

**Report**

# **Reedsport OPT Wave Park Evaluation and Findings Report**

**Submitted to: Reedsport OPT Wave Park, LLC  
FERC Project No. 12713**

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State of Oregon  
Department of  
Environmental  
Quality



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# Executive Summary

Reedsport OPT Wave Park, LLC proposes to build a ten buoy wave park in the Pacific Ocean off the coast of Reedsport, Oregon. The wave park will use the kinetic energy of ocean swells to generate electricity. Construction of the wave park requires a permit from the Army Corps of Engineers. Construction and operation of the wave park requires a license from the Federal Energy Regulatory Commission. Because a federal license and a federal permit are required for the construction and operation of the wave park, OPT must receive §401 certifications from DEQ.

This document provides DEQ's evaluation and findings for the §401 certification required for the FERC license and the §401 certification for the Army Corps of Engineers permit. The §401 certifications will be issued separately.

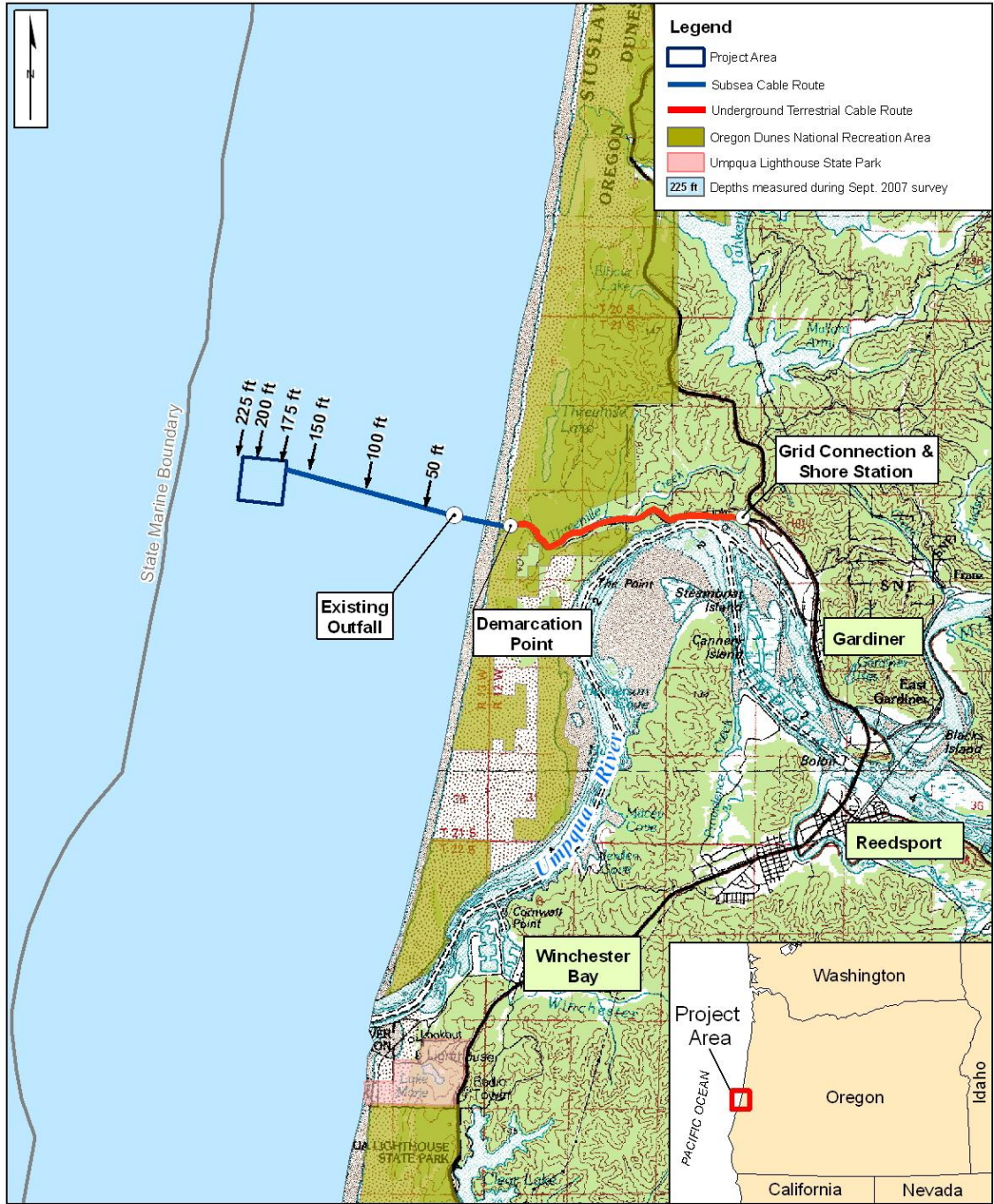
# Chapter 1: Introduction

The Oregon Department of Environmental Quality prepared this evaluation and findings report to evaluate potential impacts to water quality resulting from the construction and operation of the Reedsport Ocean Power Technology (Applicant) Wave Park hydroelectric project in the Pacific Ocean approximately 2.5 nautical miles off the Coast of Douglas County, near Reedsport, Oregon (Figure 1). The proposed project will generate electricity from an array of 10 wave energy converters (WEC) and will include an approximately 2.8-statute-mile-long subsea transmission cable and an approximately 3-mile-long terrestrial underground transmission cable which will interconnect with the electrical grid at an existing substation.

The applicant seeks water quality certification from DEQ to support a license application filed with the Federal Energy Regulatory Commission in January 2010 to operate the project. The applicant also seeks water quality certification from DEQ in support of an application to the Army Corps of Engineers for a permit issued pursuant to §404 of the Clean Water Act to construct the project. One WEC will be deployed under a permit issued by the Corps on February 5, 2010. This report evaluates potential impacts to water quality which may result from the construction and installation of the remaining project elements. This report also provides DEQ's evaluation and findings relative to the applicant's water quality § 401 certification application for operation of the ten buoy wave park, required for a license from FERC.

On July 30, 2010 OPT entered into a Settlement Agreement with three federal agencies, eight state agencies including DEQ, and three non-governmental organizations intended to balance the interests of stakeholders, resources, and project operations. Under a new FERC license which incorporates the provisions of the Settlement Agreement, the applicant will undertake studies, including a Fish and Invertebrate study and a Wave, Current and Sediment transport study, to evaluate project effects on water quality and aquatic resources.

Reedsport OPT Wave Park  
 Evaluation and Findings Report



**REEDSPORT OPT WAVE PARK**

**Figure 1: Project Map**

# Chapter 2: Requirements for Certification

## 2.1 Applicable Federal and State Law

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

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

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

**State Requirements:**

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

ORS 468B.040: This state statute prescribes procedural requirements and findings with which DEQ must comply as it makes a decision on a § 401 certification application. This statute references 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.

OAR 340-048-0020(2): These rules identify the information that must be included in an application for § 401 certification. The application together with information provided during public comment and interagency coordination is essential to support the following determinations to be made by DEQ pursuant to § 401 of the CWA 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 Oregon Administrative Rule (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 CWA and Oregon water quality standards require water quality be protected and maintained so that existing and potential beneficial uses of public waters are not impaired by degraded water quality. The regulatory approach is: (1) identify beneficial uses (2) develop and adopt criteria for water quality parameters to protect the 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 and impairment of beneficial uses.

The designated beneficial uses in the Umpqua Basin, adjacent marine waters, where the proposed Reedsport OPT Wave Park would be located, are listed in OAR 340-041-0320 and Table 320A (Umpqua R. Estuary to Head of Tidewater & Adjacent Marine Waters). These uses include industrial water supply; fish & aquatic life; wildlife & hunting; fishing; boating; water contact recreation; aesthetic quality; and commercial navigation and transportation.

### 2.2.2 Narrative and Numeric Criteria

Water quality standards include criteria to protect designated uses. For waters with multiple use designations, the criteria shall support the most sensitive use and the criteria may be numeric or narrative. Development of water quality standards is a continuing process. As new information becomes available, criteria for additional parameters may be added and existing numeric and narrative criteria may be revised to reflect the most recent scientific data and information. The current criteria are used in the § 401 certification evaluation.

### 2.2.3 Antidegradation Policy

Oregon's antidegradation policy (OAR 340-041-0004) applies to all surface waters. For waterbodies 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 develops, and the U.S. Environmental Protection Agency approves, total maximum daily loads for waters listed as water quality-limited and needing a TMDL, 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 340-042-0025 through 340-042-0080.

# Chapter 3: Project Information and Summary of Project

## 3.1 Applicant Information

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

Reedsport OPT Wave Park, LLC.  
1590 Reed Road  
Pennington, NJ 08534

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

Dr. George Taylor, Charles Dunleavy, or Robert Lurie  
Reedsport OPT Wave Park, LLC.  
1590 Reed Road  
Pennington, NJ 08534  
Telephone: (609) 730-0400  
Fax: (609) 730-0404

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

Reedsport OPT Wave Park, LLC has filed the following documents in support of its § 401 certification application for the proposed Reedsport OPT Wave Park:

- Joint Permit Application to the Army Corps of Engineers and Oregon Department of State Lands, December 2009.
- Final License Application for the Reedsport OPT Wave Park FERC Project No 12713, February 1, 2010.
- Draft Biological Assessment and Essential Fish Habitat Assessment Reedsport OPT Wave Park FERC Project no. 12713, June 2010
- Reedsport OPT Wave Park Settlement Agreement, Regarding Construction and Operation of the Reedsport OPT Wave Park, FERC No. 12713, Douglas County, Oregon, July 28, 2010
- Environmental Assessment for Hydropower License Reedsport OPT Wave Park Project—FERC Project No. 12713-002, Federal Energy Regulatory Commission, Office of Energy Projects, Division of Hydropower Licensing, 888 First Street, NE, Washington, DC 20426, December 2010
- Application for certification pursuant to Section 401 of the Federal CWA, February 2011; received by DEQ February 4, 2011.

