WR File NR S1-28812
WR Doc ID 6798841

State of Washington
DRAFT
Report of Examination for Water Right

PRIORITY DATE	WATER RIGHT NUMBER
December 16, 2015	S1-28812

MAILING ADDRESS	SITE ADDRESS (IF DIFFERENT)
Orcas Water Holdings, LLC Rosario Resort 1400 Rosario Road Eastsound, WA 98245	

Total Quantity Authorized for Diversion

DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
4.01	CFS	2,103.7

Purpose

PURPOSE	DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		PERIOD OF USE (mm/dd)
	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	
Hydropower	0.222	3.788	CFS	789.6	1,314.1	01/01-12/31

REMARKS

Maximum instantaneous rate and annual volume for hydropower under Volume XI of Adjudicated Certificates at page 85 (Record A), Volume XIII of Adjudicated Certificates at page 2, and S1-28812 is 4.01 cfs and 2,103.7 af/yr. S1-28812 may only be utilized when the water level elevation of Cascade Lake exceeds 351 feet, (Cascade Lake Dam principal spillway lip) as defined by the Cascade Lake Adjudication (1978).

IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
NA	NA	NA	NA

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
San Juan	Cascade Lake	Puget Sound	02 – San Juan

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Cascade Lake Dam	173142002000	NA	37N	01W	31	NW SE	48.6502310	-122.865498

Datum: NAD83

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)
160621001000

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE
Part of Government Lot 5, together with tidelands, Section 31, Township 37 North, Range 1 West, W.M.

Proposed Works

From an intake in Cascade Lake, at Cascade Lake Dam, water is routed through a flow meter and then a 10-inch diameter penstock approximately 1,700 feet with a 345-foot vertical drop to the hydroelectric plant. A new AC generator with a system design output of 58 kilowatts has been installed with a Canyon Hydro custom horizontal shaft tangential impulse (Pelton) type turbine, with dual hydraulically actuated variable flow nozzles and hydraulic jet deflector system in the powerhouse. After the water moves through the hydroelectric plant, the tailrace discharges the water through a pond and into Cascade Bay on East Sound.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	Complete	January 1, 2022

Measurement of Water Use and Lake Level

How often must water use and lake level be measured?	Weekly
How often must water use and lake level data be reported to Ecology?	Annually – by January 31st
What rate should be reported?	Maximum instantaneous rate
What volume should be reported?	Annual volume
What lake level data should be reported?	Water level elevation in feet

Provisions

Lake Level Water Right Use Limitations

This water right may only be exercised when the water level elevation in Cascade Lake is greater than 351 feet msl. This is the elevation of the Cascade Lake Dam principal spillway per the Cascade Lake Adjudication (1978).

Power Generation Fees

This authorization is subject to the fees in RCW 90.16.050 and 90.16.090. Orcas Water Holdings shall pay to the State of Washington in advance an annual hydropower license fee based upon the theoretical horsepower of the hydropower facility. The Department of Ecology shall bill Orcas Water Holdings or subsequent operators $1.55 annually under this water right for each year of hydropower operation. This fee is based on the following calculation and is subject to legislative change:

$$\text{Theoretical Horsepower} = \frac{(\text{head in feet})*(\text{cfs})}{8.8} = \frac{(345)*(0.22)}{8.8} = 8.63$$

8.63 Theoretical Horsepower * $0.18 = $1.55

The total power generation fee for the entire hydropower project:

$$\text{Theoretical Horsepower} = \frac{(\text{head in feet})*(\text{cfs})}{8.8} = \frac{(345)*(4.01)}{8.8} = 157.21$$

157.21 Theoretical Horsepower * $0.18 = $28.30

Lake Level Gage
A staff gage that displays the lake level in feet above msl, or that can be correlated, shall be maintained at the dam on Cascade Lake.

Lake level elevation, whether above or below the spillway lip, must be recorded at least weekly. Data shall be both retained by the permit holder and submitted to Ecology on an annual basis.

Metering and Reporting
An approved measuring device must be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use," Chapter 173-173 WAC.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

Recorded water use data shall be submitted to Ecology via the Internet. To set up an Internet reporting account, contact the Northwest Regional Office or go to https://fortress.wa.gov/ecy/meteringx/Login.aspx. If you do not have Internet access, you can submit paper copies of your water use data by contacting the Northwest Regional Office for forms to use to submit your water use data.

Department of Fish and Wildlife Requirement(s)
The intake(s) must be screened in accordance with Department of Fish and Wildlife screening criteria (pursuant to RCW 77.57.010, RCW 77.57.070, and RCW 77.57.040). Contact the Department of Fish and Wildlife, 600 Capitol Way N, Olympia, WA 98501-1091. Attention: Habitat Program, Phone: (360) 902-2534 if you have questions about screening criteria. http://www.wdfw.wa.gov/reg/regions.htm

Easement and Right-of-Way
If the water source and/or water transmission facilities are not wholly located upon land owned by the water right holder, they are advised that issuance of a water right by this department does not convey a right of access to, or other right to use, land which the water right holder does not legally possess. Obtaining such a right is a private matter between applicant and owner of that land.

Proof of Appropriation
The water right holder must file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and

the quantity of water required by the project has been put to beneficial use. Once Ecology has accepted the Proof of Appropriation form, the applicant shall retain the services of a Certified Water Rights Examiner (CWRE) to verify the extent of the perfected right and prepare the necessary documentation to allow Ecology to issue a water right certificate for this project. The certificate will reflect the extent of the project perfected within the limitations of this authorization. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions. Information on hiring a CWRE is available on Ecology's website at: http://www.ecy.wa.gov/programs/wr/rights/cwrep.html or by calling the appropriate Ecology regional office.

Inspections
Department of Ecology personnel, with proper credentials, will have access to the project location to inspect records of water use, diversions, measuring devices, and associated distribution systems for compliance with water law at all times.

Senior Water Rights
This authorization to make use of public waters of the state is subject to existing rights, including any tribal water rights held by the United States for the benefit of tribes, to the extent they may exist.

