HENRY M. JACKSON HYDROELECTRIC PROJECT

FERC No. 2157

APPLICATION for NEW LICENSE
MAJOR PROJECT - EXISTING DAM

18 CFR, PARTS 4 AND 5, SUBPART F, SECTION 4.51

VOLUME III

APPENDICES

Public Utility District No. 1
of Snohomish County

May 29, 2009

Meridian Environmental
Biota Pacific
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Appendix A

Operations Plan and Supplement

HENRY M. JACKSON HYDROELECTRIC PROJECT
FERC PROJECT NO. 2157

PROPOSED PROJECT OPERATING PLAN FOR RELICENSE

(Submitted with the Final License Application)

Submitted by:

Public Utility District No. 1 of Snohomish County

May 29, 2009

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I. PURPOSE

This document sets forth the philosophy, logic, criteria, and schedules for how the Henry M. Jackson Hydroelectric Project (Project) shall be operated beneficially for multiple purposes. The contents herein provide the basis for developing mutual understanding and agreement among the Public Utility District No. 1 of Snohomish County (District) and the Aquatic Resources Committee (ARC) on these matters. This operating plan is filed with the Federal Energy Regulatory Commission (FERC) as part of the District's efforts to secure a new Project license.

II. DEFINITIONS

For this operating plan, certain terms are defined as follows:

Project – The Henry M. Jackson Hydroelectric Project is located in the Sultan River Basin in central Snohomish County about 20 miles due east from the City of Everett, Washington.

Licensee – Public Utility District No. 1 of Snohomish County, Washington (District) is the sole applicant for a new license to be issued by the FERC. The District owns and/or operates the Project lands and facilities by cooperative agreement with the City of Everett. The District is responsible for Project operations which include meeting water supply and instream flow requirements.

ARC – Aquatic Resources Committee comprised of the National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Forest Service, Washington State Department of Fish and Wildlife, the Tulalip Tribes, City of Everett and the City of Sultan.

USGS – US Geological Survey. Agency contracted by the District to provide data collection and storage services regarding the Sultan River. Current locations of data collection are on the South Fork Sultan above Culmback Dam, below the Diversion Dam, and below the Powerhouse.

Reservoir Spill – The uncontrolled release of water from the Project's reservoir, Spada Lake, via a morning glory spillway at Culmback Dam. Spill may refer to or mean the event, a past occurrence, or the total amount (volume) of water involved.

III. RULE CURVES FOR RESERVOIR OPERATION

The Spada Lake rule curves governing Project operation are shown in Figure 1. They will 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 in the 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.

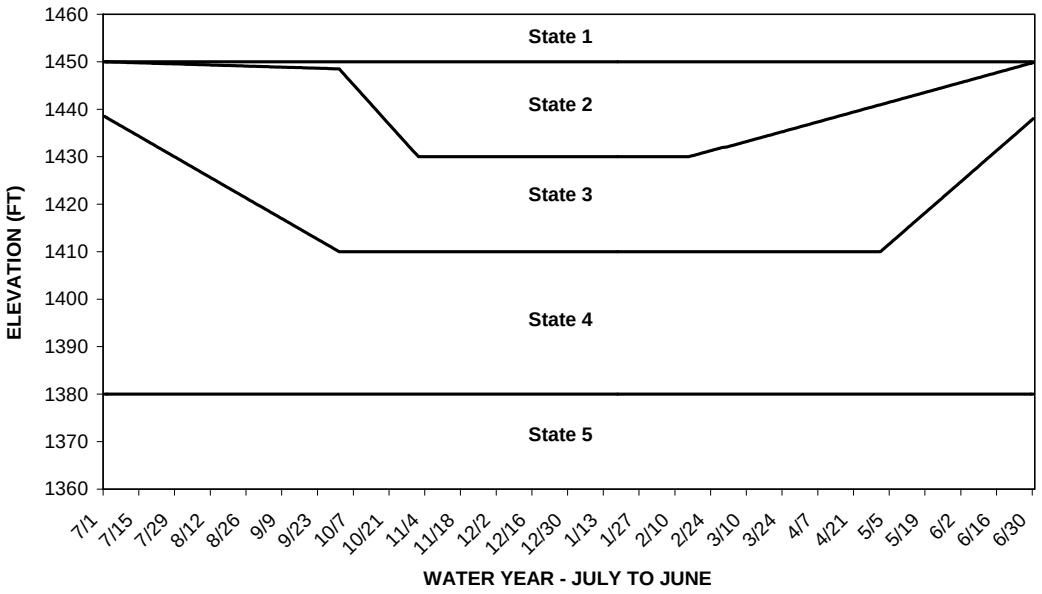

Figure 1. Spada Lake Operational Rule Curves

State 1 – Zone of Spill. Above elevation 1450 msl, Spada Lake will be in a state of spill. Therefore, the District will operate the Powerhouse to withdraw at least 1300 cfs through the power tunnel.

State 2 – Zone of Potential Spill. The District will operate the Powerhouse to withdraw at least 1300 cfs through the power tunnel unless inflow forecasts show that there is minimal risk of spill.

State 3 – Zone of Discretionary Operation. The District may operate the Powerhouse between the extremes of State 2 and State 4 depending on maintenance, power supply, and prudent operation to minimize the impacts to the fishery resources.

State 4 – Zone of Water Conservation. The District will operate the Powerhouse to satisfy the requirements of its water supply obligations to the City of Everett and the instream flow requirements in the Sultan River. Generally, the Project is operated to conserve water unless inflow forecasts and snowpack measurements indicate higher rates of water withdrawal through power production are warranted.

State 5 – Zone of Tunnel Protection – Below elevation 1380 ft msl the District will 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 District will 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 ft. msl.

IV. AQUATIC RESOURCE PROTECTION CRITERIA AND REQUIREMENTS

Several anadromous fish species utilize the Sultan River for part of their life cycle. Among them some are present the entire year, but in different life stages. Project operations planning and scheduling will take into account the presence of the fishery resource, its particular requirements at any specific time, and real or potential effects on the resource. Project operation influences or affects fishery resources through control of river flows – maximums, minimums, rates, frequency and timing of fluctuation. Also Project operation affects the water quality parameter of temperature. All of these are significant factors in fish life cycle requirements.

The intent of this plan is to provide operational guidance to protect, mitigate, and enhance aquatic resources in the Sultan River Basin for the well understood, frequently encountered, and usually expected operational situations with the Project. However, all possible natural conditions and occurrence of events cannot be identified and accounted for in this plan. Many are and will be beyond the ability of the Licensee to control or respond to effectively.

A. Minimum Instream Flow Schedule

There are three control/release points established on the Sultan River: 1) Culmback Dam at River Mile 16.5; 2) Diversion Dam at River Mile 9.7; and 3) Powerhouse at River Mile 4.5.

The Licensee shall provide and maintain the following instream minimum flows to protect, mitigate, and in some cases enhance fishery resources. However, protection of the City of Everett's water supply Safe Yield is a priority. To preserve the current Safe Yield for Spada Lake and minimize adverse effects from releases that occur when Spada Lake is in State 5, the following conservation measure will be imposed if Spada Lake drops below 1420 ft in elevation. For normal operations above elevation 1420, the instream flows below the Powerhouse will be as described in Table 1. However, whenever, Spada Lake is below elevation 1420 then the instream flows will become those shown in Table 2.

Table 1. Minimum Instream Flows – Spada Above elevation 1420 ft msl.

Dates	Point of Discharge	Minimum Instream Flow Cubic Feet/Second (CFS)
All Year	Culmback Dam	20
11/1 – 3/15	Diversion Dam	100
3/16-6/15	Diversion Dam	140
6/16 – 9/14	Diversion Dam	100
9/15 –10/31	Diversion Dam	200
6/16 – 9/14	Powerhouse	300
9/15 – 6/15	Powerhouse	300

Table 2. Minimum Instream Flow – Spada Below Elevation 1420 ft. msl.

Dates	Point of Discharge	Minimum Instream Flow Cubic Feet/Second (CFS)[1]
All Year	Culmback Dam	20
9/15 – 10/31	Diversion Dam	
Between	1420 ft. and 1415 ft	200
Between	1415 ft. and 1410 ft.	175
Between	1410 ft. and 1405 ft.	175
Below	1405 ft.	150
9/15 – 10/31	Powerhouse	
Between	1420 ft and 1410	275
Below	1410 ft.	250
11/1 – 9/14	Powerhouse	
Between	1420 ft. and 1415 ft	275
Between	1415 ft. and 1410 ft.	250
Between	1410 ft. and 1405 ft.	225
Below	1405 ft.	200

[1] Instream flows will be triggered on Spada Lake elevation. To avoid occilations if Spada elevations hover at a break point elevation for changing minimum instream flows, there will be a dead band of 0.2 feet to allow reasonable operation of the control equipment.

B. Minimum Flow Compliance Reporting

The District will provide the ARC with annual flow record reports for the Diversion Dam and Powerhouse stream gaging stations. In the event of a non-compliance with the minimum flow schedule, the District will report on the incident to the ARC within 30 days of occurrence or when determined that such incident, in fact, occurred. The ARC may, if they choose, comment in writing to the District within 14 days of receipt of the report, or at any time thereafter with the FERC. The District will file a report with the

FERC, including ARC comments, if any, within 30 days of the non-compliance incident or the date of determination that such incident did, in fact, occur.

To account for monitoring imprecision and equipment variability, non-compliance at either the Diversion Dam (considered a Project facility under the current license) or Powerhouse has occurred when the recorded flow falls below the required minimum by more than 5 percent for two - 15 minute recording periods. Revisions to flow records by the USGS in subsequent rating changes for the gaging stations, which reduce the recorded flow values below minimum requirements, are not considered non-compliance incidents. The District will be responsible for contracting with the USGS to maintain of the gaging station equipment recording accuracy.

From September 15 to October 31, minimum instream flows at both the Powerhouse and Diversion Dam are subject to Spada Lake elevation. To allow for automated compliance in responding to falling or rising lake levels, the District will be allotted a 0.2 foot allowance once a flow target has changed. For instance, if the lake elevation drops to 1420 the instream flow at the Powerhouse changes from 300 cfs to 275 cfs. If the lake then rises above 1420 again the instream flow minimum would not rise to 300 until the elevation reaches 1420.2 ft. Conversely, if the Lake elevation descends to 1419.8 ft. then upon return to 1420 the instream flow would become 300 cfs. This operating deadband forces the reservoir to make a definitive move before triggering a subsequent change in the minimum instream flow values. It is expected that the Spada reservoir will rarely operate for any length of time at or near a change point elevation (1420, 1415, etc).

The upper river flow between Culmback Dam and the Diversion Dam shall be maintained either by continuous operation of the small hydro turbine and the 10 inch cone valve at the base of Culmback Dam or by use of the auxiliary water release line. One system or the other shall be operating at all times to provide the required minimum flow. Before either one is closed or shut-off, the other shall be operating so as to maintain continuous water supply to the river.

Remote monitoring of stream flow at the Diversion Dam and Powerhouse gaging stations is available by remote telemetry and accessible by contacting the USGS on their website or by means of a link on the District's web site

C. Fall Salmon Spawning Season

Chinook and pink salmon eggs deposited while the river is flowing above 550 cfs below the Powerhouse may not have enough water to protect incubation if the Project flows are later cut back to the minimum instream flow requirements at the Powerhouse. Therefore, the District will endeavor to avoid increasing flows above the preferred maximum instream flow of 550 cfs from September 15 to October 15, the time when the main portion of the fall Chinook and pink salmon spawning season occurs.

Flows in the river up to 550 cfs of combined natural flow and Project releases are acceptable during September 15 to October 15 when the reservoir is in State 3 without consultation with the ARC. If any controlled flows are above 550 cfs, or if reservoir water storage moves into State 2 during that period, the Licensee and the ARC will confer to identify an operating strategy based on current biological information which will protect spawning and incubation but continue reservoir draw down. If the reservoir subsequently enters State 4 during the incubation period for Chinook, coho, pink, chum and steelhead (October – July) the Licensee will assess the viability of incubation at minimum flow and confer with the ARC to develop an operating strategy to protect incubation. Generally, operation of the Project in strict accordance with the rule curve requirements is in the best overall interests of all parties and the resource.

D. Winter-run Steelhead Fishing Season

Steelhead fishing is a recreational activity enjoyed on the Sultan River. The most desirable flows for this recreation activity occur below 700 cfs. To facilitate steelhead fishing opportunities on the lower Sultan River below the Powerhouse, the District will modify Project operations under the following conditions.

To invoke the need for mitigative action, the river flow must have exceeded the threshold value of 700 cfs for a significant period of time. The exceedence must be due solely to Project operation and not naturally occurring high runoff conditions. For definitional and operational purposes, the criterion "significant" is defined as 14 consecutive days at any time during the months of December, January, and February only.

Mitigative operation, if feasible, would occur on the next weekend following the 14 consecutive days of flow exceeding 700 cfs, if flows remain above 700 cfs due to Project operation. The discharge from the Powerhouse would be reduced in accord with established ramping rates to provide an instream flow of 700 cfs or less commencing on Saturday at dawn and continuing until dusk on Sunday. The total flow reduction period at the 700 cfs or less level would be approximately 32 hours. The discharge reduction would not be done if naturally occurring flows still exceed 700 cfs even with reduction of Powerhouse discharge to 100 cfs. Also, the water surface level of Spada Lake must be below elevation 1435.0 feet with decreasing inflow to the reservoir. Meteorological and hydrological forecasts for the Snohomish River Basin must be favorable with no projected flow increases. If reduced flow releases from Spada are proposed while in State 2, the PUD would notify the U.S. Army Corps of Engineers at least 72 hours in advance of the mitigative action. If the Corps does not concur, normal power operational scheduling consistent with Exhibit H will continue. Should no response be received from the Corps within 24 hours after receipt of the proposal, silence will be interpreted as concurrence.

This mitigative operation will only apply when a state authorized steelhead fishing season is open to the public.

E. Downramping Rate Schedule - Powerhouse

The amending process of the previous license required the District to conduct down ramping studies to determine the effect of Project operations on the aquatic resources of the Sultan River. One of these studies (Olson, F.W. 1990) focused on the impacts of Powerhouse Pelton Unit decreases in generation which cause associated decreases in the river flows. The associated decrease in river level is known as down ramping. The rate of downramping can strand juvenile fish in the rearing life stage. Those studies became the basis for downramping rates adopted by the licensees to govern changes in Powerhouse Pelton Unit operation.

The downramping rate schedule used for Pelton Unit operation is shown in Table 2.

Downramping recommendations vary depending upon the stage of the river below the Powerhouse. Four flow ranges were identified on the basis of relative potential for salmon fry stranding.

At flows above 750 cfs, the river stage is generally above the toe-of-bank and thus most low-gradient stranding areas are inundated.

Between 750 and 600 cfs, flow into three small side channels ceases thereby creating a potential for stranding if down ramping occurs too rapidly. In addition, special precaution is needed if downramping through this range is preceded by an extended period of high flow. Therefore, during the fry period (from time of emergence to September 30), if the river flow prior to down ramping has exceeded 1000 cfs for more than 72 hours, the downramp should be paused just above 750 cfs for at least 6 hours of daylight and one overnight period to allow fry entering these side channels to distribute to safe areas.

At river flows below 600 cfs, low-gradient gravel bars with stranding potential become exposed.

Table 2. Jackson Hydroelectric Project Powerhouse Downramping Rate Schedule[a]

(Water surface elevation decreases are in inches per hour)

Flow Range (cfs/day)	Jan. 1 to May 31		June 1 to Sept. 15	
	Day	Night	Day	Night
1,500 to 750	4	4	2	1
750 to 600	2[b]	2[b]	2[b]	1[b]
600 to 300	2	4	2	1[c]
300 to Minimum	2	2	2	1[c]
	Sept. 16 to Oct. 31		**Nov. 1 to Dec. 31**	
	Day	**Night**	**Day**	**Night**
1,500 to 750	2	1	4	6
750 to 600	2	1	2	2
600 to 300	2	2	4	4
300 to Minimum	2	2	4	4

a For normal operation. Not for power-generation equipment failures or forced outages. Units are in inches per hour at the Powerhouse. Rates are tracked on a 15-minute basis by USGS for compliance. No one 15-minute downramping value will exceed half the hourly rate shown in the table. No four consecutive downramping rates shall exceed the hourly rates shown in the table.

b If river flow prior to downramping has exceeded 1,000 cfs for more than 72 hours, downramp through this flow range (750 to 600 cfs) only after holding flow constant between 750 and 850 cfs for at least 6 hours of daylight and 1 overnight period.

c Avoid any scheduled flow reduction.

For many cases, different downramping rates are recommended for day and night. However, if downramping is to occur during the twilight period (one hour before to one hour after sunrise or sunset), the lower of the two stipulated day or night rates should be used. For example, a 4-inches-per-hour springtime downramp intended for night should not be initiated at the Powerhouse until one hour after sunset. As another example, if a summer afternoon downramp initiated at 2 inches per hour is to extend past sunset, the ramping rate should be reduced to 1 inch per hour at one hour before sunset. These precautionary guidelines should minimize the potential for stranding during the twilight hours when the juvenile fish are shifting their diurnal behavior patterns.

F. Downramping Rate Schedule – Diversion Dam

Decreases in flow occasionally occur at the Diversion Dam as a result of required operational activities such as maintenance and changing of minimum instream flows. Such activities occur only about two to four times a year. Although no stranding incidents have been documented below the Diversion Dam, after Chinook salmon and bull trout were listed as threatened under the Endangered Species Act, the District conducted a study of potential Project effects on salmonid species and bull trout in the

Sultan River. From that study the Licensee adopted the following downramping rates as a protective measure for salmonid fry in the Sultan River reach below the Diversion Dam.

For the term of the next License, the District shall operate the new Instream Flow Diversion Structure to conform to the downramping rates listed in Table 3.

Table 3. Diversion Structure Downramping Rate Schedule [a]

	Jan 1 to May 31		June 1 to Sept. 15 [b]	
	Day	**Night**	**Day**	**Night**
Ramp Rate (in/hr) [c]	3	3	3	1.5
	Sept. 16 to Oct. 31		**Nov. 1 to Dec. 31**	
	Day	**Night**	**Day**	**Night**
Ramp Rate (in/hr)	3	3	6	6

[a]For normal operations in the flow range between 100 cfs (minimum flow) and 300 cfs, not during power-generating equipment failures, forced outages, or gravel flushing/enhancement actions requiring manual operation of the sluice gate at the diversion dam.
[b]Avoid any scheduled flow reduction.
[c]Units are in inches per hour as measured at the USGS gage downstream from the Diversion Dam. Rates are tracked on a 15-minute basis. No single 15-minute downramping value will exceed one-half the hourly value shown in the table. The average of four consecutive 15-minute downramping rates shall not exceed the hourly rate shown in the table.

