STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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October 18, 2010

Mr. Kim D. Moore
Public Utility District No. 1 of Snohomish County
2320 California Street
Everett, WA 98201

RE: Henry M. Jackson Hydroelectric Project (FERC No. 2157), Order No. 7918
Water Quality Certification Order

Dear Mr. Moore:

The request for certification under Section 401 of the Clean Water Act (33 USC § 1341) for the relicensing of the Henry M. Jackson Hydroelectric Project (FERC No. 2157) in Snohomish County, Washington, has been reviewed. On behalf of the state of Washington, the Department of Ecology certifies that reasonable assurance exists that the Jackson Project, subject to and limited by the conditions stated by the enclosed Order, will comply with applicable provisions of 33 USC 1311, 1312, 1313, 1316, 1317, and other appropriate requirements of state law.

This certification shall be deemed withdrawn if the Federal Energy Regulatory Commission (FERC) does not issue a license for Henry M. Jackson Project within five years of the date of this issuance. This certification may be modified or withdrawn by Ecology prior to the issuance of the license based upon new information or changes to the October 9, 2009, Settlement Agreement or water quality standards or appropriate requirements of state law. If the certification is withdrawn, the applicant will then be required to reapply for the certification under Section 401 of the Clean Water Act.

This certification is subject to the conditions contained in the enclosed Order. If you have any questions, please contact Monika Kannadaguli at 425-649-7028. The enclosed Order may be appealed by following the procedures described in the Order.

Sincerely,

Kevin C. Fitzpatrick
Water Quality Section Manager

KCF:MK:ct

Enclosure

By certified mail 7009 2820 0001 7154 9964

cc: FERC Secretary, Kimberley Bose
FERC Service List for Henry M. Jackson Hydroelectric Project (FERC No. 2157)
Jeannie Summerhays, Department of Ecology, via e-mail: JSUM461@ecy.wa.gov
Monika Kannadaguli, Water Quality Program, Department of Ecology
Joan Marchioro, State of Washington Office of Attorney General, via e-mail: JoanM2@atg.wa.gov
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NWRO Files: FERC/Henry M. Jackson Hydroelectric Project

401 Certification Order
Henry M. Jackson Hydroelectric Project

Owned and Operated by Public Utility District No. 1 of Snohomish County

Certification Order No. 7918
FERC License No. 2157

By

Monika Kannadaguli
Water Quality Program
Northwest Regional Office/Ecology
3190 160th Ave SE
Bellevue, WA 98008-5452

October 18, 2010

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TABLE OF CONTENTS

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF GRANTING A WATER QUALITY 401 CERTIFICATION ORDER TO: Public Utility District No.1 of Snohomish County	)))	ADMINISTRATIVE ORDER DOCKET # 7918

To: Mr. Kim Moore
Snohomish Public Utility District
2320 California Street
Everett, WA 98201

Order Docket #	7918
Site Location	Snohomish County, Washington

On October 20, 2009, Public Utility District No. 1 of Snohomish County (SNOPUD) filed an application with the Washington State Department of Ecology (Ecology) requesting issuance of a 401 Water Quality Certification under the provisions of Section 401 of the Clean Water Act (33 USC § 1341) to be submitted with its application for a relicense to the Federal Energy Regulatory Commission (FERC) for the Henry M. Jackson Hydroelectric Project (Jackson Project), FERC No. 2157. SNOPUD's current license for the Jackson Project expires on May 31, 2011.

This 401 certification administrative order (Order) covers the operation and maintenance of the Jackson Project as proposed in SNOPUD's license application to FERC and as supplemented by the Settlement Agreement executed on October 9, 2009.

1.0 JACKSON PROJECT INTRODUCTION

Henry M. Jackson Hydroelectric Project is located in the northwestern section of Washington, on the western slopes of the Cascade Mountains (Figure C.1, Appendix C). It is serving two main purposes: supplying drinking water to the City of Everett's water supply system and power generation for SNOPUD. The Jackson Project facilities are sited on the Sultan River between RM 4.3 and RM 16.5 and elevations 285 and 1,470 feet.

The Jackson Project was originally licensed in 1961 and amended in 1984. In 1961, Culmback Dam was constructed to create Spada Reservoir – the source of the majority of drinking water supplied to Snohomish County by the City of Everett (Everett). In 1984, the hydroelectric project was constructed. The Jackson Project includes a 262-foot high rock-fill dam (Culmback Dam); a 1,870-acre reservoir (Spada Lake or Spada Reservoir) operated for Everett's water supply, fisheries habitat enhancement, hydroelectric power and incidental flood control; a Powerhouse; wildlife mitigation lands; and several developed and undeveloped recreation and river access sites.

In exercising authority under Section 401 of the Clean Water Act (33 USC § 1341) and the Washington State Water Pollution Control Act (RCW 90.48.260), Ecology has investigated this application pursuant to the following:

1) Conformance with all applicable water quality-based, technology-based, and toxic or pretreatment effluent limitations as provided under Sections 301, 302, 303, 306, and 307 of the Clean Water Act (33 USC Sections 1311, 1312, 1313, 1316, and 1317, FWPCA Sections 301, 302, 303, 306, and 307).

2) Conformance with any and all applicable provisions of Chapter 90.48 RCW, including the provision to use all known, available, and reasonable technologies (AKART) to prevent and control pollution of state waters as required by RCW 90.48.010.

3) Conformance with the state water quality standards as provided for in Chapter 173-201A WAC authorized by 33 USC 1313 and by Chapter 90.48 RCW, and with other appropriate requirements of state law that are related to compliance with such standards.

4) Conformance with RCW 90.56, which prohibits discharge of oil, fuel, or chemicals into state waters or onto land where such contaminants could potentially drain into state waters.

5) Conformance with the Minimum Flows and Levels Act, Chapter 90.22 RCW and the Water Resources Act, Chapter 90.54.020 RCW.

Certification of this proposal does not authorize SNOPUD to exceed applicable ground water quality standards (Chapter 173-200 WAC) or sediment quality standards (Chapter 173-204 WAC). Furthermore, nothing in this certification shall absolve SNOPUD from liability for contamination and any subsequent cleanup of surface waters, ground waters, or sediments occurring as a result of Jackson Project construction or operations.

2.0 CURRENT STANDARDS

1) Washington State Water Pollution Control Act – The intent of actions required in this certification is to support the goals of the state of Washington to "maintain the highest possible standards to ensure the purity of all waters of the state consistent with public health and public enjoyment thereof, the propagation and protection of wildlife, birds, game, fish and other aquatic life, and the industrial development of the state, and to that end require the use of all known, available, and reasonable technologies (AKART) by industries and others to prevent and control the pollution of the waters of the state of Washington" (RCW 90.48.010).

2) Washington State Water Quality Standards (WAC 173-201A, 2006) – Effective December 21, 2006, Washington State revised the surface water quality standards (Chapter 173-201A WAC). Based upon the revised standards, use-based water quality characteristics for Sultan River [Sultan River is a tributary to the Skykomish River in *Water Resource Inventory Areas* (WRIA) 7]. Use designations for Sultan River and its tributaries (listed in WAC 173-201A-600) are:

Core summer habitat, extraordinary primary contact recreation and all other water supply and miscellaneous uses.

Designated freshwater uses in the state standards include subcategories under aquatic life, recreation, water supply, and miscellaneous uses. The entire Sultan River Basin is designated for domestic, industrial, and agricultural water supply and stock watering; wildlife habitat; timber harvest; commerce and navigation; boating; and aesthetics. The basin is also designated as Core Summer Salmonid Habitat for which specific numerical criteria are established for five of the water quality

parameters applicable to the Sultan River Basin as explained in Table 2 in Section 4.0. In addition, the Sultan River, from its mouth to the Chaplain Creek confluence located near RM 6, is designated for Primary Contact recreation, and for Extraordinary Primary Contact recreation upstream of Chaplain Creek. The state standards for contact recreation that apply to the Sultan River Basin are based on fecal coliform bacteria criteria as summarized in Table 3 in Section 4.0. Other state standards in effect for Spada Lake are summarized in Table 4 in Section 4.0.

3) Toxics and Oil Spills [WAC 173-201A-260(2)(a), 2006 and RCW 90.56] – Toxic concentrations shall be below those which have the potential, either singularly or cumulatively, to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters, or adversely affect public health. RCW 90.56 prohibits any discharge of oil, fuel, or chemicals into state waters or onto land where such contaminants could potentially drain into state waters.

3.0 FINDINGS

1) Jackson Project Ownership

SNOPUD and Everett were co-licensed with the Federal Power Commission (now FERC) in 1960 to develop what was then known as the Sultan River Project. By agreement between SNOPUD and City in 2007, SNOPUD will be the sole license applicant for the new license. The FERC agreed that the City need not be a co-licensee in the future license. SNOPUD's current License for the Jackson Project expires on May 31, 2011.

2) Jackson Project Boundary

The current Jackson Project boundary includes lands owned by SNOPUD, Washington Department of Natural Resources (Washington DNR), Everett, the City of Sultan, federal lands within the Mount Baker-Snoqualmie National Forest, and private lands. The existing Jackson Project boundary, consisting of lands necessary for the safe operation and maintenance of the Jackson Project and other purposes, such as recreation, shoreline buffer, and protection of environmental resources, encompasses about 2,286 acres, of which 10.9 acres are federal lands. SNOPUD proposes to increase the area within the Jackson Project boundary to a total of 4,571 acres. This increase is associated with lands proposed to be managed under the Terrestrial Resources Management Plan.

3) Jackson Project Capacity and Production

The Jackson Project generators are collectively rated at 111.8 MW; however, the peak electrical output of the Jackson Project is approximately 104 MW because head loss in the long power tunnel/pipeline conduit does not allow simultaneous use of all four generator capacities. In 2008, the average annual generation of the Jackson Project was 428,200 megawatt hours, providing approximately 5 percent of the SNOPUD's power requirements - enough energy to meet the needs of approximately 36,000 homes.

SNOPUD is not proposing to increase its power generation capacity, but is proposing to modify its operational rule curves. SNOPUD also proposes to install a Pelton unit bypass system that allows flow continuation to the Sultan River at the powerhouse when either of the two Pelton units trip off line. In addition, SNOPUD proposes modifications to the Jackson Project boundary and a number of environmental measures to protect and enhance aquatic, terrestrial, recreation, and cultural resources.

4) Jackson Project Facilities

i. **Spada Lake:** Spada Lake is an approximately 1,802-acre reservoir with a storage capacity of 153,260 acre-feet at a maximum water surface elevation of 1,450 feet, formed by the Culmback Dam. Spada Lake includes a concrete morning glory emergency spillway with an inside diameter of 38 feet and a crest elevation of 1,450 feet. The horizontal portion of the spillway includes a 16-inch pipe with a 10-inch cone valve, and a second pipe which leads to a 60-kilowatt (kW) turbine generator which provides local power at the dam.

ii. **Culmback Dam:** Culmback Dam is a 640-foot-long, 25-foot-wide, and 262-foot-high earth and rockfill dam, located at RM 16.5 on the Sultan River and having a crest elevation of 1,470 feet. A 110-foot-tall concrete intake structure on the left bank of the reservoir, with three 20-foot movable panels withdraw unscreened water from various depths into 3.8 miles of 14-foot-diameter unlined tunnel and 3.7 miles of 10-foot-diameter underground steel pipeline. The tunnel/pipeline to the Powerhouse bypasses about 12.2 miles of the Sultan River.

iii. **Powerhouse:** The Powerhouse is a two story, 175-foot-long, 66-foot-wide reinforced concrete structure adjacent to the Sultan River at RM 4.3, containing four generating units with a total installed capacity of 111.8 MW. Units 1 and 2 are Pelton turbines rated at 47.5 MW each, and units 3 and 4 are Francis turbines rated at 8.4 MW each. The two Pelton turbines discharge directly to the Sultan River through the Powerhouse tailrace. The water that drives the Francis turbines continues past the Powerhouse and is diverted through the Jackson Project Lake Chaplain water supply pipeline, an approximately 3.5-mile-long, 72-inch-diameter, underground pipeline, which routes water from the Powerhouse to a control structure, called Portal 2; this portal controls the diversion of water into both Lake Chaplain and to the Diversion Dam. A switchyard adjacent to the Powerhouse delivers power to the SNOPUD's existing transmission system.

iv. **Diversion Dam:** The Diversion Dam is a 120-foot-long, 20-foot-high, ogee crested, concrete gravity dam owned by Everett and located at RM 9.7 on the Sultan River.

5) Water Use

Snohomish County PUD holds Power and Reservoir water rights for 1500 cfs using 153,260 acre-feet of water (Certificate No. S1- 23398C, priority date, June 15, 1979) to produce power at a theoretical horsepower of 187,500. Jackson Project is 82 percent developed to use this capacity. Everett holds prior municipal supply water rights in the Sultan River. Jackson Project facilities are also used to deliver water supply to Everett's reservoir (Lake Chaplain), in accordance with an agreement between the SNOPUD and Everett. The current water demand by the city is 84 million gallons per day or about 130 cfs, and that demand is expected to rise in the future.

6) Dams in the Sultan River Basin

The only dams in the basin are Culmback Dam (RM 16.5) and Everett's Diversion Dam (RM 9.7). Culmback Dam impounds Spada Lake, which has a storage capacity of 153,260 acre-feet. The Diversion Dam is located approximately 5.4 miles upstream of the Powerhouse. The Diversion Dam creates a small impoundment measuring less than an acre in size.

7) Sultan River System

Sultan River is a very "flashy" system subject to extremes in maximum and minimum flows. The 24-year pre-Jackson Project annual mean flow in the Sultan River was 813 cfs (1929 to 1963). Peak flows exceeding 34,000 cfs were measured twice in the 1950s at the Startup gage downstream of the Culmback Dam site (USGS Surface Water Records, Sultan River near Startup; USGS Gaging Station 12137500). The lowest recorded (pre-Jackson Project) daily mean flow was 48 cfs during September 1942. An annual 7-day minimum flow of 48.7 cfs was also recorded at this time (Snohomish County PUD and City of Everett, 2005).

8) Tributaries to Sultan River

The principal tributaries to the Sultan River upstream of Culmback Dam include the South Fork Sultan River, North Fork Sultan River, Elk Creek, and Williamson Creek. The North Fork Sultan River, South Fork Sultan River, and Williamson Creek flow directly into the Spada Lake (Figure C.2, Appendix C). Downstream from the Culmback Dam tributaries include Big Four Creek, Habecker Creek, Marsh Creek, Chaplain Creek, Cascade Creek, Woods Creek, Ames Creek, and Winters Creek. Marsh Creek is the most significant tributary downstream of the Spada Lake.

9) Water Flow During Normal Jackson Project Operation

The Jackson Project operations largely control Sultan River flows below Culmback Dam, except for additional flows contributed by a few minor tributaries and during large multiple storm events that cause spill (Figure C.3, Appendix C). Based on Jackson Project water routing and minimum stream flow requirements, the Sultan River Basin downstream of Culmback Dam can be divided into three distinct operational reaches from upstream to downstream: Operational Reach 3 (Reach 3) from Culmback Dam (RM 16.5) to the Sultan River Diversion Dam (RM 9.7); Operational Reach 2 (Reach 2) from the Sultan River Diversion Dam (RM 9.7) to the Powerhouse (RM 4.5); and Operational Reach 1 (Reach 1) from the Powerhouse (RM 4.5) to the Skykomish River (RM 0.0) (Figure C.4, Appendix C).

Existing minimum stream flow requirements, seasonal flows, peak flows, and Jackson Project flow ramping are summarized below.

Table 1. Sultan River minimum flow requirements.

Date	Point of Compliance[a]	Minimum Stream Flow (cfs)
All Year	Culmback dam valve releases	20
11/1 – 1/15	Gage at Diversion Dam[c]	95
1/16 – 2/28	Gage at Diversion Dam[c]	150
3/1 – 6/15	Gage at Diversion Dam[c]	175
6/16 – 9/14	Gage at Diversion Dam[c]	95
9/15 – 9/21	Gage at Diversion Dam[c]	145
9/22 – 10/31	Gage at Diversion Dam[c]	155
6/16 – 9/14	Gage at Powerhouse	165
9/15 – 6/15	Gage at Powerhouse	200[b]

[a] There is currently no streamflow gage in the bypassed reach downstream of Culmback dam. Cone valve discharge was verified by the USGS on August 28, 1990, for Culmback Dam discharge. Compliance points for minimum flows below the Sultan River Diversion Dam and Jackson Project powerhouse are USGS real-time gages 12137800 and 12138160, respectively.

[b] If flows at the powerhouse gage exceed 400 cfs during the Chinook spawning period (September 15 to October 15), SNOPUD releases higher minimum stream flows during the subsequent incubation period to protect spawning redds from being dewatered.

[c] Diversion dam is owned by the City of Everett.

Under current operations, 20 cfs is released from Culmback Dam into the river reach between Culmback Dam and the Diversion Dam at all times. The rest of the water diverted from Spada Lake travels through the power tunnel and power pipeline to the Powerhouse. Most of this water passes through the Pelton turbines for electrical generation and is returned to the river at the Powerhouse. However, the amount needed for municipal supply and to maintain minimum instream flows in the reach below the Diversion Dam is routed through two Francis turbines in the Powerhouse. It then flows through the Lake Chaplain pipeline to the Portal 2 facilities on the shores of Lake Chaplain. A portion of the water in the Lake Chaplain pipeline is diverted by means of the Portal 2 facilities to the lake for municipal supply. The remainder is transported east via the original water diversion tunnel back to the Sultan River at the Diversion Dam to provide minimum instream flows between the Diversion Dam and the Powerhouse.

10) Effect of Jackson Project Operation on Seasonal Flow of Water in the Sultan River

Jackson Project operations have altered the seasonal flow pattern in the Sultan River (Figure C.5, Appendix C). The reservoir rule curves (Figure C.6, Appendix C) are shaped to minimize spill (uncontrolled release of water via the spillway), provide storage of spring runoff for municipal water supply, and augment instream flows later in the year during the driest months. This strategy provides significant incidental floodwater storage and reduces, in both amplitude and frequency, the historically higher peak flows in the lower Sultan River that occurred in late fall, early-winter, and spring. Total volume of flow below the Powerhouse is reduced by withdrawals for municipal water supply, which averaged 127 cfs during the past five years of record (2003-07). This pre-existing right for municipal water withdrawals is not an effect of hydropower operations.

11) Flows

Average flows in August and September are the lowest during the year in the Sultan River. Prior to impoundment, the average flow during these months was above 150 cfs. From 1935 to 1963 (pre-impoundment) August and September flows were measured between 21 cfs and approximately 5000 cfs. Since impoundment, flows below Culmback Dam were maintained at 20 cfs. Below the Diversion Dam, flows at 95 cfs were maintained until September 15 when they were raised to 145 cfs. Highest flows are found during snowmelt in April, May, and June. Prior to impoundment, flows in the Sultan River averaged close to 800 cfs for April and June and 1000 cfs in May. From 1935 to 1963 (pre-impoundment) April, May, and June flows were measured (to vary) between approximately 14000 and 150 cfs.

12) Fish Population

The Sultan River provides spawning and rearing habitat for Chinook, coho, pink, and chum salmon, rainbow and steelhead trout, coastal cutthroat trout, and Pacific lamprey. Bull trout have not been observed spawning in the Sultan River; however, they are known to use the river as rearing/foraging habitat. Each of these species has access to the Sultan River from the confluence with the Skykomish River to the Sultan River Diversion Dam. Although Pacific lampreys are known to be present in the Sultan River, no information is available regarding its abundance and distribution.

The Sultan River Diversion Dam has blocked upstream fish passage at RM 9.7 since its construction in 1930, and beginning as early as 1917, Everett constructed various less permanent diversion structures at this location. Prior to 1917, migratory fish were able to access an additional 6 miles of riverine habitat up to RM 15.7. Under existing conditions, Chinook and coho salmon, and summer and winter run steelhead spawn and rear in the entire Sultan River downstream of the Sultan River Diversion Dam (Reach 1 and Reach 2). Chum and pink salmon spawn primarily in the lower 3 miles of the river (Reach 1). Pink salmon have been observed upstream to RM 7.5 in Reach 2.

Two ESA-listed threatened species of anadromous fish are known to occur in the Sultan River near the Jackson Project: the Puget Sound Evolutionarily Significant Unit (ESU) of Chinook salmon and the Puget Sound distinct population segment (DPS) of steelhead trout. Designated critical habitat for Chinook salmon includes the mainstem Sultan River from its confluence with the Skykomish River upstream to the Sultan River Diversion Dam. There is no designated critical habitat for the Puget Sound steelhead trout DPS in the Sultan River.

13) Fish Access

The Diversion Dam at rivermile 9.7 blocks upstream migration of salmonids from that point to their historic occurrence at rivermile 15.7, 0.8 miles downstream of the present site of Culmback Dam.

14) Marsh Creek Slide and Geology

On December 11, 2004, a slide blocked or reduced the upstream passage of salmon at rivermile 7.6. Since then, high flows have changed the configuration of the slide debris to allow some limited fish passage.

15) Water Quality

SNOPUD performed an extensive water quality study during the two year study period from April 2007 through March 2009. Finding and results from this study are reported in Water Quality Final Technical Report (WQFTR), August 2010. The objective of this study was to develop information on existing water quality conditions in the vicinity of the Jackson Project, to determine whether conditions conform to state water quality standards, and to what extent Jackson Project operations are a controlling factor of those conditions. Water Quality Final Technical Report describes the in-situ measurements and analysis of 19 water quality parameters at 13 sampling sites in the vicinity of the Jackson Project. Results from Water Quality Final Technical Report are summarized in Appendix A.

The overall water quality in the Sultan River and in the vicinity of the Jackson Project is very good. The Sultan River Basin is a remote watershed characterized by rugged forested terrain and high precipitation. These conditions result in surface waters that have diluted dissolved solids and ions content, and are generally free of pollutants or contaminants. The Sultan River Basin has been protected as the source of Everett's municipal water supply since 1917. Protective measures include restrictions on the range of recreational and other activities that may occur in the Jackson Project area, which further limits the potential for human caused effects on water quality.

16) Water Temperature Control at Jackson Project

Water temperatures below the Sultan River Diversion Dam (Reaches 1 and 2) are influenced by the amount and depth of water released at Culmback dam (both to the bypassed reach and to the powerhouse), tributary flows, and meteorological conditions. Moveable panels on the Spada Lake intake structure control the depth at which water is withdrawn, and hence, the temperature of the

water that is delivered to the powerhouse intake. The degree of temperature control that is possible by manipulating the intake structure panels varies seasonally with the degree of temperature stratification in the reservoir. Jackson Project operations have resulted in a slight increase in water temperatures during late fall and winter of approximately 0.6°C, as measured at the Sultan River Diversion Dam, and some slight cooling during the summer and early fall compared to pre-Jackson Project conditions. The warmer late fall and winter temperatures occur when the reservoir is isothermal, and coincide with salmon spawning and incubation periods. The cooler summer and early fall temperatures often occur during reservoir stratification, and generally coincide with the period of salmonids summer rearing.