Findings of Facts
Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I concur with the investigator that water is available from the source in question under certain conditions; that there will be no impairment of existing rights; that the purpose of use will be beneficial; and that there will be no detriment to the public interest.

Therefore, I ORDER approval of Application No. S1-28812, subject to existing rights and the provisions specified above.

Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of the Order.

File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

- You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel RD SW Ste 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Signed at Bellevue, Washington, this _____ day of _____ 2016.

_____

Thomas Buroker, Section Manager

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov. To find laws and agency rules visit the Washington State Legislature Website: http://www1.leg.wa.gov/CodeReviser.

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INVESTIGATOR'S REPORT
Application for Water Right: Orcas Water Holdings, LLC
Water Right Control Number: S1-28812
Investigators: Andrew B. Dunn – RH2 Engineering, Inc.

BACKGROUND

This report serves as the written findings of fact concerning Water Right Application Number S1-28812.

On December 16, 2015, Orcas Water Holdings, LLC (Orcas Water Holdings) filed a water right application with the State of Washington Department of Ecology (S1-28812). In the application, Orcas Water Holdings requested 4.01 cubic feet per second (cfs) for hydropower purposes from a surface water diversion from Cascade Lake.

The intent of the water right application is to maximize the water that is being run through the hydropower facility by minimizing the water lost from Cascade Lake through uncontrolled spill.

Table 1 Summary of Requested Water Right

Applicant Name	Orcas Water Holdings, LLC
Date of Application	December 16, 2015
Place of Use	Part of Government Lots 3, 4 and 5, together with tidelands, Section 6, Township 36 North, Range 1 West, W.M.

County	Waterbody	Tributary To	WRIA
San Juan	Cascade Lake	Puget Sound	02 – San Juan

Purpose	Rate	Unit	Af/yr	Begin Season	End Season
Hydropower	4.01	CFS	NP	01/01	12/31

Source Name	Parcel	Well Tag	Twp	Rng	Sec	QQ Q	Latitude	Longitude
Cascade Lake	173142002000	NA	37N	01W	31	NW SE	NP	NP

cfs = cubic feet per second; af/yr = acre-feet per year; Sec. = Section; QQ Q = Quarter-quarter of a section; WRIA = Water Resource Inventory Area; W.M. = Willamette Meridian. NA = Not applicable. NP = Not provided.

Legal Requirements for Approval of Appropriation of Water

Chapter 90.03 RCW authorizes the appropriation of public water for beneficial use and describes the process for obtaining water rights. Laws governing the surface water right permitting process are contained in RCW 90.03.250 through 90.03.340. In accordance with RCW 90.03.290, determinations must be made on the following four criteria in order for an application for water rights to be approved:

1. Water must be available
2. There must be no impairment of existing rights
3. The water use must be beneficial
4. The water use must not be detrimental to the public interest

Each of these four tests is addressed in the **INVESTIGATION** section.

Public Notices

RCW 90.03.280 requires that notice of a water right application be published once a week, for two consecutive weeks, in a newspaper of general circulation in the county or counties where the water is to be stored, diverted and used. Notice of this application was published in *The Journal of the San Juan Islands* on January 13 and 20, 2016.

Ms. Michele Curtis, of the Department of Ecology's (Ecology) Northwest Regional Office, reported on May 16, 2016, that Ecology had received no protests on the water right application public notice.

Consultation with the Department of Fish and Wildlife

The Department of Ecology must give notice to the Washington Department of Fish and Wildlife (WDFW) of applications to divert water. On May 31, 2016 and June 6, 2016, Andrew Dunn of RH2 Engineering, notified Mr. Steven Boessow (Water Rights Biologist) of WDFW of the pending surface water right application. Mr. Boessow was provided with a summary of the draft decision. On June 6, 2016, Mr. Boessow provided a letter stating that WDFW did not opposed the approval of this surface water application.

State Environmental Policy Act (SEPA)

A water right application is subject to a SEPA threshold determination (i.e., an evaluation whether there are likely to be significant adverse environmental impacts) if any one of the following conditions are met.

(a) It is a surface water right application for more than 1 cubic feet per second, unless that project is for agricultural irrigation, in which case the threshold is increased to 50 cubic feet per second, so long as that irrigation project will not receive public subsidies;
(b) It is a groundwater right application for more than 2,250 gallons per minute;
(c) It is an application that, in combination with other water right applications for the same project, collectively exceed the amounts above;
(d) It is a part of a larger proposal that is subject to SEPA for other reasons (e.g., the need to obtain other permits that are not exempt from SEPA);
(e) It is part of a series of exempt actions that, together, trigger the need to do a threshold determination, as defined under WAC 197-11-305.

Since greater than 1 cfs was requested for appropriation, this application was not categorically exempt from SEPA and a threshold determination was required.

The Washington State Department of Ecology (Water Resources Program) acted as the lead agency. On February 24, 2016, Ecology issued a SEPA Determination of Non-Significance (DNS) based on this water right application. Notice of the decision was emailed to interested parties. No comments were received.

Cost Reimbursement

This application is being processed under a Cost Reimbursement Agreement between the applicant and the Department of Ecology. The applicant selected RH2 Engineering, Inc. (RH2) to process this application on Ecology's behalf. Ecology had determined that no senior water right applications were requesting water from the source of supply prior to initiation of water right processing.

INVESTIGATION

Site Visit

Since Andrew Dunn (RH2) and Buck Smith (Department of Ecology) have made many site visits to Cascade Lake and are familiar with the hydrology, infrastructure, and facilities involved, no site visit was performed specifically for this application.

Cascade Lake Watershed

Cascade Lake is located on Eastern Orcas Island, in San Juan County, in Water Resource Inventory Area 2. Its surface area is approximately 169 acres in size (RH2, 2015). The natural drainage basin upstream of the dam (not including the diversion from Cascade Creek) is approximately 2,053 acres. The watershed ranges from an elevation of 351 feet at the lake up to 2,294 feet extending up the southwestern flank of Mount Constitution. Much of the Cascade Lake watershed falls within Moran State Park.