Additionally DEQ reviewed the following documents to develop the findings and evaluation of the project affects:

- The Oregon Nearshore Strategy. Oregon Department of Fish and Wildlife. January 2006.

### 3.1.4 Notification of Complete Application

On October 10, 2011 DEQ notified Reedsport OPT Wave Park, LLC that it deemed the application for § 401 certification received on February 4, 2011 for the proposed Reedsport OPT Wave Park to be administratively complete for processing.

## 3.2 Project Description

### 3.2.1 Waters of the State Potentially Impacted by Project

The marine portion of the project will be located in the Pacific Ocean approximately 2.5 nautical miles off the coast of Douglas County, Oregon (Figure 1). The project boundary will encompass an area of 0.25 square miles (800 by 800 meters) where the water depth is approximately 165 to 225 feet (50 to 69 meters). Construction and operation of the Reedsport OPT Wave Park, depending upon how the activities are conducted, could impact these waters relative to existing conditions.

### 3.2.2 Adjacent Land Use and Ownership

The following property owners own land over which the project occurs: International Paper, Siuslaw National Forest (Oregon Dunes National Recreation Area), Douglas County Planning Department, Port Blakley Tree Farms, Roseburg Resources, Oregon Department of State Lands.

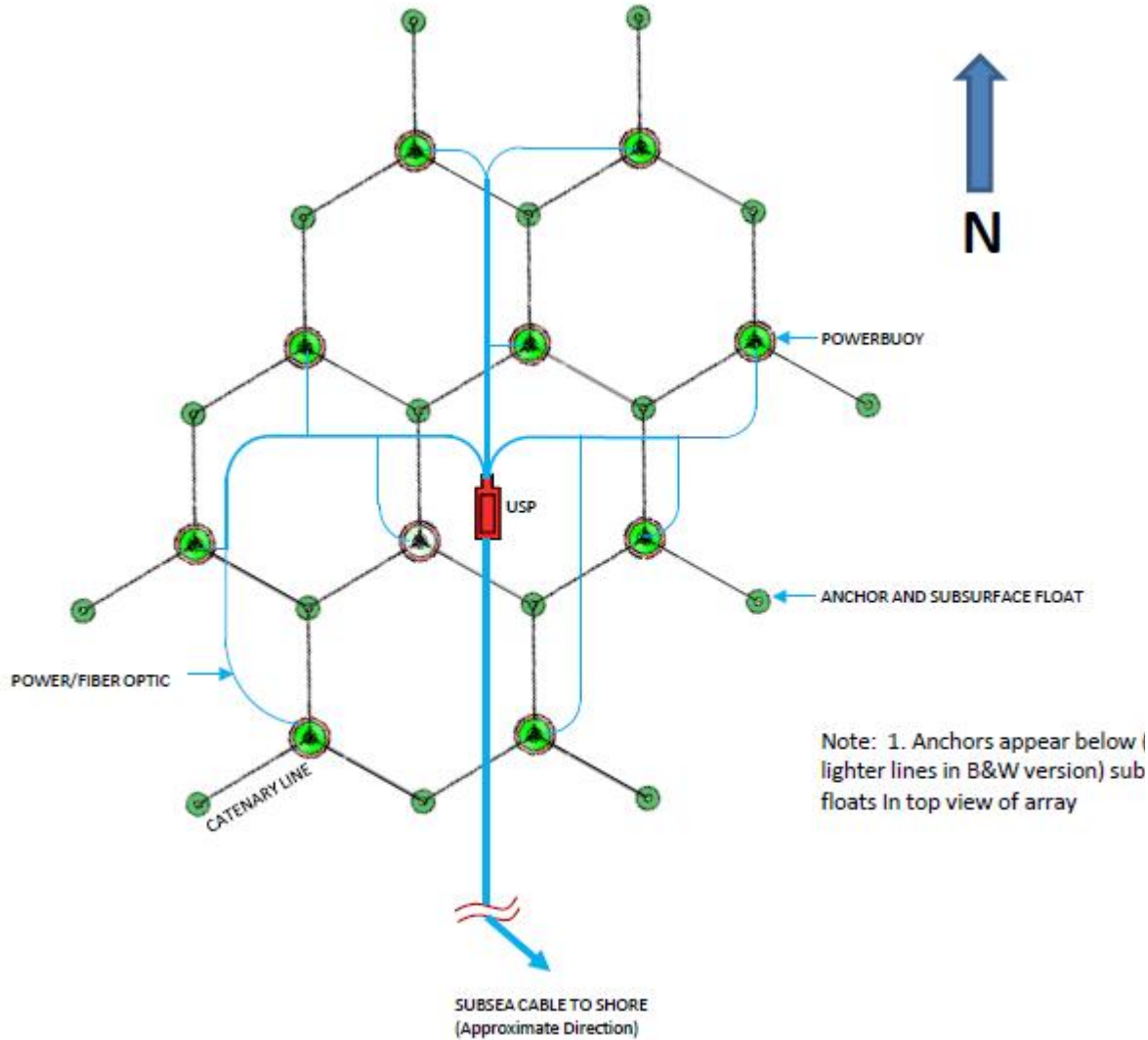
### 3.2.3 Existing Project Facilities and Operations

Currently no project exists in the project area in the Pacific Ocean.

### 3.2.4 Proposed Modification and New Facilities

The proposed action is FERC's issuance of a 35-year license for installation of nine WEC units, and operation of 10 WEC units with individual capacities of 150 kilowatt (kW) and a maximum output of 1.5 megawatts (MW), expected to generate up to 4,140 megawatt-hours (MWh) annually. The 10-WEC wave park represents Phase II of the applicant's proposed three-phased development approach. The first phase will include deployment of one test buoy. Information from phase I will be used to shape the applicant's development of subsequent phases.

The project facilities proposed in the applicant's license application include ten 150- kilowatt (kW) WEC units attached to seabed anchors, tendon lines, subsurface floats, and catenary mooring lines. The WEC units would be deployed in an array of three rows oriented in a northeast/southwest direction and would occupy about 0.25 square mile of the Pacific Ocean. A plan view of the proposed deployment is shown on Figure 2. Each WEC has a maximum diameter of 36 feet, extends 29.5 feet above water, and has a draft of 115 feet. The WEC units would be located approximately 330 feet apart, and the footprint of the constructed array is expected to be less than 1,000 feet by 1,300 feet, or approximately 30 acres.



**Figure 2: Project Plan View**

Each WEC would be moored with three anchor lines arranged symmetrically around it. The anchors are expected to be steel-reinforced pre-cured concrete and have dimensions of approximately 32.8 feet in diameter by 24.6 feet in height. They are expected to settle into the sediment and extend above the seabed approximately 18 feet. A total of 16 anchors would be installed. A power/fiber optic cable would exit the bottom of each WEC, descending to the seabed in a lazy “S” shape with subsurface floats attached to the cable and a clump weight at the seabed. The football-shaped subsurface floats would be two-piece and clamp onto the power cable at prescribed locations to give the necessary buoyancy to the cable to act as both a strain relief and to keep it off the bottom.

The 10 WEC units would be connected to a single underwater substation pod (USP) via power/fiber-optic lines. The generated power will be transmitted to shore for interconnection to the grid via an armored subsea transmission cable. The cable will be connected to the array and will be buried in the seabed to a depth of 3 to 6 feet and will follow an easterly course about 2.3 statute miles to the underwater outlet of an existing effluent discharge pipe, which is located about 0.5 statute miles from shore. The existing effluent pipe is constructed of reinforced concrete measuring 36 inches in diameter and is buried in the sand. The subsea transmission cable will run within the effluent pipe to shore.

The land-based portion of the project will occur entirely in the unincorporated town of Gardiner, including an underground transmission cable that terminates at a Douglas Electric Cooperative transmission line, and represents a total distance of about 3 miles. The entire underground terrestrial transmission cable will follow an existing easement for the effluent discharge pipe and an existing roadway. The terrestrial portion of the project will include a shore station, a small (100 to 200 square foot) building located approximately 3 miles inland and in close proximity to the Douglas Electric Cooperative interconnection.

# Chapter 4: Beneficial Uses and Water Quality Status of Marine Waters Adjacent to the Umpqua Basin

To issue a § 401 water quality certificate, DEQ must find that there is reasonable assurance that the proposed activity will not impair water quality and will comply with water quality standards. This chapter identifies applicable water quality standards in the Umpqua Basin, whose adjacent marine waters include the proposed project area. It also identifies water quality impairments documented in the project area. Chapter 5 addresses the project’s potential impact on water quality.

## 4.1 Beneficial Uses in the Umpqua Basin

The project is encompassed in the marine waters adjacent to the Umpqua basin (OAR 340-041- 0320). The following designated beneficial uses apply to “Umpqua R. Estuary to Head of Tidewater and Adjacent Marine Waters” in the Umpqua basin: industrial water supply, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, and commercial navigation and transportation.

Table 1 identifies the numeric and narrative criteria that apply to the marine water adjacent to the Umpqua basin.

**Table 1: Criteria for marine waters**

Parameter	Criterion
Narrative criteria	OAR 340-041-0007
Bacteria	Marine Waters and Estuarine Shellfish Growing Waters: A fecal coliform median concentration of 14 organisms per 100 milliliters, with not more than ten percent of the samples exceeding 43 organisms per 100 ml
Biocriteria	Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities
Dissolved oxygen	For ocean waters, no measurable reduction in dissolved oxygen concentration may be allowed.
pH	Marine waters: 7.0-8.5
Temperature	Ocean and bay waters may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the natural condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life.
Total dissolved gases	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.
Total dissolved solids	500.0 mg/l (guide concentration)
Toxic pollutants	Toxic substances may not be introduced above

	<p>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.</p> <p>Levels of toxic substances in waters of the state may not exceed the applicable criteria listed in Tables 20, 33A, and 33B.</p>
Turbidity	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.

#### 4.2 Threatened and Endangered Aquatic Species that may occur in the marine water adjacent to the Umpqua Basin<sup>1</sup>

Federally listed threatened or endangered aquatic species that may occur in the project area are listed in Table 2.