The 20 cfs released from Culmback Dam under current operating conditions originates from a deepwater valve located at the base of the dam. The water at this depth remains a relatively constant 3 to 6°C year round. This is significantly colder water than found in a natural system from April through October. As a result, summer water temperatures at the upper end of Reach 3 are up to 4-6°C colder than the natural inflow into Spada Lake.Water temperature in Reach 3 warms quickly due to the low volume of water and the prevailing bedrock and boulder substrate conditions. Recorded water temperatures at the lower end of Reach 3 have been 10°C warmer than the water released from the dam, and 6°C warmer than water released from the powerhouse.

17) Boating Access

The Sultan River is located one hour from downtown Seattle and has the potential for 12 miles of Class III and IV whitewater. In Reach 3 below Culmback Dam, flows vary from a minimum of 20 cfs controlled releases to high flows to accommodate storm events. Access is limited in this reach. In Reach 2, access is also limited; flows are limited to those released at the dam plus accretion flows plus return flows from Portal 2 back into the Sultan River at the Diversion Dam. Reach 1 flows are greater owing to the re-entry of powerhouse water into the Sultan River. Access in the upper portion of Reach 1 is limited. From Culmback Dam to the middle of this reach is suited to experienced whitewater boaters. The shallower gradient in the lower portion of Reach 1 is also suitable for less experienced whitewater boaters and boat-based angling.

18) The Primary Issues Associated With Relicensing Jackson Project include:

i. Establishing a water management and flow regime that balances hydro generation with municipal water supply, habitat, recreational, and flood control needs.

ii. Determining appropriate periodic high flow events that mimic natural fluvial processes.

iii. Facilitating upstream passage of anadromous fish; restoring spawning and rearing habitat for salmonids in the lower 3 miles of the Sultan River that has been reduced by encroaching vegetation from flow diversions.

iv. Temperature conditioning in Reach 3.

v. Wildlife habitat management; recreational access; and cultural resources protection.

19) Settlement Agreement

On October 14, 2009, SNOPUD filed a Settlement Agreement with FERC. The Settlement Agreement was signed by SNOPUD, National Marine Fisheries Service, U.S. Forest Service, U.S. Fish and Wildlife Service, National Park Service, Washington Department of Fish and Wildlife, Washington Department of Ecology, Tulalip Tribes of Washington, Snohomish County, City of

Everett, City of Sultan, and American Whitewater (Settling Parties). The environmental measures included in the Settlement Agreement resolve all relicensing issues among the Settling Parties associated with the pending license application for continued operation of the Jackson Project. SNOPUD proposes a variety of measures that would protect and enhance aquatic, terrestrial, and cultural resources and enhance recreational opportunities in the Jackson Project area.

4.0 COMPLIANCE WITH STANDARDS

Waters of the state are assigned designated uses under WAC 173-201A. Sultan River is designated as Core Summer Salmonid Habitat for which specific numerical criteria are established for temperature, total dissolved gas (TDG), turbidity, dissolved oxygen (DO), and pH (Table 2). In addition, the Sultan River, from its mouth to the Chaplain Creek confluence located near RM 6.0, is designated for Primary Contact recreation, and for Extraordinary Primary Contact recreation upstream of Chaplain Creek. The state standards for contact recreation that apply to the Sultan River Basin are based on fecal coliform bacteria criteria as summarized in Table 3. Other state standards in effect for Spada Lake are summarized in Table 4.

As per the water quality standards, Jackson Project shall meet or exceed the requirements for all designated and existing uses.

Table 2. Applicable 2006 Numerical Water quality criteria for the Sultan River Basin.

PARAMETER	STANDARD/CRITERIA TO BE MET
Turbidity	Turbidity shall not exceed 5 NTU over background turbidity when background turbidity is 50 NTU or less, or have more than a 10 percent increase when background turbidity is more than 50 NTU.
TDG	Not to exceed 110% of saturation at any point of sample collection.
Temperature	Core summer salmonid habitat: 16°C (60.8°F) as measured by the 7-day average of the daily maximum temperatures (7-DADMax). [When waterbody's temperature is higher than the criteria due to natural conditions, then human actions considered cumulatively may not increase the 7-DADMax temperature more than 0.3°C above natural conditions. All reasonable and feasible measures must be taken to achieve conditions that best protect the designated uses (WAC 173-201A-200(1)(c)(i))].
Dissolved Oxygen	Core summer salmonids habitat: 9.5 mg/l. [When waterbody's DO is lower than the criteria due to natural conditions, then human actions considered cumulatively may not decrease lowest 1-day minimum more than 0.2 mg/L (WAC 173-201A-200(1)(d)(i))].
pH	pH shall be within the range of 6.5 to 8.5 standard units, with a human caused variation within the above range of less than 0.2 standard units.

Table 3. State water quality standards for fecal coliform for extraordinary and primary contact recreation.

Extraordinary primary contact recreation	Fecal coliform organism levels must not exceed a geometric mean value of 50 colonies/100 ml, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 100 colonies/100 ml.

Primary contact recreation	Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies/100 ml, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies/100 ml.

Table 4. Summary of other relevant state water quality standards for Spada Lake.

PARAMETER	STANDARD
Nutrient Criteria	Establishes lake trophic state[a] based on ambient total phosphorus.

[a] Trophic state means a classification of the productivity of a lake ecosystem. Lake productivity depends on the amount of biologically available nutrients in water and sediments and may be based on total phosphorus. Trophic states used in this rule include, from least to most nutrient rich, ultra-oligotrophic, oligotrophic, lower mesotrophic, upper mesotrophic, and eutrophic.

5.0 401 CERTIFICATION ORDER CONDITIONS

Through issuance of this Order, Ecology certifies that it has reasonable assurance that the activity as proposed and conditioned will be conducted in a manner that will comply with applicable water quality standards and other appropriate requirements of state law. In view of the foregoing and in accordance with 33 U.S.C. §1341, RCW 90.48.120, RCW 90.48.260, Chapter 173-200 WAC and Chapter 173-201A WAC, including WAC 173-201A-300 through WAC 173-201A- 330, Section 401 water quality certification is granted to SNOPUD for the Henry M. Jackson Hydroelectric Project (FERC No. 2157) subject to the following conditions.

5.1 GENERAL CONDITIONS

Certification of this proposal does not authorize the Licensee to exceed applicable state water quality standards approved by the Environmental Protection Agency (currently codified in Chapter 173-201A WAC), ground water quality standards (currently codified in Chapter 173-200 WAC) and sediment quality standards (currently codified in Chapter 173-204 WAC), and other appropriate requirements of state law. Furthermore, nothing in this Order absolves the Licensee from liability for contamination and any subsequent cleanup of surface waters, ground waters, or sediments occurring as a result of activities associated with Project operations and FERC license conditions.

1) In the event of changes or amendments to the state water quality, ground water quality, or sediment standards, or changes in or amendments to the state Water Pollution Control Act (RCW 90.48), or changes in or amendments to the Clean Water Act, such provisions, standards, criteria, or requirements shall apply to the Jackson Project and any attendant agreements, orders, or permits. Ecology will notify SNOPUD through an Administrative Order of any such changes or amendments applicable to Jackson Project.

2) When a construction project meets the coverage requirements of the National Pollution Discharge Elimination System (NPDES) permit and State Waste Discharge General permit for stormwater discharges associated with construction activity, SNOPUD shall either, at Ecology's discretion, apply for the general permit and comply with the terms and conditions of the permit or apply for and comply with the terms of an individual NPDES permit.

3) Road construction through forest lands shall meet the requirements for water quality protection in the State Forest Practice Rules -WAC 222-24-020 road location and design, WAC 222-24-030 road construction, and WAC 222-24-040 water crossing structures. The requirements marked by an asterisk in the rules apply.

4) Discharge of any solid or liquid waste to the waters of the state of Washington without approval from Ecology is prohibited.

5) SNOPUD shall obtain Ecology review and approval before undertaking any change to the Jackson Project or Jackson Project operations that might significantly and adversely affect the water quality or compliance with any applicable water quality standard (including designated uses) or other appropriate requirement of state law.

6) The Washington State Department of Fish and Wildlife (WDFW) require a Hydraulic Project Approval (HPA) (under 75.20 RCW) for work in waters of the state. SNOPUD shall obtain HPA coverage as required by WDFW for any in-water construction project.

7) Ecology retains the right, by further Order, to modify schedules or deadlines provided under this Order or provisions it incorporates.

8) Ecology retains the right, by further Order, to amend this Order if it determines that its provisions are no longer adequate to provide reasonable assurance of compliance with applicable water quality standards or other appropriate requirements of state law that are related to protection of water quality or aquatic resources. Amendments of this certification shall take effect immediately upon issuance, unless otherwise provided in the order of amendment, and shall be appealable to the Pollution Control Hearings Board pursuant to RCW 43.21B. Ecology shall transmit such amending orders to FERC to update FERC's records as to the current certification conditions.

9) If a conflict or inconsistency arises between this Order and the Settlement Agreement for Henry M. Jackson Project, or any part thereof, the terms of this Order shall govern.

10) This Order does not exempt, and is provisional upon, compliance with other statutes and codes administered by federal, state, and local agencies, including the state's Coastal Zone Management Act.

11) This Order addresses work associated with the Jackson Project, including Jackson Project operation and related construction. Any additional work not specified in this certification that may impact water quality will require attainment of any and all applicable permits and/or certifications at the appropriate time. SNOPUD shall consult with Ecology to determine whether any such additional work triggers the need of additional permits or a separate Section 401 Certification. If a project would result in a new discharge or alteration to an existing discharge that is not specifically addressed in this Order, it will in most cases require modification of this Order or a new Section 401 Certification, depending on the circumstance.

12) Ecology reserves the right to issue orders, assess or seek penalties, and to initiate legal actions in any court or forum of competent jurisdiction for the purposes of enforcing the requirements of this Order. Failure to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Order.

13) The conditions of this Order shall not be construed to prevent or prohibit SNOPUD from either voluntarily or in response to legal requirements imposed by a court, the FERC, or any other body with competent jurisdiction, taking actions which will provide a greater level of protection, mitigation, or enhancement of water quality or of existing or designated uses.

14) Copies of this Order and associated permits, licenses, approvals, and other documents shall be kept on the Jackson Project site and made readily available for reference by SNOPUD, its contractors and consultants, and by Ecology.

15) SNOPUD shall allow Ecology access to inspect the Jackson Project and Jackson Project records required by this Order for the purpose of monitoring compliance with its conditions. Access shall occur after reasonable notice, except in emergency circumstances.

16) SNOPUD shall, upon request by Ecology, fully respond to all reasonable requests for materials to assist Ecology in making determinations under this Order and any resulting rulemaking or other process.

17) Any work that is out of compliance with the provisions of this Order, or project operation conditions that result in distressed, dying or dead fish, or any discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, or violation of turbidity criteria is prohibited. If these conditions occur, SNOPUD must immediately take the following actions:

    a) Immediately take action to stop, contain, and cleanup unauthorized discharges or otherwise stop the noncompliance, correct the problem and, if applicable, immediately repeat sampling and analysis of any noncompliance.

    b) Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage.

    c) Notify Ecology within 24 hours of the failure to comply with water quality standards and submit a detailed written report to Ecology within five days that describes the nature of the event, corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of any samples taken, and any other pertinent information.

    d) Oil or chemical spill events must be reported immediately to Ecology's 24-Hour Spill Response at 425-649-7000 or 1-800-258-5990 and submit a detailed written report to Ecology within two weeks of the incident that describes the nature of the event, corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of any samples taken, and any other pertinent information.

    e) Observed violations at the Jackson Project must be highlighted in the annual monitoring report.

Compliance with these requirements does not relieve SNOPUD from responsibility to maintain continuous compliance with the terms and conditions of this Order or the resulting liability from failure to comply.

5.2 *SPECIFIC CONDITIONS – INSTREAM FLOW AND FLOW-HABITAT*

SNOPUD shall implement and comply with flows and habitat-related proposed license articles in the Sultan River as described in the October 9, 2009, Settlement Agreement. SNOPUD shall implement and comply with the following Settlement Agreement License Articles (A-LA):

6.2.1a. A-LA-2: Marsh Creek Slide Modification and Monitoring;
6.2.1b. A-LA-3: Temperature Conditioning in Reach 3, including phases one and two;
6.2.1c. A-LA-4: Whitewater Boating Flows;

6.2.1d. A-LA-5: Downramping Rate Conditions and schedules;
6.2.1e. A-LA-6: Large Woody Debris installation and maintenance;
6.2.1f. A-LA-7: Side Channel project including enhancement and maintenance;
6.2.1g. A-LA-8: Process Flow Regime in components 1 through 5 including flows for channel maintenance, channel forming, flushing, upstream migration, and outmigration;
6.2.1h. A-LA-9: Minimum Flows in reaches one, two and three;
6.2.1i. A-LA-12: Fish Habitat Enhancement Plan;
6.2.1j. A-LA-13: Diversion Dam Volitional Passage; and
6.2.1k. A-LA-14: Reservoir Operations.
6.2.1l. A-LA-15: Adaptive Management Plan
6.2.1m. A-LA-17: Fisheries and Habitat Monitoring Plan

Copies of the above listed articles are attached in Appendix B and incorporated by reference into this Order.

5.3 SPECIFIC CONDITIONS - WATER QUALITY PARAMETERS

Jackson Project shall not cause any exceedance of water quality standards set forth in Chapter 173-201A-200(1)WAC in any waters of the state, including without limitation the Jackson Project waterbodies.

5.3.1 TURBIDITY

1) Jackson Project actions do not appear to have any significant effect on turbidity. Tributaries to Spada Lake are maintained in a fairly pristine condition with little or no development. SNOPUD must manage erosion from roads within the Jackson Project boundary. Principal source of turbidity entering Spada Lake is highly turbid inflows from the tributaries during winter storms. Other potential sources, such as wave-induced lake shoreline or bank erosion, are non-measureable in comparison. Spada Lake likely acts as a reservoir that store turbid water and release it at a lower magnitude and at a slower rate. Variation in turbidity generally corresponded to seasonal changes in precipitation, the occurrence of relatively large rainfall events, and flow conditions.

2) Turbidity Standard Exceedences: Any exceedance shall be explained in the Annual Water Quality Report required by Section 9.0 of this Order. SNOPUD shall not be held responsible for turbidity standard exceedences if the elevated turbidity is caused by a significant storm or situation not Jackson Project related. In such an instance Ecology may request an assessment of the potential causes of the turbidity increase. This assessment may consider the impacts of recent flows through the dams, precipitation, recent construction, and reservoir elevations.

5.3.2 TOTAL DISSOLVED GAS

1) TDG measurements taken during the water quality studies were less than 110 percent saturation, indicating that TDG supersaturation (i.e., TDG saturation greater than 110 percent) from potential Powerhouse turbine air entrainment is not a concern.

2) TDG Standard Exceedences: Any exceedance shall be explained in the Annual Water Quality Report required by Section 9.0 of this Order. All spill releases shall also be detailed in the monitoring report.

3) TDG Exceedences Associated with Spills for Minimum Instream Flow Requirements or Spills Requested by Other Government Agencies: To remain in compliance with the minimum instream flow provisions of this certification, releases of water by means other than the penstock and powerhouse may occasionally be required during powerhouse maintenance, inspection, or testing outages. These alternative releases will most likely result in TDG levels greater than 110% in the tailrace. Ecology has determined that no or low flow would harm biota more than the short-term elevated TDG levels. However, SNOPUD is required to apply in advance for such short-term modifications in writing to Ecology and WDFW.

5.3.3 TEMPERATURE

1) Water temperatures below the Sultan River Diversion Dam (Reaches 1 and 2) are influenced by the amount and depth of water released at Culmback dam. The 20 cfs released from Culmback Dam under current operating conditions originates from a deepwater valve located at the base of the dam. The water at this depth remains a relatively constant 3 to 6°C year-round. This is significantly colder water than found in a natural system from April through October. As a result, summer water temperatures at the upper end of Reach 3 are up to 4-6°C colder than the natural inflow into Spada Lake.

As a condition of this 401 certification, SNOPUD shall implement and comply with October 9, 2009 Settlement Agreement Proposed A-LA 3, Temperature Conditioning in Reach 3. A copy of this Proposed License Article is attached in Appendix B.

As explained in the joint explanatory statement for the October 9, 2009 Settlement Agreement, proposed A-LA 3 requires that water released from Culmback Dam must be conditioned to provide a seasonally appropriate water temperature regime that would improve aquatic habitat conditions in Reach 3 of the Sultan River through the implementation of a Water Temperature Conditioning Plan ("WTC Plan"). A-LA 3 requires that SNOPUD implement the program within the constraints of the Jackson Project's existing infrastructure (i.e. the 10-inch cone valve, the hydro unit, and the 16-inch auxiliary release line) and monitor water temperatures in Reach 3 annually for the term of the License.

A-LA 3 requires SNOPUD to install and operate a new temperature conditioning structure at Culmback Dam by 2020, or within 2 years after the date SNOPUD completes the in Diversion Dam's volitional fish passage modifications. All of the flow components for this structure, except for the valves, shall have a hydraulic capacity to allow SNOPUD to provide no less than 165 cfs (at Spada Lake elevation of 1430 feet msl) of temperature-conditioned water immediately below Culmback Dam. This capacity may allow for higher spawning flows in Reach 3 after the expiration of the license. When the reservoir is above 1380 feet msl, this structure will allow SNOPUD to temperature condition the flows released from Culmback Dam pursuant to the minimum flow regime. The temperature conditioning program shall not contribute to exceedance of state numeric water quality criteria.

In addition to annual temperature monitoring, SNOPUD is required to monitor the biological response of salmonids, macro invertebrates and other aquatic resources to the temperature conditioning. This biological monitoring must begin before the new License period by conducting surveys to establish baseline population and community characteristics for periphyton, benthic macroinvertebrates, and resident fish. The monitoring program must include a spatial (two sites)

assessment of baseline resource conditions and conditions after the first year and subsequent years at a sampling interval determined by the ARC (Aquatic Resource Committee). Surveys during the first and subsequent years of the temperature conditioning program will be compared to baseline data.

The installation of a new temperature control structure at Culmback Dam will improve the SNOPUD's ability to attain appropriate water temperature targets below Culmback Dam using lower reservoir surface elevations compared to what could be achieved using the existing infrastructure. The biological response monitoring (included in A-LA 3, Settlement Agreement) will be used to help verify that this measure is meeting biological goals and, if necessary, to adaptively adjust temperatures to meet its biological goals.

2) A-LA 3 requires that SNOPUD implement the temperature conditioning program in the Sultan River. The program's objective is to provide a seasonally appropriate water temperature regime to improve conditions for salmonids and other aquatic resources (including fish and macro invertebrates) in Reach 3 (RM 9.7 to 16.1) of the Sultan River. Conditioning of water temperature in Reach 3 is expected to result in a more normative water temperature regime (similar to the temperature regimes in Reaches 1 and 2) that will increase macro invertebrate production, improve fish growth, fish distribution and population dynamics, and facilitate fish survival in Reach 3.

3) Temperature Standards Exceedences: Any exceedance shall be explained in the Annual Water Quality Report required by Section 9.0 of this Order.

5.3.4 DISSOLVED OXYGEN

1) DO measurements at monitoring locations above Spada Lake and below Culmback dam were in general above 9.5 mg/L. Low DO values during months of June, September, and October 2007 were accompanied by unusually warm air temperatures and lower-than-normal flows. Spada Lake is classified as a lake, so the Core Summer Salmonid DO criterion does not apply. Lake DO criteria require that human actions shall not cause more than 0.2 mg/L reduction.

2) DO Standards Exceedences: Any exceedance shall be explained in the Annual Water Quality Report required by Section 9.0 of this Order.

5.3.5 pH

1) pH values obtained during water quality studies indicate that tributaries above Spada Lake are circumneutral to slightly acidic. Such conditions are common in western Cascades streams. pH and alkalinity in the lake reflect conditions of the inflowing tributaries. Deeper depths generally had lower pH. pH and alkalinity levels in Sultan River above the Diversion Dam and above the Powerhouse were consistently slightly higher than in the upstream tributaries and Spada Lake. Regardless, the conditions are circumneutral to slightly acidic with low buffering capacity.

2) pH Standards Exceedences: Any exceedance shall be explained in the Annual Water Quality Report required by Section 9.0 of this Order.

5.3.6 FECAL COLIFORM

Jackson Project actions do not appear to have any significant effect on fecal coliform. The geometric means of the detected values of fecal coliform bacteria obtained during water quality study were less than the state standard (WAC 173-201A-200). Therefore, the water quality standard for fecal coliform was met in all samples taken.

6.0 CONTAMINANT SPILL AND RELEASE PREVENTION AND CONTROL

[In the context of this section, "spills" will refer to contaminant spills as opposed to the release of water from the Jackson Project.]

No oil, fuel, or chemicals shall be discharged into state waters, or onto land with a potential for entry into state waters as prohibited by Chapter 90.56 RCW.

A Spill Prevention, Containment, and Countermeasure (SPCC) Plan must be prepared that covers, as applicable within the Clean Water Act, any equipment to be used at the site, including the powerhouse and any equipment associated with the powerhouse, that holds or contains oil, fuel, or chemicals that are potentially detrimental to water quality and the biota. The plan must be kept on site, in the possession of the person in charge at all times. The plan shall be submitted to Ecology for approval within one (1) year of license renewal. The plan must include, at a minimum, the following BMPs and spill response requirements.

Best Management Practices:

1) Care must be taken to prevent any petroleum products, paint, chemicals, or other harmful materials from entering waters of the state.

2) Visible floating oils released from construction or Jackson Project operation shall be immediately contained and removed from the water.

3) All oil, fuel or chemical storage tanks shall be contained and located on impervious surfaces so as to prevent spills from escaping to surface waters or ground waters of the state.

4) Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc., shall be checked regularly for drips or leaks, and shall be maintained and stored properly to prevent spills into state waters. Refueling of equipment on land shall occur where there is no potential of spilling fuel into rivers, creeks, wetlands, or other waters of the state. Equipment that requires refueling in-water shall be maintained and operated to prevent any visible sheen from petroleum products from appearing on the water. Proper security shall be maintained to prevent vandalism.

5) Oil & grease usage should be regularly monitored. Observation of significant increase in usage should trigger an investigation for leaks, followed by any required maintenance or corrective action.