Moran Creek and Cold Creek are the largest natural tributaries to Cascade Lake. Both of these creeks originate on the north and northeast side of the lake on the western flank of Mount Constitution (**Figure 1**).

Water naturally enters the watershed through precipitation (rain and snow). In addition to these natural sources of water, water is also imported into Cascade Lake from Cascade Creek through a 0.5-mile-long canal, which is referred to in this report as Rosario Ditch. Orcas Water Holdings owns, operates, and maintains this diversion and canal, which is located wholly within Moran State Park (**Figure 1**).

Water discharges from Cascade Lake through evaporation, domestic diversion, hydropower diversion, and by spilling through the Cascade Lake Dam and flowing into Captain Jack Creek, which flows one-quarter mile down to Cascade Bay in East Sound (**Figure 1**).

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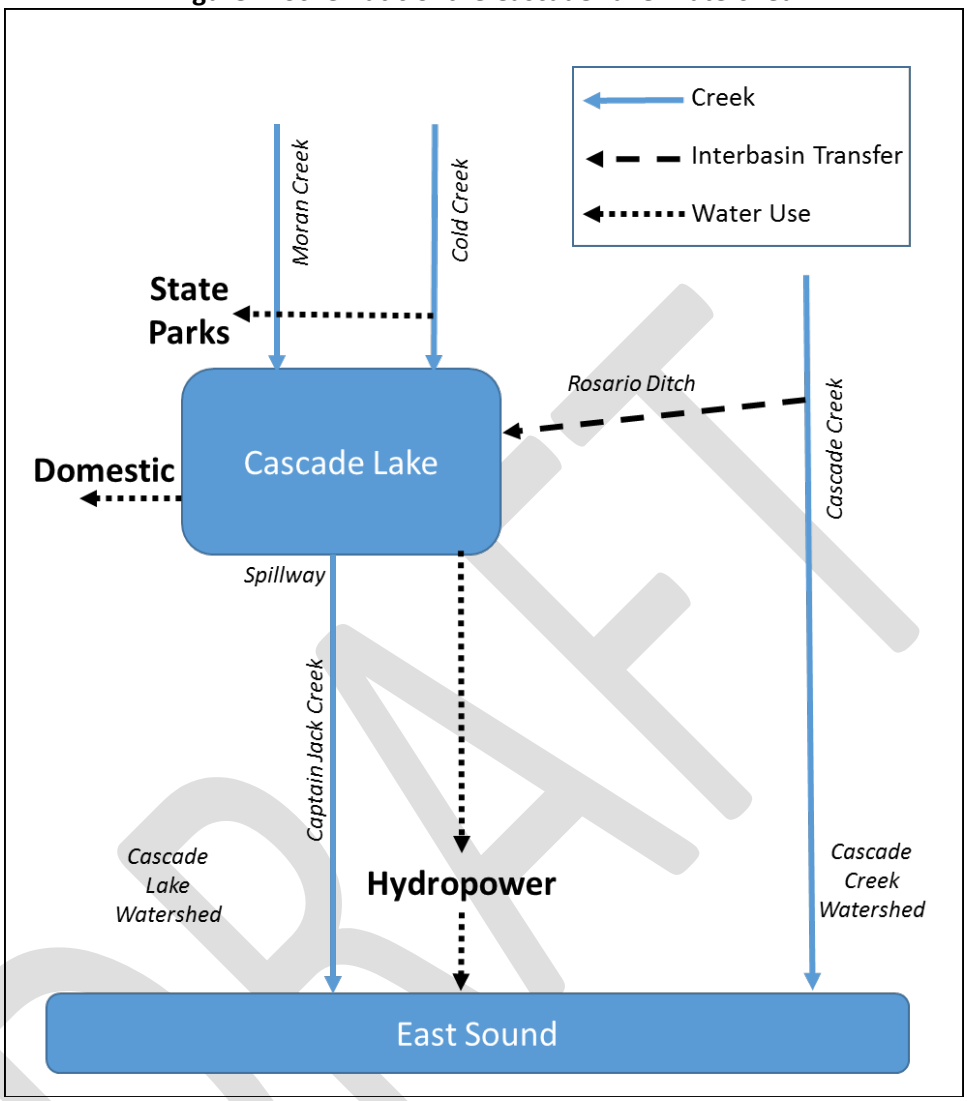
Figure 1. Schematic of the Cascade Lake Watershed



Mountain Lake-Cascade Creek and Cascade Lake Adjudications

Two adjudications have been performed that involve Cascade Lake. Those adjudications include the Mountain Lake-Cascade Creek Adjudication (County Cause No. 2448), which was completed in 1970, and the Cascade Lake Adjudication (County Cause No. 3236), which was completed in 1978. These adjudications established rights to divert water from Cascade Creek into Cascade Lake (domestic and hydropower), the storage of natural and imported water in Cascade Lake, and the use of natural water from Cascade Lake (irrigation of 5 acres, hydropower, and fire protection).

In the two adjudications, priority dates and the extent and validity of water rights was determined. Since then, multiple water right change applications have been processed, the owners of the water rights have changed, and portions of the water rights have been sold to new owners. The current attributes of the water rights associated with Orcas Water Holdings are shown below:

Cascade Lake Adjudication:

Reference Number:	Volume XIII-A of Adjudicated Water Right Certificates, at page 1
Priority Date:	1910 – Class I
Purpose:	Storage of water in Cascade Lake
Source:	Precipitation, inlet streams to Cascade Lake, appropriated water from Cascade Creek
Impoundment Location:	NW ¼ SE ¼, Section 31, Township 37 North, Range 1 West W.M.
Storage Quantity:	1,879 acre-feet to lip of spillway at elevation 351 feet msl
Further Provisions:	Filling may take place any time during the year; lake level must be maintained at no less than 347 feet above msl (four feet below spillway) in years of normal precipitation and no less than 345 feet above msl (six feet below spillway) during dry years.

The adjudication court defined when a year is normal or dry based on the amount of precipitation recorded at the Olga weather station, which has been more-or-less continuously monitored since July 1891. A normal year was defined as having precipitation greater than or equal to 29.22 inches and a dry year was defined as having precipitation less than 29.22 inches.

