical turbidity conditions.

*Comment 5g. The report states that DO reductions will likely result in violations of water quality yet also states ODEQ is “reasonably assured . . . will not result in detrimental changes to residential biological communities.”*

ODEQ Response: DO levels are at or below the applicable DO criterion of 8.0 mg/L for much of the summer and decrease below the absolute minimum concentration of 6.0 mg/L at depth in late summer. The difference between ambient conditions and the DO criterion further increases on October 15 when the DO criterion increases to 11.0 mg/L to protect spawning habitat in the portion of Row River downstream of the dam.

To correct for oxygen-deficient conditions, ODEQ has conditioned operation of the Project to require temporary shutdown of the facility during periods in which the DO criterion cannot be met. Symbiotics is not responsible for the condition of water released from the dam when the facility is not in operation. The Applicant has also proposed several adaptive measures to correct for deficient DO concentrations including oxygen augmentation using air or, possibly, pure oxygen injection (see Comment 5g). Based on the measures proposed by the Applicant, coupled with the conditions placed on Project operation, ODEQ is reasonably assured the operation of the Project will not result in violations of the Oregon DO standard.

*Comment 5h. Symbiotics should consider relocating Project to the south side of river to reduce potential construction and operational impacts to local bald eagle populations.*

ODEQ Comment: ODEQ does not condition the location or operation of the Project to mitigate impacts to terrestrial receptors.

*Comment 5i. Will operation of the Project result in unacceptable levels of noise? Will operation generate inaudible frequencies which will be detrimental to wildlife?*

ODEQ Response: ODEQ does not have the authority to regulate noise issues. Nuisance levels of noise are typically regulated at local government levels. Impacts to wildlife by audible and inaudible noise frequencies are also beyond the scope of ODEQ regulatory authority. ODFW is the state resource agency which evaluates potential impacts to wildlife.

*Comment 5j. Native geology on north side of dam is unstable and deemed unsuitable for penetration to accommodate penstock. The dip of the local rock formation coupled with the incline of the concrete abutment raises concerns about the structural suitability of the proposed Project site. Observations recorded in the area of the dam, including water seepage from rocks and settling of substrate material, raise questions about the overall competency of the underlying geologic setting.*

ODEQ Response: ODEQ water quality rules do not extend to the structural stability of the proposed Project. The geologic stability of the proposed Project area will be evaluated by the Corps.

Comment 5k. *The dam impedes the natural downstream movement of sediment. Normal operation of the dam outlet gates creates an opportunity for a flush of accumulated sediment when a gate is initially opened. Observations suggest flushes of sediment are related to the frequency of gate openings. Project operations may increase the frequency of gate openings to maintain flow consistent with the Corps operating schedule. Increased operation of the gates may result in more frequent flushes of sediment.*

ODEQ Response: ODEQ will require Symbiotics to monitor turbidity of the water diverted through the hydroelectric facility. Under Oregon water quality rules, operation of the Project may increase turbidity by no more than 10 percent above conditions observed in a control point immediately upstream of the Project. Within one year following issuance of the FERC license, Symbiotics shall develop and submit ODEQ for approval a AWQMMP which proposes a program for monitoring turbidity in the area of the Project.

Symbiotics is not responsible for turbidity or sediment loading caused during normal operation of the Dorena Dam Gates by the Corps.

Comment 5l. *The location and design of the proposed penstock may attract and retain debris and sediment.*

ODEQ Response: Operation and maintenance of the hydroelectric facility is the responsibility of Symbiotics.

Comment 5m. *Higher ramping rates result in higher sediment loads.*

ODEQ Response: Changes in ramping rates may contribute to sediment transport through shoreline erosion and sediment mobilization. Symbiotics cannot dictate the schedule or volume of water released from the dam. For this reason, Symbiotics is not responsible for mitigating impacts to water quality resulting from the management or release of water from the dam.

Comment 5n. *The Applicant indicates the penstock will be positioned at an elevation similar to the existing dam outlet gates. The diameter of the penstock is nine feet. It is inferred from drawings that the height of the inlet openings will be seven feet. Given the thermal stratification demonstrated in the application, the difference of seven vertical feet between the existing dam outlet gates and the penstock inlet may result in temperature disparities between these structures.*

ODEQ Response: In the application, Symbiotics indicated the elevation of the penstock will be similar to the elevation of the existing outlet gates to ensure no change in the temperature regime during operation of the Project. ODEQ presumes Symbiotics will clarify the elevation of the penstock inlet relative to the existing dam outlet gates during preparation of construction plans developed for the Corps.