6) No emulsifiers or dispersants are to be used in waters of the state without prior approval from the Department of Ecology, Northwest Regional Office.

7) Wash water containing oils, grease, or other hazardous materials resulting from wash down of equipment or working areas shall be contained for proper disposal, and shall not be discharged into state waters.

Spill and Release Response:

1) In the event of a discharge or release of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, containment and clean-up efforts shall begin immediately and be completed as soon as possible, taking precedence over normal work. Clean-up shall include proper disposal of any spilled material and used clean-up materials.

2) Samples shall be collected and analyzed to assess the extent of the spill and to assure all contaminants have been thoroughly removed.

3) Spills into state waters, spills onto land with a potential for entry into state waters, or other significant water quality impacts, shall be reported immediately or no later than 24 hours after discovery to the Department of Ecology, Northwest Regional Office at 425-649-7000 (24-hour phone number). SNOPUD shall provide a written follow-up report to Ecology within two (2) weeks of the incident stating what occurred, whether the incident was due to natural events or human-related activities, SNOPUD's response, a plan detailing long-term corrective actions and monitoring protocols if needed, any measures SNOPUD proposes to reduce future similar occurrences, results of any samples taken, and any additional pertinent information.

4) Compliance with this condition does not relieve SNOPUD from responsibility to maintain continuous compliance with terms and conditions of this certification or resulting liability from further failure to comply.

Additional BMPs are listed in Appendix E of this certification; Ecology recommends that all applicable BMPs in Appendix E are included in the SPCC Plan.

7.0 CONSTRUCTION PROJECTS AND HABITAT MODIFICATIONS

The following applies to all in-water or near-water work related to the Jackson Project that can impact surface- or ground-water quality. This includes, but is not limited to, construction and maintenance of, or emergencies from, any of the following: fish collection structures, generation turbines, penstocks, hatcheries, transportation facilities, portable toilets, boat ramps, access roads, transmission corridors, structures, gravel augmentation projects, and staging areas for all Jackson Project related activities.

If water quality exceedences are predicted as being unavoidable, a short-term modification must be applied for in writing to Ecology and WDFW at least three months prior to project initiation. If any project has a long-term impact on a regulated water quality parameter, characterization monitoring must be performed for the impacted parameter(s), and a monitoring plan must be outlined in the Water Quality Protection Plan discussed below.

Water Quality Protection Plan (WQPP) for Construction Projects

A Water Quality Protection Plan (WQPP) shall be prepared, and followed, for all Jackson Project related construction, maintenance and repair work that is in- or near-water that has the potential to impact surface- and/or groundwater quality. The plan shall follow the Guidelines for Preparing Quality Assurance Project Plans (QAPP) for Environmental Studies (July 2004 Ecology Publication Number 04-03-030) or its successor.

The WQPP shall contain, at a minimum, a list of water quality parameter(s) to be monitored, a map of sampling locations, and descriptions of the purpose of the monitoring, sampling frequency, sample type or number of samples, sampling procedures and equipment, analytical methods, quality control procedures, data handling and data assessment procedures, and reporting protocols. The WQPP shall include procedures for monitoring water quality and the actions to implement if a water quality exceedance were to occur, including procedures for reporting any water quality violations to Ecology. The WQPP shall include all water quality protection measures consistent with the HPA for the Jackson Project and control measures to prevent contaminants from entering surface water and groundwater. The WQPP shall include, but not be limited to, the following elements:

1) Stormwater Pollution Prevention Plan (SWPPP)

   The SWPPP shall specify the Best Management Practices (BMPs) and other control measures to prevent pollutants from entering the Jackson Project's surface water and groundwater. The SWPPP shall address the pollution control measures for SNOPUD's activities that could lead to the discharge of stormwater or other contaminated water from upland areas. The SWPPP should also specify the management of chemicals, hazardous materials and petroleum (spill prevention and containment procedures), including refueling procedures, the measures to take in the event of a spill and reporting and training requirements. The SWPP shall also specify water quality monitoring protocols and notification requirements.

2) In-Water-Work Protection Plan

   The In-Water-Work Plan shall be consistent with the SWPPP and shall specifically address the BMPs and other control measures for SNOPUD activities that require work within surface waters. In addition to construction activities, this work includes, but is not limited to, the application of herbicides, pesticides, fungicides, disinfectants, and lake fertilization. The plan shall address water quality monitoring provisions for all in-water work, including monitoring outside the area that could be influenced by the work, and at the point of compliance throughout the Jackson Project life.

A copy of the WQPP shall be in the possession of the on-site construction manager, and available for review by Ecology staff, whenever construction work is under way. BMPs shall be consistent with *Stormwater Management Manual for Western Washington* (most recent edition) or another stormwater management guidance documents or manuals which provide an equivalent level of pollution prevention and are approved by Ecology. WQPPs for construction work should include, at a minimum, the following BMPs:

1) All reasonable measures shall be taken to minimize the impact of any project on waters of the state. Water quality constituents of particular concern are turbidity, TDG, suspended sediment, oil and grease, and pH. BMPs shall be implemented to control erosion and sedimentation, to assure proper use of chemicals, to prevent and control oil and chemical spills, and to properly dispose of surplus construction supplies and other solid wastes.

2) All necessary measures shall be taken to minimize the disturbance of existing riparian, wetland or upland vegetation.

3) All equipment shall be placed so that it cannot accidentally enter a waterway or cause water quality degradation to state waters.

4) Retention areas or swales shall be used to prevent discharging of water from construction areas.

5) SNOPUD shall ensure that any fill materials placed for habitat improvements in any waters of the state do not, by reference to applicable standards, contain toxic materials in toxic amounts.

6) All construction debris must be properly disposed of on land so that the debris cannot enter a waterway or cause water quality degradation to state waters.

8.0 HERBICIDE / PESTICIDE / FERTILIZER APPLICATIONS

Prior to the use of herbicides, pesticides, fungicides, disinfectants, fertilizers, or algaecides in or adjacent to waters of the state, coverage under a NPDES Aquatic Pesticides Permit shall be obtained, and conformance with any other applicable state requirement such as SEPA, shall be attained.

In addition, BMPs and other control measures for the application of herbicides, pesticides, fungicides, disinfectants, fertilizers, or algaecides must be addressed in the In-Water-Work Protection Plan (Section 7.0). An appropriate water quality monitoring plan shall be developed prior to the application and implemented for all related work. Prior to the use of pesticides adjacent to waters of the state, SNOPUD shall follow BMPs to avoid the entry of such materials into waters of the state. Applicable BMPs include, but are not limited to, such actions as hand application and avoiding drift of materials into the water.

9.0 MONITORING AND REPORTING REQUIREMENTS

SNOPUD must monitor the Jackson Project in accordance with the proposed license articles as described in the October 9, 2009 Settlement Agreement.

1) Water Quality Monitoring Plan

Water quality shall be monitored as detailed in the Water Quality Monitoring Plan to be prepared by SNOPUD within six (6) months of license issuance and approved by Ecology. The intent of this monitoring program is to assess the water quality impact of the overall Jackson Project. Water Quality Monitoring Plan shall document how SNOPUD will implement program to ensure compliance with Washington State water quality standards (as codified in WAC 173-201A) in the Sultan River. The plan shall follow the Guidelines for Preparing Quality Assurance Project Plans (QAPP) for Environmental Studies (July 2004 Ecology Publication Number 04-03-030) or its successor.

2) Annual Water Quality Report

Water quality data shall be summarized and reported in a format approved by Ecology and submitted annually. The report shall include sample dates, times, locations, and results. Any violations of state water quality standards shall be highlighted. The report shall be submitted within 14 months of License issuance and annually thereafter. Data reports shall be submitted to the hydropower certification manager at the Department of Ecology, Water Quality Program, Northwest Regional Office.

3) Water Temperature Conditioning (WTC) Plan

As a condition of this 401 certification, SNOPUD shall implement and comply with Settlement Agreement Proposed A-LA 3, Temperature Conditioning in Reach 3. A copy of this Proposed License Article is attached as Appendix B. A-LA 3 requires that within 180 days of issuance of the FERC License, SNOPUD shall file with the Commission, for approval, a Water Temperature Conditioning Plan (WTC Plan). This WTC Plan shall document how SNOPUD shall implement a program to condition the temperature of waters released at Culmback Dam. SNOPUD shall develop the WTC Plan in consultation with the ARC. SNOPUD shall allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the WTC Plan to the Commission. When filing the WTC Plan with the Commission, SNOPUD shall include documentation of consultation; copies of comments and recommendations; and specific descriptions of how comments and recommendations from the ARC are accommodated by SNOPUD's plan. If SNOPUD does not adopt a recommendation, the filing shall include the SNOPUD's reasons based upon Jackson Project specific information.

As described in A-LA 3The WTC Plan shall include:

(a) The preliminary operation plan for the conditioning of water released from Culmback Dam pursuant to the A-LA 9 minimum flow schedule to achieve temperature conditioning performance standards in Reach 3 during both Phase One and Phase Two.

(b) The method and schedule for, and limitations upon, temperature conditioning of water releases; (c) the method, locations, and schedule for monitoring water temperature within Reach 3 and the response of aquatic resources (including fish and macroinvertebrates) to water temperature conditioning.

(d) The method and schedule for adjusting the water temperature release schedule based upon temperature monitoring and response of the aquatic resources.

(e) The conceptual design drawings of the SNOPUD's proposed alternatives for the Phase Two Structure.

(f) A preliminary operation and maintenance plan for the proposed alternatives for the Phase Two Structure.

(g) A schedule for selection, design, and construction of the Phase Two Structure.

(h) The temperature conditioning program annual reporting and ARC consultation requirements.

Upon FERC approval, SNOPUD shall implement the WTC Plan.

4) Water Quality Protection Plan (WQPP)

WQPP shall be submitted to Ecology for review at least two (2) months prior to construction work initiation and all the subsequent modification must be submitted to Ecology at least thirty (30) days before implementation. A copy of the WQPP shall be in the possession of the on-site construction manager, and the plan shall be made available for review by Ecology staff, upon request. Water quality monitoring must be conducted per the WQPP. Results of water quality sampling, as determined by the WQPP, shall be submitted to Ecology on a monthly basis during construction.

5) Water Temperature Conditioning Evaluation and Performance Standards

As a condition of this 401 certification, SNOPUD shall implement and comply with Settlement Agreement Proposed A-LA 3, Temperature Conditioning in Reach 3. A copy of this Proposed License Article is attached at Appendix B.

6) Instream Flow Monitoring

As a condition of this 401 certification, SNOPUD shall implement and comply with Settlement Agreement proposed license articles provision requiring monitoring of instream flow. Copies of these Proposed License Articles are attached as Appendix B.

10.0 MODIFICATIONS TO MONITORING

Modifications to the monitoring program can be requested by submitting to Ecology reasons for the modifications along with a modified Water Quality Monitoring Plan. Written approval must be received by Ecology before the modified plan can be implemented.

A more rigorous water quality sampling program for the listed parameters or additional parameters may be required by Ecology, if necessary, to protect water quality in the future based on monitoring results, regulatory changes, changes in Jackson Project operations, requirements of TMDLs, or to otherwise provide reasonable assurance of compliance with state water quality standards.

11.0 WATER QUALITY CRITERIA VIOLATIONS

Any work that is out of compliance with the provisions of this certification, or Jackson Project related conditions that result in distressed, dying or dead fish, or any discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, is prohibited. If these conditions occur, the applicant shall immediately take the following actions:

a) Cease operations at the location of the violation to the extent such operations may be causing or contributing to the problem.

b) Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage.

c) Observed violations of flow or observation of a sheen from petroleum products or of dying fish shall be reported to Ecology Northwest Regional Office immediately or no later than 24 hours. SNOPUD shall provide a written follow-up report to Ecology within five days of the incident stating what occurred, whether the incident was due to natural events or human-related activities, SNOPUD' s response, any measures SNOPUD proposes to reduce future similar occurrences, results of any samples taken, and any additional pertinent information.

d) All other observed water quality violations shall be highlighted in the annual water quality report (see Section 9.0).

Compliance with these requirements does not relieve SNOPUD from the responsibility to maintain continuous compliance with the terms and conditions of this certification or the resulting liability from failure to comply.

12.0 INSPECTIONS AND ADMINISTRATION

SNOPUD shall allow Ecology such access as necessary to inspect the Jackson Project operations, Jackson Project area, and Jackson Project records required by this certification in order to monitor compliance with the conditions of this certification.

Copies of this certification and associated permits, licenses, approvals, and other documents shall be kept on site and made readily available for reference by SNOPUD staff, its contractors and consultants, and by Ecology and WDFW.

13.0 ANTI-DEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water body are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of receiving water are of higher quality than the criteria assigned, the natural conditions shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

14.0 FAILURE TO COMPLY WITH THIS ORDER

Failure to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Order.

15.0 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 this 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	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 111 Israel RD SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Please direct all questions about this Order to:

Monika Kannadaguli
Hydropower Certification Manager
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA, 98008
425-649-7028
mkan461@ecy.wa.gov

DATED this 18th day of October 2010 at Bellevue, Washington.

Kevin C. Fitzpatrick

Kevin C. Fitzpatrick
Water Quality Section Manager
Northwest Regional Office
Department of Ecology
State of Washington

October 18, 2010
Date

APPENDIX A: SUMMARY OF WATER QUALITY FINAL TECHNICAL REPORT FOR HENRY M. JACKSON HYDROELECTRIC PROJECT

A two-year Water Quality Parameter Study was completed by SNOPUD in March 2009, to obtain information on existing water quality conditions in the vicinity of the project. This study assessed 19 parameters at 13 sampling sites in the vicinity of the project over the period April 2007 through March 2009, with most of the data collected during 2007 and 2008. The study confirms that water quality conditions in the vicinity of the project are very good. Results of the study also indicate that conditions in the vicinity of the project conform to Washington State water quality standards throughout the year with few exceptions as summarized below. The water quality sampling indicates that the trophic state of Spada Lake is oligotrophic. In general, oligotrophic lakes have low nutrients, low algal biomass and productivity, and high water clarity.

Table A.1 provides a summary by parameter of conclusions relative to: (1) how the data obtained during this study compare with state water quality standards or criteria; and (2) what Jackson Project-related factors may contribute to effects in cases when and where the data do not conform to the standards or criteria.

Water Temperature

The 7-DAD Max water temperature in the tributaries to Spada Lake did not exceed (and therefore met or complied with) the Core Summer Salmonid Habitat temperature criterion of 16°C at all times during the study. The 7-DAD Max water temperature values also did not exceed (and therefore met or complied with) the designated criterion of 16°C at all times during the study at the sites at RM 16, RM 9.6, RM 4.9, and RM 4.4 in the Sultan River downstream of Spada Lake (Culmback Dam). At the other two downstream sampling sites at RM 9.8 and RM 0.2, less than one percent of the 7-DAD Max values exceeded the criterion, including a five-day period in July 2007 at the site above the diversion dam (RM 9.8) when the 7-DAD Max reached 16.6°C and 1 day in September 2007 at the site above the mouth (RM 0.2) when the 7-DAD Max reached 16.1°C.

Dissolved Oxygen

In the tributary sites upstream of Spada Lake, about 85 to 92 percent of dissolved oxygen (DO) values (by site) were above (and therefore met or complied with) the designated Core Summer Salmonid Habitat DO criterion of 9.5 mg/L during the study period. Exceptions were DO values obtained in May and June 2007, when values were between 8.7 and 9.2 mg/L.

In the Sultan River downstream of Spada Lake (Culmback Dam), 94 percent or more of DO values during the study were above (and therefore met or complied with) the criterion of 9.5 mg/L. Exceptions included a three-week period in June 2007, when values were between 8.1 and 9.4 mg/L at RM 9.8, RM 4.9, and RM 0.2. Exceptions at RM 0.2 also included an 8-day period in September 2007 and a 2-day period in October 2007, when values were between 9.1 and 9.4 mg/L. Factors that caused DO values below 9.5 mg/L at these times at these sites likely were not Jackson Project-related, because similar values also occurred at tributary sites upstream of the Jackson Project area. In addition, DO during the 3-week period in June 2007 was accompanied by unusually warm air and water temperatures and lower-than-normal flows in the watershed, which likely contributed to lowered DO saturation at that time.

Table A.1

SUMMARY OF COMPARISON OF 2007–2008 DATA WITH CRITERIA, AND JACKSON PROJECT-RELATED FACTORS POTENTIALLY CAUSING EFFECTS

Locations or Reaches	How Do Data Compare with Criteria?	What Jackson Project-Related Factors Cause Effects?
Water Temperature		
Tributaries to Spada Lake	7-DAD Max values at tributary sites did not exceed 16°C at any time in 2007–2008.	None
Spada Lake	As Spada Lake is classified as a lake, the 16°C criterion does not apply.	NA
Sultan River: Below Culmback Dam to above the diversion dam (RM 16 to 9.8)	At RM 16, 7-DAD Max values did not exceed 16°C at any time in 2007–2008. At RM 9.8, 7-DAD Max values did not exceed 16°C except for 5 days in July 2007 (to 16.6°C).	Results indicate that water temperatures in this reach are in part influenced by the Jackson Project control of instream flow releases below Culmback Dam (as described in Section 5.1.5). 7-DAD Max values were always less than 16°C during this study, with one exception (the 5-day period in July 2007). An instream flow analysis is addressing flow releases from Culmback Dam to maintain suitable water temperatures (as well as physical habitat area) in the reach to support salmonid production. The results of this instream flow analysis will be the subject of another, separate report.
Sultan River: Below the diversion dam to above the mouth (RM 9.6 to 0.2)	7-DAD Max values at RM 9.8, RM 4.9, and RM 4.4 did not exceed 16°C at any time in 2007–2008. At RM 0.2, 7-DAD Max values did not exceed 16°C except for one day in September 2007 (to 16.1°C).	Results indicate that the Jackson Project operations have no detrimental effect on water temperatures in the Sultan River below the diversion dam (RM 9.6 to 0.2).
Dissolved Oxygen		
Tributaries to Spada Lake	DO measurements at SF, NF, and WC sites were above 9.5 mg/L in 2007–2008 except for samples in May–June 2007 (8.7 to 9.2 mg/L).	None
Spada Lake	As Spada Lake is classified as a lake, the DO criterion does not apply.	NA
Sultan River above the diversion dam (RM 9.8)	At RM 9.8 and RM 4.9, DO values were above 9.5 mg/L in 2007–2008 except for a 25-day period in June 2007 (8.1 to 9.4 mg/L). At RM 0.2, DO values were above 9.5 mg/L in 2007–2008 except for a 21-day period	Causal factors for DO values below 9.5 mg/L in June, September, and October 2007 were not Jackson Project-related. Similar values occurred at tributary sites upstream of the Jackson Project area.
Sultan River above the powerhouse (RM 4.9)		

Table A.1

SUMMARY OF COMPARISON OF 2007–2008 DATA WITH CRITERIA, AND JACKSON PROJECT-RELATED FACTORS POTENTIALLY CAUSING EFFECTS

Locations or Reaches	How Do Data Compare with Criteria?	What Jackson Project-Related Factors Cause Effects?
Sultan River above the mouth (RM 0.2)	in June 2007, an 8-day period in September 2007, and a 2-day period in October 2007, when values were between 9.1 and 9.4 mg/L.	DO during this period was accompanied by unusually warm air temperatures and lower-than-normal flows.
Turbidity		
Tributaries to Spada Lake	Turbidity values at SF, NF, and WC sites were less than 5 NTU in 92% of more of grab samples in 2007–2008.	None
Spada Lake	In Spada Lake, turbidity sample values in 2007–2008 were less than 5 NTU in 86% of grab samples taken near surface (0–5 m), 100% of samples taken at mid-depth (6–16 m), and 71% of samples taken near the lake bottom (42–52 m).	The principal source of turbidity to Spada Lake is highly turbid inflows from the tributaries during winter storms. As in other reservoirs, Spada Lake acts to store turbid water and release it at a lower magnitude and at a slower rate than would occur naturally without the dam. During summer, turbidity in Spada Lake is uniformly low, because tributary runoff events are infrequent at that time and inflows are clearer (less turbid).
Sultan River above the diversion dam (RM 9.8)	At RM 9.8, turbidity was less than 5 NTU in 77% of grab samples and 63% of hourly turbidity values in 2007–2008. At RM 4.9, turbidity was less than 5 NTU in 92% of grab sample and 58% of hourly turbidity values. At RM 0.2, turbidity was less than 5 NTU in 80% of grab sample and 47% of hourly turbidity values.	Turbidity in the Sultan River and at upstream tributary sites is dynamic and is explainable by non-Jackson Project-related watershed processes and responses. The hourly data show that turbidity was dynamic in the Sultan River in 2007–2008. Such dynamics are common in Western Cascades rivers and streams and do not appear to be Jackson Project-related.
Sultan River above the powerhouse (RM 4.9)		
Sultan River above the mouth (RM 0.2)		
Total Dissolved Gas		
Sultan River below the powerhouse (RM 4.4)	TDG measurements did not exceed 110% at any time. TDG ranged from 84 to 106 %, and averaged 98%.	Results indicate that the Jackson Project operations do not cause or contribute to TDG supersaturation.

Table A.1

SUMMARY OF COMPARISON OF 2007–2008 DATA WITH CRITERIA, AND JACKSON PROJECT-RELATED FACTORS POTENTIALLY CAUSING EFFECTS

Locations or Reaches	How Do Data Compare with Criteria?	What Jackson Project-Related Factors Cause Effects?
pH		
Tributaries above Spada Lake	pH measurements at SF, NF, and WC sites were within 6.5 to 8.5 in 67%, 64%, and 75%, respectively, in 2007–2008. pH values outside the range of 6.5 to 8.5 at these sites occurred in April to July (to a minimum pH of 5.6 at the SF site).	None. pH values indicate that tributaries above Spada Lake are circumneutral to slightly acidic. Such conditions are common in Western Cascades streams.
Spada Lake	In lake vertical profiles, pH was within 6.5 to 8.5 in 59% of measurements taken in 2007–2008. Minimum pH was 5.4 and maximum pH was 7.1. Deeper depths generally had lower pH.	pH and alkalinity in the lake reflect conditions of the inflowing tributaries.
Sultan River above the diversion dam (RM 9.8)	At RM 9.8, pH was within 6.5 to 8.5 in 94% of grab samples and 99% of hourly measurements in 2007–2008. At RM 4.9, pH was within 6.5 to 8.5 in 94% of grab samples and 97% of hourly measurements. At RM 0.2, pH was within 6.5 to 8.5 in 82% of grab samples and 88% of hourly measurements. pH at these sites varied from 6.2 to 7.7.	pH and alkalinity levels were consistently slightly higher than in the upstream tributaries and Spada Lake. Regardless, the conditions at RM 9.8, RM 4.9, and RM 0.2 are circumneutral to slightly acidic with low buffering capacity.
Sultan River above the powerhouse (RM 4.9)		
Sultan River above the mouth (RM 0.2)		
Fecal Coliform		
Tributaries to Spada Lake	The geometric mean of fecal coliform detected values was less than 50 CFU/100 ml.	None.
Spada Lake	The geometric mean of fecal coliform detected values was less than 50 CFU/100 ml.	Results indicate that Jackson Project operations do not cause or contribute to fecal coliform in excess of standards.
Sultan River above the diversion dam (RM 9.8)	The geometric mean of fecal coliform detected values for all sites was less than 50 CFU/100 ml.	Results indicate that Jackson Project operations do not cause or contribute to fecal coliform in excess of standards.
Sultan River above the powerhouse (RM 4.9)		
Sultan River above the mouth (RM 0.2)		
Total Phosphorus and Trophic Status		
Spada Lake	Mean summer epilimnetic TP values in Spada Lake in 2007–2008 were within the "oligotrophic" trophic classification per state standards.	Oligotrophic conditions signify that there are no excessive nutrient enrichment and algal production conditions present in Spada Lake.