Reference Number:	Volume XIII of Adjudicated Water Right Certificates at page 2
Priority Date:	1910 – Class I
Purpose:	Power generation and domestic
Source:	Natural and stored waters of Cascade Lake and its tributary streams
Point of diversion:	NW ¼ SE ¼, Section 31, Township 37 North, Range 1 West W.M.
Instantaneous quantities:	Total – 2.31 cfs
	Domestic – 0.606 cfs
	Hydropower – 1.704 cfs
Annual quantities:	Total – 499 af/yr
	Domestic – 159 af/yr
	Hydropower – 340 af/yr

Mountain Lake-Cascade Creek Adjudication:

Reference Number:	Volume XI of Adjudicated Water Right Certificates at page 85 (Record A)
Priority Date:	1884 – Class I
Purpose:	Hydropower and domestic
Source:	Cascade Creek (diverted to Cascade Lake)
Point of diversion:	Government Lot 1, Section 5, Township 36 North, Range 1 West W.M.
Instantaneous quantities:	3.0 cfs – January, November, December
(from Cascade Creek)	2.0 cfs – February, March
	1.5 cfs – October
	1.0 cfs – April, May
	0.75 cfs – June
	0.5 cfs – September
	0.25 cfs – July, August
Instantaneous quantities:	Total – 2.443 cfs
(from water stored in Cascade Lake)	
	Domestic – 0.359 cfs

	Hydropower – 2.084 cfs
Annual quantities:	1,098.1 af/yr Domestic – 124 af/yr (90 af/yr owned by Orcas Water Holding and 34 af/yr owned by Washington Water Service Company) Hydropower – 974.1 af/yr

The current status of the adjudicated certificates related to hydropower use are contained in **Table 1**.

Table 1. Existing Hydropower Water Rights Held by Orcas Water Holdings LLC

Water Right	Instantaneous Rate	Annual Volume	Source
Volume XIII of Adjudicated Certificates, at page 2	1.704 cfs	340 af/yr	Cascade Lake
Volume XI, of Adjudicated Certificates, at page 85 Record A	2.084 cfs	974.1 af/yr	Cascade Creek stored in Cascade Lake
Total	**3.788 cfs**	**1,314.1 af/yr**	

The original spillway gage is located on the southern side of the principal spillway window (**Figure 2**). This gage marks elevation in half foot increments and was designed for measurement of the lake level when it is below the principal spillway lip. A new staff gage and stilling well that allows for data logger placement was mounted to the upstream face of the dam on the north side of the principal spillway. The correlation between the two gages is that 351 feet elevation on the original gage is equal to 4.80 feet on the new staff gage.

Cascade Lake Dam

Cascade Lake Dam is a concrete single arch dam located at the western end of Cascade Lagoon, which is an arm of the lake that extends west from the main body of the lake. The Department of Ecology, Water Resources Program, Dam Safety Office has assigned this dam State ID SJ2-281 (National ID WA00281) (Department of Ecology, 2015). The principal spillway for the dam is a rectangular window cut through the 0.8-foot-thick concrete of the dam and measuring 6.6 feet wide by 1.75 feet tall (**Figure 2**). Based on the water right adjudication, the elevation of the spillway lip is 351 feet. Water spilling from the principal spillway is channeled on a sloped metal chute away from the back side of the dam and eventually cascades into a channel that passes under Palisades Drive in a culvert and then continues down a steep slope (Captain Jack Creek) toward Cascade Bay in East Sound. In addition to the principal spillway, there are also pipes that extend through the dam and can be operated to allow additional discharge from the lake. The invert elevation of the upper of these two pipes is approximately 0.58 feet higher than the spillway lip. The invert elevation of the lower pipe is unknown, but is significantly lower than the spillway elevation.

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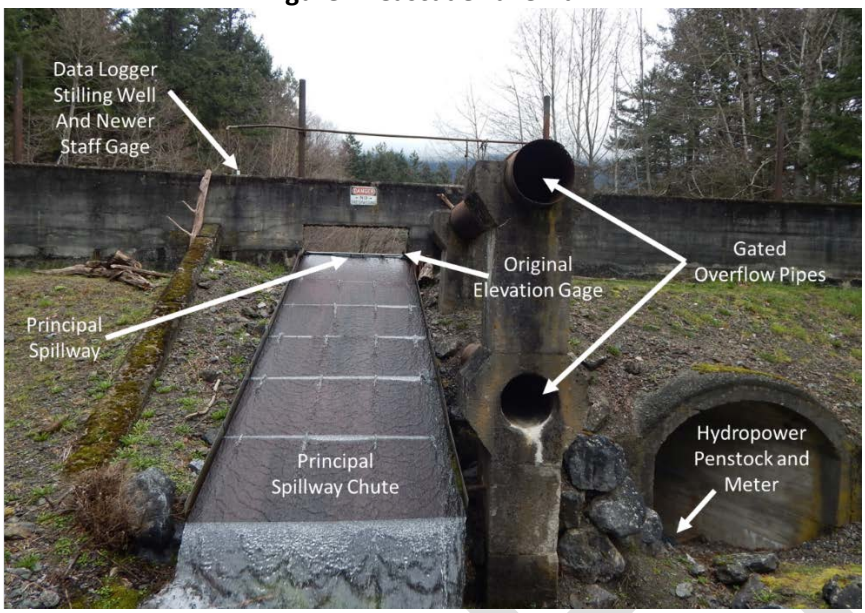
Figure 2. Cascade Lake Dam



Cascade Lake Hydrology

For the years with data, in each of the water years 1998 through 2016, the lake has managed to fill completely and spill (**Figure 3**).