**Table 2: Threatened and Endangered Aquatic Species**

ESU/DPS	Scientific Name	Federal Status
<b>Fish</b>		
Coho salmon (southern Oregon, northern California Coast, and Oregon Coast ESUs)	<i>Oncorhynchus kisutch</i>	CH/T
Coho salmon (Lower Columbia River ESU)	<i>Oncorhynchus kisutch</i>	T
Chinook salmon (Lower Columbia River ESU)	<i>Oncorhynchus tshawytscha</i>	CH/T
Chinook salmon (Upper Columbia River spring run ESU)	<i>Oncorhynchus tshawytscha</i>	CH/E
Chinook salmon (Snake River spring/summer-run and Snake River fall-run ESUs)	<i>Oncorhynchus tshawytscha</i>	CH/T
Green sturgeon (Southern DPS)	<i>Acipenser medirostris</i>	CH/T
Eulachon (smelt) (Southern DPS)	<i>Thaleichthys pacificus</i>	T
<b>Marine Mammals</b>		
Steller sea lion	<i>Eumetopias jubatus</i>	CH, T
Humpback whale	<i>Megaptera novaeangliae</i>	E
Southern resident killer whale	<i>Orcinus orca</i>	CH, E
Blue whale	<i>Balaenoptera musculus</i>	E
Fin whale	<i>Balaenoptera physalus</i>	E
Sei whale	<i>Balaenoptera borealis</i>	E
Sperm whale	<i>Physeter macrocephalus</i>	E
<b>Marine Reptiles</b>		
Leatherback sea turtle	<i>Dermochelys coriacea</i>	PCH, E
Loggerhead sea turtle	<i>Caretta caretta</i>	T

<sup>1</sup> FEDERAL ENERGY REGULATORY COMMISSION, Reedsport OPT Wave Park, LLC, Project No. 12713-002, NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT, December 3, 2010.

Green sea turtle	<i>Chelonia mydas</i>	CH, T
(Pacific) Olive ridley sea turtle	<i>Lepidochelys olivacea</i>	T

**Notes:** CH – Critical habitat designated  
PCH – critical habitat has been proposed  
DPS – Distinct population segment  
E – Listed endangered  
ESU – Evolutionarily significant unit  
T – Listed threatened

**4.3 Water Quality Impairment in the marine waters adjacent to the Umpqua basin**

DEQ maintains a list of waters that don't meet water quality standards. This list is required under the federal CWA's section 303(d) and in Oregon Administrative Rule (OAR 340-041-0046), and is commonly referred to as either the list of water quality limited waters, or the 303(d) list. The 2004/2006 list is the most recent 303(d) list. No marine waters adjacent to the Umpqua basin are on the 2004/2006 303(d) list.

# Chapter 5: Evaluation of Compliance with State Water Quality Standards

## 5.1 Water Quality Standards Evaluated in this § 401 Review

This chapter identifies which water quality criteria are not likely to be violated (criteria not of concern) and which criteria might be violated (criteria of potential concern) by the proposed project. Section 5.2 then provides a detailed analysis of the proposed project’s construction and operation relative to the criteria of potential concern.

### 5.1.1 Water Quality Standards not of Concern

Table 3 lists the water quality criteria that DEQ does not expect to be affected by the construction and operation of the proposed project. Additionally, Reedsport OPT Wave Park, LLC does not identify these water quality criteria as criteria of concern. DEQ is reasonably assured that the proposed project will not violate these criteria given the proposed description of operations and construction methods and given that there are no pollutant discharges expected from the project that might impact these criteria.

**Table 3: Water Quality Standards not of Concern**

Criterion	Description	Project Impact Not Expected
Bacteria (340-041-0009(1)(B)(b))	Marine Waters and Estuarine Shellfish Growing Waters: A fecal coliform median concentration of 14 organisms per 100 milliliters, with not more than ten percent of the samples exceeding 43 organisms per 100 ml	The proposed project construction and operations don’t discharge human or animal waste.
Dissolved oxygen (340-041-0016(6))	For ocean waters, no measurable reduction in dissolved oxygen concentration may be allowed.	The proposed project construction and operations are not expected to discharge oxygen demanding materials, cause decreased aeration of marine waters or cause the marine waters to stagnate.
Temperature (340-041-0028(7))	Ocean and bay waters may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the natural condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life.	The proposed project construction and operations are not expected to warm the marine waters.
Total dissolved gas	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	The proposed project construction and operations are not expected to increase the total dissolved gases in the marine waters.

	life, navigation, recreation, or other reasonable uses made of such water	
Tastes or odors (340-041-0007(11))	The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed;	The proposed project construction and operations are not expected to create tastes affecting the palatability of fish or create odors. Toxic or other conditions are addressed under other applicable criteria.
Aesthetic conditions (340-041-0007(14))	Aesthetic conditions offensive to the human senses of sight, taste, smell, or touch may not be allowed;	The proposed project construction and operations are not expected to create offensive conditions in the marine water.
Radioisotope concentrations (340-041-007(15))	Radioisotope concentrations may not exceed maximum permissible concentrations (MPC's) in drinking water, edible fishes or shellfishes, wildlife, irrigated crops, livestock and dairy products, or pose an external radiation hazard;	The proposed project construction and operations will not add radioactive substances to the marine water.
Total Dissolved Solids (340-041-0326(2))	Guide concentrations listed below may not be exceeded unless otherwise specifically authorized by DEQ upon such conditions as it may deem necessary to carry out the general intent of this plan and to protect the beneficial uses set forth in OAR 340-041-0320: 500.0 mg/l.	The proposed project construction and operations will not add total dissolved solids to the marine water. <sup>2</sup>

### 5.1.2 Water Quality Standards of Potential Concern

Water quality criteria of potential concern for this project are listed in Table 4. The § 401 application has been evaluated to determine whether the proposed construction and operation of the project will contribute to violations of these water quality criteria. The following discussion identifies factors and implementation measures necessary to provide DEQ with reasonable assurance that the construction and operation of the proposed project will not contribute to violations of water quality criteria. This reasonable assurance, along with implementation of the antidegradation policy, will provide DEQ with reasonable assurance that water quality standards will not be violated by the project's construction and operation.

<sup>2</sup> The applicant considered the affect of antifouling paint under the total dissolved solids criterion. This evaluation reviews the possible affect of the antifouling paint under the toxic pollutants criteria.

**Table 4: Water Quality Criteria of Potential Concern**

<b>Criterion</b>	<b>Description</b>	<b>Potential Impact</b>
Antidegradation Policy (340-041-0004)	Protects existing water quality by preventing unnecessary additional water quality degradation.	Project may lead to growth of biofouling on lines, cause EMF in project vicinity, increase shoreline sedimentation and increase sedimentation during construction activities.
Fungi or other growths (340-041-0007(10))	The development of fungi or other growths with a deleterious effect may not be allowed.	The project would include approximately 12 miles of synthetic mooring lines. Mooring lines would attract some growth of aquatic organisms. During operation movement of these lines may dislodge some of this growth, which would then settle on the seafloor. Decay of this material may cause localized anoxic conditions on the seafloor.
Oily sheens(340-041-007(13))	Scum or oily sheens may not be allowed.	The WEC units will each contain 198 to 264 gallons (750 to 1,000 liters) of hydraulic fluids that in a catastrophic failure could result with a release of fluid into the ocean. During the installation and construction of the wave park, a number of vessels will be employed. Each of these vessels contains fuel, hydraulic fluid, and potentially other hazardous materials. There is a risk that there could be a spill of hazardous materials while these vessels are being employed.
Deleterious factors (340-041-0007(1))	The highest and best practicable treatment must be provided to maintain deleterious factors at the lowest possible levels.	Attenuation of wave energy or ocean currents by the wave park may cause erosion or accretion of the shoreline, changing the habitat for the aquatic community. Electromagnetic fields could be generated by the project. Sources of EMF could include the WEC units, the USP, and the subsea transmission cable. EMF generated by the project may disrupt migration or cause disorientation of salmon in the project area.
Biocriteria (340-041-0011)	Protects aquatic communities from cumulative impacts of all potential impairment.	Attenuation of wave energy or ocean currents by the wave park may cause erosion or accretion of the shoreline, changing the habitat for the aquatic community.

		Electromagnetic fields could be generated by the project. Sources of EMF could include the WEC units, the USP, and the subsea transmission cable. EMF generated by the project may disrupt migration or cause disorientation of salmon in the project area. The effect of project noise on migrating whales is of concern. If gray whales detect the wave energy converter array, they may alter their migration route.
pH (340-041-0326(1)(a))	Marine waters: 7.0-8.5	The array anchors are expected to be steel-reinforced pre-cured concrete. Construction activities using concrete have some potential to increase pH due to accidental introduction into marine waters.
Toxic substances (340-041-0033(1) and 340-041-0033(2))	Buildup of toxic material that affects aquatic life or human uses is not allowed.	The project operations will include the use of antifouling paints to control the growths of barnacles and algae on underwater structures. Antifouling marine paints may release (leach) toxins over time into the marine waters.
Turbidity (340-041-0036)	Increases in turbidity limited to 10% above turbidity measured at a control point. Limited duration activities may be authorized provided all practicable turbidity control techniques have been applied and a §401 certification has been granted.	Placement of the WEC units and burial of the transmission cable may result in increases in turbidity in the marine waters.

**5.2 Evaluation for Criteria of Potential Concern**

This section provides the detailed evaluation of the project relationship to each water quality criteria that might be impacted by the proposed project. The § 401 review includes the text of each water quality criteria; a description of the current water quality conditions; potential operation and construction impacts and proposed measures; and DEQ’s evaluation and findings relative to the given criteria. DEQ may use several tools to evaluate the project’s impacts, including data submitted by the applicant, data collected by DEQ, data from other projects, site-specific study results, modeling results and information from studies in the scientific literature.

**Water Quality Criterion**

**Antidegradation**

**340-041-0004 (1) – (9)**

(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.

#### Current Water Quality Condition

Existing water quality is described in this document and the §401 application.