G. Process Flow Release

The Licensee agrees to release flows to facilitate bed mobilization for the purpose of channel maintenance in the reaches below Culmback Dam. The capabilities for release below Culmback Dam will be combined with releases from the Powerhouse to ensure that a discharge of greater than 3,300 cfs (as measured at USGS Gaging Station 12138160) is provided for a duration of 6 to 12 hours with a frequency of once every four years, if not provided by spill or intense rainfall.

H. Culmback Dam Valve Operation

The Licensee and ARC agree that the 48-inch Howell-Bunger and 42-inch slide valves at the base of Culmback Dam should not be operated for flood control operations. However these valves are important to Project operations for the following reasons:

1. They are a Project safety feature in the unlikely event that emergency releases would be required to protect the integrity of the Culmback Dam.

2. When normal power operations are shut down for inspection and/or maintenance, the instream flow schedule will be maintained by releases through the Culmback Dam valves.

3. They can be operated to attain the flows projected for flushing gravel downstream and/or removing accumulated fine sediment as needed.

4. They can be operated to efficiently refill the spillway tunnel pool after an inspection or maintenance that has resulted in drainage of the pool. During this type of operation the valves will be opened and closed quickly to allow the discharge to be contained within the spillway pool and minimize the flow changes to the downstream river.

To assure that the large Culmback Dam valves are operational, they must be tested periodically. Minimum operating frequency of the valves will be annually. Exercise of the valves to their full opening with the guard valve open will also accomplish a flushing of any fine sediment accumulated in the reservoir intake tunnel and avoid sediment build up that could reduce or inhibit their effectiveness. Such periodic flushing of this sediment will avoid flushing large quantities of sediment down stream at any one time.

Ideally, timing of valve operations to accomplish the goals of test exercise and sediment flushing will coincide with the falling hydrograph of flows on the Sultan River which have exceeded 1,200 cfs as measured at the Diversion Dam. This should minimize contributions to downstream flooding and allow the use of this flow to clean sediment, flush gravel, transport bedload, and exercise the valve mechanisms.

When operating the large Culmback Dam valves to create a measurable flow in the Sultan River they will be closed down at a rate to minimize the impacts from downramping on the lower Sultan River. The District will operate the Culmback Dam valves to close at rates which will not result in greater rates of downramping at the Powerhouse than those currently in place at the Powerhouse.

I. Downramping Frequency

Downramping events can have an impact on the aquatic resources and the rates for these at the various Project flow control points have been addressed above. To limit the cumulative impact of downramping over time, the District has adopted a downramping frequency schedule for operations at the Powerhouse. Operation at the Diversion Dam and Culmback Dam are so infrequent that a frequency schedule is not necessary.

Recognizing the potential for stranding of Chinook salmon fry during any downramp event, and thus the potential for cumulative losses from frequent downramping, the frequency of Powerhouse downramping will be limited when all three of the following conditions occur:

- The times when river flows are less than 750 cfs
- The time between Chinook salmon fry emergence (which may be as early as January 1) and May 31 of each year
- When down ramping is being conducted at rates greater than 1 in/hr (slightly more than 2 MW/hr)

The frequency of downramping will be limited under these conditions to 48 hours during the Chinook salmon fry season. This limitation equates to approximately 1.4 percent of the typical operating time during the 5-month period from emergence in January to May 31. Also, for added protection, no more than 16 hours of the seasonally allotted 48 hours would be allowed in any one month. The monthly restriction is intended to prevent the over-accumulation of allowable hours and their subsequent use in a single month.

Table 4. Proposed Downramping Frequency Limitations from First Emergence of Chinook Salmon Fry (approximately January 1 through May 31)

	Limit on Down Ramp Hours When Down Ramping > 1 in/hr	
Time Period	**River Flows <750 cfs**	**River Flows >750 cfs**
Season (January through May)	48 hours	No limit
Monthly: January through May	Maximum of 16 hours	No Limit

Powerhouse downramping frequency during the Chinook salmon fry period will be reported each year in the District's annual operations report, which is submitted to the ARC and filed with the FERC.

J. River Temperature

Below Diversion Dam: The operational goal for Project effects on Sultan River temperatures are to follow reasonably close to the pre-Project mean when the reservoir is stratified. Figure 2 is an approximation of the mean temperatures recorded at the Sultan River Diversion Dam from 1969 to 1979 prior to addition of the Project hydroelectric generation facilities. The District shall operate the Project power tunnel water withdrawal structure at Spada Lake to approximate to the fullest extent possible, within a

band of 2 degrees Celsius of the daily mean of recorded temperatures for this pre-generation period of time. Furthermore the seven day average of the daily maximum temperatures will not exceed WDOE criteria of 16 degrees Celsius. This criterion will not apply during periods when the Project is shut down and instream flows are met by releases from Culmback Dam.

Figure 2. Mean Daily Temperatures, Sultan River @ Diversion Dam, 1969-1979

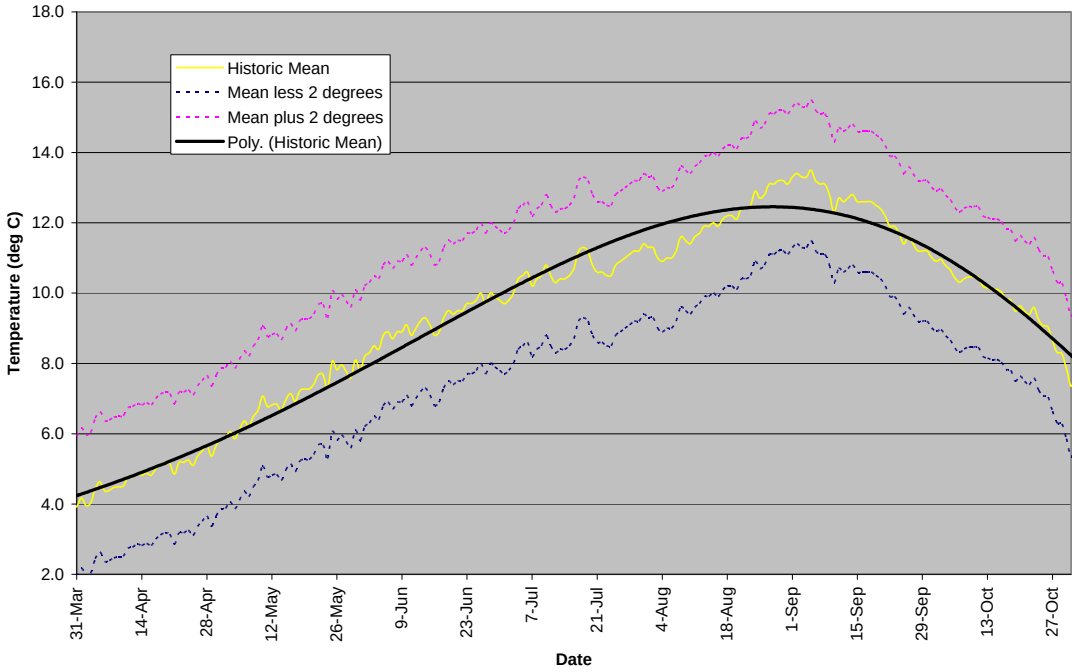

Figure 2. Mean Daily Temperature, Sultan River at Diversion Dam, 1969-1979

Below Culmback Dam: The operational goal for Project effects on Sultan River temperatures between Culmback Dam and the Diversion Dam are to increase the river temperature as much as reasonably practical when the reservoir is stratified to support the growth and development of aquatic resources in this reach. The District shall operate the valves and flow facilities at Culmback Dam to achieve as high a temperature as possible for the required minimum instream flow. However, the seven day average of the daily maximum temperatures will not exceed WDOE criteria of 16 degrees Celsius. This criterion will not apply during periods when instream flows below the Diversion Dam and/or City of Everett water supply must be met by releases from Culmback Dam.

V. OPERATING LOGIC AND CRITERIA

The operating criteria for release of water from Spada Lake in order of priority are as follows.

A. Maintaining minimum instream flows and providing municipal water supply have first priority. Minimum instream flow requirements at the designated control points, and water demand for the City of Everett must always be met.

B. The minimum storage level in Lake Chaplain must be maintained unless the City agrees to waive this requirement for the purposes of facilitating Project maintenance.

Municipal water supply and minimum instream fish flow requirements are co-first priorities. Hydropower generation has second priority. All operating plan scenarios account for meeting future Everett water supply demand and providing minimum instream flows at all times.

VI. PLAN REVISION

This operating plan shall become effective upon acceptance by the District of the new license issued by the FERC. If this operating plan, based on future study results or monitoring reports, warrants revision or fails to meet projected scenarios or expectations, the Licensees and ARC agree that they jointly or separately, based on just cause, may petition the FERC to amend this plan.

VII. ANNUAL REPORTING

The District will submit annual reports on Project operations and Sultan River temperature to the ARC by April 20 of each year. The Aquatic Resources Committee will reply with written comment, if any, by May 20. These reports, with the Aquatic Resources Committee member's comments, will be kept on file at the District's headquarters.

VIII. RESERVATION

If the FERC at some time in the future orders or allows modification to the Project or the plan of operations that differ from the terms and conditions herein, and are not based upon the monitoring process in Section VII herein, the Aquatic Resources Committee individually or collectively or the Licensees shall have a reserved right to object to such modifications.

IX. REFERENCES

CH2M Hill, 2005. Project Effects on Anadromous Salmonids and Bull Trout in the Sultan River. Henry M. Jackson Hydroelectric Project. FERC No. 2157. Prepared for Public Utility District No. 1 of Snohomish County, City of Everett, Washington, April 2005.

Olson, F.W. 1990. Down Ramping Regime for Power Operations to Minimize Stranding of Salmonid Fry in the Sultan River. FERC Project No. 2157. Public Utility District No. 1 of Snohomish County, Everett, WA.

Henry M. Jackson Hydroelectric Project
FERC #2157

Supplemental Paper
to the
Proposed Jackson Project Operations Plan

by
Public Utility District No. 1
of
Snohomish County

May 29, 2009

Table of Contents

I. INTRODUCTION

Based on comments on the District's Preliminary Licensing Proposal and presentations made to the stakeholders during the course of relicensing meetings, this supplement to the Operations Plan describes the tools used to analyze various scenarios of interest to the licensee and stakeholders, and the results of several assessments which are the basis for the District's proposal for operations during the next license.

A short discussion of the integration of Sultan Basin hydrology, Project facilities and current operating rules is provided to expand on the reader's understanding of the District's Proposed Operating Plan. Figure 1 graphically shows how water flows through the Project.

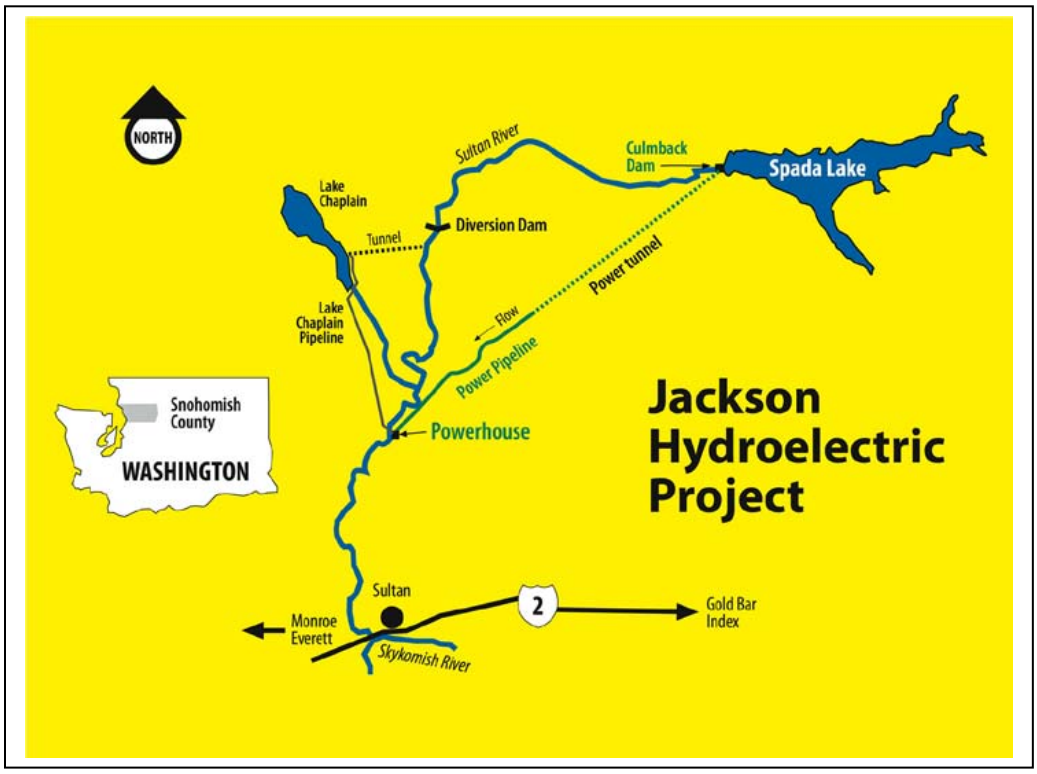

Figure 1. Jackson Project Facilities.

II. CURRENT OPERATIONS

The current operation is the baseline for comparing any proposed alternatives for the next License term. To explain current operations, what follows is a discussion of Sultan basin hydrology, Project facilities configuration, current rule curves, flood management, and Spada Lake behavior showing their integration into current operations.

Sultan Basin Hydrology

With an average annual precipitation of 162 inches (224 inches maximum and 120 inches minimum between 1986 and 2008) and daily peak rainfall as much as 11.5 inches, the Sultan basin is one of the most intense rainfall basins in the continental United States. Figures 2 and 3 provide a visual sense of the annual and monthly variation in precipitation as measured at Culmback Dam.

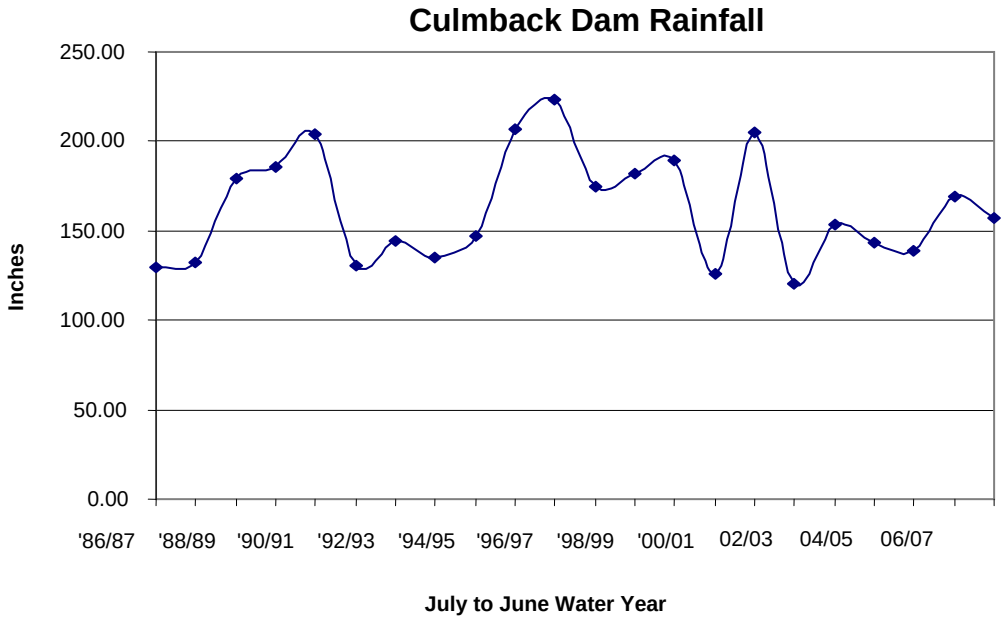

Figure 2. Culmback Dam rainfall by water year. (Source: Snohomish PUD)

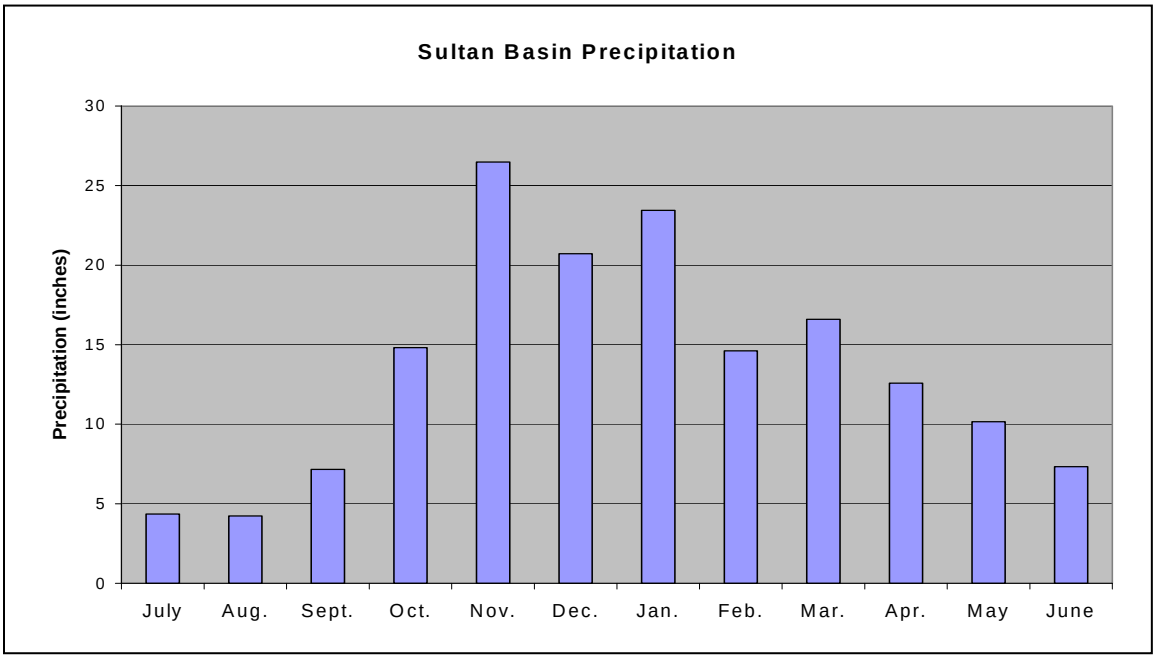

Figure 3. Culmback Dam Average Monthly Rainfall 1986-2008. (Source: Snohomish PUD)

Project Facilities Configuration

The Jackson Powerhouse has 4 turbines – two 8.4 MW Francis units that are used to return up to 170 cfs each to Lake Chaplain and the Diversion Dam, and two 47.5 MW Pelton units that discharge up to 650 cfs each into the Sultan River below the Powerhouse. Because the net pressure on the Francis units is only approximately 700 feet while the net pressure on the Pelton units is approximately 1000 feet, the Pelton units will generate more energy per unit of water than the Francis units (Figure 4).