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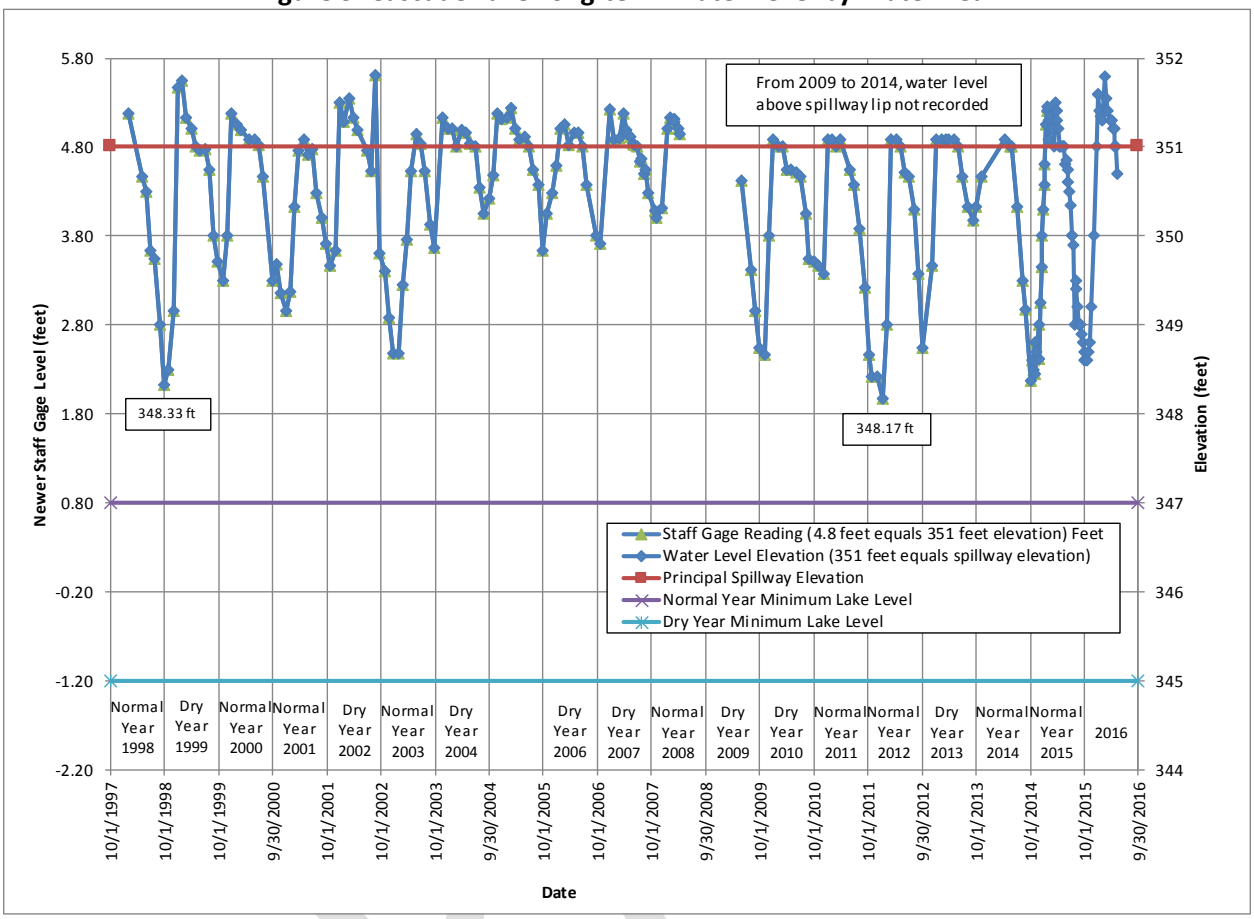
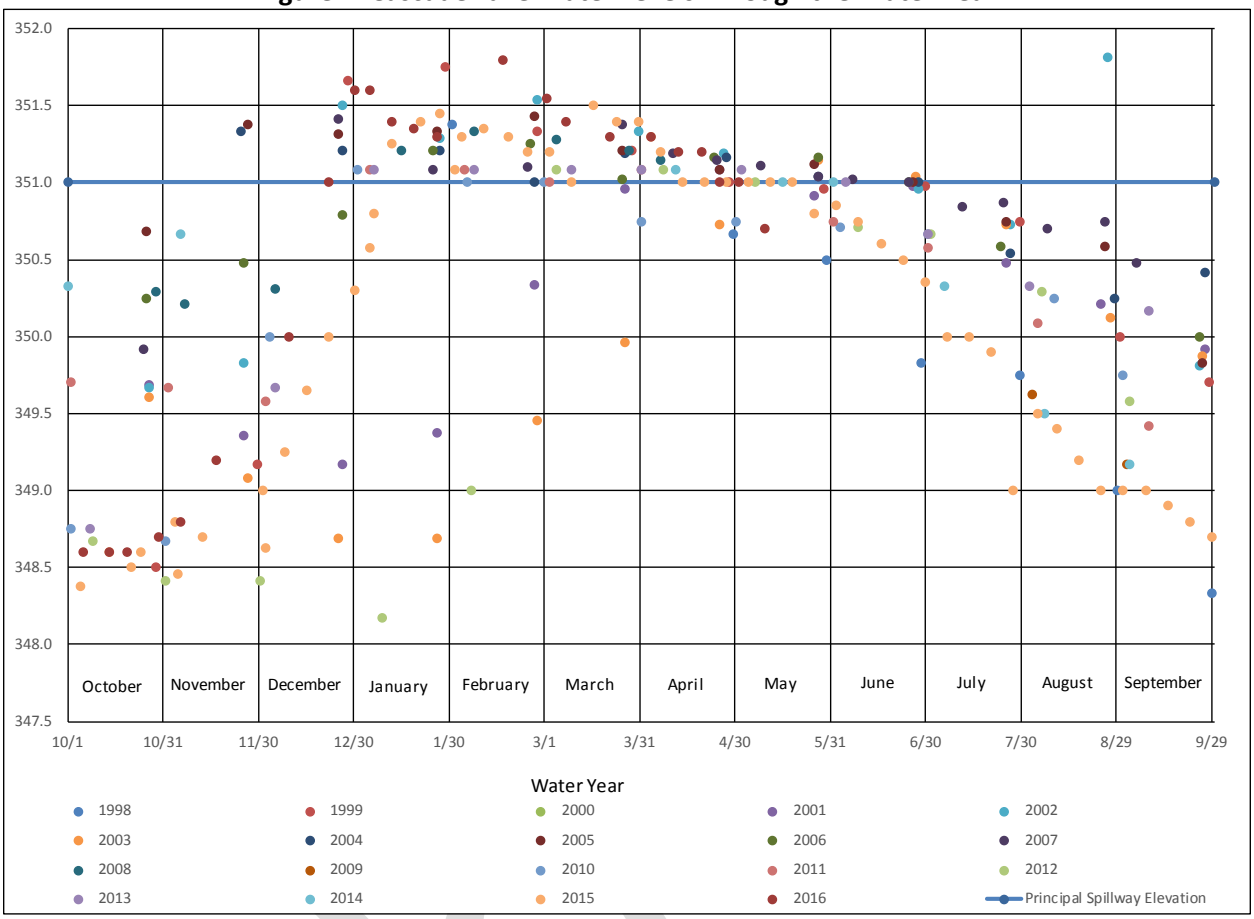
Figure 3. Cascade Lake Long-term Water Level by Water Year