#### Construction and Operations - Potential Impacts and Proposed Measures

Construction and operation of the project may cause changes in water quality which may reduce support for some beneficial uses within the project area and at the shoreline.

#### DEQ Evaluation

DEQ policy requires an antidegradation review when considering any water quality action such as a new NPDES point source discharge permit or water quality certification. The findings presented in this document represent an in-depth evaluation of individual water quality parameters which DEQ believes may reasonably be affected by project construction and operation under a new license. DEQ is reasonably assured that water quality standards will be met under a new FERC license and the Army Corps permit. The FERC license will include the actions required under the Reedsport OPT Wave Park Settlement Agreement and §401 conditions placed on project construction and operations of the ten buoy wave park. The Army Corps permit will include the §401 conditions placed on construction of the nine buoys.

To ensure that operation of the OPT Reedsport wave park will comply with these standards, OPT must monitor water quality and, in consultation with the aquatic resource and water quality implementation committee, adaptively manage operations as described in the OPT Reedsport Wave Park Settlement Agreement.

#### DEQ Finding

DEQ is reasonably assured that the antidegradation standard will be met for operation of the project under a new FERC License and Army Corps permit provided the applicant protects water quality through implementation of the OPT Reedsport Settlement Agreement study plans and adaptive management plans and §401 certification conditions.

#### Water Quality Criterion

##### **Fungi or other growths**

340-041-0007(10) The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or that are injurious to health, recreation, or industry may not be allowed.

#### Current Water Quality Condition

The applicant conducted a geological survey of the 800-meter-by-800-meter WEC array site and of a 200-meter-wide corridor centered on the subsea cable route from the seaward end of the wastewater pipeline outfall to the array site. The seabed in the project area is generally flat and featureless, with depths ranging from 165 to 225 feet at the array area. Surface sediments in the project area and cable corridor consist uniformly of fine sand. The sand is dark brown to black in color. The towed video camera survey did not reveal any flora or fauna on the seabed in the proposed WEC array area or subsea transmission corridor, although the visibility was low.

#### Operations - Potential Impacts and Proposed Measures

The project would include approximately 12 miles of synthetic mooring lines. Mooring lines may attract growth of aquatic organisms. Movement of these lines may dislodge some of this growth, which would then settle on the seafloor. Decay of the growth might result in localized anoxic conditions on the seafloor.

The applicant plans to inspect the mooring system (every three to four months, weather permitting, for the first two years, and annually thereafter), the applicant will monitor the seabed for accumulation of biofouling debris. If biofouling debris is building up on the seabed, the applicant will consult with the Aquatics Resources and Water Quality Committee on the need to evaluate potential related water quality concerns (e.g., total organic carbon, biological oxygen demand).

#### DEQ Evaluation

The buildup of organic growth on mooring lines will likely be limited as a result of the constant motion of these lines. In addition, DEQ anticipates that fragments which fall off and settle to the seafloor will be too

small to create localized anoxic conditions, given the dynamic nature of the ocean floor with constant flushing. Any buildup on the seabed will be monitored by the applicant.

#### DEQ Finding

DEQ is reasonably assured that the operation of the proposed project will comply with the anti fungi or other growths narrative criterion provided that the applicant meets the following conditions:

1. The applicant monitors the seabed as described in the Fish and Invertebrate study as outlined in the Reedsport OPT Wave Park Settlement Agreement.
2. The applicant consults with the aquatics resources and water quality implementation committee as described in the Settlement Agreement if biofouling debris is accumulating on the seabed.

#### Water Quality Criterion

##### **Turbidity**

##### **340-041-0036**

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

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

Construction will include placement of the anchors for the nine OPT buoys, the USP and burial of the subsea transmission cable. These activities may stir up sediment within the marine waters. Deposits such as sediment may have adverse effects including blanketing bottom dwelling aquatic life and depletion of dissolved oxygen.

#### Current Water Quality Condition

The applicant conducted a geological survey of the 800-meter-by-800-meter WEC array site and of a 200-meter-wide corridor centered on the subsea cable route from the seaward end of the wastewater pipeline outfall to the array site. The seabed in the project area is generally flat and featureless, with depths ranging from 165 to 225 feet at the array area. Surface sediments in the project area and cable corridor consist uniformly of fine sand, based on 15 grab samples collected by the applicant at water depths ranging from 87 to 162 feet. The sand was dark brown to black in color; grain sizes ranged from 0.17 to 0.19 millimeters (mm). There are no rocky outcroppings or ledges. The layer of sand in the substrate has a thickness of at least 65 feet (the penetration depth limit of the subbottom profiler used in the survey).

The applicant submitted no information regarding baseline turbidity conditions in the vicinity of the project. Marine waters in the vicinity of the project are not identified on the 303(d) list as impaired for turbidity.

#### Construction - Potential Impacts and Proposed Measures

Construction and installation of project elements may result in increases in turbidity in the marine waters.

Barges and tugs will to be used to ferry the project components to the site. The WEC units would be launched by towing or transporting them to the site aboard crane-equipped buoy tender vessels. Project construction can generally be divided between the following stages: site preparation, anchor and mooring line installation, WEC deployment, and transmission cable installation. Installation of the WEC array is expected to take one month and installation of the cable is expected to take three weeks. The mooring system consisting of anchors, subsurface floats and mooring lines will be deployed using typical offshore

construction vessels. Once the anchors, SSFs and mooring lines are in place, the WEC will be deployed. Each WEC will be towed to the site by a conventional tug boat.

The subsea transmission cable would be trenched from the USP to the outlet of the wastewater discharge pipe, a distance of about 2.3 statute miles (the wastewater pipe opening is located about 0.5 statute miles from shore). The cable would be installed at a minimum depth of approximately 3 to 6 feet below the sea floor according to conventional trenching or jet plowing methods, to be selected by the cable deploying contractor. Conventional trenching would involve an ocean vessel pulling an underwater plow that continuously cuts a trench and places the cable into the trench.

Placement of the anchors and USP may temporarily disturb near-surface sea floor sediments resulting in localized turbidity plumes. The applicant plans to deploy the subsea cable in a trench from the offshore array to the effluent outfall located approximately one-half mile offshore. Part of the sediment would be placed back in the trench to cover the cable. Another portion would be dispersed by currents and resettle onto the seabed. The re-deposited layer of sediment is expected to be thin beyond the immediate vicinity of the trench. Installation of the trench will temporarily displace material which may result in localized turbidity plumes.

#### DEQ Evaluation

Project construction will have only minor effects on geologic and soil resources such as short-term disturbance of sediments when anchors are installed and the subsea transmission cable is buried. Any effects related to construction are expected to be minor and short term. After construction it is likely that sediments (primarily sand) around the subsea cable(s) and anchors would quickly settle. For this reason, DEQ does not anticipate the project will increase turbidity in a manner which will degrade existing water quality.

The applicant will measure near bottom turbidity at a location adjacent an anchor deployment and along the subsea cable route in accordance with Section 5.3.8 of the Fish and Invertebrate Study Plan presented in Appendix A to the Settlement Agreement.

#### DEQ Finding:

DEQ is reasonably assured that the construction and operation of the proposed project will comply with the turbidity criterion provided that the applicant meets the following conditions:

#### Nine buoy placement conditions:

1. The applicant monitors turbidity as described in the Fish and Invertebrate Study Plan in the Reedsport OPT Wave Park Settlement Agreement.

#### Transmission cable placement conditions:

1. The applicant monitors turbidity as described in the Fish and Invertebrate Study Plan in the Reedsport OPT Wave Park Settlement Agreement.

#### Water Quality Criterion

##### **Biocriteria**

340-041-0011: Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

##### **Deleterious effects**

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.

The narrative biocriteria complements parameter-specific criteria by considering multiple stressors and cumulative effects. The narrative “deleterious effects” criterion requires the highest and best practicable treatment be used to minimize deleterious factors. Under proposed project operations the biocriteria and

deleterious effects criterion may be impacted by changes to the shoreline via changes in sedimentation (erosion or accretion) and by electromagnetic fields. EMF may be generated by subsea transmission cables and the WEC units. The following section addresses the effect on biocriteria and the deleterious effect criterion of sedimentation, EMF and acoustics.

#### Current Water Quality Condition - Sedimentation

The shoreline near Reedsport is sandy. According to ODFW (2006)<sup>3</sup> sandy shorelines are high-energy environments that experience significant wave and wind energy. Sands have a grain size between 0.02 and 2.0 mm. Seasonal variation in wind and wave energy and currents move large amounts of sand onto or off beaches.

ODFW describes the biology of the sandy shoreline as follows: “The movement of sand through water and wind energy makes sandy beaches largely unsuitable for rooted and attached organisms. The fauna of sandy beaches is either transitory – fish and birds using either side of the waves for foraging opportunities – or those invertebrates that burrow in the sand during periods of exposure for protection from desiccation and/or predators and emerge, as tides permit, to forage. Dominant groups are insects and some crustaceans in the driest reaches of the upper intertidal zone, and crustaceans, mollusks and diverse worm taxa in the mid and lower intertidal zones.” (ODFW 2006)

#### Current Water Quality Condition - EMF

EMFs are common and exist in a wide variety of natural and human-made forms. Natural forms include the earth’s magnetic field, magnets, and different processes within organisms (i.e., biochemical, physiological, and neurological). Human-made sources include telecommunications cables (fiber optic and coaxial).

Currently, no data exist about EMF levels in the project area. However, prior to deploying any WEC units, the applicant will collect baseline measurements of naturally occurring field strengths at the project site and a control site.

#### Current Water Quality Condition – Acoustics

Ambient noise in the marine environment originates from natural and anthropogenic sources including vehicle traffic, wave action, marine life, seismic events and atmospheric noise. Currently, no data exist about noise levels in the project area.

#### Operations - Potential Impacts and Proposed Measures - Sedimentation

WEC units extract and absorb power from passing waves. Depending on the size and other characteristics of the wave park, the WEC units could cause changes in wave height and direction. These changes could persist shoreward to the outer edge of the surf zone and could affect nearshore currents, potentially resulting in erosion or accretion of the beach. These changes may affect nearshore aquatic habitat.