Table A.1

SUMMARY OF COMPARISON OF 2007–2008 DATA WITH CRITERIA, AND JACKSON PROJECT-RELATED FACTORS POTENTIALLY CAUSING EFFECTS

Locations or Reaches	How Do Data Compare with Criteria?	What Jackson Project-Related Factors Cause Effects?
Total Petroleum Hydrocarbons		
Sultan River above the diversion dam (RM 9.8)	TPH were not detected in samples from these sites in 2007–2008.	Results indicate that Jackson Project operations do not cause or contribute to detectable levels of TPH.
Sultan River above the powerhouse (RM 4.9)		
Sultan River above the mouth (RM 0.2)		

Because Spada Lake is classified as a lake (as defined under WAC-173-201A-020), the water temperature and DO criteria established for the tributaries and Sultan River sites do not apply. Instead, water temperature and DO conditions in the lake were assessed to determine whether suitable conditions are maintained to support the aquatic life beneficial use (i.e., habitat for trout), particularly in the summer months. Vertical water quality profiles taken in the lake during the study indicate that water temperature and DO are at levels that support and maintain positive growth of trout in 100% of the lake's volume in the summer months.

Turbidity

Turbidity values in the tributaries to Spada Lake were less than 5 NTU in 95 percent or more of grab samples obtained during the study. In Spada Lake, turbidity values were less than 5 NTU in 86 percent of grab samples taken near surface (0–5 m), 100 percent of samples taken at mid-depth (6–16 m), and 71 percent of samples taken near the lake bottom (42–52 m). As discussed in Section 5.3, Bechtel (1981) determined that the principal source of turbidity entering Spada Lake is highly turbid inflows from the tributaries during winter storms. Other potential sources, such as wave-induced lake shoreline or bank erosion, are non-measureable in comparison. Spada Lake likely acts as other similar reservoirs that store turbid water and release it at a lower magnitude and at a slower rate than would occur naturally without the dam.

Turbidity grab sample values in the Sultan River downstream of Spada Lake were less than 5 NTU in 77 to 92 percent of grab samples obtained during the study. As such, grab sample values at downstream sites were relatively low most of the time, but generally exceeded 5 NTU more often than at the upstream tributary sites. The hourly turbidity data obtained at downstream sites show that turbidity was dynamic in the Sultan River during the study (as described in Section 3.3). Such dynamic conditions are common in Western Cascades rivers and streams, which can carry high sediment loads in response to run-off events and other watershed erosion and mass-wasting processes. The generally higher turbidity in the Sultan River downstream of Spada Lake does not have an obvious Project-related cause, and is explainable by other non-Project-related watershed processes and responses. Variation in turbidity generally corresponded to seasonal changes in precipitation, the occurrence of relatively large rainfall events, and flow conditions (as discussed in Section 5.3).

Total Dissolved Gas

TDG measurements taken during the study were less than 110 percent saturation, indicating that TDG supersaturation (i.e., TDG saturation greater than 110 percent) from potential powerhouse turbine air entrainment is not a concern. Monthly TDG measurements obtained during the study in the Sultan River below the powerhouse tailrace (RM 4.4) ranged from 84- to 106-percent saturation, and averaged 98-percent saturation. In addition, hourly TDG measurements below the powerhouse tailrace during two separate week-long events in June and July 2008 ranged from 102- to 104-percent saturation during the June event and 101- to 103-percent saturation during the July event. All these values are less than (and therefore comply with) the criterion of 110 percent.

pH and Alkalinity

Most pH values obtained during the study were within (and therefore met or complied with) the designated pH criterion range of 6.5 to 8.5 (WAC 173-201A-200). Instances of pH outside this range occurred at all sites, including at tributary sites upstream of the Jackson Project area. When outside the range, pH values were consistently on the low (i.e., slightly acidic) side of the range. In addition, alkalinity values were consistently low at all sites throughout the study, indicating a low buffering capacity. These results indicate that all sampling sites—including tributary sites, Spada Lake, and the Sultan River downstream of Spada Lake—are similarly circumneutral to slightly acidic with low buffering capacity, and pH conditions in the lake reflected conditions of the inflowing tributaries. In the Sultan River downstream of Spada Lake (Culmback Dam), pH and alkalinity levels were consistently slightly higher than in the upstream tributaries and Spada Lake, with 82 to 99 percent of pH values within the pH criterion range. However, the conditions at the downstream sites were still circumneutral to slightly acidic with low buffering capacity. Circumneutral to slightly acidic conditions with low buffering capacity are common in Western Cascades streams. Slightly acidic rainfall occurs in the Western Cascades and the capacity of the solutes of water to buffer and neutralize acid is generally low (Welch et al. 1998).

Nutrients and Chlorophyll-a

The state water quality action values for total phosphorus (TP) concentrations indicate that the trophic state classification of Spada Lake is oligotrophic. These oligotrophic conditions signify that nutrient enrichment and high algal production are not present as potential effects relative to Jackson Project facilities or operations. Nutrient and chlorophyll-a values during Year 1 (2007) and Year 2 (2008) were consistently low at all sites, indicating a low potential for any high (or nuisance) primary production (e.g., algae growth).

Fecal Coliform Bacteria

The geometric means of the detected values of fecal coliform bacteria obtained during the study were less than the state standard (WAC 173-201A-200). Therefore, the water quality standard for fecal coliform was met in all samples taken.

Other Parameters

The results obtained during the study for other parameters indicate good water quality. Conductivity and TDS values indicated dilute dissolved solids and ions content. All TPH samples obtained during the study were less than (and therefore met) the criterion, indicating that diesel- and oil-range hydrocarbons are not present in the Sultan River in the Jackson Project area.

APPENDIX B: OCTOBER 9, 2009 SETTLEMENT AGREEMENT

A-LA 2: Marsh Creek Slide Modification and Monitoring

If, based upon monitoring and other available information, the Aquatic Resource Committee (ARC) determines that the use of dynamite, expandable grout, or comparable methods to modify the size and location of specific rocks at the Marsh Creek Slide (MCS) is necessary to enhance fish passage at the Slide, the Licensee shall implement such modifications pursuant to a plan and a schedule approved by the ARC and the Commission and subject to obtaining any necessary regulatory approval. The Licensee shall seek the input of the US Forest Service (USFS) Enterprise Team in developing the plan for such modifications.

Modifications to the MCS shall be designed with the objective of not compromising the stability of the adjacent slope.

The Licensee shall also monitor fish passage at the MCS by continuing to annually monitor escapement in the reach upstream of the Slide, as it has been conducted since the 1990s. The Licensee shall use funds from the Habitat Enhancement Account (HEA) (see A-LA 12) to implement additional similar modifications to the MCS as necessary if the ARC concludes that an additional modification to the MCS is necessary to enhance fish passage and 1) initial or subsequent modifications cause further slides or blockages or 2) the annual escapement of Chinook salmon and steelhead trout in the spawning habitat within the Diversion Dam Index Area (RM 9.2 to 9.7) does not exceed ten (10) percent of the total annual escapement of Chinook or steelhead in all index areas in the Sultan River in any year. Any additional future modifications by the Licensee to the MCS are subject to availability of HEA funds.

To accomplish these commitments, within 180 days of issuance of the License, the Licensee shall file with the Commission, for approval, a Marsh Creek Slide Monitoring and Modification Plan (Marsh Creek Slide Plan). The Marsh Creek Slide Plan shall include: (1) the establishment of a permanent survey control point or benchmark; (2) the methods and schedule for conducting a detailed baseline physical survey at low flow; (3) the method and schedule for using dynamite, expandable grout or comparable methods to modify the size and location of specific rocks to create additional potential passage route(s) and improve passage; (4) the method and schedule for conducting post modification physical surveys of the Marsh Creek Slide; (5) the method and schedule for monitoring fish use and escapement upstream of the Marsh Creek Slide on an annual basis throughout the License term; and (6) the method and schedule for conducting physical surveys of the Marsh Creek Slide subsequent to flow events exceeding 4,000 cfs instantaneous peak as measured at the Diversion Dam or a scheduled process flow pursuant to A-LA 8.

The Licensee shall develop the Marsh Creek Slide Plan in consultation with the ARC. The Licensee shall allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the Marsh Creek Slide Plan to the Commission. When filing the Marsh Creek Slide Plan with the Commission, the Licensee shall include documentation of consultation; copies of comments and

recommendations; and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

Upon Commission approval, the Licensee shall implement the Marsh Creek Slide Plan.

A-LA 3: Temperature Conditioning in Reach 3

The Licensee shall implement the following program to condition the temperature of the water released at Culmback Dam pursuant to the A-LA 9 Reach 3 instantaneous minimum flow requirements. The program's objective is to provide a seasonally appropriate water temperature regime to improve conditions for salmonids and other aquatic resources (including fish and macroinvertebrates) in Reach 3 (RM 9.7 to 16.1) of the Sultan River.

1. Temperature Conditioning Performance Standards

In consultation with the Aquatic Resource Committee (ARC), the Licensee shall develop temperature conditioning performance standards for April through October for (1) the water release points and (2) the downstream end of Reach 3. These temperature conditioning performance standards shall be the suitable temperature bands (ranges) for the benefit of salmonids and other aquatic resources (including fish and macroinvertebrates). These temperature conditioning performance standards shall comply with applicable state water quality standards.

2. Temperature Conditioning Monitoring

The Licensee shall monitor water temperature within Reach 3 for the term of the License. The Licensee shall also monitor the biological response of salmonids and other aquatic resources (including fish and macroinvertebrates) to the temperature conditioning in at least two (2) separate index areas within Reach 3 for the term of the License. The temperature conditioning monitoring shall be done in consultation with the ARC.

3. Temperature Conditioning Program Development

3.1. Phase One

Until the earlier of (a) two (2) years after the date that the Licensee completes the Diversion Dam's volitional fish passage modifications, as described in A-LA 13, or (b) January 1, 2020, the Licensee shall implement the temperature condition program within the constraints of the Project's existing piping infrastructure. During Phase One, the Licensee shall make temperature sensor and control valve modifications, as necessary.

The water release points shall be the 10-inch cone valve, the hydro unit, and the 16-inch auxiliary release line. Blending ratios associated with this temperature conditioning program shall be determined by temperature monitoring at the water release points, the downstream end of Reach 3, Spada Lake, and/or other suitable locations.

Phase One of the temperature conditioning program shall be implemented only when (1) reservoir elevations are greater than 1410 feet mean sea level (msl) and (2) the reservoir is stratified (typically April through October).

3.2. Phase Two

Prior to the earlier of (a) two (2) years after the date that the Licensee completes the Diversion Dam's volitional fish passage modifications, as described in A-LA 13, or (b) January 1, 2020, and subject to the Commission's approval and obtaining any necessary regulatory approval, the Licensee shall install and operate a temperature conditioning structure (Phase Two Structure). All of the flow components for this structure, except for the valves, shall have a hydraulic capacity to allow the Licensee to provide no less than 165 cfs (at Spada Lake elevation of 1430 feet msl) of temperature conditioned water immediately below Culmback Dam.

When the reservoir is above 1380 feet msl, this structure shall allow the Licensee to temperature condition the flows released from Culmback Dam.

Blending ratios associated with this temperature conditioning program shall be determined by temperature monitoring at the water release points, the downstream end of Reach 3, Spada Lake, and/or other suitable locations.

Phase Two of the temperature conditioning program shall be implemented only when (a) reservoir elevations are greater than 1380 feet msl and (b) the reservoir is stratified (typically April through October).

4. Water Temperature Conditioning Plan

Within 180 days of issuance of the License, the Licensee shall file with the Commission, for approval, a Water Temperature Conditioning Plan (WTC Plan). This WTC Plan shall document how the Licensee shall implement a program to condition the temperature of waters released at Culmback Dam. The WTC Plan shall include: (1) the preliminary operation plan for the conditioning of water released from Culmback Dam pursuant to the A-LA 9 minimum flow schedule to achieve temperature conditioning performance standards in Reach 3 during both Phase One and Phase Two; (2) the method and schedule for, and limitations upon, temperature conditioning of water releases; (3) the method, locations, and schedule for monitoring water temperature within Reach 3 and the response of aquatic resources (including fish and macroinvertebrates) to water temperature conditioning; (4) the method and schedule for adjusting the water temperature release schedule based upon temperature monitoring and response of the aquatic resources; (5) the conceptual design drawings of the Licensee's proposed alternatives for the Phase Two Structure; (6) a preliminary operation and maintenance plan for the proposed alternatives for the Phase Two Structure; (7) a schedule for selection, design and construction of the Phase Two Structure; and (8) the temperature conditioning program annual reporting and ARC consultation requirements.

The Licensee shall develop the WTC Plan in consultation with the ARC. The Licensee shall allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the WTC Plan to the Commission. When filing the WTC Plan with the Commission, the Licensee shall include documentation of

consultation; copies of comments and recommendations; and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

Upon Commission approval, the Licensee shall implement the WTC Plan.

A-LA 4: Whitewater Boating Flows

The Licensee shall provide flows for twelve (12) viable whitewater boating events every three (3) years for the duration of the License with sufficient advance notice to whitewater boaters. During each three-year period, the Licensee shall provide a firm water budget of 2,100 acre-feet of water (total, to be allocated over three (3) years) to ensure that twelve (12) viable whitewater events occur. If the 2,100 acre-feet of water budget in combination with controlled and uncontrolled flow releases (i.e. spill) and accretion flows is not sufficient to achieve twelve (12) viable whitewater events during each three (3) year period, the License shall provide a reserve budget of 1,200 acre-feet to ensure that such events occur.

1. Whitewater Recreation Plan

Within ninety (90) days after issuance of the License, the Licensee shall file with the Commission, for approval, a Whitewater Recreation Plan (WR Plan). This WR Plan shall document how the Licensee shall implement a program to provide annual higher flows in the Sultan River below Culmback Dam for whitewater boating for the duration of the License.

1.1 The WR Plan shall include the following provisions that describe: (1) the frequency, magnitude, duration, and timing of each whitewater event during the first three-year period and the mechanism for determining such parameters during subsequent years; (2) operational, biological, and other constraints upon whitewater events; (3) the ongoing involvement (including annual meetings) of the Aquatic Resource Committee (ARC) and American Whitewater in implementing the Program; (4) the mechanism for timing whitewater events to coincide with natural rainfall events or coordinate with Project generation or other License Article obligations to achieve greater flow volumes in desired reaches or habitats; (5) mechanism for notifying whitewater boating stakeholders of whitewater boating opportunities during scheduled whitewater events and other high flow events within the Sultan River; (6) mechanism for assessing the boaters' satisfaction during whitewater events and impacts to aquatic and terrestrial resources; (7) mechanism for recording the number of participants, safety incidents, and costs; (8) the timing and other restrictions necessary to minimize impacts to aquatic resources, to not exacerbate flood damage in the City of Sultan; (9) the method and schedule for monitoring flow releases and water budget accounting pursuant to the Plan; (10) the waiver of indemnity for participants in a scheduled flow release; and (11) the mechanism for providing and restricting the whitewater boating stakeholder representatives shuttle vehicle access to Culmback Dam and the Diversion Dam during scheduled whitewater events

1.2 The Licensee shall develop the WR Plan in consultation with the ARC, American Whitewater and National Park Service (NPS). The Licensee shall

allow a minimum of thirty (30) days for members of the ARC, American Whitewater and NPS to comment and make recommendations before submitting the WR Plan to the Commission. When filing the WR Plan with the Commission, the Licensee shall include documentation of consultation, copies of comments and recommendations, and specific descriptions of how comments and recommendations from the ARC, American Whitewater, and NPS are accommodated by the WR Plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information. Upon Commission approval, the Licensee shall implement the WR Plan.

2. Whitewater Events

2.1 The twelve (12) whitewater events will be provided either as (1) scheduled events (section 2.3), or (2) viable unscheduled whitewater events (section 2.2).

2.2 Viable Unscheduled Whitewater Events: A viable unscheduled whitewater event is defined as a calendar day (a) occurring between March 15 and November 30 or at times agreed to by the Licensee and American Whitewater in consultation with the ARC, (b) with controlled and uncontrolled flow releases (i.e. spill) and accretion flows between 600 and 2000 for at least three (3) hours, (c) during a time of day that supports whitewater boating, at conditions that allow access to the reach, and (d) with at least 48 hours notice to boaters.

2.3 Scheduled Whitewater Events: Each year, at a minimum two (2) of the whitewater events will be scheduled at least two (2) weeks in advance and shall occur on weekends, with one (1) occurring in September and one (1) occurring in April or May. Each event shall be between 600 cfs and 2000 cfs and at times of the day that support whitewater boating. If the duration of a scheduled whitewater event is scheduled to be longer than three (3) daylight hours, the event will be counted as two (2) events. For purposes of determining compliance, the scheduled whitewater event's magnitude and duration will be measured at the flow gage immediately upstream of the City of Everett's Diversion Dam at River Mile (RM) 9.8.

2.4 So long as the whitewater recreation flow occurs on the noticed day for the whitewater event, the scheduled magnitude and duration of a whitewater event may be achieved through any combination of controlled (including releases to achieve process flow components pursuant to A-LA 8) and uncontrolled flow releases (i.e. spill) and accretion flow. However, only water (above scheduled minimum flows) released from Culmback Dam pursuant to a scheduled whitewater recreation flow event and any downramping associated with such release (as required by A-LA 5) shall be deducted from the 2,100 acre-feet water budget. If a portion of the 2,100 acre-foot water budget remains after the twelve (12) events have been provided, the balance of the

water budget is available for additional releases during that three (3) year period.

2.5 So long as the whitewater recreation flow occurs on the scheduled day, the scheduled magnitude and duration of a whitewater event may be achieved through any combination of controlled (including releases to achieve process flow components pursuant to A-LA 8) and uncontrolled flow releases (i.e. spill) and accretion flow. However, only water released from Culmback Dam pursuant to a scheduled whitewater recreation flow event and any downramping associated with such release (as required by A-LA 5) shall be deducted from the water budget provided in section 1.1.

2.6 The Licensee shall consult with the ARC, NPS and American Whitewater on an annual basis to determine if the WR program is providing a meaningful whitewater experience and if the program should be modified, within the constraints of the water budget. The Licensee in consultation with the ARC and American Whitewater, may request that the Commission temporarily suspend or reduce the WR Program based upon lack of meaningful whitewater boating experience. In the event that the program is temporarily suspended or reduced, the Licensee will consult annually with the ARC, NPS and American Whitewater concerning whether the Program shall be resumed.

3. Drought Events

During the course of a water year, if necessary, the Licensee in consultation with the ARC shall develop a drought controlled flow release schedule for whitewater events when: (1) a drought event resulting in advisory reductions in domestic water consumption (as described by the 2007 City of Everett's Drought Response Plan as a Stage 1 response to a drought event) is occurring; (2) the whitewater events described in this LA require interim modification (including postponing or reductions in flow magnitude) to manage water supply during periods of weather related shortages; and (3) the drought release schedule shall not undermine the purposes of this License Article. The Licensee shall notify the Commission and shall implement the drought release schedule within seven (7) days of providing such notice, unless otherwise directed by the Commission.

4. Reservation System

The Licensee shall develop a reservation system for the weekend whitewater events, a scheduled water release may be canceled if less than six (6) whitewater boaters makes a reservation by 5:00 p.m. on the Thursday prior to the scheduled event. Any event cancelled due to insufficient reservations shall be counted as if the event has occurred (with a proportional reduction from the water budget provided in A-LA 4), and the Licensee shall be under no obligation to reschedule the whitewater event.

A-LA 5: Downramping Rate Conditions

The Licensee shall operate the Project within the following downramping rate schedules and downramping frequency limitations. Downramping rate refers to the rate of allowable stage reduction per unit time. The downramping rates do not apply to power-generation equipment failures, forced outages, or when flow releases are exacerbating downstream flood conditions. However, the Licensee shall take steps listed in section 1 below to reduce operational emergencies that may trigger sudden drops in flow below the Powerhouse. The Licensee shall track rates on a 15-minute basis by monitoring U.S. Geological Survey (USGS) Streamflow Gages. No one (1) 15-minute downramping value shall exceed half the hourly rate shown in the schedule. No four (4) consecutive 15-minute downramping rates, in total, shall exceed the hourly rates shown in the schedule.

Day is defined as one (1) hour after sunrise to one (1) hour before sunset. Night is defined as one (1) hour after sunset to one (1) hour before sunrise. If the Licensee downramps during one (1) hour before to one (1) hour after sunrise or sunset and different downramping rates are required for day and night, the Licensee shall follow the lower of the day or night rates.

1. Operational Improvements

To reduce operational emergencies that result in flow fluctuations, the Licensee shall install and use a flow deflector to the existing Pelton wheel units to maintain flow during load rejection events. Until the new Pelton bypass system proves to be operationally effective, the Licensee shall maintain staff at the Powerhouse during potential electrical storms.

2. Redd Dewatering Protection

The Licensee shall institute a salmon ceiling flow of 550 cfs (mean daily discharge measured at the Powerhouse gage) during the September 15 to October 15 period of peak spawning for Chinook salmon, unless natural accretion flows or Spada Lake inflow supersedes the Licensee's hydraulic control of the Project. This ceiling shall ensure that redds remain wetted should Project flows be reduced to minimums of 300 cfs. Furthermore, the Licensee shall use spawner survey information collected to determine the highest elevation at which spawning has occurred during Chinook and steelhead spawning seasons. The Licensee shall attempt to keep redds covered with water until fry emergence has occurred. The spawning flow ceiling and corresponding minimum flow may be adjusted based upon approval by the Aquatic Resource Committee (ARC).