Comment 5o. *Temperature profiles in the lake presented by the Applicant confirm thermal stratification during the March, July, and August monitoring events. In August, the rate of thermal change is estimated at 4° C per two meters at a depth of 10 to 12 meters. If the elevation of the penstock inlet is two meters (i.e., approximately seven*

*feet) above the existing outlet dam outlet gates, the resulting temperature difference may be significant.*

ODEQ Response: Monitoring data confirm thermal stratification of the lake occurs in the summer. Stratification results in an upper zone of thermally homogenous water (i.e., epilimnion), an intermediate zone of thermal transition (i.e., metalimnion), and a lower zone of relatively homogenous cooler water (i.e., hypolimnion). Since the position of the penstock relative to the August metalimnion is not known, it is not certain what thermal changes, if any, occur in the immediate vicinity of the penstock. As indicated in the response to Comment 5n above, ODEQ presumes Symbiotics will clarify the elevation of the penstock inlet relative to the existing dam outlet gates during preparation of construction plans developed for the Corps.

*Comment 5p. A review of topographic maps prepared prior to construction of the dam indicates the original stream channel existed approximately where the current south abutment of the dam is currently located. The location of the historic stream channel near the south part of the dam likely corresponds to maximum pool depth and, presumably, the coldest water temperatures near the reservoir floor at this location. Symbiotics should consider relocating the Project to the south side of Row River to capitalize on this deeper and colder source of water.*

ODEQ Response: ODEQ has no authority to dictate the siting of the proposed facility. Symbiotics intends to withdraw water from the same interval as the existing dam outlet gates to ensure the water temperature is consistent with the thermal condition of water released by the Corps. ODEQ will require continuous temperature monitoring of the Project to ensure compliance with applicable temperature criteria.

*Comment 5q. The location and configuration of the penstock inlet may promote sediment scour and mobilization.*

ODEQ Response: Modeling studies performed by the Applicant indicate entrance velocities to the penstock will not exceed 0.3 fps near the reservoir floor under maximum flow conditions. The Applicant indicates that penstock inlets operating under similar conditions at similar projects result in no measurable scour to reservoir sediments. ODEQ does not expect that this low velocity, expected only under conditions of maximum capacity turbine operation, would be sufficient to cause sediment scour adjacent to the new intake structure. However, ODEQ considers it appropriate to monitor turbidity during operation to confirm this expectation and require corrective modifications if scour and excessive turbidity is identified.

*Comment 5r. The Willamette River Basin TMDL identified a correlation between total mercury and TSS concentrations. The potential for Project operations to contribute to mercury transport is of concern.*

ODEQ Response: Mercury is present in Dorena Lake and the Row River basin as a result of legacy mining activities in watersheds above the Project area. Symbiotics is not responsible for correcting for impairments to water quality which may exist upstream of the Project. However, Symbiotics is responsible for changes in water quality which may occur as a result of Project related activities. Operation of the Project does not introduce mercury to the water. Furthermore, ODEQ is reasonably assured that Project operation

will not result in excessive sediment mobilization subject to the operating conditions identified in Section 5.2.3.

Comment 5s. *Fish tissue and lake sediment mercury sampling data provided by the Applicant vary significantly against data produced by ODEQ and others.*

ODEQ Response: The Applicant has proposed additional mercury sampling studies in conjunction with proposed construction activities. The *Mercury Contamination Study Report* (Symbiotics, June 2005) proposes replicating sampling efforts “two additional times *post-license and prior to construction* during separate years during both spring and autumn to augment the existing pre-construction data set.”

Comment 5t. The report indicates operation of the hydroelectric facility may result in violations of the DO and TDG standards. However, evaluation of the Oregon biological criteria concludes that operation of the Project “will not result in detrimental changes to the resident biological communities”.

ODEQ Response: ODEQ has conditioned operation of the Project to require DO and TDG monitoring. Symbiotics is further required to implement adaptive management strategies to correct for impacts resulting in water quality violations related to Project activities. Should corrective strategies fail to achieve compliance with applicable Oregon water quality criteria, ODEQ may require temporary suspension of Project operation until a time when compliance may be achieved, demonstrated and sustained.