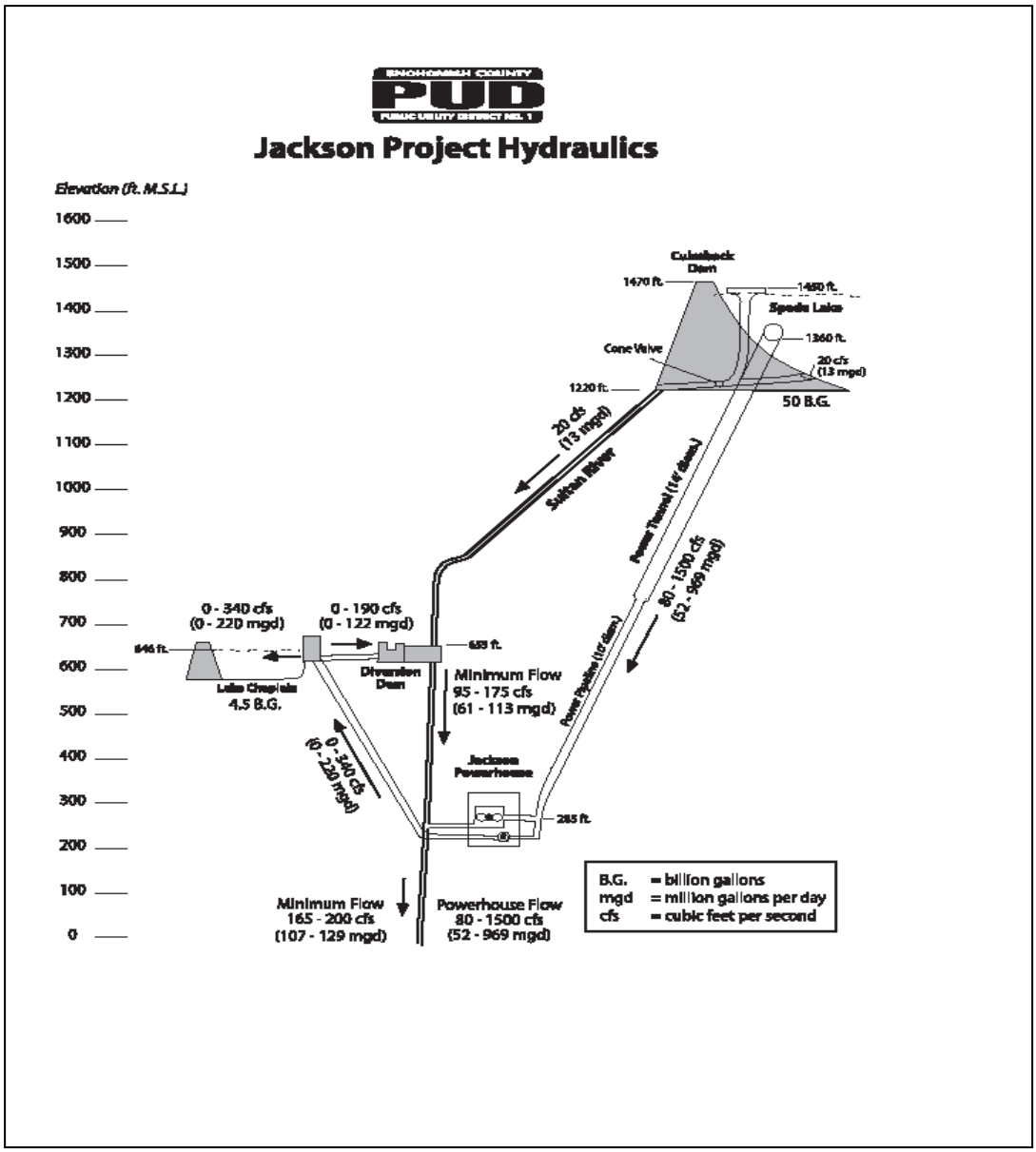

Figure 4. Jackson Project Hydraulics.

Project Operating Constraints

There are several constraints on Project operations which are arranged in a hierarchy of priority. These are:

a. Water supply needs must always be satisfied.

b. Minimum instream fish flows below Culmback Dam, the Diversion Dam, and the Powerhouse must always be satisfied.

c. During the fall Chinook spawning season (September 15 to October 15) the regulated maximum flow in the Sultan River will not be exceeded to protect any redds below the Powerhouse from dewatering if the Project is operated at minimum instream flows during the egg incubation period (September 15 to January 31 depending on the temperature conditions of the water).

d. When Spada Lake drops to elevation 1380, restrictions in generation flow through the power tunnel will be implemented to avoid vortex conditions that would cause negative pressures inside the power tunnel.

Current Rule Curves

Current operations involve a set of rule curves which guide operational decisions throughout the year depending on the elevation of Spada Lake. The current rule curves are shown in Figure 5.

Figure 5. Current Spada Lake Operational Rule Curves.

Spada Lake is divided into 4 operating states.

State 1 is above elevation 1450, the spill elevation for the morning glory spillway. To facilitate flood reduction, the Project is operated to withdraw 1300 cfs through the power tunnel.

State 2 is a zone of high potential spill, and therefore the Project is operated to withdraw 1300 cfs through the power tunnel.

State 3 is a zone of variable power operation. The basis for operation in State 3 is power market conditions, maintenance scheduling, and instream aquatic conditions. Operation

in State 3 may be anywhere in the range of maximum as defined in State 2 above to minimum generation as defined by State 4 below.

State 4 is a zone of water. The Project is operated to maintain the City of Everett's elevation in its municipal water supply reservoir, Lake Chaplain, and to ensure fish flows in the Sultan River below the Diversion Dam and Powerhouse are maintained at or above the minimum flows specified in the Project license.

Flood Management

Recorded maximum flows prior to construction of Culmback Dam have exceeded 34,000 cfs at the USGS Gage No. 12137500 downstream of the current site of Culmback Dam. (See Figure 6 for a comparative record of high Sultan River flows adjusted to the Powerhouse stream gage at river mile 4.7.)

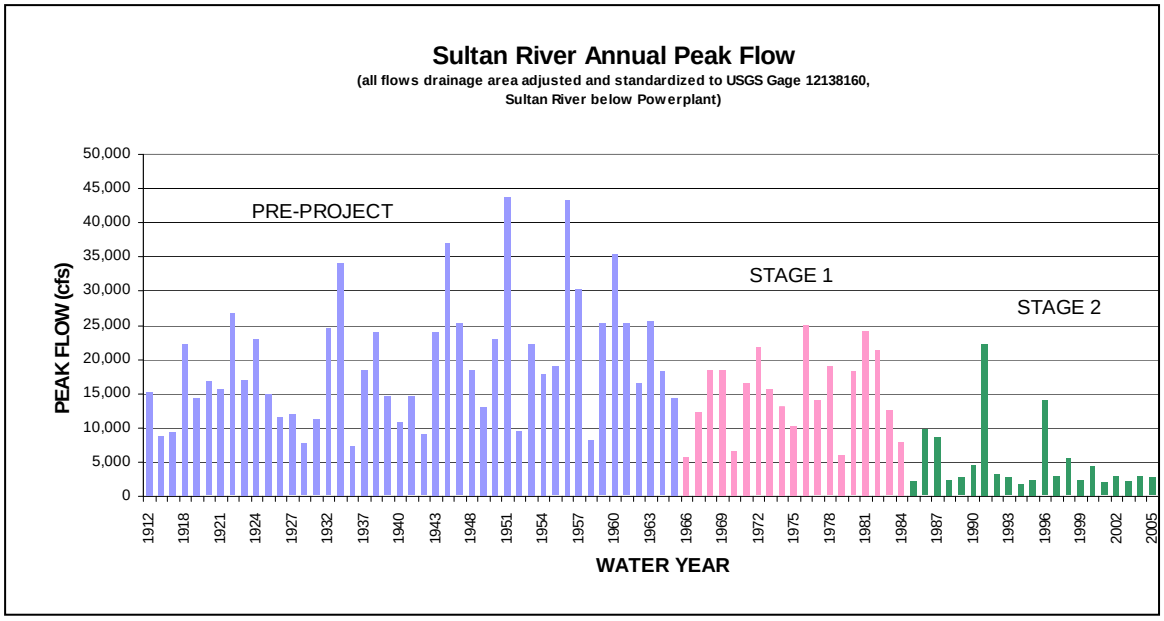

Figure 6. Sultan River Annual Peak Flows; 1912 – 2005.

Spada Lake is the only storage flood control structure on the Skykomish River System and only one of two storage flood control structures on the Snohomish River system. Therefore, flood control was an important aspect of Stage II which raised Culmback Dam by 62 feet and increased the volume of Spada reservoir by 4.5 times. However, at the time of Stage II development, the rigid prescription of reservoir management by the U.S. Army Corps of Engineers to maximize flood control was not supported by either the licensees or the aquatic resource agencies due to the anticipated negative effects on downstream resources. Therefore, under the current license, flood control is "incidental" to Project operations (i.e., an indirect outcome of the result of operating the Project for the other beneficial purposes). This was agreed to by the Joint Agencies and the Corp of Engineers while developing the current license operating plan which was finalized and accepted by the FERC in 1996.

The shape of the rule curves and the guidelines for operation (see below) are designed to minimize flooding on the Sultan River. Over the course of the current license, pink and Chinook salmonids have responded positively to reduction of flood flows in the Sultan River below Culmback Dam, which usually occur in the late fall. (See Figure 5.3-2 and Figure 5.3-4 of the PAD).

The Sultan River can constitute from 20 percent to 50 percent of the flood flows on the Skykomish River below the City of Sultan depending on the concentration of storm effects on the two river systems. The City of Sultan (pop.~5000) is located at the mouth of the Sultan River where it empties into the Skykomish River. At this location the City business district is subject to flooding whenever the Skykomish River is swollen from rainfall. Current operations of the Jackson Project have substantially reduced the medium-size floods on the Sultan River and reduced, to the extent reasonably possible, the larger floods that may occur. Thus, it is a Project benefit that the Sultan River flooding is contained or delayed from contributing to the downstream flooding that may be occurring when the Skykomish River is also flooding. However, the Jackson Project can not contain the larger multiple storm events that have historically occurred in the Sultan basin. (See *Integrating Sultan Basin Hydrology and Project Operations* below.) A recent FEMA flood reinsurance study estimates that the 100-year flood on the Sultan River would be on the order of 58,000 cfs. However, this value was calculated without accounting for any flood routing or other operational benefits from the Project because FEMA will not allow any credit for flood management if operations are not solely dedicated to maximizing flood control benefits. To operate for maximization of flood control would compromise other Project benefits such as power generation without adding substantially to flood reduction in the lower Skykomish River for the rare extreme event.

III. INTEGRATING SULTAN BASIN HYDROLOGY AND PROJECT OPERATIONS

1. **Fall Run-off** - Spada Lake can be very flashy in the face of the intense Sultan basin rainfall. During the 2006-07 water year, which was typically dry in the summer and fall before an intense storm occurred in early November, a multi day storm occurred with a single day rainfall of 11.27 inches on November 6, 2006. This created a daily inflow that peaked at 15,600 cfs (Figure 7). Over the course of 4 days the reservoir rose nearly 50 feet even though the Powerhouse was generating at nearly 100 MW, causing a power tunnel withdrawal of over 1300 cfs.

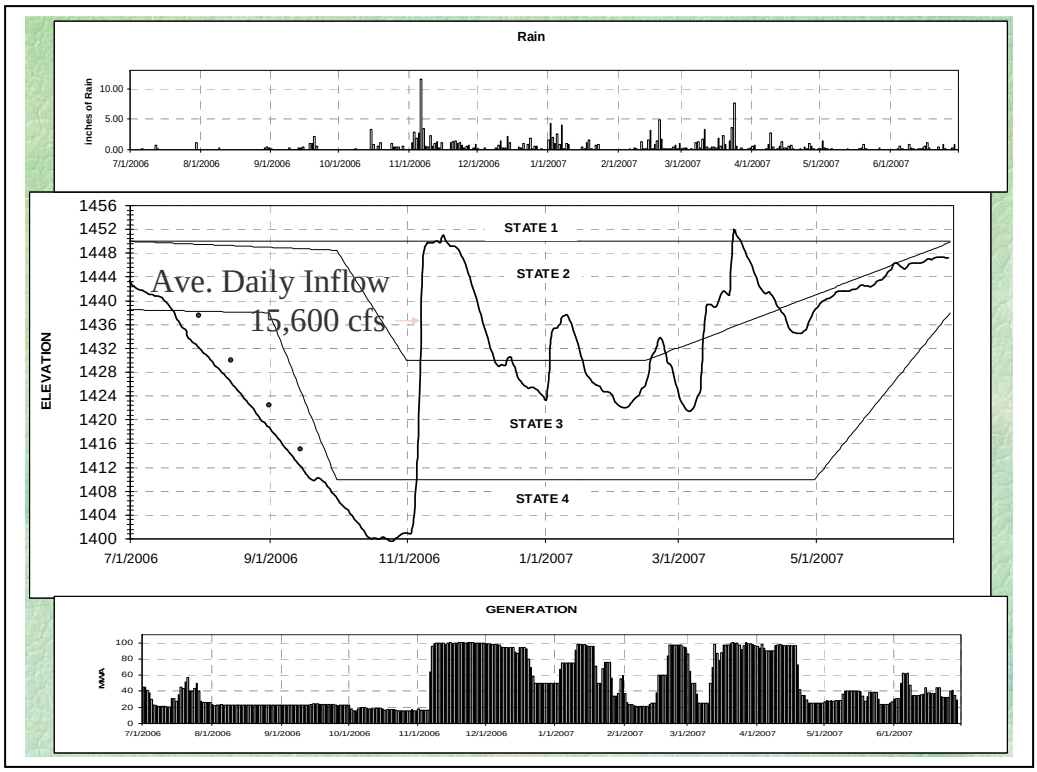

Figure 7. 2006-07 Water Year showing Spada Lake response to intense fall rainstorm.

2. **Spring Runoff** - In the spring of 2008, the Sultan basin achieved record levels of snow by April 1. The runoff was strong and steady as shown by the reservoir rise throughout the month of May (Figure 8).

3. **Multiple Fall Storms –** Occasionally the Pacific Northwest experiences multiple storm events which can lead to spill in Spada Lake. Project operations can absorb most or all of the first event but the second event which can occur only two weeks later will arrive with very little capacity in Spada Lake to absorb it. Such a series of events occurred in 1990 as shown in Figure 9. The first storm event included an 11.5 inches of rainfall in 24 hours on November 11, 1990. With an average daily inflow of 14,700 cfs, Spada Lake rose 22 feet in 24 hours resulting in a modest spill of about 3000 cfs. Operating at full power, the reservoir was only lowered to about 2.5 feet below the rim of the spillway when two weeks later on November 24^{th,} the second multi-day storm arrived. Inflows to Spada Lake increased to 18,000 cfs which raised the lake level nearly 7 feet over the top of the spillway, resulting in a spill peak flow of nearly 17,000 cfs.

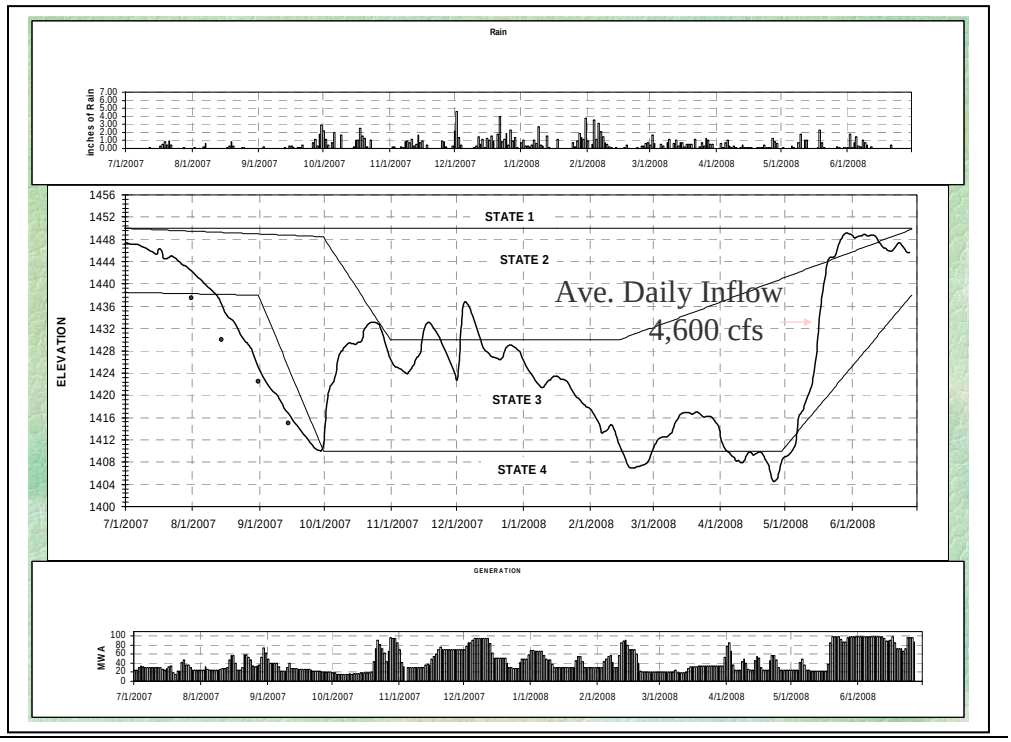

Figure 8. 2007-08 Water Year showing Spada Lake response to a spring runoff event with large snowpack.