3. Downramping Rate Schedules

3.1 Jackson Hydroelectric Project Powerhouse Downramping Rate Schedules

The following schedule as measured at USGS Streamflow Gage No. 12138160 applies to Jackson Hydroelectric Project Powerhouse downramping when the flow is less than 1,500 cfs. When providing flow releases from Culmback Dam (including process flows, special purpose flows, and whitewater recreation flows), the Licensee shall coordinate such releases to ensure compliance with this schedule.

January 1 to May 31

Flow Range (cfs)	Day	Night
1,500 to 750	4 inches per hour	4 inches per hour
750 to 600	2 inches per hour	2 inches per hour
600 to 300	2 inches per hour	4 inches per hour
300 to Minimum	2 inches per hour	2 inches per hour

June 1 to September 15

Flow Range (cfs)	Day	Night
1,500 to 750	2 inches per hour	1 inch per hour
750 to 600	2 inches per hour	1 inch per hour
600 to Minimum	2 inches per hour	1 inch per hour

Sept. 16 to Oct. 31

Flow Range (cfs)	Day	Night
1,500 to 750	2 inches per hour	1 inch per hour
750 to 600	2 inches per hour	1 inch per hour
600 to Minimum	2 inches per hour	2 inches per hour

November 1 to December 31

Flow Range (cfs)	Day	Night
1,500 to 750	4 inches per hour	6 inches per hour
750 to 600	2 inches per hour	2 inches per hour
600 to Minimum	4 inches per hour	4 inches per hour

From January 1 to September 15, if river flow prior to downramping has exceeded 1,000 cfs for more than 72 hours, the Licensee shall downramp through the 750 cfs to 600 cfs flow range only after holding flow constant between 750 and 850 cfs for at least six (6) hours of daylight and one (1) overnight period.

3.2 Reach 2 (River Mile (RM) 4.5 to RM 9.7) and Reach 3 (RM 9.7 to RM 16.1) Ramping Rate Schedule

The following schedule as measured at USGS Streamflow Gage No. 12137800 applies to downramping when the flow is below 300 cfs. The schedule does not apply to actions (such as gravel flushing) which require manual operation of the sluice gate at the Diversion Dam.

Time of Year	Day	Night
January 1 to May 31	3 inches per hour	3 inches per hour
June 1 to September 15	3 inches per hour	1.5 inches per hour
September 16 to October 31	3 inches per hour	3 inches per hour
November 1 to December 31	6 inches per hour	6 inches per hour

For flow releases from Culmback Dam (including process flows, special purpose flows, and whitewater recreation flows) that cause the flow range at USGS Streamflow Gage No. 12137800 to be greater than 300 cfs but less than 1000 cfs, the Licensee shall attempt within the constraints of the Project's existing equipment to limit the downramping rate to no more than 0.5 feet per hour.

4. Downramping Frequency Limitations

The Licensee shall limit Jackson Hydroelectric Project Powerhouse downramping to no more than a total of 48 hours from January 1 through May 31. The Licensee shall limit Jackson Hydroelectric Project Powerhouse downramping to no more than 16 hours of the seasonally allotted 48 allowed in any consecutive 30-day period during this January 1 through May 31 period. The downramping frequency limitations apply when downramping is greater than one (1) inch per hour and river flows as measured at USGS Streamflow Gage No. 12138160 are less than 750 cfs. Ramping as a result of high flow events required by License Articles (process flows, whitewater recreation flows, special purpose flows) is not subject to the downramping frequency limitations.

5. Downramping Report

Within one (1) year of the completion of the side channel enhancement projects pursuant to A-LA 7, the Licensee shall file with the Commission a ramping rate report. The Licensee shall develop this report in consultation with the ARC. The report shall evaluate whether additional ramping rate restrictions are necessary to protect juvenile salmon from stranding.

6. Incident Report

If Project operations result in an exceedance of the above downramping rate schedules (section 3) or downramping rate restrictions (section 4), the Licensee shall notify the members of the ARC and the Commission no later than ten (10) business days after such incident.

A-LA 6: Large Woody Debris (LWD)

Within five (5) years of the Commission's approval of the Large Woody Debris Plan (LWD Plan), the Licensee shall install five (5) to eight (8) large woody debris (LWD) structures in the lower Sultan River (River Mile (RM) 0 to RM 16) subject to gaining regulatory approval and necessary legal access. In addition, starting ten (10) years after License issuance through the remainder of the term of the License, the Licensee shall install up to four (4) additional LWD structures in the Sultan River at a schedule to be determined by the Aquatic Resource Committee (ARC), subject to gaining regulatory approval and necessary legal access. In addition, throughout the License term, the Licensee shall move woody debris accumulated in Spada Reservoir between Culmback Dam and the log boom to areas targeted for restoration decided by the ARC.

Up to five (5) of the initial eight (8) structures shall be main channel LWD structures designed to improve main channel habitat complexity. The Licensee shall design the main channel LWD structures to re-direct flow, carve and create habitat, add diversity, retain and sort sediment, provide salmonid rearing habitat, and/or provide a medium for use by macroinvertebrates.

Up to three (3) of the initial eight (8) structures shall be associated with side channels and designed to improve mainstem / side channel connectivity by re-directing flow into the side channel, as reasonably feasible and appropriate.

Every LWD structure installed pursuant to this License Article shall include a minimum of five (5) and up to thirty (30) structural pieces and where possible, shall be designed to collect additional wood over time. Additionally, each structural piece shall be between 24-inches to 36-inches in diameter (dbh) and approximately 35-feet to 40-feet in length with rootwads intact. The size and length of each structural piece shall be limited by the transportation capacity of moving structures to a staging area by truck. Further limitations shall be imposed for projects relying on the use of helicopter transport of structural pieces. The weight of each structural piece shall be limited by aerial transport capabilities by Chinook helicopter between the staging area and the project site. The structural pieces shall be one of the following species: fir, hemlock or cedar. Structural pieces greater than 36-inches in diameter (dbh) shall be considered subject to availability and the limitations previously described.

In selecting the specific location and design of an LWD structure, the Licensee shall consult with the ARC and consider the probability of structure retention and risk to property.

The Licensee shall use woody debris from Spada Reservoir that accumulates between Culmback Dam and the log boom where possible to support the LWD projects described herein and also to provide materials in support of the Side Channel Enhancement (SCE) projects. The Licensee shall consult with the ARC regarding movement and placement of materials downstream of Culmback Dam.

To accomplish this, within one (1) year of issuance of the License, the Licensee shall file with the Commission, for approval, an LWD Plan. This LWD Plan shall document how the Licensee shall implement a program to install up to eight (8) LWD structures between RM 0 and RM 16 in the Sultan River within five (5) years of Commission approval of the LWD Plan and up to an additional four (4) LWD structures from ten (10) years after License issuance through the term of the License. The LWD Plan shall include provisions that describe: 1) the design and location of each LWD structure; 2) the LWD installation schedule; 3) the restrictions necessary to minimize adverse impacts to public safety and property; 4) the method and schedule for monitoring the effectiveness of the LWD structures; and 5) the method and schedule for moving woody debris accumulated in Spada Reservoir between Culmback Dam and the log boom to areas targeted for restoration decided by the ARC.

The Licensee shall develop the LWD Plan in consultation with the ARC. The Licensee shall allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the LWD Plan to the Commission. When filing the LWD Plan with the Commission, the Licensee shall include documentation of consultation; copies of comments and recommendations; and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

Upon Commission approval, the Licensee shall implement the LWD Plan.

A-LA 7: Side Channel Projects

The Licensee shall enhance the salmonid habitat function of a minimum of 10,000 linear feet of side channel area to provide a minimum of three (3) acres of additional rearing habitat and other habitat functions. This habitat shall be located within the wetted geographic area defined by a flow of 4,100 cfs, within the Sultan River, measured downstream of the Powerhouse. This enhancement shall be achieved through projects that improve flow connectivity or other habitat modification projects. This enhancement shall be subject to obtaining regulatory approval and legal access to any property necessary to carry out the above enhancement.

As part of this commitment, the Licensee shall restore and maintain flow connectivity between the mainstem Sultan River and the five prominent side channels at flows greater than 300 cfs (as measured at the USGS Streamflow Gage No. 12138160). These five prominent side channels are identified in the Preliminary License Proposal (December 2008) at Figure 5.3-12 as Side Channels 1, 2, 3, A, and B. At Side Channels 1, 2, 3, A and B, the Licensee shall excavate the inlets or use other means to redirect and maintain flow to ensure that flow connectivity and habitat value is achieved at flows greater than 300 cfs. The Licensee shall design the excavation or other means utilized in these side channels so that connectivity is self-maintaining. The Licensee shall also design the side channel enhancements to avoid adverse impacts to surrounding properties (including the City of Sultan's recreational properties). If property easements or regulatory approval cannot be obtained, the Licensee shall develop, in consultation with the Aquatic Resource Committee (ARC), other similar projects in the Sultan or Skykomish river systems to meet the linear foot and square foot requirements dictated by this License Article obligation.

The Licensee shall rely upon LiDAR, HEC_RAS modeling, existing studies and other available information to identify other side channels, swales, backwater and off channel habitats suitable for enhancement as salmonid rearing habitat within the Sultan River downstream of Culmback Dam.

As described in the LWD License Article, the Licensee shall use large woody debris collected at Culmback Dam to add structure and function to side channels.

Within one (1) year of issuance of the License, the Licensee shall file with the Commission, for approval, a Side Channel Enhancement Plan (SCE Plan). This SCE Plan shall document how the Licensee shall implement a program to enhance the salmonid rearing habitat function in a minimum of 10,000 linear feet of side channel area within the wetted geographic area defined by a flow of 4,100 cfs as measured at the USGS gaging station below the Powerhouse within the Sultan River downstream of Culmback Dam. The SCE Plan shall include provisions that describe: 1) the method and schedule for restoring and maintaining year-round flow connectivity between the mainstem Sultan River and Side Channels 1, 2, 3, A, and B; 2) the method and schedule for excavating or utilizing other means to redirect and maintain flow, Side Channels 1, 2, 3, A, and B; 3) the method and schedule for identifying, enhancing and maintaining other

off channel habitat suitable for enhancement; 4) the use of large woody debris or other flow re-direction means to re-direct a portion of the mainstem flow into the side channels, 5) the use of large woody debris collected at Culmback Dam to add structure and function within the side channel; and 6) the method and schedule for monitoring (including reporting requirements) and maintaining side channel enhancements throughout the term of the License.

The Licensee shall develop the SCE Plan in consultation with the ARC. The Licensee shall allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the SCE Plan to the Commission. When filing the SCE Plan with the Commission, the Licensee shall include documentation of consultation, copies of comments and recommendations, and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt an individual ARC member's recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

Upon Commission approval and obtaining any necessary regulatory approvals, the Licensee shall implement the SCE Plan.

A-LA 8: Process Flow Regime

The Licensee shall discharge water from the Project into the Sultan River to ensure that the magnitude, duration, timing and frequency of the process flow components specified within sections 1 through 5 of this License Article are achieved. However, unless otherwise provided by this License Article, the magnitude, duration, timing and frequency of the process flow components may be achieved through any combination of controlled (including whitewater boating releases pursuant to A-LA 4) and uncontrolled flow releases (i.e. spill) and accretion flow.

A-LA 8 Table 1. Process Flow Components Summary

Process Flow Component	Magnitude and Duration	Frequency
Component 1: Channel Maintenance Flow (measured at USGS Streamflow Gage No. 12138160)	Component Flow achieved when: (a) a target flow of at least 4100 cfs is maintained for twenty-four (24) hours; or (b) a target flow of at least 4100 cfs is achieved and the Licensee provides a maximum release flow at the time when flow drops below 4100 cfs for a total duration (including the target flow and maximum release) of twenty-four (24) consecutive hours.	Four (4) times every ten (10) years (but not less than once every four (4) years).
Component 2: Channel Forming (measured at USGS Streamflow Gage No. 12138160)	Component flow is achieved when: (a) a target flow of at least 6500 cfs is maintained for twenty-four (24) consecutive hours; or (b) a target flow of 6500 cfs is achieved and the Licensee provides a maximum release flow at the time when flow drops below 6500 cfs for a total duration (including the target flow and maximum release) of twenty-four (24) consecutive hours, or (c) the Licensee provides a maximum release flow for twenty-four (24) consecutive hours that is timed to achieve, to the extent feasible, a target flow of 6500 cfs.	One (1) time every ten (10) years.

Component 3.1: Reach 1 Flushing Flows (measured at USGS Streamflow Gage No. 12138160)	Component flow is achieved when 1500 cfs is maintained for six (6) consecutive hours. If the Spada Reservoir is below 1420 feet, component flow is achieved when a 1200 cfs instantaneous minimum flow is maintained for six (6) consecutive hours.	Two (2) times every year (with one occurring in September and one occurring between April 1 and May 31).
Component 3.2: Reach 2 Flushing Flows(measured immediately upstream of Powerhouse at RM 4.7)	Component flow achieved when: (a) a 500 cfs instantaneous minimum flow is maintained for six (6) consecutive hours; or (b) a 700 cfs instantaneous minimum flow is maintained for three (3) consecutive hours.	Two (2) times every year (with one occurring in September and one occurring between April 1 and May 31).
Component 3.3: Reach 3 Flushing Flows (measured immediately upstream of City's Diversion Dam at RM 9.8)	Component flow achieved when: (a) a 400 cfs instantaneous minimum flow is maintained for six (6) consecutive hours; or (b) a 600 cfs instantaneous minimum flow is maintained for three (3) consecutive hours.	Two (2) times every year (with one occurring in September and one occurring between April 1 and May 31).
Component 4.1: Reach 1 Upstream Migration Flow (measured at USGS Streamflow Gage No. 12138160)	Component flow achieved when a minimum flow between 800 and 1200 cfs as determined by the Aquatic Resource Committee (ARC) is maintained or exceeded for six (6) consecutive hours.	One (1) time per year (occurring in September).
Component 4.2: Reach 2 Upstream Migration Flow (measured immediately upstream of the Powerhouse at RM 4.7)	Component flow is achieved when a flow between 400 and 600 cfs instantaneous minimum flow, as determined by the ARC, is maintained for six (6) consecutive hours.	One (1) time per year (occurring in September).

Component 4.3: Reach 3 Upstream Migration Flow (measured immediately upstream of the City's Diversion Dam at RM 9.8)	Component flow achieved when a minimum flow between 300 and 500 cfs as determined by the ARC is maintained or exceeded for six (6) consecutive hours.	One (1) time per year (occurring in September) after completion of Diversion Dam volitional fish passage modification.
Component 5.1: Reach 1 Outmigration Flow (measured at USGS Streamflow Gage No. 12138160)	Component flow is achieved when between 800 and 1200 cfs minimum flow as determined by the ARC is maintained or exceeded for six (6) consecutive hours.	Two (2) times per year (one occurring in April and one occurring in May).
Component 5.2: Reach 2 Outmigration Flow (measured immediately upstream of the Powerhouse at RM 4.7)	Component flow is achieved when between 400 and 600 cfs minimum flow as determined by the ARC is maintained or exceeded for six (6) consecutive hours.	Two (2) times per year (one occurring in April and one occurring in May).
Component 5.3: Reach 3 Outmigration Flow (measured immediately upstream of the City's Diversion Dam at RM 9.8)	Component flow is achieved when between 200 and 400 cfs minimum flow as determined by the ARC is maintained or exceeded for six (6) consecutive hours.	Two (2) times per year (one occurring in April and one occurring in May) after volitional fish passage and the ARC determines need.

The controlled flow releases shall be consistent with the Licensee's obligation pursuant to other License Articles and agreements with the City of Everett pertaining to its municipal water supply needs. The Licensee, in consultation with the Aquatic Resources Committee (ARC), shall schedule the timing of the controlled flow releases for any process flow component to avoid exacerbation of any downstream flood damage, and take into account maintenance and real-time aquatic resource (including fish and macroinvertebrates) concerns.

During the course of a water year, if necessary, the Licensee, in consultation with the ARC, shall develop a drought controlled flow release schedule for process flow components when: (1) a drought event resulting in voluntary reductions in domestic water consumption (as described by the 2007 City of Everett's Drought Response Plan as a Stage 2 response to a drought event) is occurring; (2) the process flow components described in this LA require interim modification (including changes in timing or reductions in flow magnitude) to manage water supply during periods of weather-related shortages; and (3) the drought release schedule shall not undermine the purposes of this LA. The Licensee shall notify the Commission and shall implement the drought release schedule within seven (7) days of providing such notice, unless otherwise directed by the Commission.

With respect to the maintenance flows (section 1), the flushing (section 3), upstream migration (section 4), and outmigration (section 5) process flow components, for compliance purposes (to account for monitoring imprecision and release equipment variability and accretion flow variability), a component flow is achieved notwithstanding temporary fluctuations of up to ten (10) percent of the required flow levels for so long as the average over the process flow component duration is above the specified process flow component flow level.

Based upon A-LA 17 monitoring and the best available information, in year ten (10) of this License and every ten (10) years thereafter, the Licensee shall file a process flow effectiveness report with the Commission for its approval, after consultation with the ARC. The report will evaluate the effectiveness of each process flow component in achieving its designated objective.

Within ninety (90) days of issuance of the License, the Licensee shall file with the Commission for approval, a PF Plan. This PF Plan shall document how the Licensee shall implement a program for periodic controlled flow releases from the Powerhouse, the outlet pipe located adjacent to the City of Everett's Diversion Dam, and Culmback Dam. The PF Plan shall include provisions that describe: (1) the frequency, magnitude, duration, and timing of process flow components consistent with this License Article; (2) the ongoing involvement of the ARC in implementing this program; (3) the mechanism for timing controlled flow releases (including whitewater boating releases pursuant to A-LA 4) to coincide with natural rainfall events or uncontrolled flow releases to achieve the flow frequency, magnitude, and duration for each of the process flow components; (4) the timing and other restrictions necessary to minimize impacts to aquatic resources, to not exacerbate downstream flood damage in the City of Sultan; (5) the method, locations, and

schedule for monitoring and measuring process flow components; (6) the method and schedule for studying the necessity of flushing flow for supporting the geomorphic process goals; (7) the method and schedule for studying the necessity of upstream migration flow and outmigration flow for providing timely and effective upstream and downstream migration of anadromous fish; and (8) the method and schedule for monitoring the impacts of process flow upon aquatic resources.

The Licensee shall develop the PF Plan in consultation with the ARC. The Licensee shall allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the PF Plan to the Commission. When filing the PF Plan with the Commission, the Licensee shall include documentation of consultation, copies of comments and recommendations, and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

Upon Commission approval, the Licensee shall implement the PF Plan.

The process flow regime specified by this License Article has the following components:

1. Channel Maintenance Flow: Four (4) times per every ten (10) years (but not less than once every four (4) years) for the term of the License, the Licensee shall discharge water from the Project if necessary to ensure that a channel maintenance flow is achieved. A channel maintenance flow is achieved when (a) a target flow of at least 4100 cfs instantaneous minimum flow is maintained for twenty-four (24) consecutive hours at USGS Streamflow Gage No. 12138160 or (b) a target flow of at least 4100 cfs is achieved and the Licensee provides a maximum release flow from the Powerhouse, the outlet pipe located adjacent to the City of Everett's Diversion Dam, and Culmback Dam (via the Howell Bunger and 42-inch slide valves) at the time when flow drops below 4100 cfs for a total duration (including the target flow and maximum release) of twenty-four (24) consecutive hours as measured at USGS Streamflow Gage No. 12138160.

2. Channel Forming Flow: Once (1) every ten (10) years for the term of the License, the Licensee shall discharge water from the Project if necessary to ensure that a channel-forming flow is achieved. A channel-forming flow is achieved when (a) a target flow of at least 6500 cfs instantaneous minimum flow is maintained for twenty-four (24) consecutive hours at USGS Streamflow Gage No. 12138160 or (b) a target flow of 6500 cfs is achieved and the Licensee provides a maximum release flow from the Powerhouse, the outlet pipe located adjacent to the City of Everett's Diversion Dam, and Culmback Dam (via the Howell Bunger and 42-inch slide valves) for twenty-four (24) consecutive hours at the time when flow drops below 6500 cfs for a total duration (including the target flow and maximum release) of twenty-four (24) consecutive hours as measured at USGS Streamflow Gage No. 12138160, or (c) the Licensee provides a maximum release flow from the Powerhouse, the outlet pipe

located adjacent to the City of Everett's Diversion Dam, and Culmback Dam (via the Howell Bunger and 42-inch slide valves) for twenty-four (24) consecutive hours that is timed to achieve, to the extent feasible, a target flow of 6500 cfs at USGS Streamflow Gage No. 12138160. This channel-forming flow obligation shall be in addition to the channel maintenance flow obligation required by section 1.

3. Flushing Flow

3.1. Reach 1 (River Mile (RM) 0.0 to RM 4.5) Flushing Flows: Two (2) times every year for the term of the License, the Licensee shall discharge water from the Powerhouse if necessary to ensure that a flushing flow is achieved. One (1) of the annual flushing flows shall occur in September and one (1) of the annual flushing flows shall occur between April 1 and May 31. A flushing flow is achieved when a 1500 cfs instantaneous minimum flow is maintained for six (6) consecutive hours at USGS Streamflow Gage No. 12138160. In the event that the Spada Reservoir is below 1420 feet at the time of a scheduled flushing flow, a flushing flow is achieved when a 1200 cfs instantaneous minimum flow is maintained for six (6) consecutive hours at USGS Streamflow Gage No. 12138160.

3.2. Reach 2 (RM 4.5 to RM 9.7) Flushing Flows: The Licensee shall discharge water from the outlet pipe located adjacent to the City of Everett's Diversion Dam if necessary to ensure that two (2) flushing flows are achieved. One (1) of the annual flushing flows shall occur in September and one (1) of the annual flushing flows shall occur between April 1 and May 31. A flushing flow is achieved when either (a) a 500 cfs instantaneous minimum flow is maintained for six (6) consecutive hours immediately upstream of the Powerhouse at RM 4.7 or (b) a 700 cfs instantaneous minimum flow is maintained for three (3) consecutive hours immediately upstream of the Powerhouse at RM 4.7.

3.3. Reach 3 (RM 9.7 to RM 16.1) Flushing Flows: The Licensee shall discharge water from Culmback Dam if necessary to ensure that two (2) flushing flows per year are achieved. One (1) of the annual flushing flows shall occur in September and one (1) of the annual flushing flows shall occur between April 1 and May 31. A flushing flow is achieved when either a 400 cfs instantaneous minimum flow is maintained for six (6) consecutive hours immediately upstream of the City of Everett's Diversion Dam at RM 9.8 or b) a 600 cfs instantaneous minimum flow is maintained for three (3) consecutive hours immediately upstream of the City of Everett's Diversion Dam at RM 9.8.