To address stakeholder concerns about these potential effects, the applicant proposes to implement wave, current, and sediment transport monitoring to assess any unanticipated effects on wave heights, coastal sediment transport, and depositional processes. The study will focus on:

1. Identifying the near field effects of the WEC units.
2. Monitoring the bathymetry, shoreline contour and water column properties to capture any nearshore anomalous affects.

The studies will include:

- In-situ observations of directional waves and temperature and salinity fields. In situ observations will take place for several months after deployment of the array.
- Radar observations of near field waves to estimate wave height variations. Six one day deployments are planned.

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<sup>3</sup> Oregon Department of Fish and Wildlife, The Oregon Nearshore Strategy, January 2006, downloaded from:

<http://www.dfw.state.or.us/mrp/nearshore/document.asp>

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- Video observations of the shoreline and sand bar locations. Sampling will occur at monthly intervals for 12 months prior to deployment of the 10 WEC array. Video observations will increase to bi-weekly following deployment of the array.
- Monitoring of beach topography, which will occur every three months prior to deployment of the array, and bi-monthly following deployment of the array.
- Modeling to estimate the affect of the project on wave scattering.

If significant shoreline changes are observed, additional monitoring will be evaluated through the adaptive management process outlined in the Settlement Agreement.

#### Operations - Potential Impacts and Proposed Measures – EMF

At the proposed WEC array, sources of EMF could include the WEC units, the USP, and the subsea transmission cable. EMFs consist of both electric (E) field and an induced magnetic (B) field. B fields have a second induced component, a weak electric field, referred to as an induced electric (iE) field, which are created by the flow of seawater or movement of organisms through a B field. The strength of both E and B fields depends on the magnitude and type of current flowing through the cable and the construction of the cable (including any cable shielding that can reduce or eliminate E fields). Some marine animals have specialized organs to sense EMFs, which allow for prey detection and ocean navigation. Members of the elasmobranch family (sharks, skates, and rays) can sense the weak E fields that emanate from their prey's muscles and nerves during muscular activities, such as respiration and movement.

Although data are limited, studies have shown that organisms as diverse as Atlantic salmon, cod, plaice, eels, lampreys, sea trout, yellowfin tuna, lobster, crab, shrimp, prawns, snails, bivalves, and squid are able to detect B fields. Concerns have been raised that EMF generated by the project may disrupt migration or cause disorientation of salmon in the project area.

The applicant proposes to study the affect of EMF to:

- Determine the physical characteristics of EMF likely to be generated by the array,
- Anticipate which marine life might be adversely affected,
- Estimate the magnitude of potential affects.

Prior to deploying any WEC units, the applicant will collect baseline EMF data. Once the array is installed the applicant will measure EMF for the 1) ten WEC units; 2) the cables leading from the WEC units to the subsea pod; and 3) the subsea pod. The applicant will submit an updated study plan to the Aquatic Resources and Water Quality Implementation Committee prior to measuring EMF.

#### Construction and operations- Potential Impacts and Proposed Measures – Acoustics

The installation of the wave energy converters will result in noise from vessels and equipment. During construction of the WEC array, the main source of noise will be the vessels propellers. The vessels should be fully underway only when traveling to and from the project site. High level noise may also result from cavitations (the sudden formation and collapse of low-pressure bubbles in the ocean from rotation of the vessel propeller) during vessel start and stops. During project operations, noise will mainly be generated from waves impacting the float portion of the wave energy converter and movement of internal mechanical components. Noise generated during project installation and operation may alter migration and feeding patterns.

The applicant will collect acoustic measurements as described in the Settlement Agreement. Specifically, the applicant will:

- Collect measurements of acoustic emissions of the single wave energy converter as a function of sea state, i.e. wave height,
- The values will be compared to acoustic thresholds documented in scientific literature to assess the potential effects of the project on marine resources,
- Collect measurement after the single wave energy converter is deployed,
- Submit a report to the Aquatic Resources and Water Quality Implementation Committee.

### DEQ Evaluation

#### Sedimentation

The applicant estimated attenuation of wave amplitude to be about 12 percent behind the WEC units and a worst-case (maximum) instantaneous attenuation of wave amplitude at the beach of 2.1 percent.

Because of the small scale of the proposed installation and the distance between the wave park and shoreline (2.5 miles), the changes in wave amplitude are unlikely to cause substantial nearshore effects.

#### EMF

The recorded EMF levels will be compared to known thresholds for sensitive species. If threshold levels are not available in the literature for species of concern or other surrogates, the Aquatic Resources and Water Quality Implementation Committee will be convened to determine appropriate next steps to understand the effects of the EMF on these species.

#### Acoustics

At a meeting of marine mammal acoustic experts on October 9 and 10, 2008 there was agreement that concern that whales may collide with the wave energy converter array was limited to non-toothed whales. Toothed whales were unlikely to collide with the array especially if it was documented that sound produced by the array doesn't have a high frequency component that might interfere with sonar. Measured acoustic levels will be compared to scientific literature values and reported to the Aquatic Resources and Water Quality Implementation Committee. If additional information is needed by the committee, the adaptive management process outlined in the Settlement Agreement will be used to determine appropriate steps.

### DEQ Finding

#### Sedimentation

DEQ is reasonably assured that the operation of the proposed project will comply with biocriteria and deleterious effects criterion provided that the applicant meets the following conditions:

1. Implements the Wave, Current and Sediment Transport Plan as described in the Reedsport OPT Wave Park Settlement Agreement.
2. If significant shoreline changes are observed, the additional steps or monitoring will be evaluated through the Settlement agreement's adaptive management process.

#### EMF

DEQ is reasonably assured that the operation of the proposed project will comply with the biocriteria and deleterious effects criterion provided that the applicant meets the following condition:

1. Implements the EMF Effects Study Plan as described in the Reedsport OPT Wave Park Settlement Agreement.

#### Acoustics

DEQ is reasonably assured that the operation of the proposed project will comply with the biocriteria and deleterious effects criterion provided that the applicant meets the following condition:

1. Implements the acoustic emission characterization plan as described in the Reedsport OPT Wave Park Settlement Agreement.

### Water Quality Criterion

#### **Oily sheens**

340-041-007(13): Objectionable discoloration, scum, oily sheens, or floating solids, or coating of aquatic life with oil films may not be allowed.

#### Current Water Quality Condition

The applicant didn't provide any information on oily sheens in the project area.

### Construction- Potential Impacts and Proposed Measures

During the installation and construction of the wave park, a number of vessels will be employed. Each of these vessels contains fuel, hydraulic fluid, and potentially other hazardous materials. There is a risk that there could be a spill of hazardous materials while these vessels are being employed. The marine construction contractors will be required to have spill response plans.

### DEQ Evaluation

The installation of the arrays and cabling would not require handling project related fluids at sea, such as the hydraulic fluid for the WEC units. The potential for spills would only be associated with the typical operation of the vessels used during the installation. The use of licensed, insured operators with their own spill response plan, in combination with the spill prevention, countermeasures and control plan for this project should minimize the potential for spills during installation.

### DEQ Finding:

DEQ is reasonably assured that the construction of the proposed project will comply with the oily sheen criterion provided that the applicant meets the following conditions:

1. The applicant hires only licensed, insured operators who have their own spill response plan.
2. The applicant implements the SPCC Plan for this project, as described in Appendix F to the license application.
3. In the event of a spill or release or threatened spill or release to state waters, OPT shall implement the SPCC Plan, or other applicable contingency plan, and notify the Oregon Emergency Response System (OERS) at 1-800-452-0311.

### Operations – Potential impacts and proposed measures

The WEC units will each contain 198 to 264 gallons (750 to 1,000 liters) of hydraulic fluids that in a catastrophic failure could result with a release of fluid into the ocean. The hydraulic fluid is contained within a hydraulic system which is contained within the steel WEC structure. The WEC doesn't have any hydraulic seals exposed directly to the ocean. Each seal is backed up with an end cap that captures any fluid leakage. Any fluid that could leak would be contained with the spar structure. Sensors in the bottom of the spar measure the amount of leaked fluid and will trigger an alarm. The alarm will alert the applicant and initiate the spill prevention control and countermeasure plan.

### DEQ Evaluation

The WEC will be designed to minimize the potential for leaks of hydraulic fluid. In addition, the volume of fluid used in each WEC is relatively small. By comparison an average crabbing boat contains 10,000 to 30,000 gallons of diesel fuel.

The applicant did not identify any potentially harmful fluids that would be used in the underwater substation pod, or methods to detect leaks from the USP that could occur as a result of corrosion and cracks in the structure. Although its location on the seabed limits the potential for physical strikes by ships or other objects, identifying any harmful fluids and methods to detect leaks, if present, would reduce the potential for the release of harmful fluids into the environment.

### DEQ Finding

DEQ is reasonably assured that the operations of the proposed project will comply with the oily sheen criterion provided that the applicant meets the following conditions:

1. The applicant implements the SPCC Plan for this project, with modifications described in condition 2. The plan will describe the response measures and procedures that would be in place if a release of hydraulic fluid were to occur. The plan is described in Appendix F to the license application.
2. Modify the proposed SPCC Plan to identify any hazardous fluids that would be used in the underwater substation pod and describe monitoring methods that would be used to identify any leaks of hazardous fluids.

**Water Quality Criterion**

**pH**

340-041-0326(1)(a): pH (hydrogen ion concentration). pH values may not fall outside the following ranges: (a) Marine waters: 7.0-8.5

**Current Water Quality Condition**

Limited pH data exists for the project area. DEQ collected pH data in 2003 in the Pacific Ocean in locations near the Umpqua River. These data are stored in DEQ's LASAR database. The sampling results are in Table 5:

**Table 5: pH values in project vicinity**

Site Description	Station ID	Latitude	Longitude	Depth (m)	Result
Pacific Ocean, 3.6 nautical miles southwest of Umpqua river mouth	30263	43.6212	-124.2648	68	7.7
				33	7.9
				2	8.3
Pacific Ocean, 8.4 nautical miles southwest of Umpqua river mouth	30247	43.5975	-124.3788	98	7.7
				46	7.8
				2	8.3
Pacific Ocean, 5.4 nautical miles northwest of Umpqua river mouth	30242	43.7502	-124.2542	74	7.7
				37	7.8
				2	8.4

These data indicate that the pH criterion for marine waters is met in the project area.