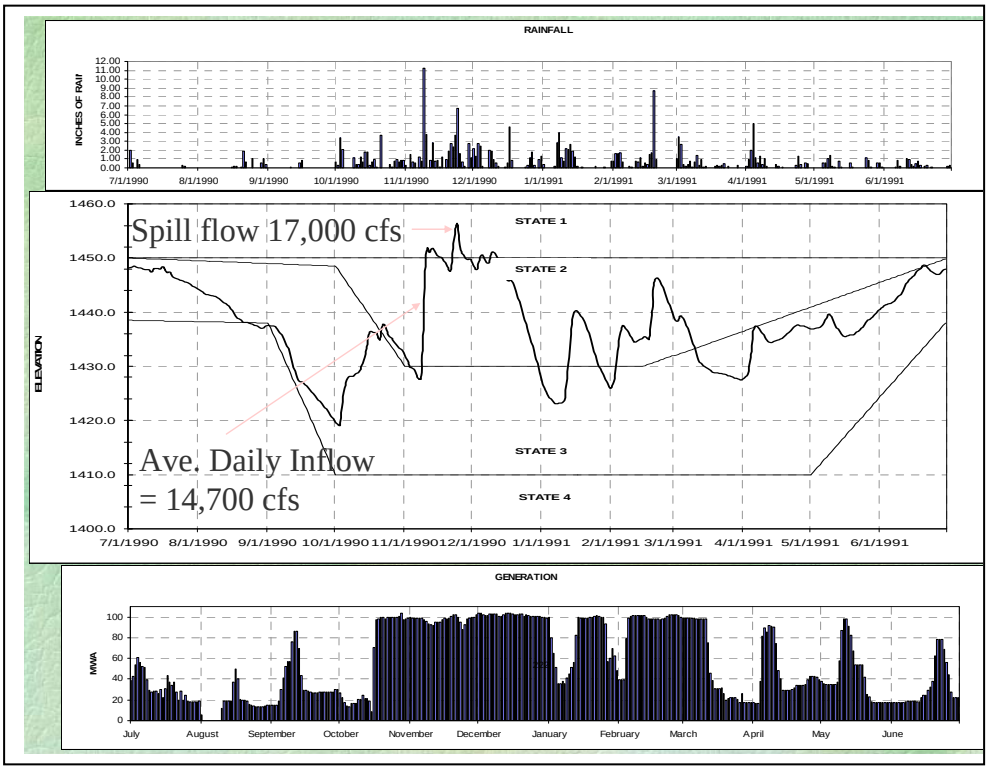

Figure 9. 1990-91 Water Year showing multiple storm events on Spada Lake.

4. **Rain on Snow Event**: These events do not occur annually, but when they do occur they can yield a substantial runoff in a short period of time. The rule curves are designed to minimize the chance of this type of event from causing a spill. Figure 10 shows one such event that occurred in early January 2009. Spada Lake was drawn down to elevation 1415.4 by January 5, 2009. Over the next 4 days 20.9 inches of rain fell (9.4 inches on January 7) which created runoff into Spada Lake that achieved a daily average peak of 13,100 cfs. Spada Lake rose 28.2 feet over this 4 day period to 1443.6 ft.

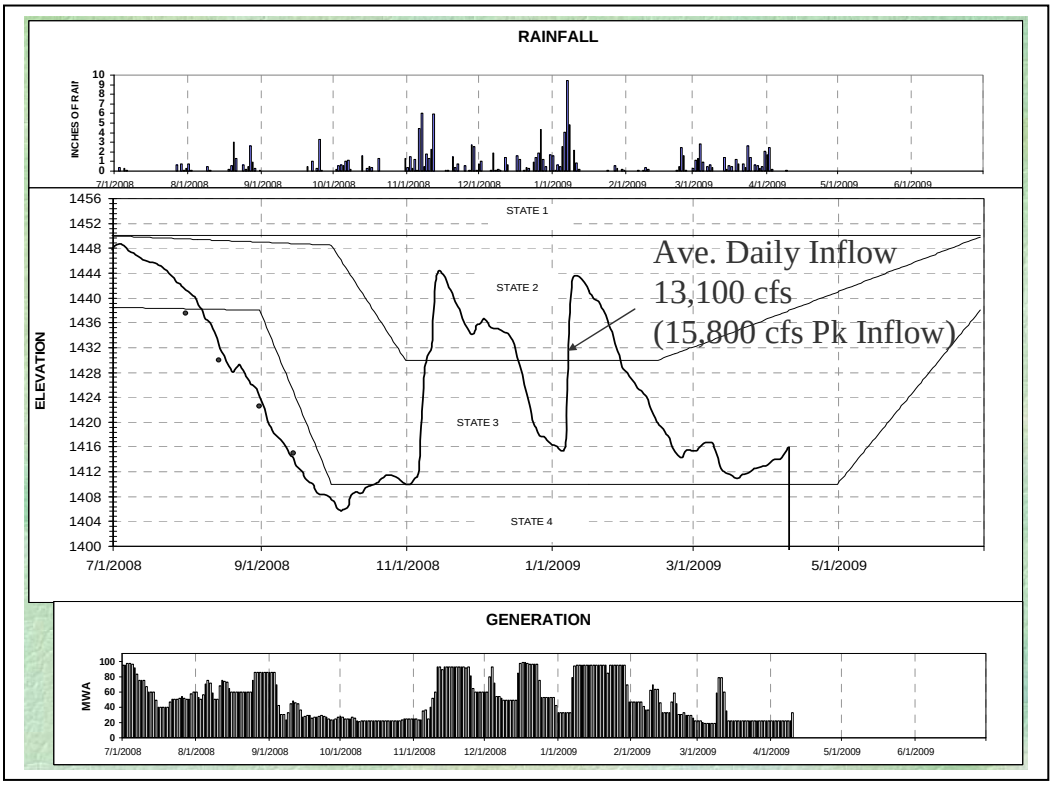

Figure 10. 2008-09 Water Year with Spada Lake response to January 2009 run-off event

IV. PRIMARY PROJECT PURPOSES

Reliable Water Supply

The City of Everett is the wholesale water supplier for 80 percent of Snohomish County and has rights for the use of 380 cfs (245.6 mgd) of Sultan River water for municipal water supply with a pending application for an additional 200 cfs (129.3 mgd). The District is obligated by agreement with the City of Everett to operate the Jackson Project to meet the City's water supply demands. This is accomplished almost exclusively by flowing water through the Powerhouse Francis units and back up to Lake Chaplain. Under some circumstances flowing water through the Powerhouse to Lake Chaplain is not possible or feasible (such as for power tunnel or equipment inspections or maintenance). When this occurs, water for the City's water supply is accomplished by releases through Culmback Dam to the Diversion Dam, where it flows to Lake Chaplain. (This is the original pathway used by the City to get its water supply before the Stage II generation facilities were developed in 1984.)

The City of Everett projects that its water supply demand will increase over time. Figure 11 shows the City demands with conservation from 2008 to 2060. This corresponds roughly to the span of a Project license lasting 50 years.

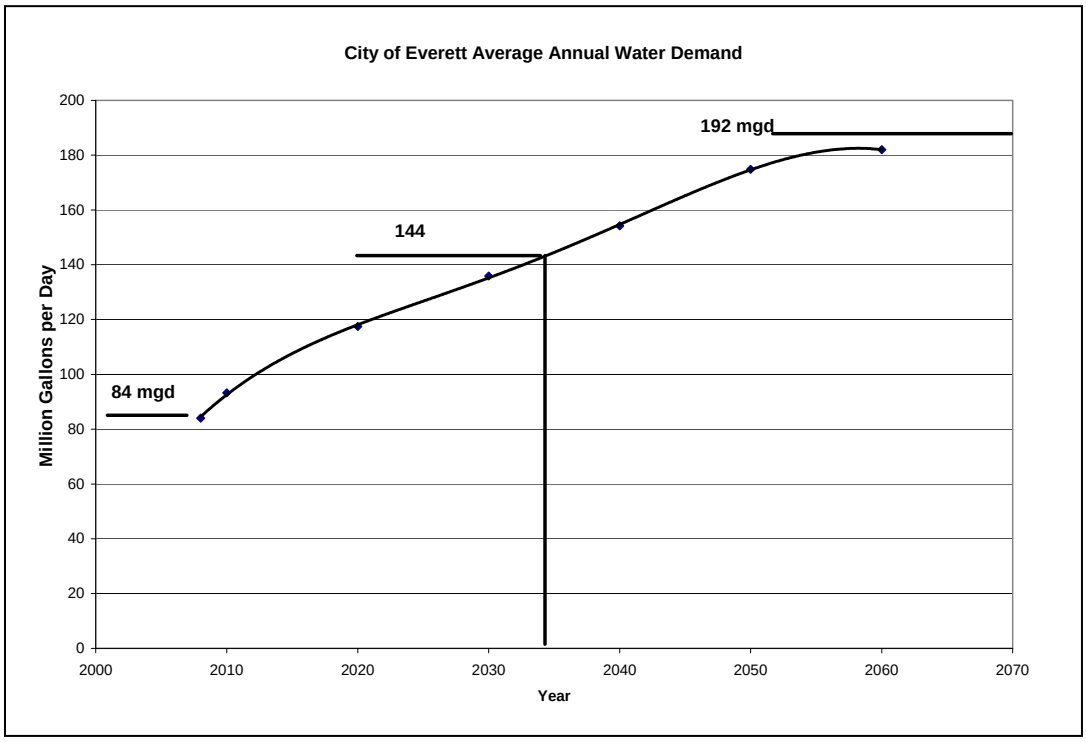

Figure 11: City of Everett Projected Water Supply Demand With Conservation.

(Source: Data from City of Everett 2008 Comprehensive Water Plan)

For the purposes of modeling effects on Project operations over the course of the next license, District staff analyzed various operating scenarios for the current water demand of 84 mgd, a mid-license water demand of 144 mgd and a demand of 192 mgd which would occur beyond the potential term of the next license. This demand curve assumes that cumulative conservation measures of .5 percent annually would be adopted to reduce the demand. In reality, the City water supply demands may actually increase at a lower rate or even decline over time as more conservation measures are adopted. However, for this analysis the demands shown in the most recent Comprehensive Water Plan are use and represent a very conservative approach to assessing Project impacts to the City water supply.

One of the City's concerns in managing the water supply is to protect the "safe yield" of the reservoir system. Simply stated, the safe yield is that demand that they would be able to rely on without more than a 2 percent risk of failure. Translated into terms relative to this analysis, this means that the chance of Spada Lake going dry given the City's demand and the hydrologic variability of the Sultan basin would not be greater than twice in a 109 year period. The City analysis of their "safe yield" under the current operating scenario is 200 mgd. (Source: City of Everett's 2008 Comprehensive Water Plan)

Power Generation

Jackson Project Generation currently averages 421,800 MWh's annually, which represents approximately 5 percent of Snohomish County PUD's needs for annual power. Because of hydraulic limitations on the power tunnel and return line, the full capacity of the four generators (111.8 MW) cannot be utilized at any one time. The maximum generation capacity is only approximately 104 MW if only using the Pelton units, which is rarely done. Because of the need to meet water supply requirements for the City of Everett with the Francis units, the maximum generation for the Powerhouse is usually less than 100 MWs. Delivery of water to the City of Everett for water supply and maintaining minimum instream flows are a co-first priority for Jackson Project operations. As explained previously, these are met through the Francis units which deliver water up to the shore of Lake Chaplain for distribution. Flows above those needed for water supply or instream flows pass through the Pelton units to generate additional power, as allowed by the Spada Lake rule curves.

V. SIMULATION MODEL

After the Project was designed and built by Bechtel in the early 1980's, the District has used a simulation computer model to understand current and proposed Project operations. Over the years this model has been updated to run on progressively more advanced computer platforms using modern programming languages. In 2008, the District contracted with the civil engineering department of the University of Massachusetts – Amherst (UMass) to update and operate the computer simulation model of Jackson Project operations. The UMass team, lead by Dr. Richard Palmer (formerly of the University of Washington), has a long history of modeling Spada Lake operations.

The simulation model is based on a daily time step of volumetric water quantities entering the Sultan River at various points from Spada Lake to the Powerhouse. These include Lake Chaplain and accretion flows into the river.

The model accounts for and prioritizes meeting the City of Everett's water demand and instream flows below Culmback Dam, the Diversion Dam, and the Powerhouse. Model inflows are updated annually and calibrated to accurately reflect reservoir fluctuations and power generation.

A simulated history of input flows for the model has been reconstructed from actual gaging data and early records of data on nearby river systems. This history dates from July 1, 1899 to June 30, 2008 (109 years of daily flows in the Sultan River system). With this inflow history the District can analyze Project operations under varying conditions, such as during severe drought. It can also be used to give a sense of the frequency of occurrence of extreme or average conditions, such as the number of times that Spada Lake would be drawn down below elevation 1410 feet in elevation when conditioning the

temperature of water releases from Culmback Dam becomes impossible with the existing infrastructure.

VI. MODELING CURRENT OPERATIONS

Current Operating Constraints, Policies, and License Requirements

Table 1. Current Rule Curves and applicable minimum instream flows.

Location	Date	Minimum Instream Flows (cfs)
Below the Powerhouse	July 1 to Sept 14	165
	Sept 15 to June 30	200
Below the Diversion Dam	July 1 to Sept 14	95
	Sept 15 to Sept 21	145
	Sept 22 to Oct 31	155
	Nov 1 to Jan 14	95
	Jan 15 to Feb 28	150
	Mar 1 to June 30	95
Below Culmback Dam	Year round	20

Table 2. Current operating constraints,

Fall Target elevation by September 15	1415 ft
Fall Chinook Spawning Maximum flow season	Sept 15 to Oct 15
Fall Chinook Spawning Maximum flow value	400 cfs
Minimum Pelton unit discharge	70 cfs
Minimum Pelton unit power production	5 MW
Minimum Francis unit discharge	50 cfs
Minimum Francis unit power production	2 MW

Current Operations Modeling Results

Water Supply Safe Yield

Figures 12 and 13 show the annual low elevations in Spada Lake for the 109 years for each of the City of Everett water supply demands. As the City's demands increase over a span of time roughly equivalent to the next license term, Spada Lake will be drawn lower each year (always in the fall) given the same hydrology. For the 84 mgd demand the variation in hydrology shows there is little chance of Spada Lake falling below the 1380 power-off line. For the 144 mgd demand, Spada Lake falling below 1380 occurs 5 times in 109 years or less than 5 percent of the time. For the 192 mgd demand, Spada Lake operating below 1380 occurs 28 times in the 109 years or less than 28 percent of the time.

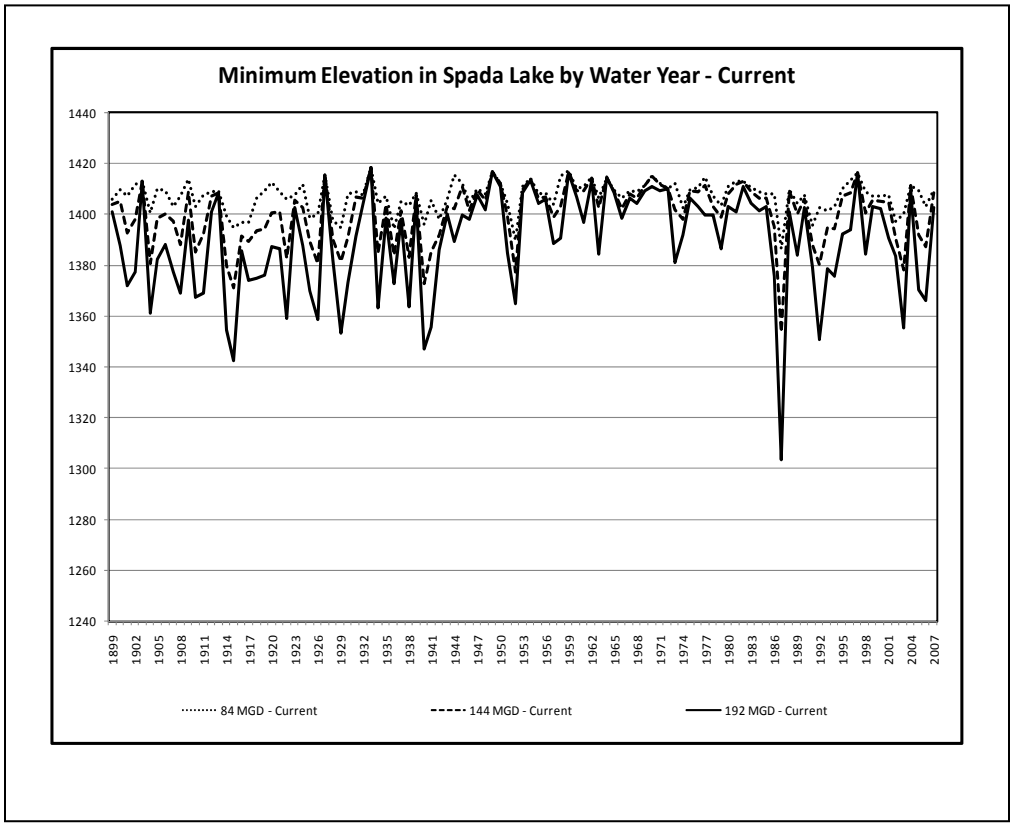

Figure 12. Spada Annual Low Elevation assuming 109 years of hydrologic variation, the current license rule curves and current license instream flow requirements.