In **Figure 3**, each water year is designated as being either “dry” or “normal”. The cutoff for this distinction, which was defined in the 1978 Cascade Lake Adjudication, is based on the annual precipitation at the Olga weather station. The cutoff between normal and dry years is 29.22 inches.

Figure 4 shows the seasonality of when the lake level has historically been above and below the spillway lip. From this figure, the lake is spilling most often between December and June.

Figure 4. Cascade Lake Water Levels Through the Water Year



RH2 (2015) found that over the period of April 2007 through March 2008, the natural inflow into Cascade Lake, minus evaporation and seepage, was 1,326 acre-feet. Over that same period 628 acre-feet, or approximately half of the natural inflow, flowed out of the lake over the spillway without being beneficially used. The precipitation measured during that period at the Olga weather station was 24.51 inches (the 95th driest on record), suggesting that the volume of natural inflow for the period was less than would be expected in an average year. Other investigations have estimated the average annual natural inflow to be between 2,700 acre-feet (Ecology, 1975) and 3,684 acre-feet (RH2, 2005).

Proposed Use and Basis of Water Demand

Figures 3 and **4** suggest that the water level elevation of Cascade Lake will typically not be above the spillway elevation for the entire year, but is most often above the spillway elevation from December through June. 4.01 cfs continuously all year is equal to 2,903.1 af/yr. 2,903.1 af/yr represents the maximum volume of water that could physically be run through the hydropower facility in a year. Orcas Water Holdings already holds a combined 1,314.1 af/yr of hydropower water rights from Cascade Lake and Cascade Creek sources (**Table 1**).

Review of hydropower data from 1998 through 2008 shows that historically, hydropower has been used most heavily from November through April with less use from May through October. That data also identified calendar year 2000 as the highest hydropower use year, with 1,170.8 acre-feet being run through the hydropower facility (**Table 2**).

Table 2. Domestic and Hydropower Water Diverted from Cascade Lake

Year	Domestic Acre-feet	Hydropower Acre-feet	Combined Total Acre-feet
1998	158.81	966.83	1,125.64
1999	160.88	808.27	969.15
2000	119.48	1,170.79	1,290.27
2001	125.97	848.64	974.61
2002	116.42	812.96	929.37
2003	115.76	568.69	684.45
2004	109.08	547.41	656.50
2005	106.44	514.81	621.24
2006	112.45	572.22	684.67
2007	107.64	546.85	654.48
2008	79.24	Unknown	Unknown
2009	76.62	Unknown	Unknown
2010	79.00	979.37	1,058.37
2011	80.16	1,041.45	1,121.61
2012	83.17	1,047.88	1,131.05
2013	83.71	408.60	492.31
2014	89.13	868.66	957.79

The use in 2000 was still 143.3 acre-feet less than the water right limit, but hydropower is not subject to relinquishment as long as the hydropower fees have been paid (RCW 90.14.140(2)(a)). Ecology confirmed that Orcas Water Holdings has paid all required hydropower fees for this project (License HP-222). To calculate the annual volume to grant under this water right the following process was used (**Table 3**). First, the percentage of total for each month was determined for the 2000 calendar year data. Second, this percentage was then used to divide up the existing hydropower allocation of 1,314.1 af/yr by month. Third, the continuous instantaneous rate was calculated based on each monthly volume. Fourth, the calculated continuous instantaneous rate was subtracted from the hydropower facility capacity of 4.01 cfs for the months of December through June to produce the available instantaneous capacity. Fifth, the available instantaneous capacity was used to determine the additional volume that could be run through the hydropower facility for each month. Finally, the monthly volumes were added together to determine the annual volume to allocate. **Table 3** lays out the results of the calculations described above.

Table 3. Calculation of Additional Allocation

Month	Days	2000		Percentage of Total	Full Water Right Use		Additional Allocation	
		(cfs)	(af)		(cfs)	(af)	(cfs)	(af)
January	31	2.68	164.61	14.1%	3.00	184.76	1.01	61.8
February	28	3.15	175.05	15.0%	3.54	196.47	0.47	26.2

March	31	2.21	135.90	11.6%	2.48	152.53	1.53	94.0
April	30	1.02	60.75	5.2%	1.15	68.19	2.86	170.4
May	31	1.04	63.97	5.5%	1.17	71.79	2.84	174.8
June	30	1.12	66.53	5.7%	1.25	74.67	2.76	163.9
July	31	1.02	62.67	5.4%	1.14	70.34	0	0
August	31	0.98	60.54	5.2%	1.11	67.95	0	0
September	30	1.31	78.22	6.7%	1.48	87.80	0	0
October	31	1.09	66.81	5.7%	1.22	74.99	0	0
November	30	1.74	103.73	8.9%	1.96	116.43	0	0
December	31	2.15	132.01	11.3%	2.41	148.17	1.60	98.4
Total	365	**-**	1,170.79	100.0%	-	1,314.10	-	**789.6**

Therefore, 789.6 af/yr of additive hydropower water rights will be recommended. The total hydropower water rights that can be run through the plant under existing water rights plus this new allocation are equal to 2,103.7 af/yr.