**Construction- Potential Impacts and Proposed Measures**

The proposed project would include approximately 16 concrete block anchors approximately 32.8 feet in diameter by 24.6 feet high. Each anchor would cover an area approximately 32.8 feet (10 meters) in diameter, and the total area of the seafloor ultimately covered by 16 anchors would be 13,760 square feet (0.321 acre), or 1.7 percent of the footprint of the array. Once in place the anchors are expected to settle into the sediment and extend above the seabed approximately 18 feet.

**DEQ Evaluation**

Construction activities in which cement or grout are used have some potential to increase pH due to accidental introduction into marine waters. The applicant proposes to use pre-cured concrete ballast blocks as the anchors. Pre-cured blocks should not leach into the marine waters.

**DEQ Finding**

DEQ is reasonably assured that the construction of the proposed project will comply with the pH marine criterion provided that the applicant meets the following condition:

- I. Cast-in-place concrete or poured cement or grout must be cured for a minimum of 24-hours prior to contact with waters of the state. Pouring of uncured cement must be done in isolation from waters and with complete containment of any water contacting uncured cement.

### Water Quality Criterion

#### **Toxic pollutants**

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.

340-041-0033(2): Levels of toxic substances in waters of the state may not exceed the applicable criteria listed in Tables 20, 33A, and 33B.

#### Current Water Quality Condition

No water quality data for toxic pollutants is available for the project area. However, there are currently no projects in the project area which would be expected to release toxic pollutants.

#### Operations - Potential Impacts and Proposed Measures

Species such as spores, barnacles and algae can colonize underwater surfaces. This colonization is known as biofouling. Biofouling is of particular concern for the applicant's WEC design which relies on smooth interface between the float and spar. If unmitigated, biofouling could result in extensive effort to remove colonized structures and repair affected areas. The applicant will use antifouling paints on the WEC unit, SSFs, and USP. Antifouling marine paints release (leach) toxins over time into the proximal area to limit biofouling. Antifouling paint is toxic to a variety of aquatic organisms and the resulting water concentrations must be estimated to ensure that water quality standards are not violated by the paint.

Ablative antifouling paint is a soft paint that is designed to wear away, exposing fresh layers of biocide. The applicant is planning to use ablative antifouling paint (ABC3 Antifouling6 ) to inhibit buildup of colonizing species on project components. ABC3 Antifouling is a self-polishing organotin-free antifoulant coating specifically designed for use in the marine environment. The active ingredients in ABC3 Antifouling are cuprous oxide and 4,5-dichloro-3-n-octyl-4-isothiazolin-3-one. Ameron's "ABC3 Antifouling" will be used to coat the float, spar, SSFs, and subsea pod in the following approximate volumes:

- WEC (spar and float) - 120 gallons (454 liters)
- SSF - 30 gallons (114 liters)
- Subsea pod - 25 gallons (95 liters).

Antifouling paint leaches small quantities of copper overtime to control biological growth. The applicant provided the release rates for constituents in Ameron's ABC3 solution. These values are summarized in Table 6 below:

**Table 6: Release Rated for Baseline Copper Ablative Coating**

Constituent Name	Static Release Rate [(µg/cm <sup>2</sup> )/day]
Total Copper	8.9
Total Zinc	3.6
Total Iron	0.44
Ethyl benzene	0.0

The applicant calculated the total daily release rate using the surface area of the mooring system (141 square meters), WEC Float (1,415 square meters), and USP (334 square meters). The results are summarized in Table 7 below:

**Table 7: Estimated Release Rates for Project Components**

Constituent Name	Mooring Release Rate (ug/day)	WEC Release Rate (ug/day)	Substation Pod Release Rate (ug/day)	Total Release Rate (ug/day)
Total Copper	$1.3 \times 10^7$	$1.3 \times 10^8$	$3.0 \times 10^7$	$1.7 \times 10^8$
Total Zinc	$5.1 \times 10^6$	$5.1 \times 10^7$	$1.2 \times 10^7$	$6.8 \times 10^7$
Total Iron	$6.2 \times 10^5$	$6.2 \times 10^6$	$1.5 \times 10^6$	$8.3 \times 10^6$
Ethyl benzene	0.0	0.0	0.0	0.0

The entire project area will measure 300 by 400 meters, with an average depth of approximately 65 meters for a volume of approximately  $7.8 \times 10^6$  cubic meters or  $7.8 \times 10^9$  liters.

The applicant calculated the expected concentration within the project area. These values are shown in Table 8 below:

**Table 8: Concentration of constituents released from copper ablative coating**

Constituent Name	Oregon Water Quality Criteria (ug/l)	Total Release Rate for Ten WEC units (ug/day)	Calculated Concentration with Project Boundary (ug/l/day)*
Total Copper	2.9	$1.7 \times 10^9$	0.22
Total Zinc	86	$6.8 \times 10^8$	0.09
Total Iron	300	$8.3 \times 10^7$	0.0
Ethyl benzene	1,400	0.0	0.00

DEQ Evaluation

DEQ calculated the concentration within the project area using the same release rate and the same project area volume. DEQ calculated results and comparison with applicable criteria are summarized in Table 9:

**Table 9: Constituent concentration comparison with criteria**

Constituent Name	Calculated Concentration with Project Boundary (ug/l/day)	Calculated Concentration with Project Boundary (ug/l) over 4 days	Protection of Aquatic Life <sup>4</sup>		Human Health Criteria for the Consumption of:	
			Marine Chronic Criteria (ug/l)	Marine Acute Criteria (ug/l)	Water and organism (ug/L) <sup>5</sup>	Organism Consumption Only (ug/L)
Total Copper	0.02	0.08	2.9	2.9	NA	NA
Total Zinc	0.09	0.36	95	86	NA	NA
Total Iron	0.01	0.04	NA	NA	NA	NA
Ethyl benzene	0.0	0	NA	NA	NA	210 <sup>6</sup>

<sup>4</sup> The acute criteria refer to the average concentration for one (1) hour and the chronic criteria refer to the average concentration for 96 hours (4 days), and that these criteria should not be exceeded more than once every three (3) years.

<sup>5</sup> The marine waters adjacent to the Umpqua Basin are not designated for public or private domestic water supply, so the “water and organism” criteria do not apply.

These results indicate that criteria for the protection of aquatic life and human health will not be exceeded by the leaching of the biofouling coating.

DEQ Finding

DEQ is reasonably assured that operation of the proposed project will comply with the toxics pollutants criteria provided that the applicant meets the following condition:

1. The applicant uses only Ameron's "ABC3 Antifouling paint. Changes to the antifouling paint can only be made after consultation with DEQ.
2. If the applicant's planned monitoring of the sediments for any debris build-up underneath the WEC units detects any accumulation of toxins that approach levels that could have an adverse effect, the applicant will consult with the aquatic resources and water quality implementation committee on the need to evaluate water column and sediment concentrations of toxic pollutants from the biofouling paint.

# Chapter 6: Evaluation of Other Appropriate Requirements of State Law

As part of the §401 review, DEQ must determine whether additional conditions are needed to assure compliance with other appropriate requirements of state law, pursuant to § 401(d) of the Clean Water Act. Such requirements are appropriate if they have any relation to water quality, (Arnold Irrigation Dist. v. DEQ, 79 Or.App. 136 (1986)), and may include requirements as to water quantity if necessary to protect a beneficial use. (PUD No.1 of Jefferson Co. v. Washington Dept. of Ecology, 511 U.S. 700 (1994).)

## 6.1 Department of State Lands

ORS 196.810 requires permits be obtained from the Oregon Department of State Lands prior to any fill and removal of material from the bed or banks of any stream. DSL permits, if issued, may be expected to contain conditions to assure protection of water quality to protect fish and aquatic habitat. The proposed new license will include some construction activities which may require a removal-fill permit from DSL, a dredge and fill permit from the U.S. Army Corps of Engineers pursuant to § 404 of the CWA, and a §401 water quality certification from DEQ. The applicant applied for a Joint Permit Application with the United States Army Corps of Engineers and DSL in December 2009 for the disturbance to the seabed associated with deployment of the project. The applicant must first obtain all applicable permits, certificates, and authorizations prior to engaging in activities required under the terms of a new FERC License.

## 6.2 Department of Fish and Wildlife

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

### **ORS 541.405** Oregon Plan for Salmon and Watersheds

Restore native fish populations and the aquatic systems that support them, to productive and sustainable levels that will provide environmental, cultural and economic benefits.

### **ORS 496.012** Wildlife Policy

This statute establishes ODFW's primary directive to prevent serious depletion of any indigenous species and to maintain all species of fish and wildlife at optimum levels.

### **ORS 496.435** Policy to Restore Native Stocks

Restore native stocks of salmon and trout to historic levels of abundance.

### **ORS 509.580 - 509.645** ODFW's Fish Passage Law

Provide upstream and downstream passage at all artificial obstructions in Oregon waters where migratory native fish are currently or have historically been present.

### **OAR 635-007-0502 through 0509** Native Fish Conservation Policy

### **OAR 635-500-0100-0120** Trout Management

Maintain the genetic diversity and integrity of wild trout stocks; and protect, restore and enhance trout habitat.

There are a number of Oregon state laws administered by ODFW that pertain to the protection and enhancement of aquatic species and their habitats. These laws include requirements for the restoration of native fish populations and the aquatic systems that support them, for providing upstream and downstream passage at artificial obstructions, and for mitigating for losses of fish and wildlife habitat. The project will

not hinder fish passage or substantially alter fish or wildlife habitat, therefore the project is consistent with ODFW's rules per ORS 496.