Water year 1987-88 had the most sever drought condition in the summer and fall which coincides with water demand peak usage and higher instream flows for Chinook spawning. Consequently, the reservoir drawdown in the fall of 1987 is a barometer of Project response to severe drought conditions

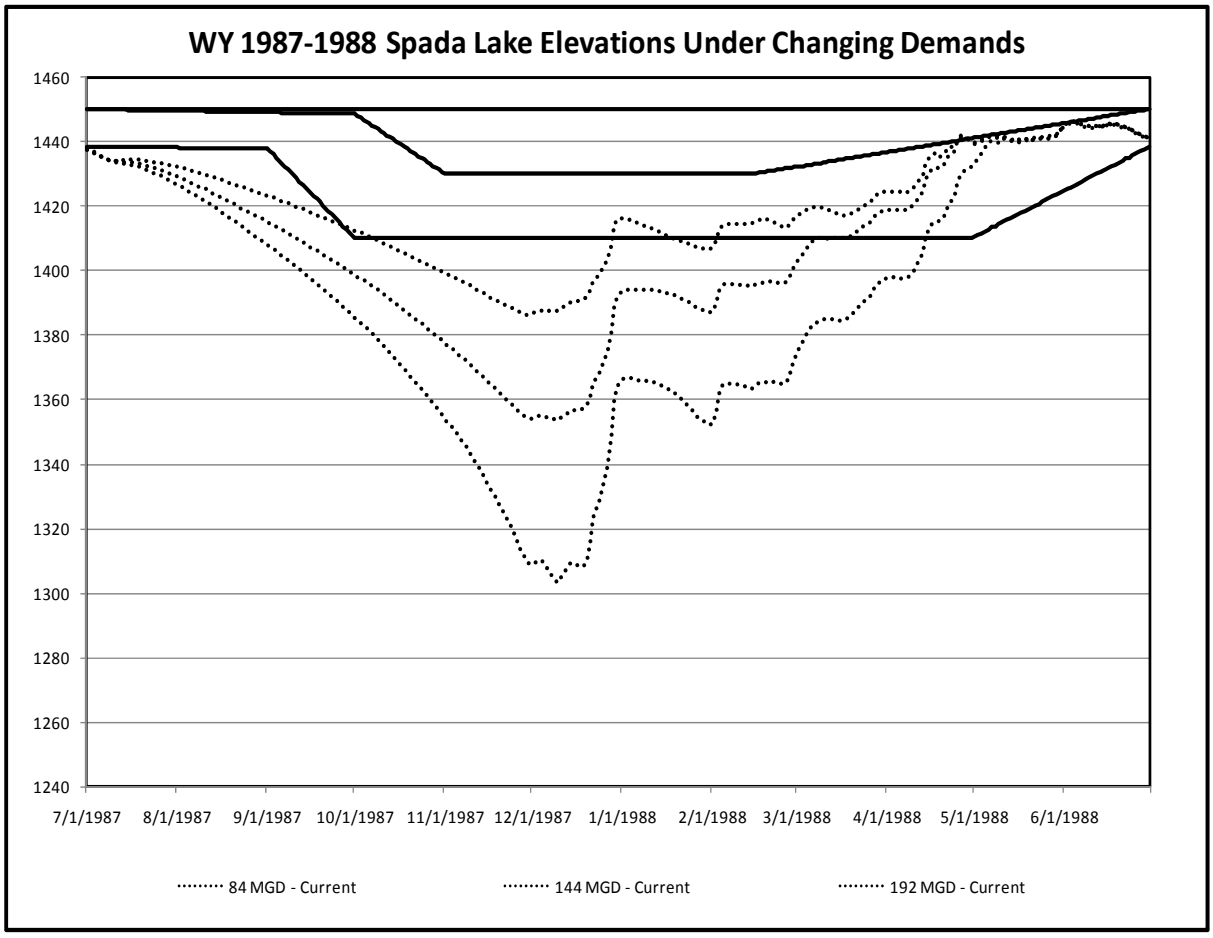

Figure 13. Spada Lake response to 1987-88 drought conditions for three water supply demands under current license operating requirements.

Power Production

As the City of Everett water supply increases with time the proportionate share of the water through the Francis units will also increase. The result will be an average annual shift of water from the Pelton units to the Francis units. Because of the different net pressures on the Pelton and Francis units, the result will be a progressive decrease in average annual energy production from the Project as the City's water demands increase. (See discussion on generation impacts.)

Under the current license the expected decrease in Jackson power production over the time represented by the increasing City of Everett water demands is approximately 50,000 Mwh (Figure 14).

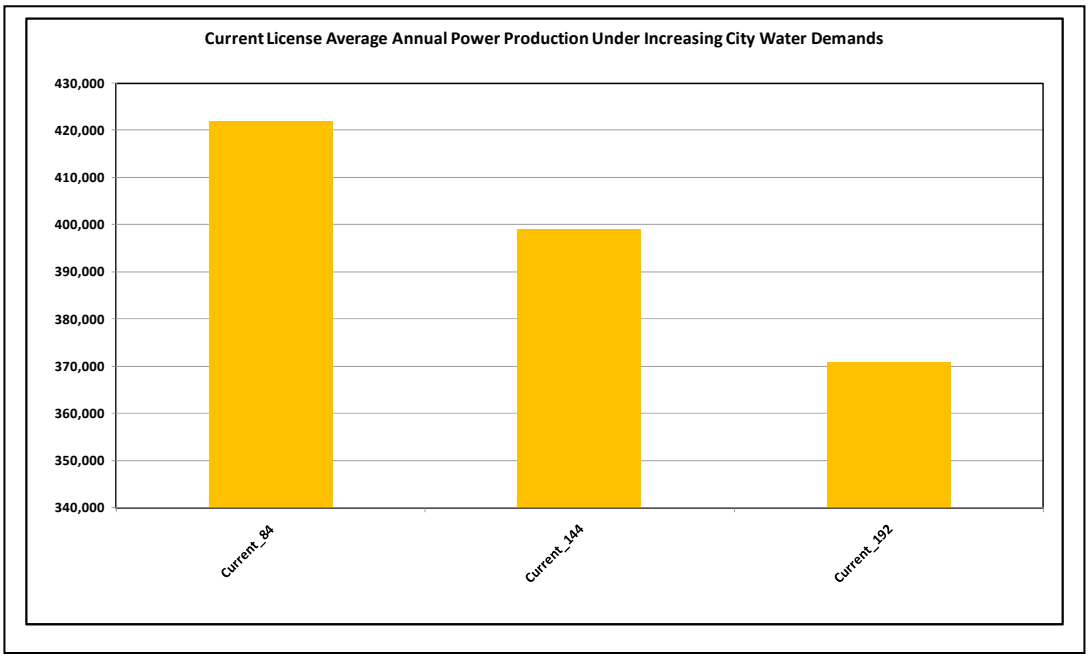

Figure 14. Generation output for current operating conditions with increasing City of Everett water demands.

VII. DISTRICT PROPOSED OPERATIONS

Alteration of the Spada Lake Rule Curve

The current Spada Lake Rule Curves (Figure 2) which have guided operation of the Jackson Project for the past 18 years are designed to accomplish a number of Project benefits. These include:

- Flood management by reduction of the magnitude and frequency of high flood events which typically occur during the late fall through early spring months on the Sultan River.

- Insuring ample water for instream flows for the aquatic resources of the Sultan River and for the City of Everett as the wholesale water supplier of 80 percent of Snohomish County.

In combination with various operating constraints that offer additional protection, these rule curves have provided an effective guide to operation over the broad range of rapidly changing hydrologic conditions, which is characteristic of the Sultan basin.

Altering the rule curves represents a refinement in Jackson Project operations to provide the benefits of additional flood management capability under extreme hydrologic conditions, which in turn leads to reduced risk to Sultan River aquatic resources, and to increased power generation.

The District proposes to alter the State 3-4 rule curves to be a straight line from elevation 1438 feet on July 1 to elevation 1410 feet on October 1 (Figure 15).

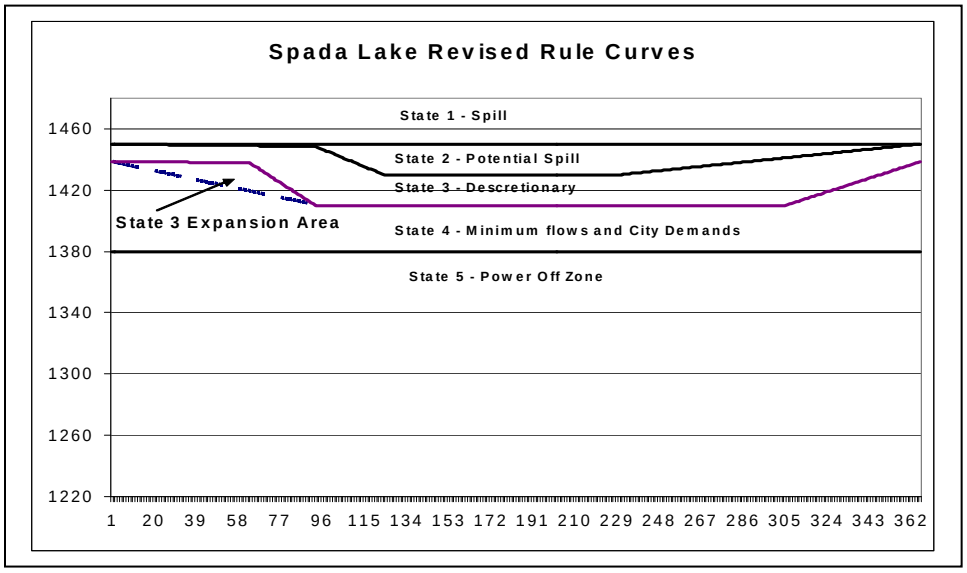

Figure 15. Spada Lake Proposed Rule Curves compared to Current Rule Curves.

The proposed fall expansion of State 3 would allow the District to draw down the reservoir to meet a target elevation of 1420 feet by September 15 (also a proposed operating condition) even during the wettest of summer conditions. The 1420-foot target elevation would ensure the attainment of 30 feet (51,000 acre-feet) of flood management storage in Spada Lake prior to entering the Chinook spawning season from September 15th to October 15th. During Chinook spawning, operations would be constrained to a maximum output of 550 cfs for the period of September 15th to October 15th to protect redds from dewatering if the Project is operated for a proposed minimum instream flow of 300 cfs during incubation. After October 15th, the District's ability to achieve substantial flood management target elevations is limited given the close proximity to the heavy rainfall season which can occur anytime beginning the latter part of October. Because the District's ability to reliably attain the Project's flood management capabilities is severely limited after September 15th, a target elevation of 1420 feet by September 15th is prudent.

The District has noted that in some years the inflows from higher than normal precipitation during August, September, or October can keep the elevation of Spada Lake abnormally high (Figure 16). These circumstances can lead to an increased risk of spill in October. Biologically, this is not preferable because the spill may disrupt spawning of ESA-listed Chinook salmon which are more prevalent in the river in October than in November. Lengthy disruption of spawning habitat conditions may cause utilization of marginal habitats and may also impact egg survival.

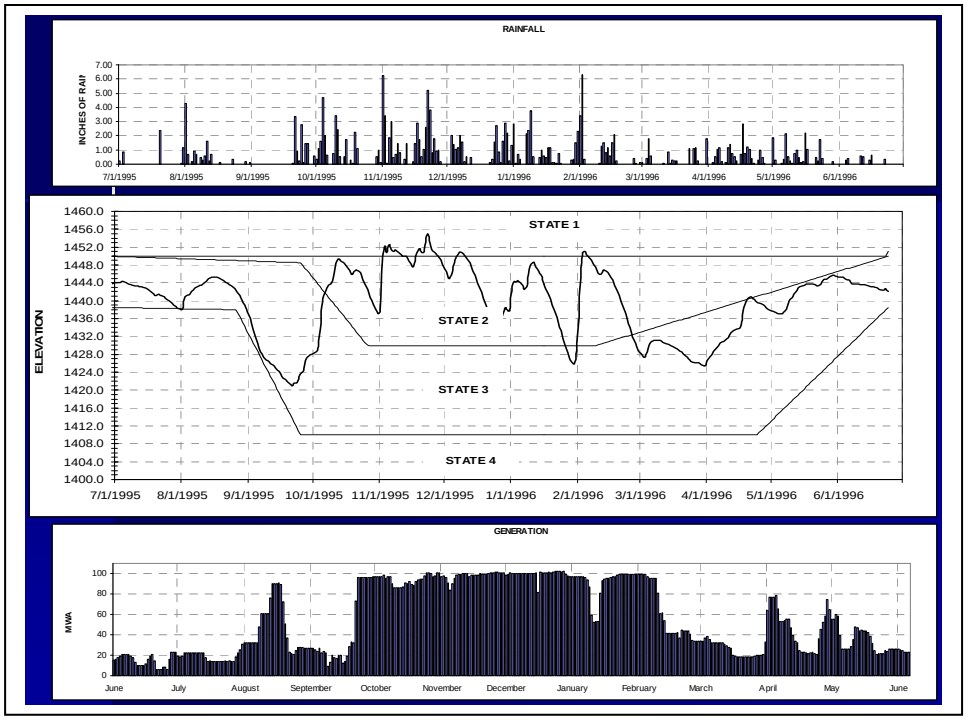

Figure 16. Jackson Project Operations 1995-96

Therefore, as a protection measure against those years when the hydrology of the Sultan basin is abnormally wet in the late summer and early fall months, the District proposes to expand State 3 to allow the option of more aggressive reduction of Spada Lake elevation with a commensurate reduction in the risk of a spill with its undesirable impacts on spawning Chinook and pink salmon.

If a wet late summer occurs and Spada Lake elevation raises in late October, the District may not be able to reduce the water elevation through normal operations before the rains of November occur. This increases the risk of an uncontrolled spill event (such as occurred in 1995) in the Sultan River which could have unintended impacts to the City of Sultan and in the lower Skykomish River valley. Therefore, the proposed alteration in the Spada Lake rule curves also extends the Jackson Project's ability to provide flood management benefits to the downstream Sultan and Skykomish River areas.

The altered rule curve would not have an effect on the reservoir elevations during drought events. Drought events such as happened in 1987-88 would have drawn the reservoir down into State 4, the conservation zone, regardless of whether the proposed or current rule curves were in effect. Figure 17 shows the modeled comparison of the 1987-88 water year using the proposed and current rule curves.

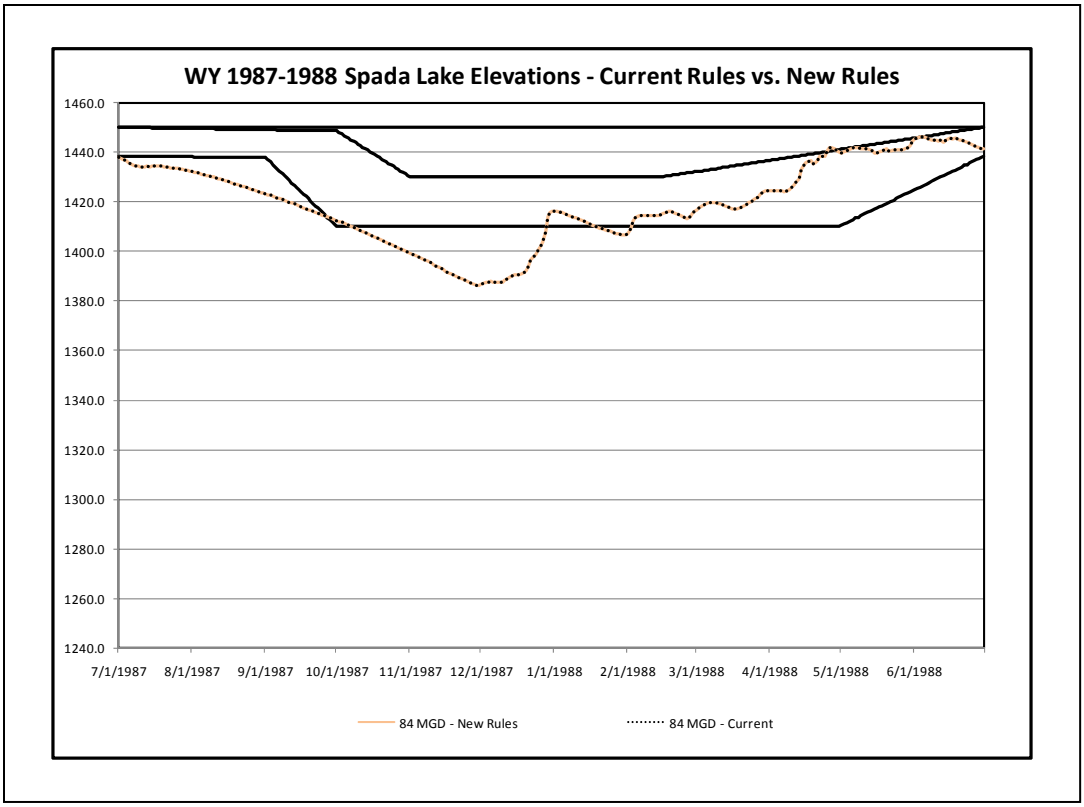

Figure 17. Water year 1988 Spada Lake elevation; 84 mgd diverted for municipal water supply.

Proposed Instream Flows

The following instream flows are proposed for the term of the next license.

Table 3. Instream Flow Targets for the next license term.

Location	Date	Target	Flow Rate (cfs)
Below the Powerhouse	Year round	Min	300
	September 15 to October 15	Max	550
Below the Diversion Dam	March 16 to June 15	Min	140
	June 16 to September 14	Min	100
	September 15 to October 31	Min	200
	November 1 to March 15	Min	100
Below Culmback Dam	Year round	Min	20

The flows below the Powerhouse are an increase from the current instream flows and based on maintenance of side channel habitat in the lower Sultan River. The flows below the Diversion Dam are based on a refinement of the current instream flows to fit the current life stages and habitat needs of the aquatic resources utilizing the reach between

the Diversion Dam and Powerhouse. The District does not propose to alter the instream flows below Culmback Dam. The maximum flows below the Powerhouse during Chinook spawning are designed to protect redds in the Sultan River from becoming dewatered if the Project is operated at minimum flows below the Powerhouse during incubation.

VIII. ANALYSIS OF EFFECTS OF PROPOSED OPERATIONS

The two major changes in operations would be the increased instream flows below the Powerhouse and the projected increase in water for municipal supply as the City of Everett's demand increases through time. While studying alternative instream flow scenarios, the District became aware of two consequences to operations during the course of the next license from these operational changes. First, the City's Safe Yield would become jeopardized and second, Spada Lake would be susceptible to dropping below the 1380 power-off elevation. This would have consequences for both the District and the aquatic resources of the Sultan River below Culmback Dam. For the District, the consequences would be the loss of Jackson generation until the reservoir recovers. For the aquatic resources, the consequences would be the release of large quantities of cold water to meet the instream flow requirements below the Diversion Dam and Powerhouse and to provide the City with water to be conveyed to Lake Chaplain from the Diversion Dam

Impacts to Water Supply Safe Yield

Safe yield was evaluated using the simulation model with the 109 years of daily hydrologic data for each of the three City of Everett average water demands expected to occur during the span of the next license. The annual low elevation in Spada Lake for each water supply demand is shown in Figures 18, 19, and 20.