Other Rights Appurtenant to the Place of Use

Water rights diverting from Cascade Lake are held by Orcas Water Holdings, Washington Water Service Company for domestic/community domestic, and hydropower purposes of use (**Table 4**).

Table 4. Consumptive Water Rights Diverted from above Cascade Lake Dam

Water Right Number	Water Right Holder	Priority Date	Purpose	Qi (cfs)	Qa (af/yr)	Source
Volume XI, of Adjudicated Certificates, at page 85 Record A	Orcas Water Holdings and Washington Water Service Company	1884	Domestic and Hydropower	2.443 0.359 (domestic) 2.084 (hydropower)	1,098.1 124 (domestic) 974.1 (hydropower)	Stored Water in Cascade Lake from Cascade Creek
Volume XIII, of Adjudicated Certificates, at page 2	Orcas Water Holdings	1910	Domestic and Hydropower	2.31 0.606 (community domestic) 1.704 (hydropower)	499 159 (community domestic) 340 (hydropower)	Cascade Lake Natural Water
			Total	***4.753*** ***0.965 (domestic)*** ***3.788 (hydropower)***	***1,597.1*** ***283 (domestic)*** ***1,314.1 (hydropower)***	**-**

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All domestic and hydropower water used by Orcas Water Holdings is fully consumptive to Cascade Lake. All of the domestic water is taken to a wastewater treatment facility, which is discharged outside of the basin. Rosario's hydropower plant is located near sea level and takes advantage of the 345-foot drop from Cascade Lake for power production. Rosario's hydropower facility historically produced DC power using a Pelton wheel and generator. Recently, a new AC power plant was installed.

The domestic water for Rosario (now operated by Washington Water Service Company) and hydropower water are diverted directly from Cascade Lake. Over the period of 1997 through 2014, the average annual diversion volume for domestic use was 106.11 af/yr with a minimum of 76.62 af/yr in 2009 and a maximum of 160.88 af/yr in 1999. Over the period of 1998 through 2014, the average annual diversion volume for hydropower use was 780.23 af/yr with a minimum of 408.60 af/yr in 2013 and a maximum of 1,170.79 af/yr in 2000. The highest year of combined domestic and hydropower use was 2000 with a total use of 1,290.27 af/yr (**Table 2**).

No water rights, authorizing diversion from Capitan Jack Creek, downstream from the Cascade Lake Dam, were identified using the Department of Ecology's Water Resources Explorer (accessed April 29, 2016).

Impairment Considerations

Impairment is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection. A water right application may not be approved if it would:

- Interrupt or interfere with the availability of water to an adequately constructed groundwater withdrawal facility of an existing right. An adequately constructed groundwater withdrawal facility is one that (a) is constructed in compliance with well construction requirements and (b) fully penetrates the saturated zone of an aquifer or withdraws water from a reasonable and feasible pumping lift.
- Interrupt or interfere with the availability of water at the authorized point of diversion of a surface water right. A surface water right conditioned with instream flows may be impaired if a proposed use or change would cause the flow of the stream to fall to or below the instream flow more frequently or for a longer duration than was previously the case.
- Interrupt or interfere with the flow of water allocated by rule, water rights, or court decree to instream flows.
- Degrade the water quality of the source to the point that the water is unsuitable for beneficial use by existing users (e.g., via sea water intrusion).

This application requests to divert up to 4.01 cfs. Since this water right will be provisioned to only allow diversion when Cascade Lake is spilling, it will not impair the senior adjudicated water rights because the water that is spilling is no longer available to the senior adjudicated water rights. The rate of 4.01 cfs is the maximum rate that can be diverted for hydropower under this and existing rights. Utilization of the right only when the lake is spilling and ceasing diversion when the lake level drops below the spillway lip will protect the senior adjudicated water rights and the minimum lake levels that were specified in the Cascade Lake Adjudication (1978).

Water Availability

For water to be available for appropriation, it must be both physically and legally available.

Physical availability

For water to be physically available for appropriation, there must be surface water present in quantities and quality and on a sufficiently frequent basis to provide a reasonably reliable source for the requested beneficial use or uses.

Water spills from the Cascade Lake Dam on an annual basis. The timing and rate of spill varies with the amount of natural precipitation, the timing of the precipitation, the lake level, the amount of water imported into the basin from Cascade Creek, and the amount of water put to domestic and hydropower beneficial uses.

While water is not physically available year round, it is often available during the winter and spring. Hydropower does not require a firm source of supply, so this seasonal physical availability is acceptable.

Therefore, water is physically available for appropriation under certain specific conditions and at certain specific times, as specified in the provisions section.

Legal availability

To determine whether water is legally available for appropriation, the following factors are considered:

- Regional water management plans – which may specifically close certain water bodies to further appropriation.
- Existing rights – which may already appropriate physically available water.
    - Volume of water represented by senior water rights, including federal or tribal reserved rights or claims;
    - Water right claims registered under Chapter 90.14 RCW;
    - Groundwater uses established in accordance with Chapter 90.44 RCW, including those that are exempt from the requirement to obtain a permit; and
    - Potential riparian water rights, including non-diversionary stock water.
- Fisheries and other instream uses (e.g., recreation and navigation). Instream needs, including instream and base flows set by regulation. Water is not available for out of stream uses where further reducing the flow level of surface water would be detrimental to existing fishery resources.
- Ecology may deny an application for a new appropriation in a drainage where adjudicated rights exceed the average low flow supply, even if the prior rights are not presently being exercised. Water would not become available for appropriation until existing rights are relinquished for non-use by state proceedings.

The adjudication set minimum lake levels for Cascade Lake in normal and dry years. Since this water right will only be used for taking water when the lake is uncontrollably spilling, the lake level will not be dropped below 351 feet elevation due to this appropriation. There are no administrative rules dealing with minimum instream flows or lake closures associated with WRIA 2. Cascade Lake and Captain Jack Creek are not identified on the Surface Water Source Limitation (SWSL) list by WDFW. The result is that

the lake has not been closed to future consumptive appropriation. Therefore, water is legally available for appropriation under certain specific conditions and at certain specific times.