Project construction and operation will alter habitat in the project area by installing project components and creating new habitat features (hard structure in surface, water column, and benthic habitats). Potential impacts include changes to marine community composition. The applicant proposes to study the effects of the project in the fish and invertebrate study described in the OPT Reedsport wave park Settlement Agreement (Appendix A). The study will include marine and anadromous species that may be in the project area. The aquatic resources and water quality committee will meet to review and discuss the study plan results. Implementation of the fish and invertebrate study will provide further assurance of compliance with ODFW regulations.

### **6.3 Department of Land Conservation and Development**

ORS Chapter 197 contains provisions of state law requiring the development and acknowledgement of comprehensive land use plans. This chapter also requires state agency actions to be consistent with acknowledged local land use plans and implementing ordinances. In a county planning department affidavit signed December 9, 2009 and included in the applicant's December 2009 Joint Permit Application, Douglas County Planner, Jonathan Wright, stated that the onshore facilities are consistent with local land uses and the marine portions of the project are not regulated.

The Oregon Department of Land Conservation and Development (DLCD) is responsible for implementing comprehensive plans and ensuring consistency with statewide planning goals. As outlined in the Territorial Sea Plan (TSP), DSL shall convene a joint agency review team (JART), in order to facilitate the coordination of state and federal agencies as they apply their separate regulatory, proprietary, or other authorities to the review of a proposed renewable energy facility development. In an email to the applicant dated January 25, 2010 and included in the application to FERC, DLCD stated "The JART will not be invoked by DSL for the Reedsport Project that is covered under the Settlement Agreement. The SA process has functioned well and has addressed all the TSP and Goal 19 issues that would be considered under the JART. The assumption is that the coordinating committee under the SA is the substantive equivalent of the JART, so a separate process and coordination group would be redundant and unnecessary."

### **6.4 Department of Environmental Quality**

#### **Onsite Septic systems - ORS 454**

There are no plans for waste facilities at the project location, so ORS Chapter 454 is not applicable to this Project.

#### **Spills of petroleum and Hazardous Materials- ORS 466**

OPT developed the SPCC Plan to conform to 40 CFR Part 112 as well as local and state requirements.

#### **Clean Water Act Sections 301, 302, 303, 306, and 307**

Pursuant to Section 401 of the CWA, DEQ must find that the project complies with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the CWA. These sections of the CWA address technology based effluent limitations (Section 301); water quality based effluent standards (Section 302), load-based standards (Section 303), performance standards for new sources (Section 306), toxic standards and pre-treatment standards for treatment plant discharges (Section 307). The requirements contained in the above-referenced sections of the CWA relate to point source discharges and provide the foundation for National Pollution Discharge Elimination System permits issued under Section 402 of the CWA. The project does not include any point source discharges related to construction or operation of the project. Therefore, Sections 301, 302, 303, 306, and 307 of the CWA are not applicable to this project.

DEQ regulates stormwater for certain industries under the CWA. Stormwater permits are required from DEQ for construction sites that exceed one acre in size (1200-C Construction Stormwater General Permit requirements). The applicant proposes to construct the land portion of the transmission line within an existing effluent pipe, and there are no new pollution-generating impervious surfaces associated with this project. There will be limited ground disturbance, less than one acre for construction of the marine and

terrestrial components of the project. Therefore a stormwater permit is not required based on current regulatory requirements.

# Chapter 7: Public Comment

## 7.1 Issuance of Public Notice, Opportunity to Comment

In December 2009, Reedsport OPT Wave Park, LLC submitted a joint permit application to US Army Corps of Engineers and Department of State Lands for the installation of nine wave energy converters and interconnecting electric infrastructure. The Corps published a Public Notice soliciting comments on the project on February 8, 2010. DEQ issued a public notice for the joint permit application on February 9, 2010. The comment period ended on March 10, 2010. On February 4, 2011, Reedsport OPT Wave Park, LLC withdrew and resubmitted the application for water quality certification.

On October 11, 2011, following development of this evaluation and findings document, DEQ issued a notice of public hearing for the proposed issuance of § 401 certifications for the proposed Reedsport OPT Wave Park (FERC Project 12713, US Army Corps of Engineers Nationwide Permit 2007-62/1). An informal question and answer session was held at Reedsport City Hall, followed by a formal hearing, on October 25, 2011 to discuss the proposed certification conditions. The opportunity to submit written comments was held open until 5 p.m. on November 14, 2011.

## 7.2 Public Comment Received

DEQ received four comments by e-mail during the public comment period that ran from February 9, 2010 through March 10, 2010.

DEQ received oral testimony from one party at the hearing, and received five comments by e-mail during the public comment period that ran from October 11, 2011 through November 14, 2011. Upon review and consideration of the oral and written comments, DEQ prepared a document summarizing the public comment and DEQ's responses. In consideration of and in response to the public comments received, DEQ revised the proposed certification conditions that were available for public viewing.

Summary of Public Comment Received and DEQ Responses  
for the  
Reedsport OPT Wave Park  
Proposed 401 Certification Conditions

- 1) Clifford Brown, 1331 Adair Dr. Richland, WA. 99352

*Comment:* Our entire nation is years behind the Europeans and others in the development of wave energy, mainly because we have a moronic legal structure that considers these things as potentially dangerous as offshore oil rigs. They are not! The fish will love them. The fishermen will adjust. It is free energy and needs to be developed asap! Go for it. Fast.

*Response:* DEQ appreciates the comment.

- 2) Umpqua Watersheds, Cascadia Wildlands and Francis Eatherington ,886 Raven Lane Roseburg, OR 97471, Cindy Haws, Umpqua Watersheds, P.O. Box 10, Josh Laughlin, Cascadia Wildlands, P.O. Box 10455, Eugene, OR 97440

*Comment:* In general, we are very supportive of developing alternate energy sources, especially energy that is generated locally, such as wave parks on the Oregon Coast. We are also supportive of the user-owned utility, Douglas Electric Coop, being the recipient of the electricity, and the re-use of an existing conduit at the old paper mill for the sub-sea transmission cable.

However, we are concerned about the impacts to migrating Grey Whales from horizontal cables, such as cables that could stabilize the buoys. These whales migrate up and down the Oregon coast, close to shore, with their mouths open. If they were to swim into a horizontal cable, they have no reverse, and an entanglement problem could endanger their life.

The video at

<http://www.oceanpowertechnologies.com/tech.htm>

implies there are no horizontal cables needed (except along the ocean floor) in some wave technologies. If this is the case with the Reedsport Wave Park, please make that clear. However, the Roseburg News-Review article reports that "Three anchor lines will keep each buoy in place within the grid." If horizontal cables near the ocean surface are needed at the Reedsport Wave Park, consider the impacts to marine mammals, especially potential entanglement issues with grey whales. Consider alternatives to the use of horizontal cables.

During the northern migration in April, the gray whales travel closer to shore, especially during the mother and calf migration in late April.

"Recent plans to develop wave energy farms off the Oregon coast have raised concerns about the potential effects on the marine environment. Among these concerns are the potential effects of the wave farms on gray whales migrating along the Oregon coast. To address that question, the Oregon State University Marine Mammal Institute is conducting a study on the migration patterns of gray whales off Yaquina Head. This study is funded by the Oregon Wave Energy Trust and supported by the Bureau of Land Management, Yaquina Head Outstanding Natural Area.

The objective of the study is to obtain up to date information on the areas used by gray whales when they pass by Yaquina Head. In particular, we will estimate distance to shore and water depth preferences of the migrating whales. We will also obtain detailed behavioral observations by tracking the whales. Data gathered before the wave energy structures are deployed, during the 2007-2008 migration, will serve as a baseline for comparison once the wave energy farms are deployed."

<http://mmi.oregonstate.edu/graywhalemigrationstudy>

Please disclose the results of this OSU study, and how the results will impact this project.

*Response:* The § 401 certifications issued by DEQ address water quality standards and other applicable state laws, whale migration is beyond the scope of the §401 certification.

3) Dave Sabala, General Manager, Douglas Electric Cooperative, Roseburg, Oregon

*Comment:* Please find this letter in support of OPT's Reedsport Wave Power Project located off of the coast of Gardiner, Oregon. With electric demand expected to be 30% more in 2030 than it is today, our nation needs all forms of electric generating sources including energy from the ocean. Projects such as the OPT Reedsport Wave Project will help us all better understand wave project viability, predictability, reliability, and environmental sensitivity.

*Response:* DEQ appreciates the comment.

4) Gene Holt, Coos Bay, OR

*Comment:* I hope the project can be enlarged. The South Coast needs to be independent with a "green energy source". As for crabbing, I have crabbed in that exact area. It is a very good area but, the crabs will move and any pot outside the area of a generator will still catch its share of crab. If by some small chance, the areas near the generators happen to prove to be "incubators", all the better. Good luck and I wish they were already in.

*Response:* DEQ appreciates the comment.

5) Julie Chapman

*Comment:* Can you please clarify how the siting of a wave energy park/401 certification off of Reedsport squares with the Territorial Sea Plan? I know that an extensive mapping and "land use planning" process is currently underway through DLCD, in order to locate geography in which to site these parks. I thought that FERC had to wait for this state process to be completed so that they could be in compliance with the decisions of the state. Thanks for helping me understand this development ahead of the Sea Plan amendment.

*Response:* Under the territorial sea plan amendment process, the area for which OPT has the FERC authorization for up to 10 buoys will be treated as an existing use for which the company has obtained authorization from FERC and DSL, and is covered by the Settlement Agreement that the state agencies have signed and approved. The Reedsport OPT Wave Park project area, referred to as phases 1 and 2, will be grandfathered into the draft plan maps as a site that has been permitted and designated for marine renewable energy development.

6) Aaron LeMieux, Founder and CEO, Tremont Electric, Inc.

*Comment:* I am writing to submit public comment on the Oregon Department of Environmental Quality approval process for water quality certification of further buoy deployment in waters off of the Oregon shoreline. My company, Tremont Electric, manufactures the patented nPower® Kinetic Energy Harvesting technology. I am the inventor, founder, and CEO - I first envisioned the nPower® technology as a thru hiker on the Appalachian Trail in 1996.