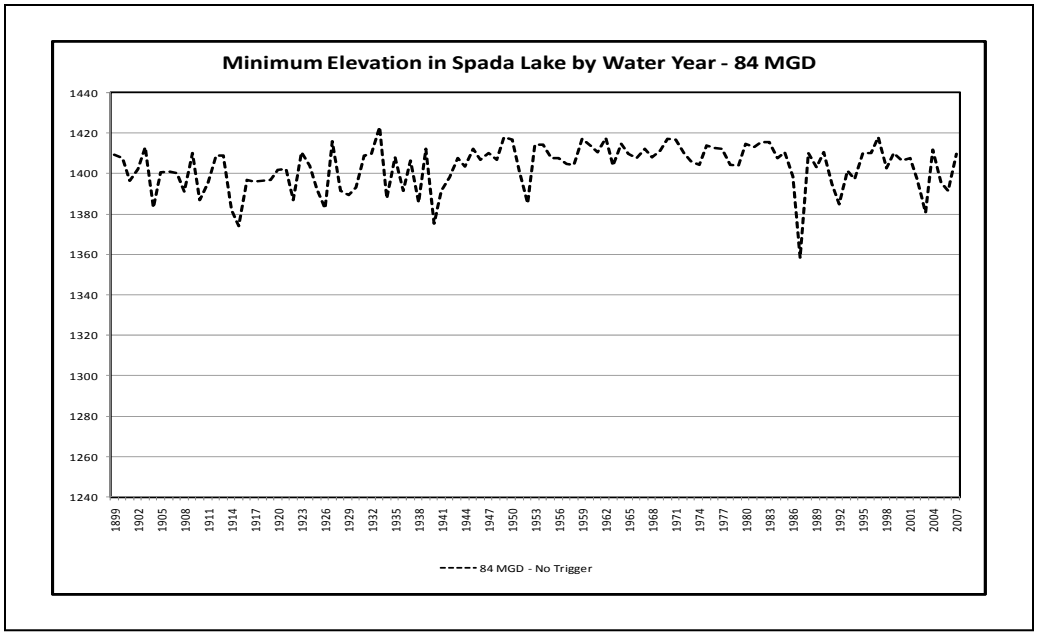

Figure 18. Spada Lake Annual Minimum Elevations for 109 years of hydrologic variation with proposed instream flows and current City water demands.

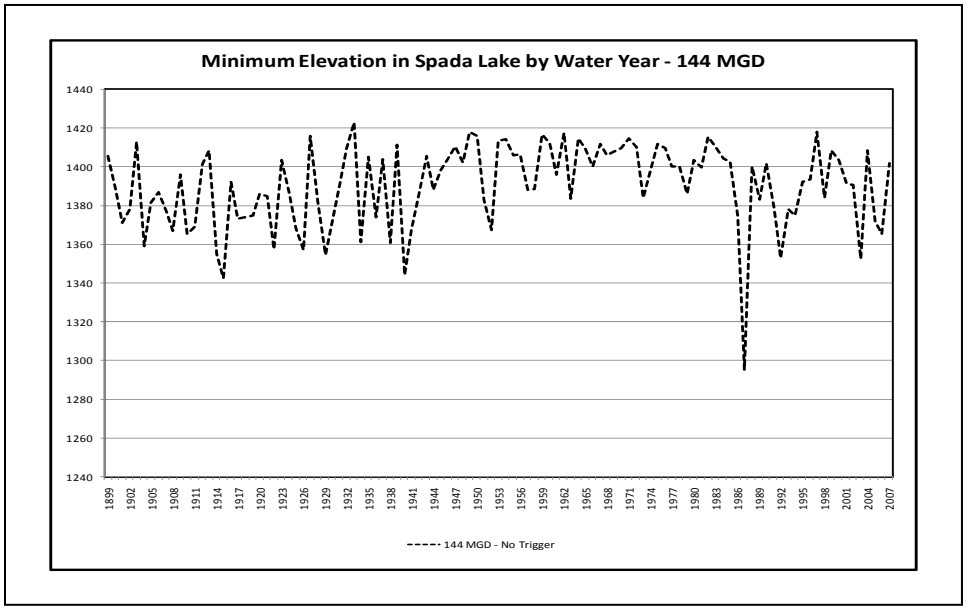

Figure 19. Spada Lake Minimum Elevations for 109 years of hydrologic variation with proposed instream flows and 144 mgd City water demands.

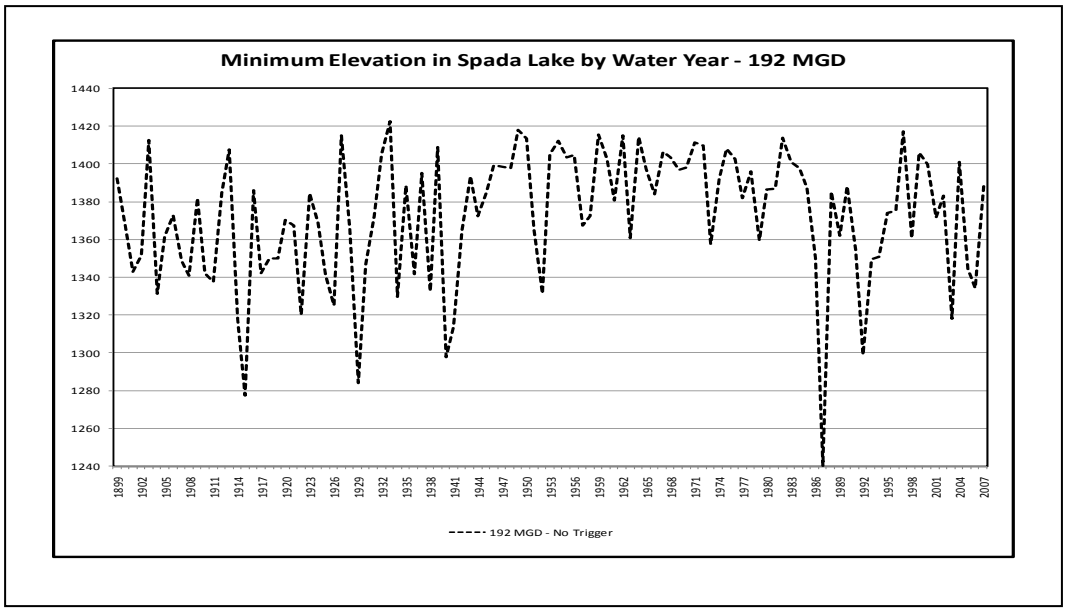

Figure 20. Spada Lake Minimum Elevation for 109 years of hydrologic variation with proposed instream flows and 192 mgd City water demands.

Analysis of the impacts on Spada Lake of the City's water demands over the term of a new license, using the 109 years of variable hydrologic history, was done using the simulation model. **However, no curtailment of water demands was assumed in this analysis. Therefore, the impacts to Spada Lake are extremely conservative in this analysis. Most likely the City will impose more strident conservation measures whenever an extreme drought event occurs and thus the decent of Spada Lake will not be as dramatic in frequency and magnitude as shown in the above analysis.**

As the City water demands increase over the course of the next license, the probability that Spada Lake would drop below 1380 feet would increase in frequency and duration. This would have consequential impacts to the aquatic resources because cold water would be released throughout the Sultan River system below Culmback Dam and the District would not be able to generate during the time of a power-off release which would occur in the fall of the year.

Therefore, the District is proposing to implement conservation triggers when Spada Lake drops below 1420 feet by reducing the minimum instream flow requirements below the Powerhouse and the Diversion Dam.

Conservation Trigger on Instream Flows

To mitigate for the impacts of the proposed instream flows on Spada Lake operations, the District proposes the following conservation triggers which would lead to a reduction of the instream flows in Reach 1 and 2 during times when Spada Lake would be at risk of dropping below elevation 1380 feet.

During the six-week fall Chinook spawning season (September 15 to October 31):

Above 1420 ft – 300 cfs at PH and 200 cfs at DD
Between 1420 ft and 1415 ft – 275 cfs at PH and 200 cfs at DD
Between 1415 ft and 1410 ft - 275 cfs at PH and 175 cfs at DD
Between 1410 ft and 1405 ft - 250 cfs at PH and 175 cfs at DD
Below 1405 ft - 250 cfs at PH and 150 cfs at DD

During other times of year (November 1 to September 14):

Above 1420 ft – 300 cfs at PH
Between 1420 ft and 1415 ft - 275 cfs at PH
Between 1415 ft and 1410 ft - 250 cfs at PH
Between 1410 ft and 1405 ft - 225 cfs at PH
Below 1405 ft - 200 cfs at PH

These instream flow reductions allow a stair-step reduction when Spada Lake elevation is decreasing under the influence of lower inflows, withdrawals for power generation, and to meet City of Everett water demands and instream flow needs.

During the Chinook spawning season the Diversion Dam and Powerhouse instream flows would be reduced together to allow the minimum Pelton generation (5 MW = 70 cfs) at the Powerhouse to supply the gap for instream flows between the Diversion Dam and the Powerhouse. Put another way, if the flow at the Powerhouse is not enough to meet the minimums at that delivery point, the District wants the gap to be greater that 70 cfs so the Pelton units are operated somewhat efficiently without wasting water.

Instream flows at the Powerhouse are met through supplementation by the Pelton units to water flowing down from the Diversion Dam plus accretion. However, the Pelton units have a minimum flow/power operating constraint of 70 cfs or about 5 MW. Operation below this level is a very inefficient use of water and leads to greater rates of maintenance required. Therefore, the Diversion Dam flows have been reduced in concert with the Powerhouse flows to allow the Pelton's to be used to make up the difference without supplying any more water than necessary to meet the minimum instream flows at the Powerhouse.

Several aspects of Project Operations were analyzed to show the beneficial effects of the instream flow conservation trigger. These included Spada Lake elevations with or without the conservation trigger, and the range of Spada Lake elevations for the 109 years of hydrologic variation throughout the year.

Effect on Spada Lake During Drought Conditions

Figure 21 shows the impact of the proposed operating conditions with and without imposition of the flow conservation measures. Such measures will reduce the number of days below 1380 from 56 days to 46 days, or a reduction of 10 days that the Sultan River below Culmback Dam is exposed to high flows of relatively cold temperature

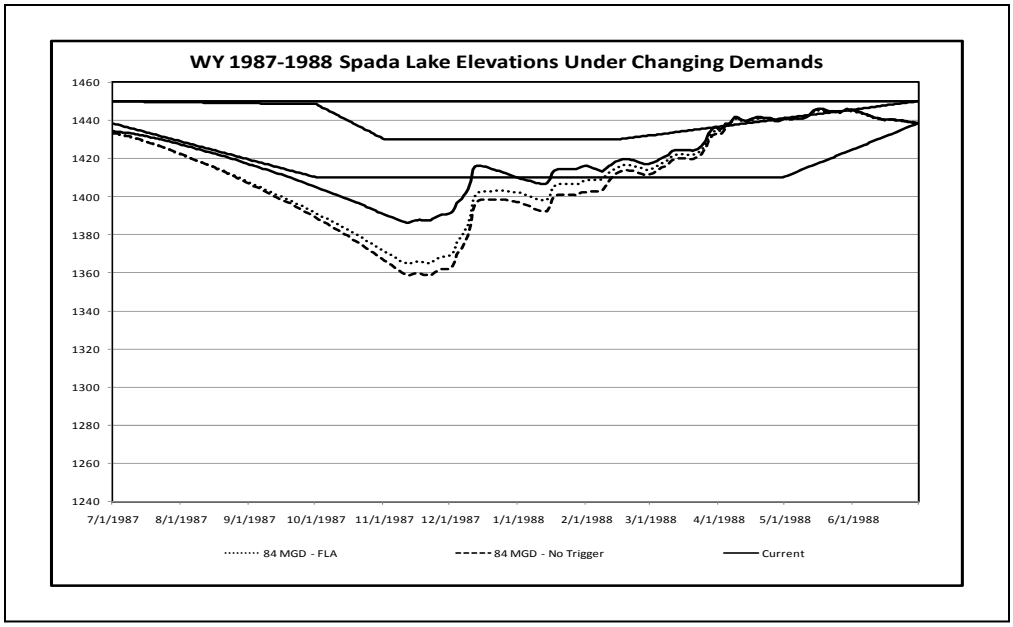

Figure 21. Simulated Spada Lake operations during the 1987-88 extreme drought hydrologic conditions with and without the instream flow conservation trigger imposed.

Range of Elevation on Spada Lake

From the computer simulation model the maximum, minimum, average, 25th and 75th exceedance percentiles were plotted for the 109 years of hydrology. The results are shown in the series of graphs Figure 22, 23, and 24 depicting the elevations of Spada Lake depending on the City of Everett's water demand throughout the next license.

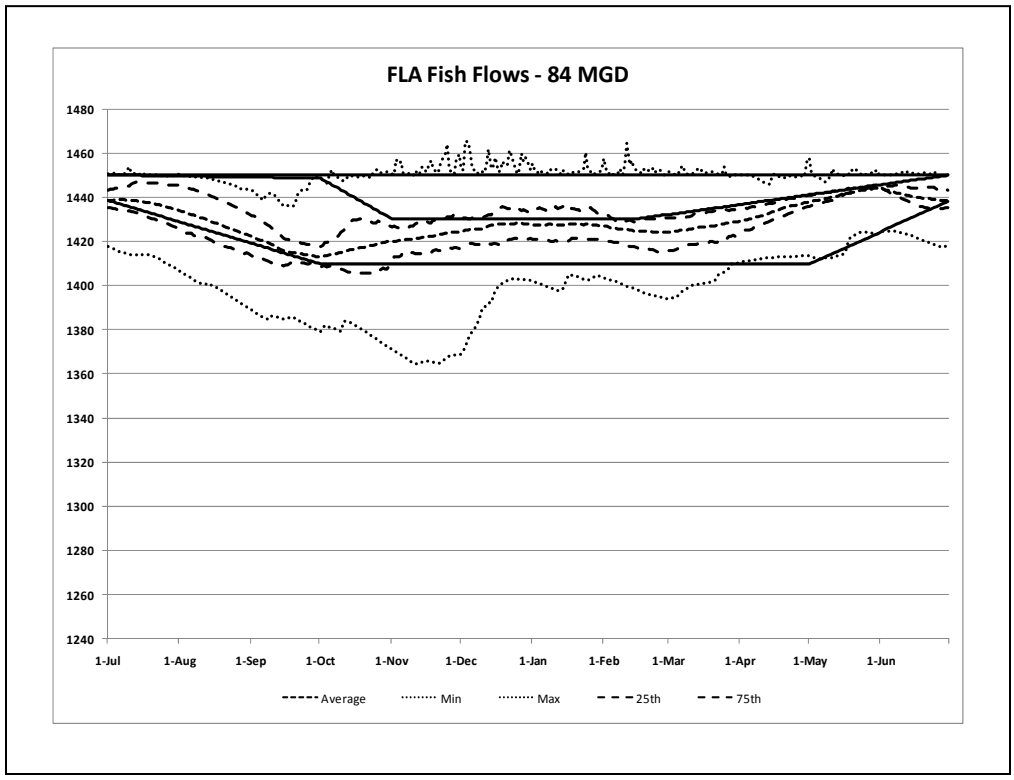

Figure 22. Spada Lake Range of Elevation under Proposed Operations – 84 mgd

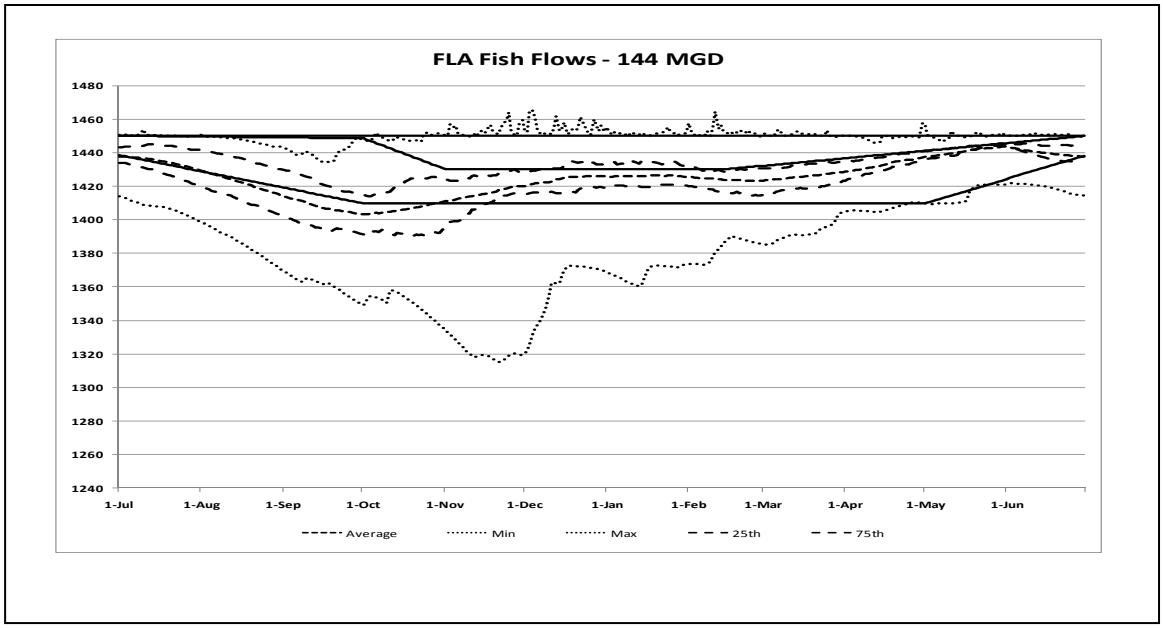

Figure 23. Spada Lake Range of Elevation under Proposed Operations – 144 mgd

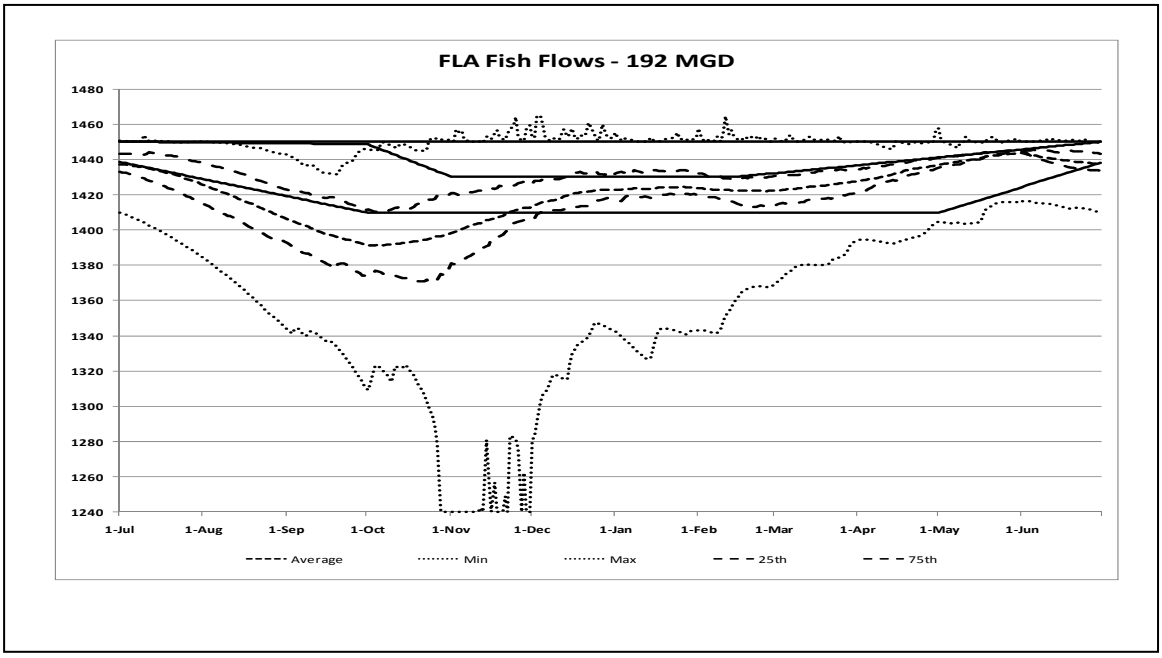

Figure 24. Spada Lake Range of Elevation under Proposed Operations – 192 mgd

As can be seen from the above graphs, Spada Lake recovers nearly every year during the spring to place the reservoir in position to go into the next water year to meet the water supply, power supply, and bypass temperature conditioning goals for the Project. Only when the City of Everett Water Demands begin to approach their maximum water rights is Spada Lake subject to failure to supply water for the City and meet the instream flows recommended for the next license term.