4. Upstream Migration Flow

4.1. Reach 1 Upstream Migration Flow: The Licensee shall discharge water from the Powerhouse if necessary to ensure that one (1) upstream migration flow per year is achieved in Reach 1. The upstream migration flow shall occur in September. An upstream migration flow is achieved when a minimum flow between 800 and

1200 cfs as determined by the ARC is maintained or exceeded for six (6) consecutive hours at USGS Streamflow Gage No. 12138160.

4.2. Reach 2 Upstream Migration Flow: The Licensee shall discharge water from the Project if necessary to ensure that one (1) upstream migration flow per year is achieved in Reach 2. The upstream migration flow shall occur in September. An upstream migration flow is achieved when a flow between 400 and 600 cfs instantaneous minimum flow, as determined by the ARC, is maintained for six (6) consecutive hours immediately upstream of the Powerhouse at RM 4.7.

4.3. Reach 3 Upstream Migration Flow: Upon the date that the Licensee completes the Diversion Dam's volitional fish passage modifications, the Licensee shall discharge water from Culmback Dam if necessary to ensure that one (1) upstream migration flow per year is achieved in Reach 3. An upstream migration flow is achieved when a flow of between 300 and 500 cfs minimum flow as determined by the ARC is maintained or exceeded for six (6) consecutive hours immediately upstream of the City of Everett's Diversion Dam at RM 9.8.

5. Outmigration Flow

5.1. Reach 1 Outmigration Flow: The Licensee shall discharge water from the Powerhouse if necessary to ensure that two (2) outmigration flows per year are achieved. One (1) of the annual outmigration flows shall occur in April and one (1) of the annual migration flows shall occur in May. An outmigration flow is achieved when between 800 and 1200 cfs minimum flow as determined by the ARC is maintained or exceeded for six (6) consecutive hours at USGS Streamflow Gage No. 12138160. The PF Plan shall address the proportion of the outmigration flow that must occur during nighttime hours to best protect juvenile salmonids from predation.

5.2. Reach 2 Outmigration Flow: The Licensee shall discharge water from the outlet pipe located adjacent to the City of Everett's Diversion Dam if necessary to ensure that two (2) outmigration flows per year are achieved. One (1) of the annual outmigration flows shall occur in April and one (1) of the annual migration flows shall occur in May. An outmigration flow is achieved when between 400 and 600 cfs minimum flow as determined by the ARC is maintained or exceeded for six (6) consecutive hours immediately upstream of the Powerhouse at RM 4.7. The PF Plan shall address the proportion of the outmigration flow that must occur during nighttime hours to best protect juvenile salmonids from predation.

5.3. Reach 3 Outmigration Flow: Upon Commission approval after the ARC determines that an outmigration flow in Reach 3 is needed for timely and effective anadromous fish outmigration, the Licensee shall discharge water from Culmback Dam if necessary to ensure that two (2) outmigration flows per year are achieved. One (1) of the annual outmigration flows shall occur in April and

one (1) of the annual migration flows shall occur in May. An outmigration flow is achieved when between 200 and 400 cfs minimum flow as determined by the ARC is maintained or exceeded for six (6) consecutive hours immediately upstream of the City of Everett's Diversion Dam at RM 9.8. The PF Plan shall address the proportion of the outmigration flow that must occur during nighttime hours to best protect juvenile salmonids from predation.

A-LA 9: Minimum Flows

The Licensee shall discharge water from the Project into the Sultan River, in accordance with the flow regime required by this License Article. The purposes of this License Article are to protect, mitigate, and enhance fish and wildlife resources, riparian vegetation, aesthetic resources, and water quality in the Sultan River.

During the course of a water year, if necessary, the Licensee in consultation with the Aquatic Resource Committee (ARC), shall develop a drought controlled flow release schedule for minimum flows when: (1) a drought event resulting in voluntary reductions in domestic water consumption (as described by the 2007 City of Everett's Drought Response Plan as a Stage 2 response to a drought event) is occurring; (2) the release schedule described in this License Article requires interim modification to manage water supply during periods of weather-related shortages; and (3) the drought release schedule shall not undermine the purposes of this License Article. The Licensee shall notify the Commission and shall implement the drought release schedule within seven (7) days of providing such notice, unless otherwise directed by the Commission.

Compliance with the minimum instream flow schedule outlined below shall be monitored at U.S. Geological Survey (USGS) Gaging Stations (12138160 and 12137800) for component releases for Reaches 1 and 2 and calibrated valve curves for Reach 3 Component releases. The Licensee shall commit to funding the operation or operating these two (2) gaging stations in the lower river downstream of Culmback Dam for the License term. For compliance purposes and to account for monitoring imprecision and release equipment variability, the Licensee is allowed temporary fluctuations of up to five percent of the scheduled flow release as measured at USGS Streamflow Gage No. 12138160 for Reach 1 Component releases, USGS Streamflow Gage No. 12137800 for Reach 2 Component releases, and calibrated valve curves for Reach 3 Component releases.

The flow regime required by this Article has three components, described as follows:

1. Reach 1 (River Mile (RM 0 to RM 4.5) Component

   1.1 Except as provided in section 1.2, the Licensee shall release water from the Powerhouse to maintain instantaneous minimum flows at USGS Streamflow Gage No. 12138160 at all times of 300 cfs.

   1.2 If the Licensee determines in consultation with the ARC that a drought event resulting in advisory reductions in domestic water consumption (as described by the 2007 City of Everett's Drought Response Plan as a Stage 1 response to a drought event) is occurring, the Licensee shall release water from the Powerhouse to maintain instantaneous minimum flows at USGS Streamflow Gage No. 12138160 at all times in accordance with the following:

From September 15 through October 31:

Reservoir Level:	Instantaneous Minimum Instream Flow:
Above 1420 ft	300 cfs
Between 1420 ft and 1410 ft	275 cfs
Between 1410 ft and 1405 ft	250 cfs
Below 1405 ft	200 cfs

From November 1 through September 14:

Reservoir Level:	Instantaneous Minimum Instream Flow:
Above 1420 ft	300 cfs
Between 1420 ft and 1415 ft	275 cfs
Between 1415 ft and 1410 ft	250 cfs
Between 1410 ft and 1405 ft	225 cfs
Below 1405 ft	200 cfs

2. Reach 2 (RM 4.5 to RM 9.7) Component

The Licensee shall release water from the outlet pipe located adjacent to the City of Everett's Diversion Dam into the Sultan River to maintain instantaneous minimum flows at USGS Streamflow Gage No. 12137800 in accordance with the following schedule:

Date:	Instantaneous Minimum Instream Flow:
November 1 – March 15	100 cfs
March 16 – June 15	140 cfs
June 16 – September 14	100 cfs

From September 15 through October 31:

Reservoir Level:	Instantaneous Minimum Instream Flow:
Above 1420 ft	200 cfs
Between 1420 ft and 1415 ft	200 cfs
Between 1415 ft and 1410 ft	175 cfs
Between 1410 ft and 1405 ft	175 cfs
Below 1405 ft	150 cfs

3. Reach 3 (RM 9.7 to RM 16.1) Component

Until 2020, the Licensee shall provide an annual water budget of 20,362 acre-feet for release from the Culmback Dam into the Sultan River.

Starting with the 2020 water budget (July 2020 – June 2021) and for the remaining term of the License, the Licensee shall provide an additional 3,469 acre-feet to the water budget for a total annual water budget of 23,831 acre-feet, unless the ARC decides to delay or postpone this increase to the water budget.

The Licensee shall release the annual water budget as instantaneous minimum flows with a release schedule developed prior to each water budget year (July 1 – June 30) in consultation with the ARC. No later than ninety (90) days prior to the beginning of each water budget year, the Licensee shall prepare and distribute to the ARC a preliminary Flow Report containing a recommended release schedule for the annual water budget for the upcoming water budget year. Following consultation with the ARC, the Licensee shall modify the Flow Report to document the final release schedule determined by the ARC and shall file the finalized Flow Report with the Commission for informational purposes by no later than fifteen (15) days prior to the beginning of each water budget year.

If, during the course of a water budget year, but not more than once every ninety (90) days unless exceptional circumstances exist, the ARC determines that the release schedule described in the Flow Report requires interim modification consistent with the purposes of this Article, the Licensee shall notify the Commission and implement the revised release schedule within seven (7) days of providing such notice, unless otherwise directed by the Commission. Additionally, during the first three (3) water budget years after License issuance, but not more than once every thirty (30) days, if the ARC determines that additional interim modifications are necessary for the purposes of this Article, the Licensee shall notify the Commission and implement the revised schedule within seven (7) days of providing such notice unless otherwise directed by the Commission.

Prior to the 3,469 acre-foot water budget increase and the date that the Licensee completes the Diversion Dam's volitional fish passage modifications, as described in A-LA 13, in the event that the ARC is unable to reach consensus regarding the release of the water budget by fifteen (15) days prior to the beginning of the water budget year, the following flow regime shall be implemented beginning the first day of the water budget year:

Month:	Default Instantaneous Flow Release Schedule:
July	20 cfs
August	20 cfs
September	20 cfs
October	20 cfs
November	20 cfs
December	20 cfs
January	20 cfs
February	25 cfs
March	30 cfs
April 1- 15	45 cfs
April 16- 30	55 cfs
May 1-15	65 cfs
May 16-31	50 cfs
June	35 cfs

Prior to the 3,469 acre-foot water budget increase but after the date that the Licensee completes the Diversion Dam's volitional fish passage modifications, as described in A-LA 13, in the event that the ARC is unable to reach consensus regarding the release of the water budget by fifteen (15) days prior to the beginning of the water budget year, the following flow regime shall be implemented beginning the first day of the water budget year:

Month:	Default Instantaneous Flow Release Schedule:
July	30 cfs
August	35 cfs
September 1-15	45 cfs
September 16-30	55 cfs
October 1-15	65 cfs
October 16-31	50 cfs
November	20 cfs
December	20 cfs
January	20 cfs
February	20 cfs
March	20 cfs
April	20 cfs
May	20 cfs
June	25 cfs

After the 3,469 acre-foot water budget increase, in the event that the ARC is unable to reach consensus regarding the release of the water budget by fifteen (15) days prior to the beginning of the water budget year, the following flow regime shall be implemented beginning the first day of the water budget year:

Month:	Default Instantaneous Flow Release Schedule:
July	40 cfs
August	45 cfs
September 1-15	55 cfs
September 16-30	65 cfs
October 1-15	70 cfs
October 16-31	60 cfs
November	20 cfs
December	20 cfs
January	20 cfs
February	20 cfs
March	20 cfs
April	20 cfs
May	30 cfs
June	35 cfs

The Licensee shall discharge water to the Sultan River to achieve the scheduled instream flows specified in this License Article. Water releases exceeding the planned flows shall not be charged to the minimum flow water budget.

A-LA 12: Fish Habitat Enhancement Plan

Within one (1) year of License issuance, the Licensee shall file with the Commission, for approval, a comprehensive Fish Habitat Enhancement Plan (FHE Plan) to enhance fish habitat in the Sultan River basin. The primary purpose of the FHE Plan is to guide the implementation of projects designed to enhance aquatic habitat in the Sultan River basin.

The Licensee shall develop the FHE Plan in consultation with the Aquatic Resource Committee (ARC). The Licensee shall allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the FHE Plan to the Commission. When filing the FHE Plan with the Commission, the Licensee shall include documentation of consultation, copies of comments and recommendations, and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

Upon Commission approval, the Licensee shall implement the FHE Plan.

The FHE Plan shall consist of the following actions:

1. Habitat Enhancement Account (HEA): The Licensee shall deposit $2.5 million into an interest-bearing account within thirty (30) days after issuance of the License. In addition, starting the tenth anniversary after issuance of the License and annually for the term of the License, the Licensee shall deposit $200,000 into this account. All funds are based on 2011 dollars and adjusted annually according to the U.S. Department of Labor, Bureau of Labor Statistics Consumer Price Index, All Urban Consumers, for Seattle-Tacoma-Bremerton (CPI-U). The Licensee shall use this account to fund projects developed pursuant to this License Article. The Licensee shall develop a proposed budget for each project. The Licensee shall use the funds provided within this section to implement only those projects specified and provided for in the budget. The Licensee shall not use the funds provided within this section for its administration or oversight of these projects.

2. Habitat Enhancement Projects: Throughout the term of the License, the Licensee shall, in consultation with the ARC, develop and implement, specific HEA-funded aquatic habitat enhancement and restoration projects within and adjacent to the Sultan River. Such projects shall include annual funding (up to $3,000 (2011 dollars)) for the National Resources Conservation Service hydrologic monitoring equipment (SNOTEL or other equipment), unless the ARC determines that such funding is no longer necessary. Such projects may include, but not be limited to: (a) instream structure enhancements; (b) side-channel habitat development; (c) removal, maintenance or construction of large woody debris; (d) removal of barriers to upstream migration; (e) gravel augmentation; (f) land purchases related to aquatic habitat enhancement; (g) purchase of additional water (on a willing-buyer, willing-seller basis) for

process or special purpose flows; and (h) other projects that provide for adaptive management in the Sultan basin. However, such projects shall not include projects which the Licensee would otherwise be required to implement pursuant to any other License Article.

3. Use of Funds: The Licensee, in consultation with the ARC, shall use funds from the HEA established in Paragraph (1) to implement the types of projects identified in this section. In addition, throughout the term of the License, if available funds remain within the Account, the Licensee shall implement other appropriate aquatic habitat enhancement and restoration projects developed by the ARC within the Snohomish River Basin; however, any measures identified in the FHE Plan for implementation in a location that is both (a) outside the Sultan River basin and (b) outside of the then-existing Project boundary, shall be limited to actions that do not result in an expansion of the Project boundary. In the event that a future landslide causes a barrier to upstream migration and the Licensee determines in consultation with the ARC that there is a Project nexus with the barrier, the Licensee will prioritize the use of funds from the HEA to study and, if necessary, modify such landslide to remove the barrier to upstream migration. However, the Licensee need not prioritize the use of the fund if the ARC determines that such prioritization of funds is not biologically warranted in light of the potential alternative uses of the fund and such alternative uses would mitigate for Project impacts. The availability of funds in this account shall not prevent the exercise of reserved authority by Ecology.

4. Threatened Species Take Minimization Measures: The Licensee shall implement measures to minimize the take of Puget Sound Chinook salmon, Puget Sound Steelhead, and bull trout associated with in-water work during development of any physical structures and facilities pursuant to other PM&Es, consistent with the agencies' incidental take statements [attached as Appendices __ and __ to this order]. The Licensee shall not use funds from the HEA to implement such measures.

5. FHE Plan Implementation Schedule: The Licensee shall include a schedule for implementing the FHE Plan, evaluating the success of the enhancement and restoration projects, and modifying the plan, if needed.

6. FHE Report: The Licensee shall file with the Commission, by June 30 of each year, an annual report fully describing its implementation of the FHE Plan during the previous calendar year and a list of planned projects for the current calendar year. The ARC shall have at least thirty (30) days to review and comment on the draft report prior to filing with the Commission. The Licensee shall provide copies of the annual report to the ARC.

A-LA 13: Diversion Dam Volitional Passage

1. Pursuant to the limitations and schedules prescribed below the Licensee shall provide for the construction, maintenance, and operation of safe, timely, and effective upstream and downstream volitional fish passage at the City of Everett's Diversion Dam through structural modifications to the Diversion Dam or sluice way. The Licensee's obligation to construct, maintain, and operate such fishways is subject to the U.S. Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) determining, in consultation with the Aquatic Resource Committee (ARC), that spawning escapement of either Chinook salmon or steelhead trout within the Diversion Dam Index Area (DDIA) equals or exceeds in any one (1) year ten percent (10 %) of the combined total spawning escapement for either Chinook salmon or steelhead trout within the four (4) index areas of the Sultan River, downstream of the Diversion Dam ("passage trigger") and the Licensee obtaining any necessary regulatory approvals.

2. Upon the Service and NMFS determining, in consultation with the ARC, that the spawning escapement above the Diversion Dam exceeds six (6) anadromous redds in any one (1) year, the Licensee shall not reverse flow (divert) or authorize the reverse flow of water from the Sultan River into the Diversion Dam outlet pipe unless required for the City of Everett's water supply needs. If this water supply requirement is triggered, the Licensee shall in consultation with the ARC take appropriate measures to protect Endangered Species Act listed fish. Notwithstanding, in the event that the District installs and operates a fish screen at the outlet pipe, the District may resume reverse flow (divert) or may authorize the reverse flow of water from the Sultan River into the Diversion Dam outlet pipe. Such fish screen shall conform to the National Marine Fisheries Service (NMFS) 2008 Anadromous Salmonid Passage Facility Design Manual, prepared by the NMFS Northwest Region Hydro Division, dated February 8, 2008 (NMFS Design Manual).

3. Diversion Dam Volitional Passage Design Drawings

The Licensee's design for modifying the Diversion Dam to provide upstream and downstream volitional fish passage shall conform to the NMFS Design Manual, while continuing to meet the City of Everett's water supply requirements.

4. Schedule for Providing Diversion Dam Volitional Passage

4.1 Within twelve (12) months after license issuance, the Licensee shall file with the Commission the conceptual design drawings and cost estimates of the proposed Diversion Dam modifications required for achieving volitional fish passage, which may include modifications to the Dam's sluiceway or sluice gate

4.2 Within six (6) months after the fish passage trigger prescribed at 1.0 above occurs, the District will file with the Commission the final design for the Diversion Dam modifications and apply for all necessary permits. Prior to filing the final design with the Commission, the Licensee shall prepare detailed design

drawings at the thirty percent (30%)(functional design), fifty percent (50%) and ninety percent (90%) completion stage and consult with the ARC at each stage.

4.3 The Licensee shall not begin construction of the Diversion Dam modifications until the Service and NMFS, in consultation with the ARC, and the Commission approves the final design and plan, and the Licensee has obtained all necessary permits.

4.4 The Licensee shall complete the Diversion Dam modifications no later than two (2) full construction seasons after the Commission approval of the final design and plan and obtaining all necessary permits. For purposes of this prescription for fishways, the construction season is defined as August 1 to August 31.

5. Diversion Dam Volitional Passage Plan

5.1 Within one (1) year after License issuance, the Licensee shall file for Commission approval, a Diversion Dam Volitional Passage Plan (DDVP Plan). The DDVP Plan shall include: (1) the conceptual design drawings and cost estimates of the Licensee's proposed Diversion Dam modifications for achieving upstream and downstream volitional fish passage; (2) the method and schedule for implementing the Diversion Dam proposed modifications in the event that the passage trigger prescribed at 1.0 above occurs; (3) the method and the schedule for monitoring annual spawning escapement within the Diversion Dam Index Area and above the Diversion Dam, as well as, annual spawning escapement within other existing index areas in the Sultan River; (4) the method and schedule for testing and verifying fish passage effectiveness at the Diversion Dam through the use of spawning surveys and/or visual digital recordings; and (5) the program annual monitoring and reporting and ARC consultation requirements.

5.2 The Licensee shall develop the DDVP Plan in consultation with the ARC. The District will allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the DDVP Plan to the Commission. When filing the DDVP Plan with the Commission, the Licensee will include documentation of consultation; copies of comments and recommendations; and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing will include the Licensee's reasons based upon Project-specific information. Upon Commission approval, the Licensee will implement the DDVP Plan.

A-LA 14: Reservoir Operations

1. Rule Curves for Reservoir Operations

The Licensee shall operate the Project consistent with the Spada Lake Reservoir Rule Curves ("Rule Curves") as shown in Figure 1. The purpose of the Rule Curves is to allow the Licensee to provide a balance of reliable municipal water supply, instream flows, incidental winter flood storage, higher lake levels for early summer recreation, and prevention or reduction of risk of spill following Chinook fall spawning and Steelhead spring spawning. The Rule Curves were developed based on the physical storage capacity of Spada Lake and the hydrology of the Sultan Basin. The Rule Curves divide Spada Lake into five states that shift throughout the water year (July through June). This operational water year is used to minimize the change in storage from year to year.

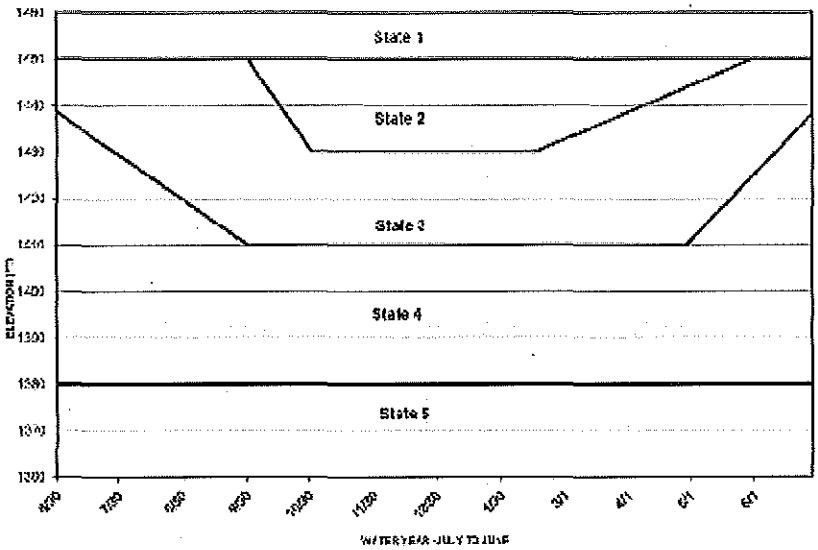


FIGURE 1. SPADA LAKE RESERVOIR OPERATIONAL RULE CURVES

State 1 – Zone of Spill. Above elevation 1450 feet msl, Spada Lake shall be in a state of spill. Therefore, the Licensee shall operate the Powerhouse to withdraw at least 1,300 cfs through the power tunnel.

State 2 – Zone of Potential Spill. The Licensee shall operate the Powerhouse to withdraw at least 1,300 cfs through the power tunnel unless inflow forecasts show that there is minimal risk of spill.

State 3 – Zone of Discretionary Operation. The Licensee shall operate the Powerhouse consistent with the operation objectives described in section 2.

State 4 – Zone of Water Conservation. The Licensee shall operate the Powerhouse to satisfy the requirements of its water supply obligations to the City of Everett and the instream flow requirements of the Sultan River. The Licensee shall operate the Project to meet the Licensee's other License Article obligations (including minimum instream flows and process flows) and to conserve water unless inflow forecasts and snow pack measurements indicate higher power production is warranted.