Beneficial Use

The proposed use of water for hydropower (hydroelectric power production) is defined in statute (RCW 90.54.020(1)) as a beneficial use.

Public Interest Considerations

The proposed new permit will allow the water right holder to divert only at times when there is excess natural water in Cascade Lake.

The water ultimately discharges to Cascade Bay in East Sound regardless if it is used to produce clean electricity by being run through the hydropower plant, or if the water is allowed to spill and flow down Captain Jack Creek.

Approval of this water right will not have a negative impact on the public's ability to enjoy Cascade Lake within Moran State Park.

The Washington State Department of Fish and Wildlife does not oppose approval of the application.

Consideration of Protests and Comments

No protests were received during the public notice protest period.

Therefore, the requested appropriation will not prove detrimental to the public interest.

Conclusions

The facts in this investigation support findings that water is both physically and legally available, that the proposed diversion will not impair existing water rights, that the proposed use is beneficial, and that the proposed permit will not prove detrimental to the public interest.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that this request for a water right be approved in the amounts and within the limitations listed below and subject to the provisions listed above.

Purpose of Use and Authorized Quantities

The amount of water recommended is a maximum limit and the water user may only use that amount of water within the specified limit that is reasonable and beneficial:

4.01 cfs (0.222 additive, 3.788 non-additive)
2,103.7 af/yr (789.6 af/yr additive, 1,314.1 af/yr non-additive)
Hydropower
Continuously

Subject to Cascade Lake water level elevation being above 351 feet as defined in the Cascade Lake Adjudication (1978). This elevation is considered to be the principal spillway lip at the Cascade Lake Dam, as currently configured.

Point of Diversion
NW¼ SE¼, Section 31, Township 37 North, Range 01 West, W.M.

Place of Use
Part of Government Lot 5, together with tidelands, Section 31, Township 37 North, Range 01 West, W.M.

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Andrew B. Dunn, L.G., L.HG., CWRE – RH2 Engineering, Inc. *Date*

Buck Smith, L.G., L.HG. – Department of Ecology *Date*

If you need this publication in an alternate format, please call Water Resources Program at (360) 407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

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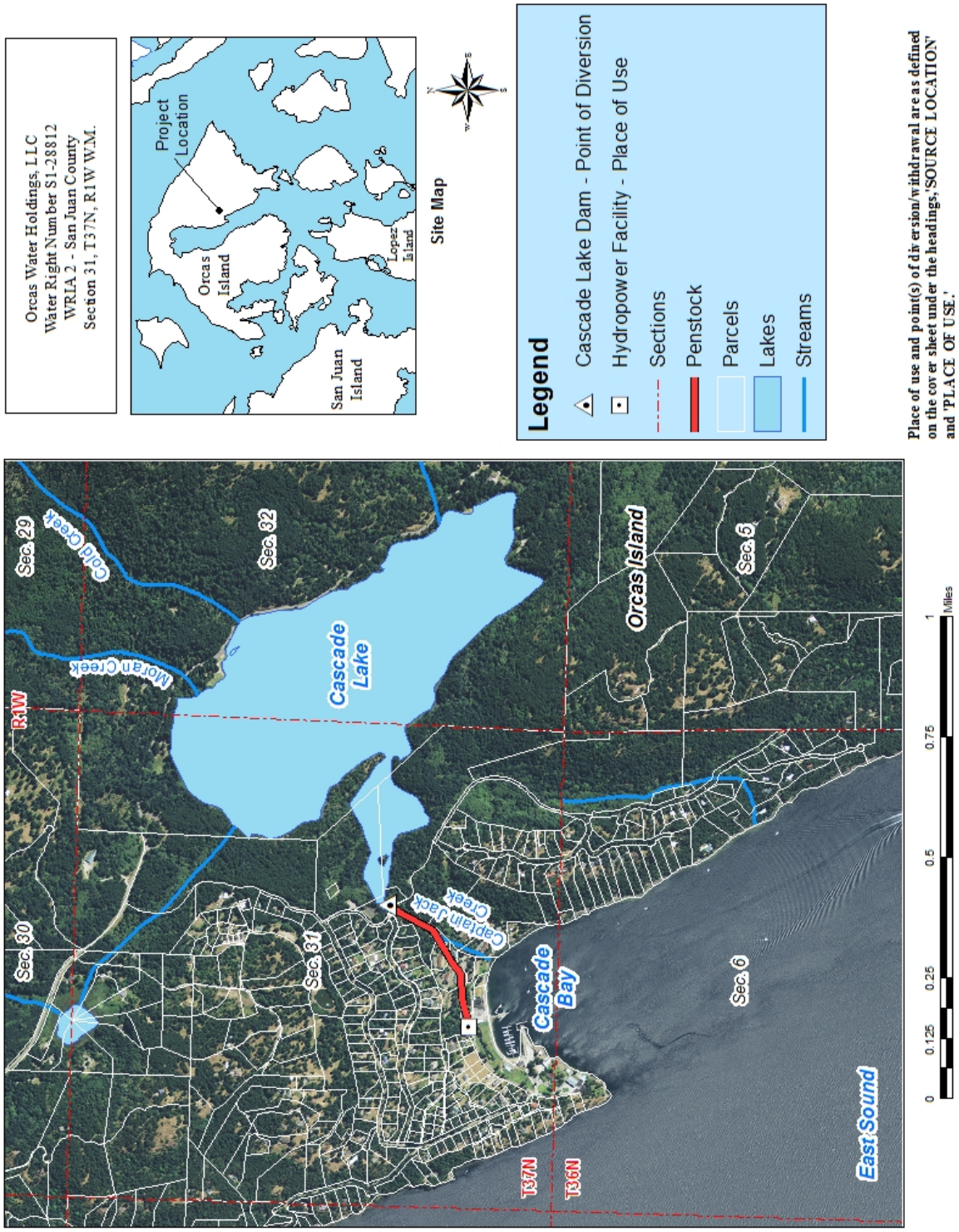
ATTACHMENT 1 – MAP