Kinetic energy harvesting of wave motion does not need to, and should not rely on dirty legacy technology, particularly dirty technology with the potential to spill large quantities of petroleum product (like hydraulic fluid) into the sea. Technology already exists which removes this risk.

Our nPower® technology, which uses no fuel other than motion, produces no emissions, and does not rely on hydraulic fluid, is proven in the marketplace. Our first product, the nPower® Personal Energy Generator (PEG) is on the market now, providing customers off the grid with clean energy to recharge their personal hand-held electronics. Here's what our customers are telling us.

<http://www.npowerpeg.com/index.php/blog/101-qhavent-plugged-my-ipod-into-the-wall-since-i-got-my-npower-pegg>

<http://www.npowerpeg.com/index.php/blog/100-qbest-mobile-recharging-device-ive-ever-usedq>

This month, the nPower® Wave Energy Converter, a commercial scale application for wave energy harvesting, was patented.

<http://www.npowerpeg.com/index.php/blog/97-tremont-electric-is-granted-wave-energy-patent>

Currently, the US Military is testing the nPower® PEG to solve the mobile power needs of soldiers in the field. Here is Former US Senator John Warner speaking at the Cleveland City Club about the potential of nPower® technology.

<http://www.npowerpeg.com/index.php/blog/83-former-us-senator-john-warner-loves-npower-peg>

When considering water quality certification for wave energy converter buoys, it is critical that the Oregon Department of Environmental Quality consider the environmental impact of all available technologies. There is simply no need to rely on technology which increases the risk of polluting Oregon coastal waters merely by its long term presence in Oregon waters. Tremont Electric has a safer and cleaner alternative to buoys relying on hydraulic fluid. I hope DEQ will consider this in its determination.

*Response:* While evaluating the application for § 401 certification DEQ considers the project's affects on water quality and determines whether the project will cause or contribute to exceedances of water quality standards. DEQ doesn't consider competing technologies when making this determination.

7) Gus Gates, Oregon Policy Manager, Surfrider Foundation (with citations)

*Comment:* First, Surfrider urges DEQ to require OPT to use only those bio-fouling paints that are free of harmful organotins as negotiated in the Settlement Process. The Project contains mooring lines and anchors, which will likely become encrusted with biofouling species, such as barnacles, mussels, bryozoans, and corals. As such, OPT plans to apply anti-fouling paint to all in-water structures to prevent the growth of fouling organisms. Certain anti-fouling paints can be very dangerous to the environment, specifically, those containing organotin compounds in the form of tributyltin (TBT). In this form organotin anti-fouling paints interfere with biological processes in a diverse range of species. In 2008, the International Marine Organization (IMO) prohibited the use of harmful organotins in anti-fouling paints on all member ships present and future, and required those ships currently coated with such paint to apply a barrier coating to prevent leaching of the underlying non-compliant paint into the marine environment. Based on the international environmental consensus on the vast harms of organotin-containing bio-fouling paints, Surfrider urges DEQ to require OPT to use only those anti-fouling paints that are free of harmful organotins.

*Response:* As noted in the application for § 401 certification, OPT proposes to use ABC3 antifouling paint to inhibit the buildup of colonizing species. This antifouling paint is organotin-free. The active ingredients are cuprous oxide and 4,5 dichloro 3-n-octyl-4-isothiazolin-3-one. The constituents expected to leach from the paint include copper, zinc, iron and ethyl benzene. The applicant and DEQ compared the water column concentrations expected based on leaching rates and no violations of applicable aquatic life or human health criteria are expected. See section 5.2 of this Evaluation and Findings report for the analysis. Additionally, the § 401 certification contains a condition which state that Reedsport OPT Wave Park, LLC shall only use the ABC3 antifouling paint. Changes to the paint can only be made after consultation with DEQ.

*Comment:* Surfrider urges DEQ to require OPT to take those measures necessary to prevent Project equipment from leaking or spilling hydraulic fluid into the Oregon ocean waters. As such, we appreciate DEQ's attention to details on this issue and working with OPT on developing and modifying the SPCC Plan specific to hydraulic fluid leaks and spills to ensure that should such an event occur, all parties involved are prepared and understand the actions that must be taken to ensure a rapid response and cleanup, allowing the least detrimental effect on our marine, coastal, and beach communities as possible.

*Response:* The § 401 certification requires Reedsport OPT wave Park, LCC to implement the Spill Prevention, Control and Countermeasures Plan (SPCC Plan) for the project.

8) Concerned University of Oregon Students, Ben Miller, Taylor Coronel, Jill Hollis, and Mason Trinca

*Comment:* Upon initially hearing of this project our concern was immediately directed to the health and safety of the marine wildlife in this region. Upon further review of the "Wave Energies Effects Briefing Paper" (WEEBP) provided by the Hatfield Marine Science Center at Oregon State University and review of the Reedsport OPT FE Report this concern still remains. As seen in the WEEBP there is a documented abundance of marine life in the region of the proposed site. This wildlife includes Gray Whales, Sea Otters, many species of seabirds, fish, and other biota. Though it seems that much has been researched regarding the chemical and physical effects the buoys will have on ocean currents and water qualities, the potential effects on marine life, particularly regarding entanglement and entrapment of marine animals, remained vague upon reviewing the Reedsport OPT FE Report. Initially, the Mooring lines would provide surface for fungal growth and potential habitat for microorganism, that would eventually attract fish populations, subsequently resulting in feeding grounds for other animals. The WEEBP provides some recommendations that we wish you to consider upon implementation of this project.

"Mitigation: Mitigation for collision and entanglement can include visual cues, such as highly visible paints and acoustic "guidance" to cause animals to perceive the structures or avoid them. Entanglement may also be avoided by using thick, high-tension mooring lines. Entrapment mitigation may be achieved both by visual or acoustic avoidance, but more likely by appropriate device design consideration." (page 45 of the report).

*Response:* The § 401 certifications issued by DEQ address water quality standards and other applicable state laws, whale entanglement is beyond the scope of the §401 certification.

*Comment:* Further concern is raised by the WEEBP about Electromagnetic Fields. The WEEBP recommends armoring and trenching to limit effects of submarine cables.

*Response:* The § 401 certification contains a condition which requires Reedsport OPT Wave Park, LLC to implement the EMF Effects Study Plan as described in the Settlement Agreement. Under this plan prior to deploying any wave energy converter units, Reedsport OPT Wave Park, LLC will collect baseline EMF data. Once the array is installed Reedsport OPT Wave Park, LLC will measure EMF for the 1) ten WEC units; 2) the cables leading from the WEC units to the subsea pod; and 3) the subsea pod. The applicant will submit quarterly updates to the Aquatic Resources and Water Quality Implementation Committee and the committee will determine if additional studies are needed.

*Comment:* Acoustics were another concern that seemed to have limited resolutions. The best mitigation suggestion put forth was siting and device design.

*Response:* Based on this comment, acoustics are addressed in the evaluation and findings report and the § 401 certification. Under the terms of the Settlement Agreement, Reedsport OPT Wave Park, LLC will characterize the acoustic emissions of the wave energy converters. This is now a condition in the § 401 certification for the FERC license.

9) Mason Trinca

*Comment:* A concern of mine about this project is tampering with this aesthetic beauty that the Oregon coast offers.

*Response:* The § 401 certifications issued by DEQ address water quality standards and other applicable state laws, aesthetic concerns are beyond the scope of the §401 certification.

*Comment:* Another concern that I have about this project is the EMF, which permeates from these WEC. I know there's not much knowledge about the short and long terms effects and even amassing data from EMF studies, but shouldn't studies be taken place before an installation of a rather large project.

*Response:* The § 401 certification contains a condition which requires Reedsport OPT Wave Park, LLC to implement the EMF Effects Study Plan as described in the Settlement Agreement. Under this plan prior to deploying any wave energy converter units, Reedsport OPT Wave Park, LLC will collect baseline EMF data. Once the array is installed, Reedsport OPT Wave Park, LLC will measure EMF for the 1) ten WEC units; 2) the cables leading from the WEC units to the subsea pod; and 3) the subsea pod. The applicant will submit quarterly updates to the Aquatic Resources and Water Quality Implementation Committee and the committee will determine if additional studies are needed.

Oral Testimony – Provided on October 25, 2011 at a public hearing held at the Reedsport City Hall:

10) Mr. Miller

*Comment:* Thank you, thank you both for coming down. My comment merely goes to the concern I had about notice. I was only aware of this meeting when a friend of mine in Portland sent me a copy of a newspaper article out of the Portland paper. I was concerned so that maybe people didn't know about the meeting. And wanted to be here, could give their comments. And so I am hoping that there's going to be some additional publication letting people know they can submit their information. The local paper I checked with they didn't have any notice to give. The local radio station, when I checked with them, had not received any notice. And the local daily sheet that comes out, it is kind of an informal newspaper but it is read by a lot of people, weren't notified about it either. So, I just wanted to be sure, I know there will probably be many more of these kinds of meetings, that the notice is provided, so that people do have an opportunity. I was glad to see that people showed up tonight. Thank you again for coming down.

*Response:* DEQ apologizes if notice in local media were insufficient. DEQ noticed the meeting in an ad placed in the “The World” newspaper. The press release was picked up by several news outlets, including Oregon Public Broadcasting.

# Chapter 8: Conclusions and Recommendation for Certification

DEQ has evaluated Reedsport OPT Wave Park, LLC's applications for §401 water quality certification and related supporting documents. 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, provided Reedsport OPT Wave Park, LLC implements the § 401 conditions proposed in this document.

Based on the preceding analysis and findings, it is recommended that pursuant to § 401 of the Federal Clean Water Act and ORS 468B.040, the Director, or assigned signatory, conditionally approve the application for certification of the Reedsport OPT Wave Park, FERC Project No. 12713 and US Army Corps of Engineers No. NWP-2007-62/1, consistent with the findings of this document.