State 5 – Zone of Tunnel Protection. Below elevation 1380 feet msl the Licensee shall operate to withdraw water through the Powerhouse only in so far as vortexing does not occur in the power tunnel. Vortexes could cause power tunnel collapse from the negative hydraulic pressures of spiral flow. The Licensee shall satisfy instream flow and water supply requirements at Culmback Dam, the Diversion Dam, and the Powerhouse by releasing water from the exit valves at the base of Culmback Dam. The exit valves are at elevation 1220 feet msl.

2. State 3 Operation Priorities and Reservoir Elevations Targets

2.1. State 3 Reservoir Elevation Targets. The Licensee shall attempt to maintain a minimum impoundment elevation in Spada Lake Reservoir above 1430 feet msl between July 1 and August 15. Until the temperature conditioning structure described in section 3.2 of A-LA 3 is installed and operational, the Licensee shall target to maintain a minimum impoundment elevation in Spada Lake Reservoir at or above 1420 feet msl from August 16 to September 15. After the temperature conditioning structure described in section 3.2 of A-LA 3 is installed and operational, the License shall attempt to maintain a minimum impoundment elevation in Spada Lake Reservoir above 1415 feet msl from August 16 to September 15.

These minimum impoundment surface elevations targets may be temporarily modified if required by operating emergencies beyond the control of the Licensee. If an impoundment water surface elevation target is so modified, the Licensee shall notify the Aquatic Resource Committee as soon as possible but no later than two (2) business days after each such incident. The Licensee shall document the modification in its annual operations report to the FERC.

2.2. State 3 Operation Objectives. During State 3, the Licensee shall manage Project operations: (1) to allow the Licensee to provide for the City of Everett's water demands; (2) to meet the Licensee's other License Article obligations (including its minimum instream flow pursuant to A-LA 9 and temperature conditioning obligations pursuant to A-LA 3); (3) to meet its power production needs; (4) to provide for Spada Lake reservoir recreation;

(5) to provide for the interests of dam safety; and (6) to reduce the risk of flooding in the City of Sultan.

A-LA 15: Adaptive Management Plan

Within 180 days of License issuance, the Licensee shall file with the Commission, for approval, an Adaptive Management Plan (AM Plan). This AM Plan shall document how the Licensee shall: (1) address water use issues, specifically from Spada Lake Reservoir, when refill, Project operations, flow releases and Spada Lake Reservoir water surface elevations may conflict; and (2) address the process for evaluating and adaptively managing within the constraints of the specific License Articles.

The Licensee shall develop the AM Plan in consultation with the Aquatic Resource Committee (ARC). The Licensee shall allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the AM Plan to the Commission. When filing the AM Plan with the Commission, the Licensee shall include documentation of consultation, copies of comments and recommendations, and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

Upon Commission approval, the Licensee shall implement the AM Plan.

A-LA 17: Fisheries and Habitat Monitoring Plan

Within one (1) year after License issuance, the Licensee shall file with the Commission, for approval, a Fisheries and Habitat Monitoring Plan (FHM Plan) for the Sultan River. The Licensee shall implement the FHM Plan throughout the term of the License, in consultation with Aquatic Resource Committee (ARC).

The Licensee shall develop the FHM Plan in consultation with the ARC. The Licensee shall allow a minimum of thirty (30) days for members of the ARC to comment and make recommendations before submitting the FHM Plan to the Commission. When filing the FHM Plan with the Commission, the Licensee shall include documentation of consultation, copies of comments and recommendations, and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

The purpose of the FHM Plan is to inform the implementation of other aquatic License Articles. The FHM Plan shall include a schedule for the Licensee's: (1) implementation of the plan consistent with this License Article; (2) consultation with the ARC regarding the results of the monitoring and a schedule for providing preliminary monitoring data; and (3) filing of results, comments, and the Licensee's response to these comments with the Commission.

Implementation of the plan shall not commence until the Licensee is notified by the Commission that the filing is approved. Upon Commission approval, the Licensee shall implement the plan.

The Licensee shall file with the Commission, by June 30 of each year, an annual report fully describing the monitoring efforts of the previous calendar year. By December 1 of each year, the Licensee shall file with the Commission a notice describing the monitoring activities required under the plan for the following year. The ARC shall have at least thirty (30) days to review and comment on the draft report prior to filing with the Commission. The Licensee shall provide copies of the annual report to the ARC.

As provided below, the ARC may modify the monitoring program methods and frequencies of data collection and reporting requirements to more effectively meet the specific purpose of a monitoring activity.

The following guidelines shall be used in developing and implementing the FHM Plan: (a) monitoring and studies shall be relevant to the License, (b) monitoring and studies shall be chosen and conducted so that they provide useful information for Project management decisions or establishing compliance with License conditions, and (c) monitoring and studies shall be cost-effective in meeting the specific purpose of the monitoring activity.

For purposes of implementing the FHM Plan, each year is defined on a calendar year basis (i.e., January through December). Except as provided in other License Articles, this Plan covers monitoring and studies to be conducted by the Licensee during all years through the term of the License. Monitoring of A-LA 12 habitat projects shall be addressed within the Plan for such projects. Where years are specified, Year 1 is the first year after the Plan is approved.

The FHM Plan shall consist of monitoring the following:

1. Fish Habitat in the Sultan River

1.1. Riverine Habitat

1.1.1. Purpose

The purpose of the riverine fish habitat monitoring program is to characterize and quantify habitat types (including side channel, riparian, and flood plain) in the Sultan River to determine how habitat restoration efforts and Project operations affect fish habitat conditions over the life of the License. Because the majority of the restoration efforts are focused in the alluvial portion of Reach 1, the habitat monitoring program shall focus primarily on habitat changes in the Sultan River downstream of River Mile (RM) 2.7.

1.1.2. Method

The Licensee shall assess the quantity and quality of fish habitat in the lower Sultan River by employing standard Timber, Fish and Wildlife (TFW) Agreement *(Pleus et al 1999)* or comparable methods, consistent with the recent assessment of the Sultan River conducted under relicensing Study Plan 18. The Licensee shall assess habitat units, such as pools, riffles and glides, substrate composition, gradient, channel exposure, woody debris, bank stability, and riparian vegetation content. The Licensee shall use a statistically-valid approach consistent with the TFW methods in assessing both the quantity and quality of habitat, and in enabling detection of changes to habitat condition between sampling events. The Licensee shall also use digital photography to document conditions at a series of fixed permanent photo points. The Licensee shall conduct surveys during late summer to assess conditions under low flows and for consistency between surveys.

The river channel of interest is already divided into distinct process reaches based on channel morphology and habitat types consistent with existing baseline habitat information. Analysis and data summarization shall be performed consistent with these reach boundaries.

1.1.3. Frequency

The initial habitat survey as part of the relicensing studies (Study Plan 18) shall constitute the initial baseline for all subsequent surveys.

During Year 1 through Year 10, if there is a high flow event or other major event causing change, the Licensee shall perform a subsequent habitat survey. From Year 11 throughout the term of the License, the Licensee shall perform habitat surveys once every five (5) years (starting in Year 16) unless the frequency of such surveys is modified by the ARC.

1.2. Water Temperature

1.2.1. Purpose
The purpose of water temperature monitoring is to document temperature regimes in the Sultan River. This data is needed to help analyze the biological information collected through separate monitoring efforts (i.e., spawning timing, emergence timing, juvenile size or growth rates, distribution, habitat utilization, and species interactions).

1.2.2. Method
The Licensee shall install thermographs to monitor water temperatures on an hourly basis in the Sultan River at the South Fork Sultan River, the base of Culmback Dam, upstream and downstream of the Diversion Dam, upstream and downstream of the Powerhouse, at the confluence with the Skykomish River, and in the Skykomish River immediately upstream and downstream of the confluence with the Sultan River.

1.2.3. Frequency
The Licensee shall deploy, operate and maintain thermographs at the above-listed locations in the Sultan River continuously throughout the term of the License, unless the frequency of monitoring or locations are modified by the ARC.

2. Fish Populations in the Sultan River

2.1. Spawner Abundance, Distribution, and Timing in the Sultan River

2.1.1. Purpose
The purpose of assessing spawner abundance, distribution, and timing is to evaluate trends in adult salmon and steelhead escapement and habitat utilization over the term of the License.

2.1.2. Method
The Licensee shall conduct surveys using standard methods employed in the region to assess spawner abundance, spawner distribution, spawning timing, and species composition.

Such surveys shall enumerate redds and/or fish (live and dead) depending on species and location within the river. Such surveys shall be conducted using one or more of the following techniques depending on species and location within the river: foot surveys, raft surveys, and snorkel surveys. Where possible and for data

consistency and compatibility, these surveys shall use the same index areas and procedures used under the current License and in place since 1991. It is expected that methods and procedures that work best to achieve the purpose shall be evaluated during the first several years of the License. Once the methods have been evaluated and the most appropriate ones selected, they shall be applied consistently over the term of the License, unless modified by the ARC.

The Licensee shall collect, compile, and report the following: (1) spawner abundance by species, production origin (hatchery versus wild), and location; (2) species distribution; and (3) spawning timing.

The Licensee shall include in the FHM Plan provisions for appropriate and reasonable analysis of data from the above surveys. The Licensee shall implement such provisions.

2.1.3. Frequency
The Licensee shall conduct assessments annually during the spawning seasons for each species throughout the term of the License.

2.2. Juvenile Production, Distribution, and Habitat Utilization in the Sultan River

2.2.1. Purpose
The purpose of assessing juvenile production, distribution, and habitat utilization in the Sultan River is to evaluate reproductive success and species behavior over the term of the License.

2.2.2. Method
The Licensee shall install and operate a juvenile trap in the lower Sultan River to assess natural salmonid production in the Sultan River.

The Licensee shall collect, compile, analyze and report the following juvenile trap data by species and life stages: numbers of fish caught, timing, fish population estimates, hatchery and wild composition, size distribution, and trap efficiency.

Under circumstances defined in the monitoring plan, the Licensee shall conduct supplemental assessments using snorkeling and/or backpack electrofishing surveys, subject to obtaining appropriate permits, to evaluate such things as rearing, fish distributions, relative abundance, habitat utilization, size, and life stage survival.

2.2.3. Frequency
The Licensee shall operate the juvenile trap to assess juvenile production annually in the Sultan River for the first six (6) years after License issuance and then two (2) out of every six (6) years thereafter for the term of the License.

The Licensee shall operate the trap during the period that juveniles are expected to emigrate from the Sultan River. During Years 1 and 2, the Licensee shall operate the trap beginning February 1 through June 30. Based upon the results obtained during Years 1 and 2, thresholds to reduce sampling days and periods shall be developed by the ARC for subsequent years. The goal is to have sampling sufficient to encompass at least 90 percent of the out-migration period.

The Licensee shall operate the trap between 30 and 40 percent of the hours in any given week and follow standard procedures employed by WDFW and the Tulalip Tribes, except that the trap shall not be operated during severe flow events. During Years 1 and 2, such operations shall include weekends. After such time, unless the sampling results indicate such operations are necessary, the trap shall not be operated on weekends. Traps shall be scheduled to fish for four (4) day and four (4) night periods per week. Each fishing period shall last a minimum of six (6) hours. This operation schedule may be adjusted by the ARC if an alternative sampling schedule produces acceptable data for assessing juvenile production. Also, during periods when few fish are emigrating, trapping frequency can be reduced to fewer days per week. Exact scheduling shall be determined by the ARC.

W-LA 1: Water Quality Protection Plan

Within 180 days of issuance of the FERC License, the Licensee shall file with the Commission, for approval, a Water Quality Protection Plan (WQPP). This WQPP shall document how the Licensee will implement a program to ensure compliance with Washington State water quality standards (as codified in WAC 173-201A) in the Sultan River. At a minimum WQPP shall include following components:

(1) water quality protection measures related to Project construction or maintenance activities (includes Best Management Practices (BMPs) for in-water and upland construction and maintenance activities);
(2) spill prevention and containment procedures;
(3) procedures for application of herbicides, pesticides, fungicides, and disinfectants; and
(4) compliance monitoring and reporting procedures for select water quality parameters, such as stream flow, temperature, turbidity etc..

The WQPP shall follow the Guidelines for Preparing Quality Assurance Project Plans (QAPP) for Environmental Studies (July 2004 Ecology Publication Number 04-03-030) or its successor. The WQPP shall contain, at a minimum, a list of water quality parameter(s) to be monitored, a map of sampling locations, and descriptions of the purpose of the monitoring, sampling frequency, sample type or number of samples, sampling procedures and equipment, analytical methods, quality control procedures, data handling and data assessment procedures, and reporting protocols.

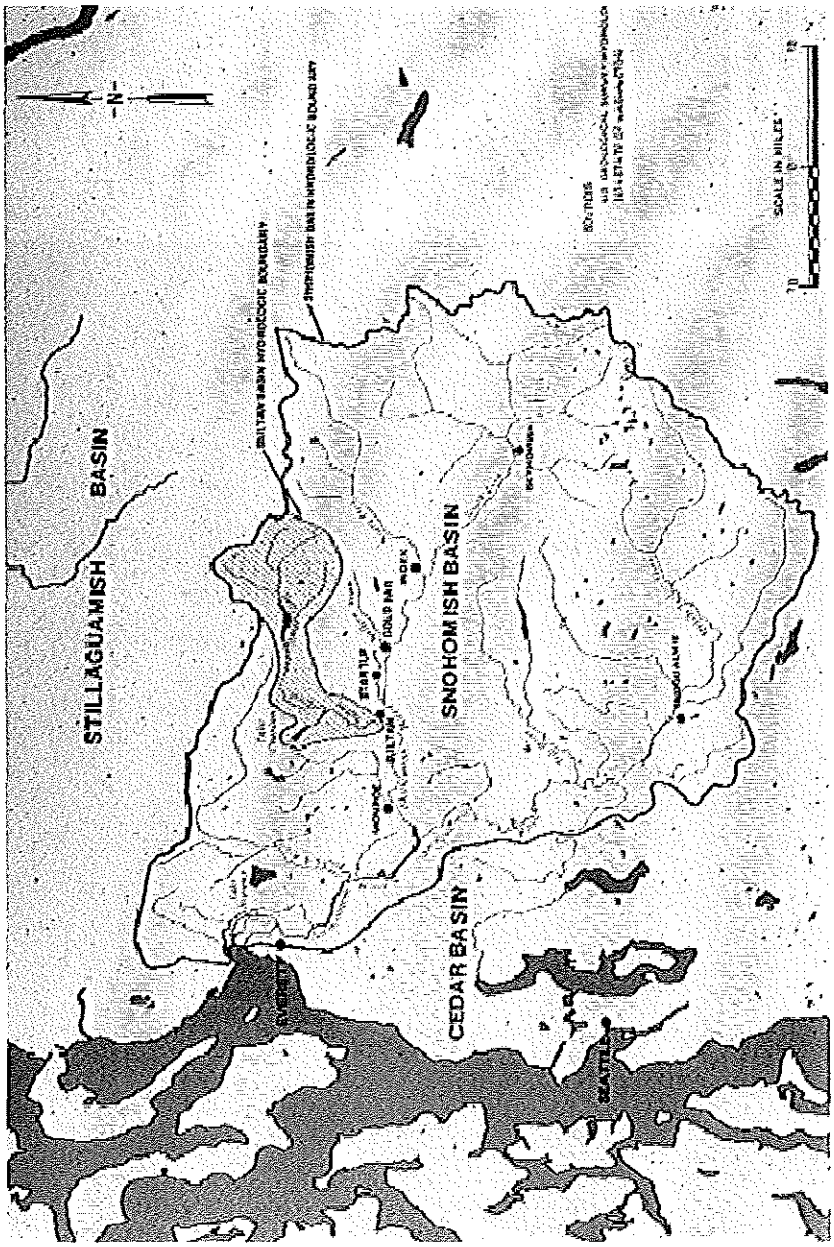
The Licensee shall prepare an annual report based on data collected. The Licensee shall review and update the WQPP as needed.

The Licensee shall allow a minimum of thirty (30) days for members of the Aquatic Resource Committee (ARC) to comment and make recommendations before submitting the WQPP to the Commission. When filing the WQPP with the Commission, the Licensee shall include documentation of consultation; copies of comments and recommendations; and specific descriptions of how comments and recommendations from the ARC are accommodated by the Licensee's plan. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

Upon Commission's approval, the Licensee shall implement the WQPP.

APPENDIX C: MAPS AND FIGURES FOR HENRY M. JACKSON HYDROELECTRIC PROJECT

Figure C.1. Location of Henry M. Jackson Hydroelectric project and Snohomish River Basin.



The Sultan River flows into the Skykomish River at RM 34.4. The Skykomish and Snoqualmie Rivers join at Monroe (RM 20.5) to form the Snohomish River (Figure 1). The Snohomish River watershed has a drainage area of 1,980 square miles and is the second largest river basin draining to Puget Sound.

Figure C.2. Tributaries to Sultan River.

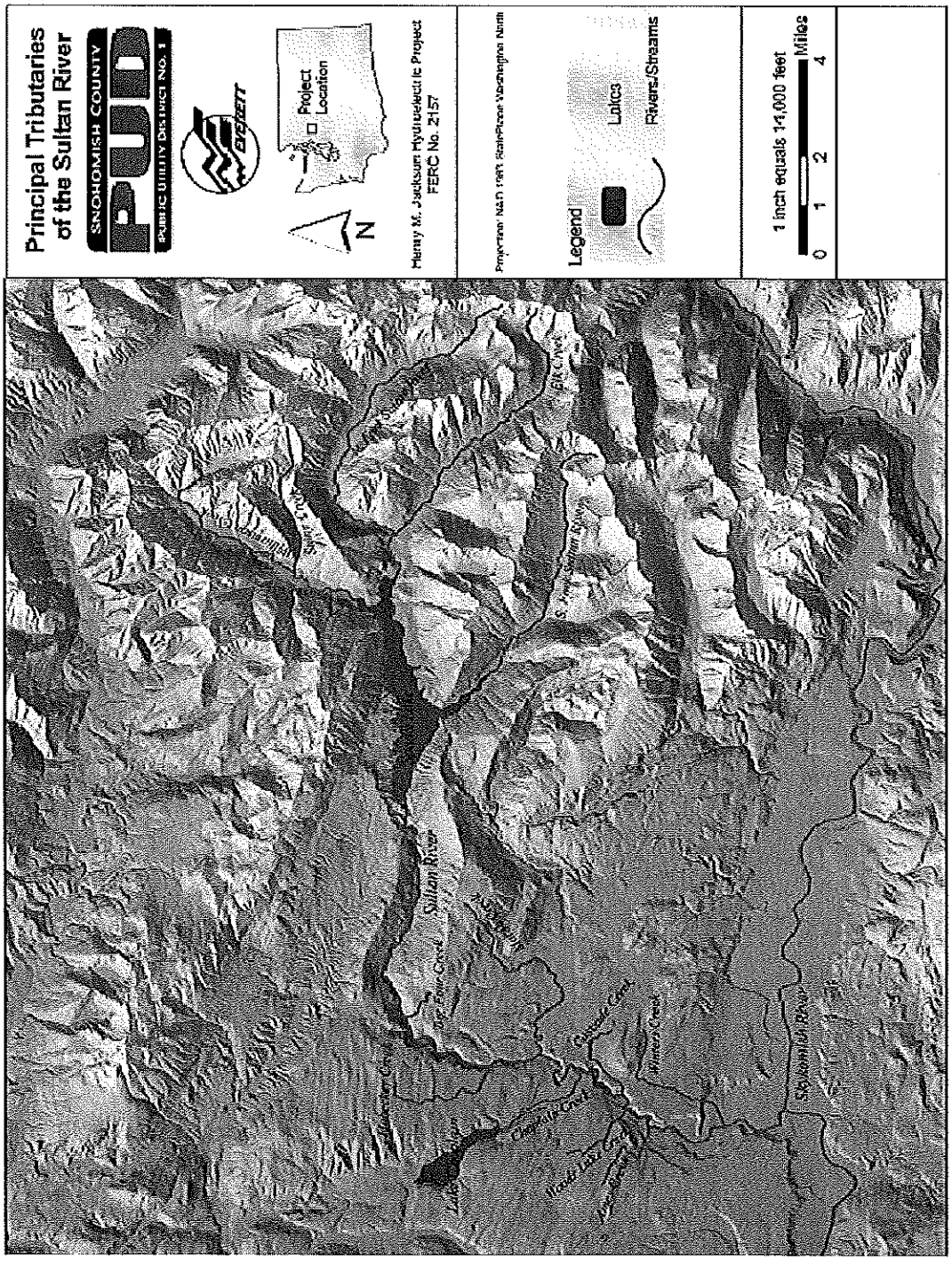


Figure C.3. Jackson Project flow during normal operation.

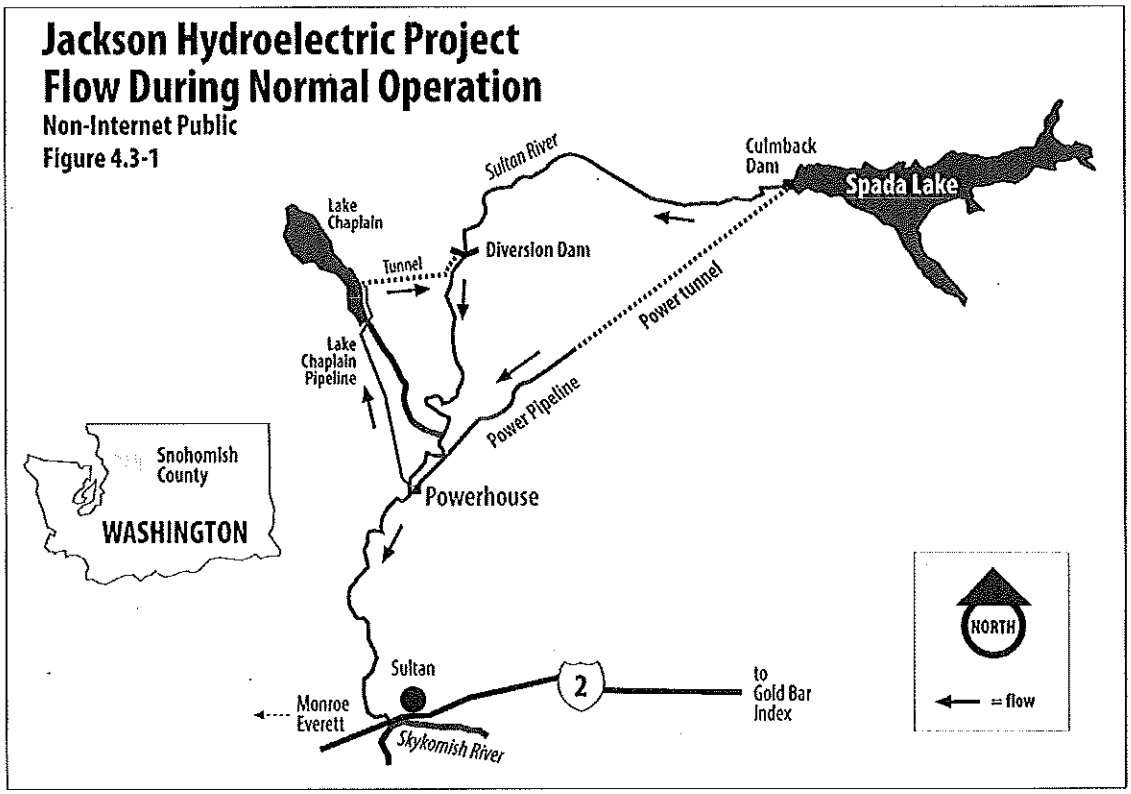


Figure C.4. Operational Reaches 1, 2, and 3 on the Sultan River below Culmback Dam.