Temperature Conditioning in Reach 3

Spada Lake becomes stratified during the months of April through October with the warmer surface water reaching 12 degrees C and the colder water at the base of the dam remaining at 4 degrees C.

Water releases into Reach 3 are by releases through the valves at the base of Culmback Dam. Because these releases are from the bottom of the reservoir, the water is relatively cold which has an impact on the growth of aquatic resources in the upper end of this reach. As the water moves through the 6 miles of Reach 3 it warms up from exposure to air and mixing with accretion surface runoff.

A bypass flow pipeline was constructed into Culmback dam when it was raised in 1983. This pipeline is 16 inches in diameter, has a flow capacity of 20 cfs, and is operable above elevation 1410. The District proposes to use this bypass valve to mix warmer upper elevation water with the lower elevation water to achieve a more favorable environment for aquatic growth.

Therefore, the ability to condition temperatures in Reach 3 during the late fall is dependent on Spada Lake staying above 1410 for as long into October as possible (in late October the reservoir becomes isothermal and temperature conditioning is not effective.)

To accomplish this goal, the District proposes to target a reservoir elevation of 1420 by September 15 and will attempt to retain Spada Lake above 1410 for as long as possible to allow the bypass line to be used for temperature conditioning in Reach 3. This will be possible in most, but not all summer and fall hydrologic conditions. Figures 25, 26, and 27 show the computer simulations of Spada Lake elevations on September 15 throughout the 109 years of Sultan Basin hydrology for each of the City of Everett water supply demands.

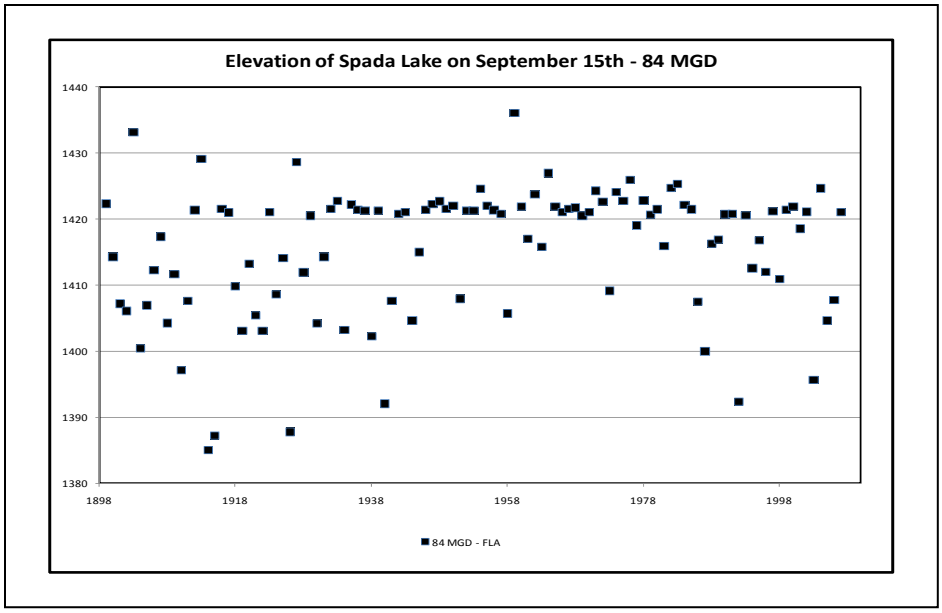

Figure 25. **Spada Lake Elevation on September 15 for each of 109 years of hydrologic variation under current City of Everett water demands.**

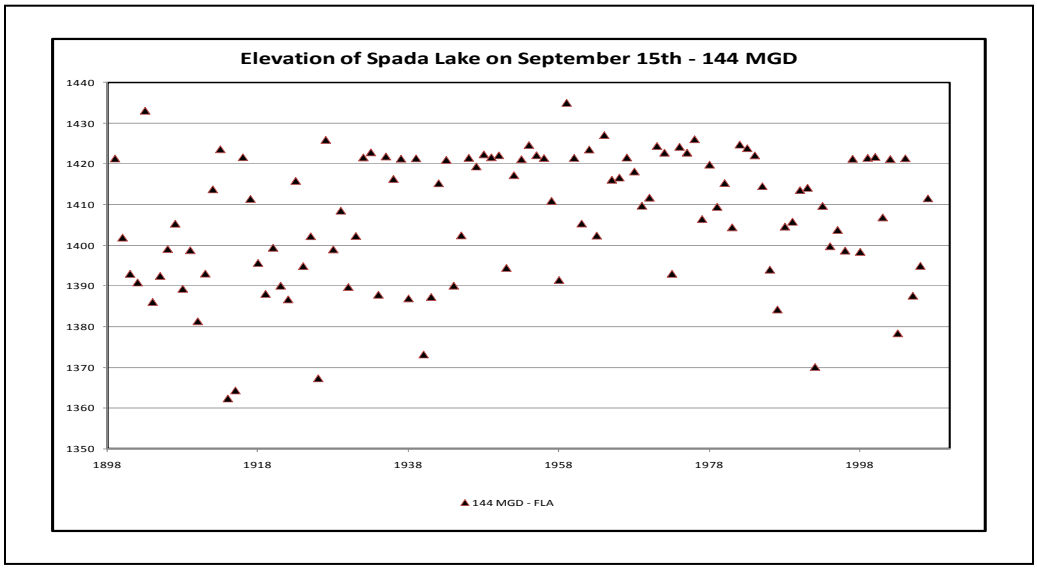

Figure 26. **Spada Lake Elevation on September 15 for each of 109 years of hydrologic variation under City of Everett water demand of 144 mgd.**

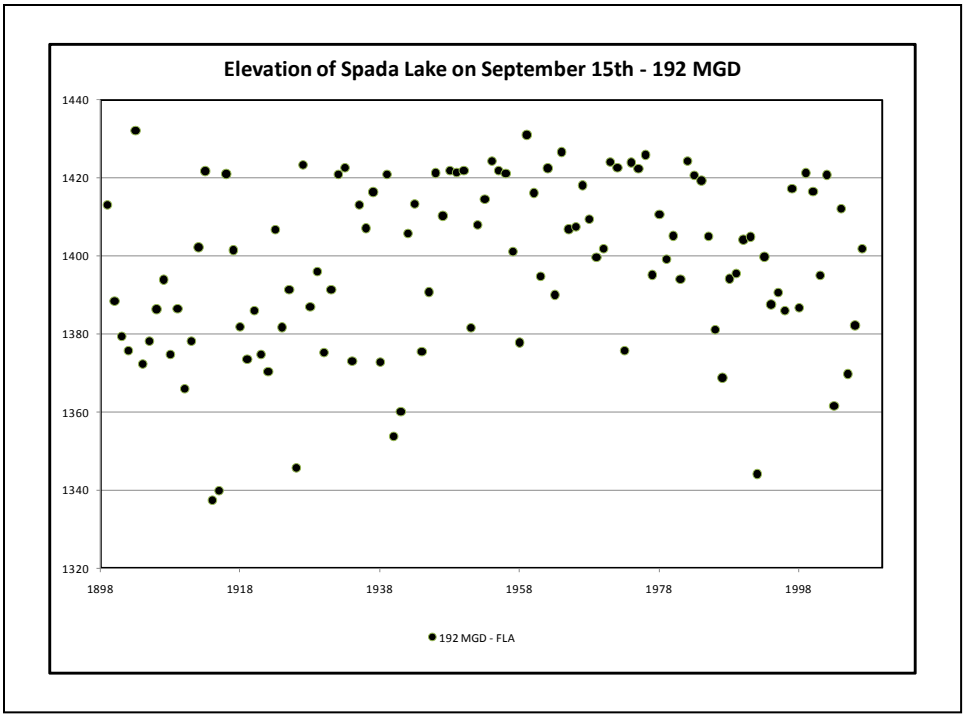

Figure 27. Spada Lake Elevation on September 15 for each of 109 years of hydrologic variation under City of Everett water demand of 192 mgd.

In the early years of the next license term, when the City of Everett water demand is lower, the District would be able to condition the water flowing into Reach 3 most years. Conditioning would not be possible when summer and fall severe drought conditions exist and when Spada Lake would be drawn down below the 1420 foot elevation. As the City of Everett's water demands increase, this situation will be come more dramatic as shown by the decreasing frequency of meeting the 1420 foot elevation when the City demands increase to 144 mgd and 192 mgd.

Impacts of Conservation Trigger on Power Supply

Figure 28 shows three scenarios of the change in Jackson Project power production as the City of Everett water demand increases: power production under the current operating conditions, under the proposed operating conditions without a conservation trigger, and proposed operating conditions with a conservation trigger. Table 4 shows the calculated power values for each scenario.

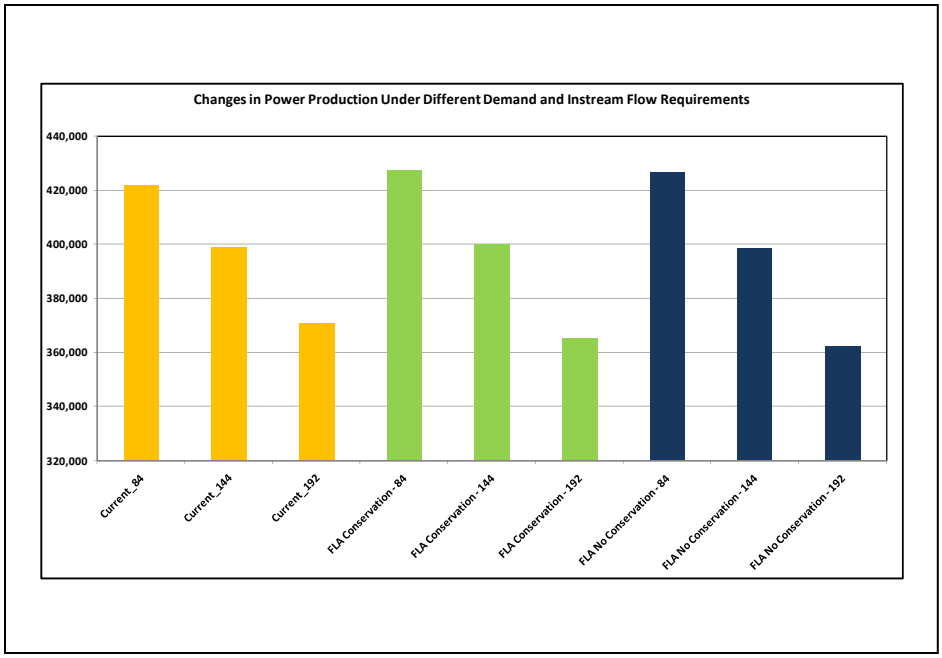

Figure 28. Power Production variation under current and proposed operations .

Table 4. Power values for several operating scenarios.

Scenario	Water Demand (mgd)	Average Annual Power (MWh)
Current	84	421,834
	144	398,940
	192	370,910
Proposed without trigger	84	426,941
	144	398,595
	192	362,329
Proposed with trigger	84	427,155
	144	398,261
	192	370,231

As the City of Everett water supply demands increase over time the average energy of the Jackson Project will decrease. Under the current scenario the decrease will be 50,924 MWhs annually. Under the Proposed operating scenario without the instream flow conservation triggers the decrease will be 64,612 MWhs annually. Under the proposed

operating scenario with the triggers, the decrease in average annual power production will be 56,924 MWhs.

Appendix B

Proposed Protection, Mitigation and Enhancement Measures

PROTECTION, MITIGATION AND ENHANCEMENT MEASURES

Operations

Rule Curves for Reservoir Operations

The District will operate the Project consistent with the Spada Lake Reservoir Rule Curves governing Project operation as shown in Figure 1. The purpose of the Spada Lake Reservoir Rule Curves, as defined in the Operations Plan (Appendix A), is to allow the District 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.

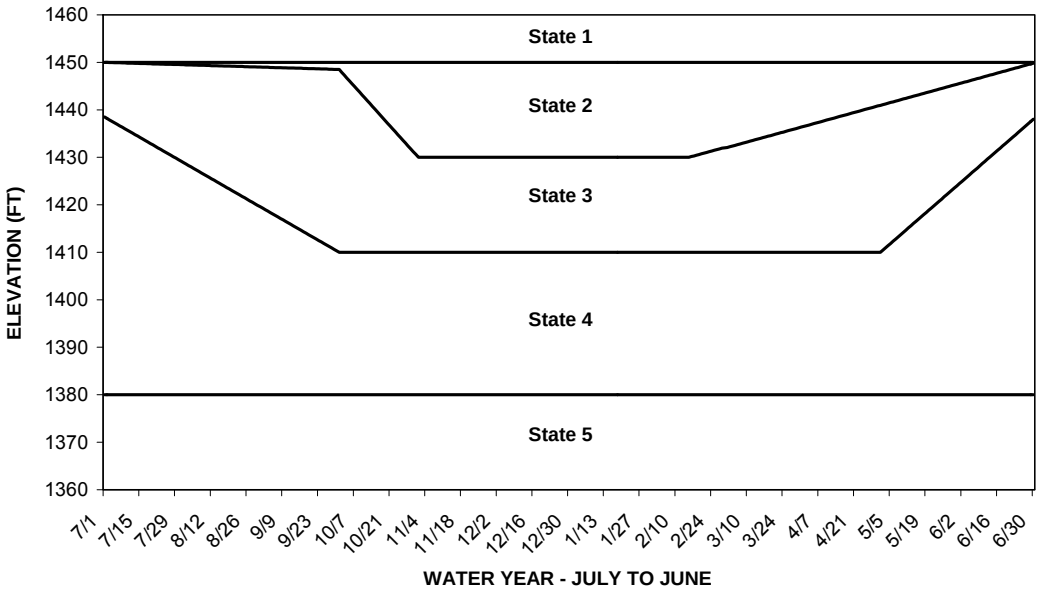

Figure 1. Spada Lake reservoir operational rule curves.

State 1 – Zone of Spill. Above elevation 1,450 feet above mean sea level (msl), Spada Lake will be in a state of spill. Therefore, the District will operate the Powerhouse to withdraw at least 1,300 cubic feet per second (cfs) through the power tunnel.

State 2 – Zone of Potential Spill. The District will 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 District may operate the Powerhouse depending on maintenance, power supply, and prudent operation to minimize the impacts to the fishery resources.

State 4 – Zone of Water Conservation. The District will 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. Generally, the Project is operated to conserve water unless inflow forecasts and snow pack measurements indicate higher water withdrawal for power production is warranted.

State 5 – Zone of Tunnel Protection – Below elevation 1,380 feet msl the District will 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 District will 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 1,220 feet msl.

Reservoir Elevations

Upon approval of the Operational and Flow Monitoring Plan required to monitor surface water elevations, the District will attempt to maintain a minimum impoundment elevation in Spada Lake Reservoir above 1,430 feet msl between July 1 and August 15. The District shall also attempt to maintain a minimum impoundment elevation in Spada Lake Reservoir above 1,420 feet msl from August 15 to September 15.

The purposes of maintaining these minimum elevation levels are (1) to allow the District to provide for the City of Everett's water demands; (2) to meet the District's other license article obligations (including its temperature conditioning obligations) and power production needs; (3) to enhance the Spada Lake reservoir recreation; (4) to provide for the interests of dam safety; and (5) to minimize flooding in the City of Sultan.

These minimum impoundment surface elevations may be temporarily modified if required by operating emergencies beyond the control of the District. If the impoundment water surface elevation is so modified, the District shall notify the Aquatic Resource Committee (ARC) as soon as possible, but no later than 2 business days after each such incident. The Licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident.

Operational and Flow Monitoring Plan

Within 180 days of issuance of the License, the District will file with the Commission, for approval, an Operational and Flow Monitoring Plan (OFM Plan). This OFM Plan will document how the District will: (1) monitor impoundment water surface elevations; (2) monitor stream flows in the Sultan River downstream from the Project, as required by the Minimum Stream Flow Requirement PM&E; (3) ensure compliance with the minimum instream flow requirements; and (4) address water use issues, specifically from

Spada Lake Reservoir, when refill, Project operations, flow releases and Spada Lake Reservoir water surface elevations may conflict.

The District will develop the OFM Plan in consultation with the ARC. The District will allow a minimum of 30 days for members of the ARC to comment and make recommendations before submitting the OFM Plan to the Commission. When filing the OFM Plan with the Commission, the District 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 District's plan. If the District does not adopt a recommendation, the filing will include the District's reasons based upon Project-specific information.

Upon Commission approval, the District will implement the OFM Plan.

Water Quality

Water Quality Protection Plan

Within 60 days of issuance of the License, the District will file with the Commission, for approval, a Water Quality Plan (WQ Plan). This Water Quality Plan will document how the District will implement a program to ensure continued protection and monitor compliance with Washington State water quality standards (currently codified in WAC 173-201A) in the Sultan River. The WQ Plan will include provisions as follows: (1) water quality protection measures related to Project construction or maintenance activities; (2) spill prevention and containment procedures; (3) procedures for application of herbicides, pesticides, fungicides, and disinfectants; and (4) measures for monitoring select water quality parameters, such as stream flow, temperature, and turbidity.

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

The Licensee will review and update the WQ Plan annually based on a yearly review of data.

The District will develop the WQ Plan in consultation with the Washington State Department of Ecology (Ecology). The District will also seek approval of the Plan by Ecology. If the District files the WQ Plan with the Commission without first obtaining the approval of Ecology, the District will include specific reasons for doing so. Upon Commission approval, the District will implement the WQ Plan.