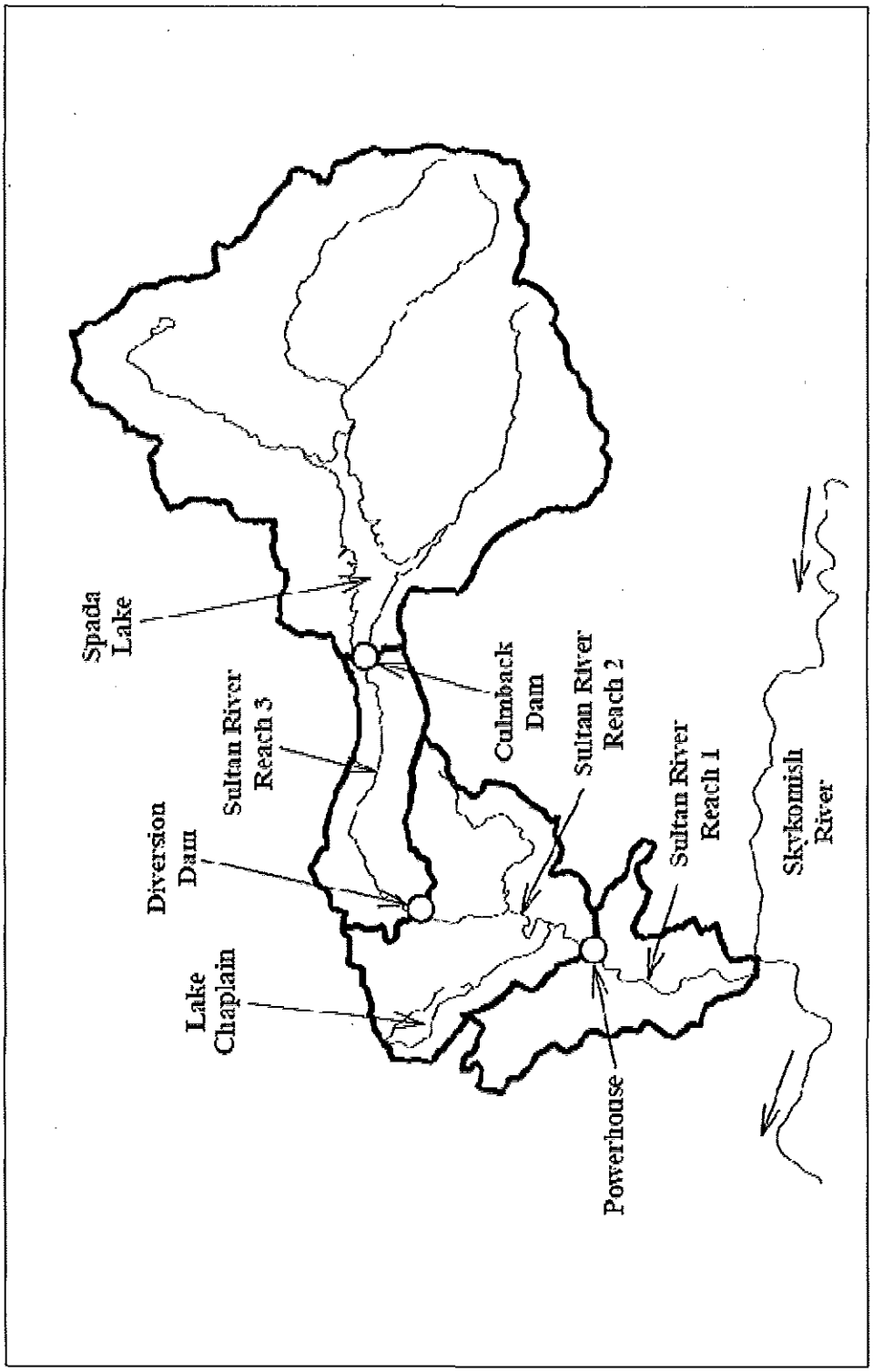
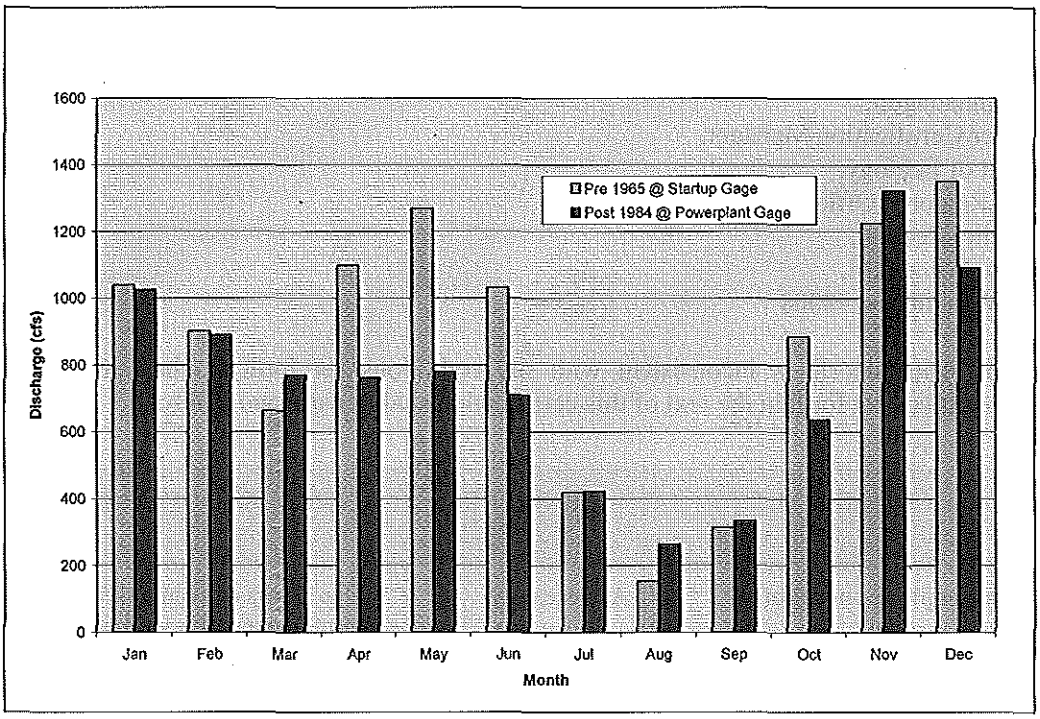
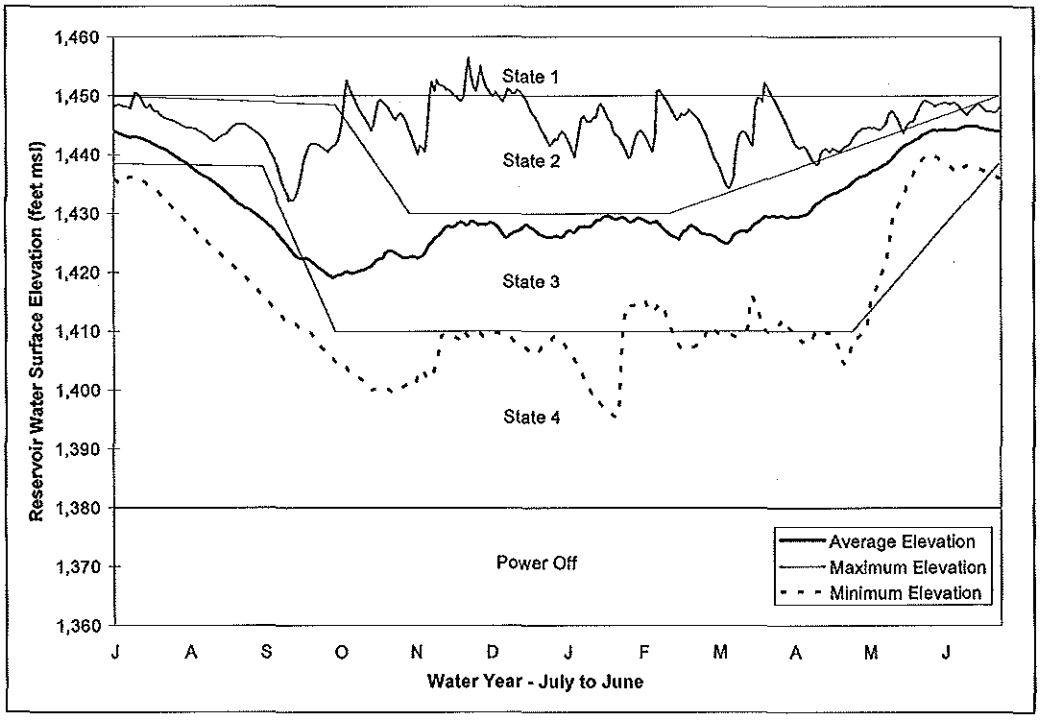


Figure C.5. Sultan River average monthly flows, pre-Project vs. post-Project.



Note: Data have been standardized by drainage area and adjusted for withdrawals.

Figure C.6. Spada Lake daily minimum, maximum and average water levels observed (1990 to 2007) and operational rule curves.



APPENDIX D: SUBMITTAL REQUIREMENTS

The following submittals are requirements of Henry M. Jackson Hydroelectric Certification Order. Refer to the specified section for additional information. Unless indicated otherwise, submittals shall be sent to the

Monika Kannadaguli,
Hydropower Certification Manager,
Department of Ecology,
Northwest Regional Office,
Water Quality Section,
3190 160th Avenue SE,
Bellevue, Washington 98008

[To the extent this Appendix D is inconsistent with the conditions set forth in the text of this certification, the conditions set forth in the text of this certification shall govern and control.]

SECTION	SUBMITTAL	FREQUENCY	FIRST SUBMITTAL DATE
Section 5.1	Non compliance notification	As necessary	Within 24 hrs of event (425-649-7000) followed by a written report within five (5) days of the violation
Section 5.1	Notification of Spill Events	As necessary	Immediately (425-649-7000), followed by written report within two (2) weeks of the incident
Section 5.1	NPDES Construction Stormwater Permit	As necessary	At least 45 days prior to construction commencement for general NPDES permit and 180 days prior to construction commencement for individual NPDES permit
Section 6.0	Spill Prevention, Containment, and Countermeasure (SPCC) Plan	Once, updated as necessary	within one (1) year of license renewal
Section 8.0	NPDES Aquatic Pesticide Permit	As necessary	60 days prior to pesticide application
Section 9.0	Water Quality Monitoring Plan (WQMP)[a]	Once, updated as necessary	Within 6 months of license renewal
Section 9.0	Annual Water Quality Report[b]	Annually	Within 14 months of license renewal and annually thereafter
Section 9.0	Water Temperature Conditioning (WTC) Plan*	Once, updated as necessary	Submitted to FERC on July 16, 2010
Section 9.0	Water Quality Protection Plan (WQPP)[c]	As necessary	At least two (2) months prior to construction work initiation and all the subsequent modification must be submitted to Ecology at least thirty (30) days before implementation.
Refer to October 9, 2009 Settlement Agreement for the Jackson Hydropower Project in Appendix B for the details of following submittals			
6.2.1a	Marsh Creek Slide Plan[d]	once	For review by ARC 150 days or sooner after license issuance

6.2.1b.	Water Temperature Conditioning Evaluation and Performance Standards [d]	once	Three years after initiation of temperature conditioning
6.2.1c	Whitewater Recreation Plan [d]	once	For review by ARC 60 days or sooner after license issuance
6.2.1d	Downramping Report [d]	once	Prior to one year after completion of the side channel enhancement projects
6.2.1d	Downramping Incident Report [d]	as needed	within 10 days of incident
6.2.1e	Large Woody Debris Plan [d]	once	For review by ARC 335 days or sooner after license issuance
6.2.1f	Side Channel Enhancement Plan [d]	once	For review by ARC 335 days or sooner after license issuance
6.2.1g	Process Flow Plan [d]	once	For review by ARC 60 days or sooner after license issuance
6.2.1g	Process Flow Effectiveness Report [d]	every 10 years	prior to 10 years after license issuance
6.2.1g	Process Flow Drought Response [d]	stage 2 drought event	first stage 2 drought event
6.2.1g	Process Flow Scheduling [d]	ongoing	first process flow scheduled after licensing
6.2.1h	Minimum Flow Annual Water Budget [d]	yearly	prior to April 1st after license issuance
6.2.1h	Minimum Flow Drought Response [d]	stage 2 drought event	first stage 2 drought event
6.2.1i	Fish Habitat Enhancement Plan [d]	once	For review by ARC 335 days or sooner after license issuance
6.2.1j	Diversion Dam Passage Index Review [d]	Yearly until threshold is reached	after spawning escapement counts
6.2.1j	Diversion Dam Design Review [d]	upon 30%, 50%, & 90% completion	prior to 6 months after spawning index threshold is reached
6.2.1k	Reservoir impoundment emergencies notification [d]	emergencies	within two business days after incident
6.2.1.l	Adaptive Management Plan [d]	once	For review by ARC 150 days or sooner after license issuance
6.2.1m	Fisheries and Habitat Monitoring Plan [d]	once	For review by ARC 335 days or sooner after license issuance
6.2.1m	Fisheries and Habitat Monitoring Annual Report [d]	yearly	For review by ARC before May 31 after license issuance
6.2.1m	Fisheries and Habitat Monitoring juvenile fish trap operation schedule [d]	yearly as needed	Anytime but adaptively between February 1 and June 30
6.2.1m	Fisheries and Habitat Monitoring juvenile fish trap operation schedule reduction [d]	once	After year two of sampling

[a] Water Quality Monitoring Plan required by this 401 certification Order is same as component 4 of the Water Quality Protection Plan required by the Settlement Agreement's Proposed License Article W-LA 1.

[b] Annual Water Quality Report required by this 401 certification is same as the annual report required by the Settlement Agreement's Proposed License Article W-LA 1.

[c] Water Quality Protection Plan as explained in this 401 Certification Order is required for construction projects. This WQPP has two important elements: Stormwater Pollution Prevention Plan (SWPPP) and In-Water-Work Protection Plan. This WQPP is same as

components 1, 2, and 3 of the Water Quality Protection Plan required by the Settlement Agreement's Proposed License Article W-LA 1.

d Submit to Aquatic Resource Committee (ARC) for review.

APPENDIX E: RECOMMENDED SPCC PLAN BMPS FOR HENRY M. JACKSON HYDROELECTRIC PROJECT

Spill Response

a) Establish in agreement with the Department of Ecology, site oil spill cleanup material inventory and include an inventory list at each site. Jackson Project operators and any staff required to respond to an oil spill must have input on the inventory levels, type, product brand, and quality of the oil spill cleanup supplies maintained on-site. Purchase good quality spill cleanup supplies.

b) In the event of an oil spill, properly dispose of used/contaminated materials and oil and as soon as possible restock new supplies. Include records of proper disposal in the oil consumption records and keep copies of disposal records of contaminated cleanup supplies at the District's office for inspection; provide these records to Ecology immediately upon request.

c) Ensure that operational work boats and trained boat operators are available at the project. Install mechanisms as appropriate to safely launch or lower work boats into areas where work boats would be deployed in the event of an oil spill.

d) Install stair cases, permanent ladders, etc. allowing for oil spill response staff to safely reach areas anticipated that could, in the event of an oil spill, need to be accessed to deploy sorbent pads and boom materials.

Oil-Water Separators (OWS)

a) Have a maintenance plan for the OWS. This maintenance plan must include a process to periodically inspect and ensure quality assurance that they will work as designed.

b) OWS shall not include rain or other water run-off, except as designed.

c) Perform periodic and appropriate maintenance and inspection on a schedule to include cleaning of sediment.

d) Clean and service the OWS in the event of an oil spill incident where oil is introduced into the OWS.

e) Evaluate each OWS for inflows to account for a total transformer container failure during a major rain event to ensure that oil would not be "washed through" the OWS during such an event.

Transformers

a) Transformer deck containment area surfaces must be impervious. Conduct periodic inspections and resurfaced areas, fill cracks, caulk metal plate footings, or otherwise ensure that containment areas will contain all spill fluids.

b) Obtain pre-approval from Ecology before breaching containment areas for reasons other than containment area maintenance.

c) Remove oil from transformers prior to moving them from the transformer containment area, unless the transformer is continuously monitored during the move. If transformers are moved with oil, keep spill containment equipment handy.

Sumps

a) Locate oil sensors on the surface of the water in each sump, in addition to the oil sensors located at the bottom of each pumping cycle. Inspect and test these sensors annually or sooner if needed to ensure that they will work as designed. Include in the inspection provisions to verify that the oil sensors located at the bottom of each pumping cycle are properly placed at the proper level. Visually inspect these areas each week if oil is suspected to be present such as in the event of an oil sensor alarm or the observance of an oil or grease spill in the turbine pit of sufficient volume to reach the sump. Any oil detected in the sumps requires immediate Ecology (425-649-7000) and NRC notification and cleanup.

b) Immediately repair those oil leaks in the turbine pit that are of sufficient volume that can reach the sump and that cannot be placed under a containment pan.

c) Install handrails and mechanisms so the sump covers can be removed for a visual inspection of the sump. Provide waterproof lighting in the sumps or spotlights adequate to view the surface water in the sumps. Provide a mechanism to satisfactorily deploy and recover sorbent boom in the sumps at each project.

Oil, fuel, and chemical storage containers, containment areas, and conveyance systems

a) Provide proper containment around each storage container (including transformers) or around a combination of storage containers as appropriate and agreed upon by Ecology. Proper containment equals the volume of the container plus 10 per cent.

b) Recalculate required containment areas to ensure proper containment still exists after major equipment changes. For example: When converting from water cooled transformer to an air cooled unit, re-calculate oil volume and compare to containment area. Calculate containment volumes from *maximum* storage volumes, not normal oil level volumes.

c) Provide external oil level gauges for governor oil tanks, transformers and other oil tanks that contain over 100 gallons of oil. Provide appropriate level markings for these gauges.

d) Regularly check all fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc, for drips or leaks. Maintain and properly store them to prevent spills into state waters.

e) Do not refuel equipment within 50 feet of rivers, creeks, wetlands, or other waters of the state.

f) When working on transformers and other equipment that might spill or drip oil, provide full oil spill containment capacity plus 10 per cent.

g) Inspect containers once per week. Maintain container inspection sheets to include maximum container volume and an exact reading recording of the oil level by the staff/operator conducting the inspection. Weekly inspection readings must be consistent; provide training to the staff/operator to ensure consistent and accurate readings.

h) Keep oil consumption records maintained at the District office; provide these records to Ecology immediately upon request.

i) In the event that any Jackson Project modifies the oil transfer operation to include hard-plumbing to reservoirs such as the governor oil tank from the oil tank room, or other extensive modifications, Ecology notification and approval of such modification should be conducted.

j) Contain wash water containing oils, grease, or other hazardous materials resulting from wash-down of equipment or working areas for proper disposal, and do not discharge this water into state waters.

Other

a) Identify and map floor drains. Post these maps at the Jackson Project in a conspicuous location for use by operators and other personnel in the event of an oil spill. Seal floor drains that are no longer needed.

b) Maintain site security at each Jackson Project site to reduce chance of oil spills.

c) Keep SPCC Plans as required and historical spill records on-site. Provide these to Ecology immediately upon request.

APPENDIX F: ACRONYMS AND ABBREVIATIONS FOR HENRY M. JACKSON HYDROELECTRIC PROJECT

401 Certification	Water quality certification pursuant to Section 401 of the CWA, 33 U.S.C. § 1341, issued by WDOE.
7-DADMax	7-day average of the daily maximum temperatures
AKART	all known, available, and reasonable technologies
ARC	Aquatic Resource Committee
°C	degrees Celsius
certification	Section 401 water quality certification
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act, 33 U.S.C. §§ 1251 *et seq.*
CZMA	Coastal Zone Management Act
City	City of Everett
Department	Department of Ecology
District	Snohomish Public Utility District
DO	dissolved oxygen
DOE	Department of Ecology
EA	environmental assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
HPA	Hydraulic Project Approval
Jackson Project	Henry M. Jackson Hydroelectric Project
kW	Kilowatt
Licensee	Snohomish Public Utility District
LWD	large woody debris
mgd	million gallons per day
mg/L	milligrams per liter
MW	Megawatt
MWh	megawatt-hour
NTU	nephelometric turbidity unit
Project	Henry M. Jackson Hydroelectric Project
RCW	Revised Code of Washington
RM	river mile
Settling Parties	Snohomish Public Utility District (SNOPUD), National Marine Fisheries Service ("NMFS"), United States Forest Service ("USFS"), United States Fish and Wildlife Service ("FWS"), United States National Park Service ("NPS"), Washington Department of Fish and Wildlife ("WDFW"), Washington Department of Ecology ("WDOE"), the Tulalip Tribes of Washington, the City of Everett, Snohomish County, the City of Sultan, and American Whitewater are collectively referred to as "Settlement Parties" or "Parties"
Settlement Agreement	October 9, 2009 Settlement agreement between Settling Parties.
WDFW	Washington Department of Fish and Wildlife
WQPP	Water Quality Protection Plan
WRIA	Water Resource Inventory Area

APPENDIX G: REFERENCES

1) Final License Application , SNOPUD Henry M. Jackson Hydroelectric Project, May 29, 2009

2) Water Quality Final Technical Report, SNOPUD Henry M. Jackson Hydroelectric Project, August 2010

3) FERC, 2010, Draft Environmental Assessment, Henry M. Jackson Hydroelectric Project, Washington (Project No. 2157), May 2010

4) Jackson Hydroelectric Project Water Quality Final Technical Report, Supplemental Report for December 2008 – March 2009, October 2009

5) Settlement Agreement, SNOPUD Henry M. Jackson Hydroelectric Project, October 9, 2009