Study Area

The study area includes the South Fork of the Sultan River near the entrance to Spada Lake, within Spada Lake, and the Sultan River downstream of Culmback Dam. The study area will specifically include monitoring of five specific zones:

- Spada Lake
- South Fork Sultan River above entrance to Spada Lake
- Sultan River from Culmback Dam to the Diversion Dam
- Sultan River from the Diversion Dam to the Powerhouse
- Sultan River from the Powerhouse to the Sultan River mouth

The parameters will be monitored annually from May to October. The parameters to be monitored will vary by location. In general, sampling locations will be selected for their ability to represent zone conditions and consistency with previous sampling efforts.

Methods (§5.11(b)(1) and §5.11(d)(5))

All water quality data will be evaluated with respect to the protection of the designated uses for Spada Lake and the Sultan River as described in the applicable standards in WAC 173-201A-030(1)(b), 173-201A-030(2)(b) and 173-201A-030(5)(b) (1997).

Monitor Water Quality Conditions (Objective 1)

Several water quality parameters will be monitored in the five specific zones listed below over the license period (Table 1).

Table 1. Water quality parameters and sampling zones.

Parameter	Spada Lake tributary (South Fork)	Spada Lake (SR-1, near log boom)	Sultan River – RM 16.3, base of Culmback Dam	Sultan River – RM 9.8, upstream of Diversion Dam	Sultan River – RM 9.6, downstream of Diversion Dam	Sultan River - RM 4.4, downstream of Powerhouse	Frequency
Flow volume / discharge / reservoir elevation	●	●	●		●	●	
Temperature	●	●	●	●	●	●	Continuous in stream reaches during sampling season, monthly for lake profile
Dissolved Oxygen	●	●		●		●	Continuous in select stream reaches during sampling season, monthly for lake profile during sampling season
Turbidity	●	●		●		●	Continuous in stream reaches during sampling season, monthly for lake profile

Parameter	Spada Lake tributary (South Fork)	Spada Lake (SR-1, near log boom)	Sultan River – RM 16.3, base of Culmback Dam	Sultan River – RM 9.8, upstream of Diversion Dam	Sultan River – RM 9.6, downstream of Diversion Dam	Sultan River - RM 4.4, downstream of Powerhouse	Frequency
Secchi Transparency		•					monthly
pH	•	•		•		•	Continuous in stream reaches during sampling season, monthly for lake profile
Conductivity	•	•		•		•	Continuous in stream reaches during sampling season, monthly for lake profile

Specific sites within the five sampling zones will be selected to evaluate longitudinal gradients in water quality for stream sections and the vertical water quality gradients in Spada Lake. The sampling protocols for specific parameters are described below.

Water Temperature

Continuous recording thermographs will be deployed at locations throughout the watershed. Thermographs will be programmed to record temperature on an hourly basis. All thermographs will be serviced approximately once per month. A calibration temperature measurement using a hand-held thermometer will be recorded at each servicing. In addition, all thermographs will be calibrated using the manufacturer's recommendations.

Turbidity

Turbidity will be measured continuously at the locations indicated in Table 1. Measurements will be made at all riverine sites including the tailrace and the surface waters of Spada Lake. Transparency will be measured in Spada Lake with a standard 20 cm Secchi disk.

Compatibility with Long-Term Monitoring (Objective 2)

This study will collect, analyze, and archive data in a manner that will support the identification of long-term water quality monitoring needs, if appropriate, and will ensure future compatibility of data to the greatest extent feasible.

Progress Reporting (§5.11(b)(3))

Progress reports will be completed annually. Data will be expressed in accordance with the Ecology's approach to presenting water quality data. All raw data will be presented

in an appendix, and digital copies of the data will be available to agencies, tribes and interested stakeholders.

Maintain Water Temperature within Stage I Range

The District proposes to continue operating the Project in a manner that maintains water temperature in the Sultan River within the pre-Stage II range downstream of the Diversion Dam. In summary, the operational goal is to ensure that Sultan River temperatures are reasonably close to the pre-Project mean during the period when the reservoir is stratified (the time that Project operations have water temperature control capabilities). The District specifically proposes to operate the Project power tunnel water withdrawal structure at Spada Lake to approximate to the fullest extent possible, within a band of 2°C, the daily mean of recorded pre-Project temperatures (Figure 2).

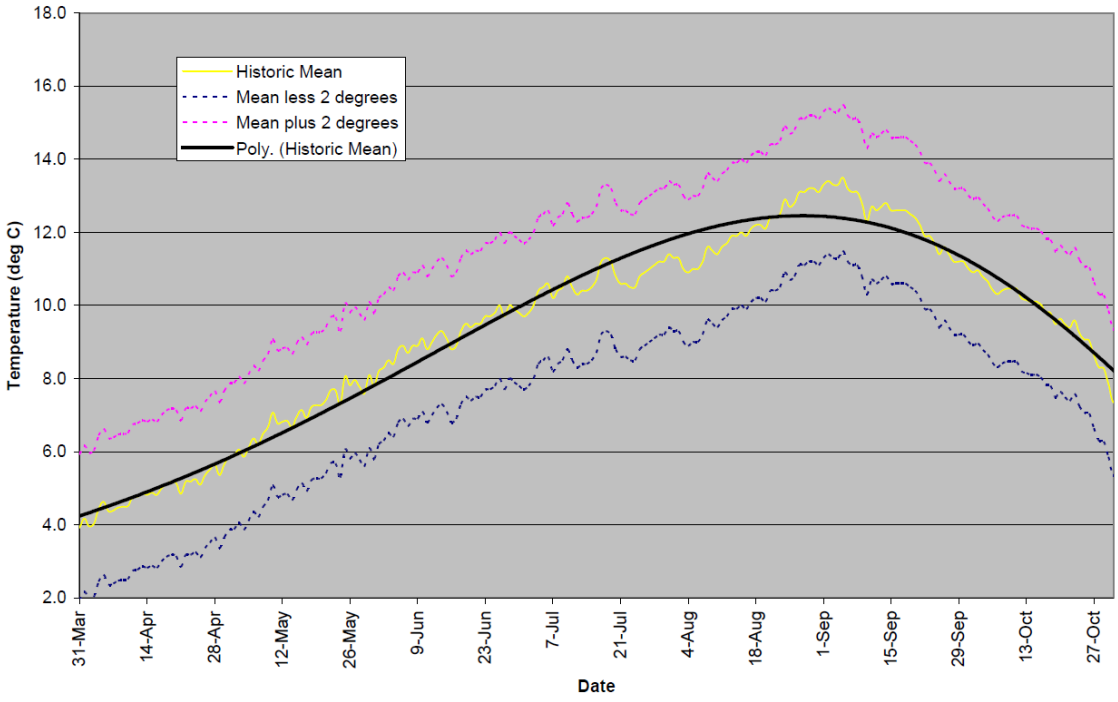

Figure 2. Mean daily water temperature in the Sultan River at the Diversion Dam (1969-1979).

Water Temperature Conditioning in OR-3

The District will implement the following program to condition the temperature of the water released at Culmback Dam pursuant to the proposed instantaneous minimum flow requirements. The program's objective is to provide a seasonally appropriate water temperature regime to improve conditions for aquatic resources (including resident fish and macroinvertebrates) in Reach 3 of the Sultan River.

Temperature Conditioning Performance Standards

In consultation with the ARC, the District will 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 will be the suitable temperature bands (ranges) for the benefit of aquatic resources (including resident fish and macroinvertebrates).

Temperature Conditioning Monitoring

The District will monitor water temperature within Reach 3 annually for the term of the License and any subsequent annual licenses. The District will also monitor the biological response of aquatic resources (including resident fish and macroinvertebrates) to the temperature conditioning for the term of the License and any subsequent annual licenses. The temperature conditioning monitoring will be done in consultation with the ARC.

Temperature Conditioning Program Development

The District will implement the temperature condition program when environmental conditions allow and within the constraints of the Project's existing piping infrastructure. The District will make temperature sensor and control valve modifications, as necessary, to implement this program.

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

This temperature conditioning program will be implemented only when (1) reservoir elevations are greater than 1,410 feetmsl and (2) the reservoir is stratified (typically April through October).

Water Temperature Conditioning Plan

Within 180 days of issuance of the License, the District will file with the Commission, for approval, a Water Temperature Conditioning Plan (WTC Plan). This WTC Plan will document how the District will implement a program to condition the temperature of waters released at Culmback Dam. The WTC Plan will include: (1) the preliminary operation plan for conditioning the water released from Culmback Dam pursuant to the Minimum Flow PME schedule to achieve temperature conditioning performance standards in Reach 3; (2) the method and schedule for, and limitations upon, temperature conditioning of water releases; (3) the method, the locations, and the schedule for monitoring water temperature within Reach 3 and the response of aquatic resources (including resident fish and macroinvertebrates) to water temperature conditioning; (4) the method and schedule for adjusting the water temperature release schedule based upon temperature monitoring; and (5) the temperature conditioning program annual reporting and ARC consultation requirements.

The District will develop the WTC 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 WTC Plan to the Commission. When filing the WTC Plan with the Commission, the District 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 District's plan. If the District does not adopt a recommendation, the filing will include the District's reasons based upon Project-specific information.

Upon Commission approval, the District will implement the WTC Plan.

Aquatic Resources

Establish Aquatic Resource Committee

Within 30 days of issuance of the License, the District shall establish and convene an Aquatic Resource Committee (ARC) for the purpose of consultation with the District as expressly provided in specific license articles. The purpose of the ARC is to assist in implementation of the license articles.

The District shall arrange, administer, and chair all meetings. The District will provide draft meeting minutes for concurrence by the ARC prior to final distribution. Meeting minutes will include ARC action items, a summary of issues discussed, decisions reached, and member concerns.

The District shall bear all costs associated with conducting meetings.

For purposes of the license, consultation or consult means that the District shall obtain the views of and attempt to reach consensus among the specified parties or specified committee whenever the license requires the District to consult. Consultation shall not mean consultation under Section 7 of the Endangered Species Act or other federal laws specifically requiring consultation unless specifically provided.

Modify Minimum Instream Flow Schedule in OR-1 and OR-2

The District will discharge water from the Project into the Sultan River, in accordance with the flow regime required by this PME. The purposes of this PME 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, the Aquatic Resource Committee (ARC) may recommend a drought release schedule when: (1) the ARC determines that a drought event (as described by the most current version of the City of Everett's Drought Response Plan) is probable; (2) the release schedule described in this PME requires interim modification to manage water supply during periods of weather related shortages; and (3) the drought release schedule will not undermine the purposes of this PME. Upon such recommendation, the District will notify the Commission and will implement the drought

release schedule within seven days of providing such notice, unless otherwise directed by the Commission.

Compliance with the minimum instream flow schedule outlined below will be monitored at established USGS gaging stations (No. 12138160 and No. 12137800) for component releases for reaches 1 and 2 and calibrated valve curves for Reach 3 Component releases. The District will commit to funding the operation or operating these two 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 District is allowed temporary fluctuations of up to five percent of the scheduled flow release as measured at USGS Gaging Station No. 12138160 for Reach 1 Component releases, USGS Gaging Station 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 Component:

   For the term of the license and any subsequent annual license, the District will release water from the Powerhouse to maintain instantaneous minimum flows at USGS gage No. 12138160 at all times in accordance with the following:

   From September 15 through October 31)

Spada Lake Level	Minimum Instream Flow
Above 1,420 feet msl	300 cfs
Between 1,420 feet and 1,410 feet msl	275 cfs
Below 1,410 feet msl	250 cfs

   From November 1 through September 14

Reservoir Level	Minimum Instream Flow
Above 1,420 feet msl	300 cfs
Between 1,420 feet msl and 1,415 feet msl	275 cfs
Between 1,415 feet msl and 1,410 feet msl	250 cfs
Between 1,410 feet msl and 1,405 feet msl	225 cfs
Below 1,405 feet msl	200 cfs

2. Reach 2 Component:

   For the term of the License and any subsequent annual license, except as stated below, the District will release the following instantaneous minimum flows 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 Gaging Station No. 12137800, in accordance with the following schedule:

Date	Instantaneous Minimum Flow Release Schedule:
January 1 – March 15	100 cfs
March 16 – June 15	140 cfs

June 16 – September 14	100 cfs
September 15 – October 31	*Varies with Spada Lake elevation: see schedule below.
November 1 – December 31	100 cfs

*From September 15 through October 31

Reservoir Level	Minimum Instream Flow
Above 1,420 feet msl	200 cfs
Between 1,420 feet msl and 1,415 feet msl	200 cfs
Between 1,415 feet msl and 1,410 feet msl	175 cfs
Between 1,410 feet msl and 1,405 feet msl	175 cfs
Below 1,405 feet msl	150 cfs

3. Reach 3 Component:

For the term of the license and any subsequent annual licenses, the District will release from Culmback Dam to the Sultan River an instantaneous minimum flow of 20 cfs.

Maximum Flow during Chinook Salmon Spawning

The District will institute a salmon ceiling flow of 550 cfs during the September 15 to October 15 period of peak spawning for Chinook salmon. This ceiling will ensure that redds remain wetted should Project flows be reduced to minimums of 300 cfs. Furthermore, the District will use spawner survey information collected to determine the highest channel bed elevation (shallowest depth) at which spawning has occurred during Chinook and steelhead spawning seasons. The District will attempt to keep redds covered with water until fry emergence has occurred. The spawning flow ceiling and corresponding minimum flow may be adjusted per consultation with the ARC.

Process Flow Release Plan

The District will provide a water budget of 22,000 acre-feet total over the license term to provide controlled flows, to supplement natural accretion flows, and for geomorphic and channel maintenance flow (collectively referred to as process flow). Water released from Culmback Dam pursuant to a scheduled process flow release and any downramping associated with such process flow release (as required by Downramping PME) will be deducted from the water budget.

The District, in consultation with the Aquatic Resources Committee (ARC), will schedule the timing of the geomorphic process flow to take advantage of accretion flows and to achieve geomorphic process goals within the longitudinal and lateral riverine ecosystem. The District, in consultation with the ARC, will schedule the timing of channel maintenance flows with the objectives of maintaining habitat, supporting margin accretion and achieving the gravel sorting experienced within a normative flow regime.

During a process flow event, the District will release process flows from Culmback Dam via the Howell Bunger and 42-inch slide valves. The combined maximum release flow

associated with these valves is 2,355 cfs at full pool elevation (1,450 feet msl) within Spada Reservoir.

The process flow releases will be consistent with the District's obligation pursuant to other license articles and agreements with the City of Everett pertaining to its municipal water supply needs. The District, in consultation with the ARC, will schedule the timing of the process flow releases to avoid exacerbation of any downstream flooding, and take into account maintenance and real-time aquatic resource (including fish and macroinvertebrates) concerns. The District will not be required to provide process flows when the District determines a drought event (as described by the City of Everett 2001 Drought Response Plan) is probable or occurring.

Within 1 year of license issuance, the District will file with the Commission for approval, a Process Flow Release Plan (PFR Plan). This PFR Plan will document how the District will implement a program that will include a total water budget of 22,000 acre-feet over the term of the license for periodic process flow releases from Culmback Dam. The PFR Plan will include provisions that describe: (1) the frequency, magnitude, duration, and timing of process flow releases; (2) the ongoing involvement of the ARC in implementing the program; (3) the mechanism for timing process flow releases to coincide with natural rainfall events or coordinate with whitewater boating releases (pursuant to the Whitewater Boating Flows PM&E) and Project generation to achieve greater flow volumes in desired reaches or habitats; (4) the timing and other restrictions necessary to minimize impacts to aquatic resources, to not exacerbate flooding in the City of Sultan and to prevent out of bank flooding; (5) the method, locations, and schedule for monitoring and measuring process flow releases pursuant to the PFR Plan; and (6) the method and schedule for monitoring the impacts of process flow releases upon aquatic resources.

The District will develop the PFR Plan in consultation with the ARC. The District will allow a minimum of 30 days for members of the ARC to comment and make recommendations before submitting the PFR Plan to the Commission. When filing the PFR Plan with the Commission, the District 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 District's plan. If the District does not adopt a recommendation, the filing will include the District's reasons based upon Project-specific information.

Upon Commission approval, the District will implement the PFR Plan.

Powerhouse Pelton Unit Flow Continuation

To reduce operational emergencies that result in flow fluctuations, the District will install and use a flow deflector on the existing Pelton wheel units to maintain flow during load rejection events. The District is currently proceeding[1] to install a governor control system in the Powerhouse to allow bypass of the flow through individually controlled turbine needle valves to the Sultan River. This measure is expected to greatly reduce the

[1] No disagreement to this measure has been expressed by Project stakeholders.

potential for an immediate reduction in Sultan River flow caused by inadvertent turbine shutdown. The District proposes to implement this solution by the end of 2009 in an effort to provide Pelton unit flow bypass capability as early as possible. Until the new Pelton bypass system proves to be operationally effective, the District will maintain staff at the Powerhouse during potential electrical storms. See the Operating Plan for a more detailed description of the upgrade.

Downramping Rate Conditions

The District will operate the Project in accordance with the following downramping rate schedules and downramping frequency limitations. Downramping rate refers to the rate of allowable stage reduction per unit of time. The downramping rates apply to specific flow ranges and compliance points and do not apply to power-generation equipment failures, forced outages, or when flow releases are exacerbating downstream flood conditions. However, the District will take the steps listed below to reduce operational emergencies that may trigger sudden drops in flow below the Powerhouse. The District will track rates on a 15-minute basis by monitoring US Geological Survey (USGS) streamflow gages. No one 15-minute downramping value will exceed half the hourly rate shown in the schedule. No four consecutive 15-minute downramping rates shall exceed the hourly rates shown in the schedule.

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

Powerhouse Downramping Rate Schedules

The following schedule as measured at USGS Gaging Station No. 12138160 applies to Jackson Hydroelectric Project Powerhouse downramping when the flow range is below 1,500 cfs. When providing flow releases from Culmback Dam (including process flows, special purpose flows, and whitewater recreation flows), the District will coordinate such releases to ensure compliance with this schedule.

January 1 to May 31

Flow Range (cfs/day)	**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 200*	2 inches per hour	2 inches per hour

*In the event the reservoir level conservation trigger results in flow reductions below 300 cfs.

June 1 to September 15

Flow Range (cfs/day)	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

September 16 to October 31

Flow Range (cfs/day)	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)	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 District will downramp through the 750 cfs to 600 cfs flow range only after holding flow constant between 750 and 850 cfs for at least six hours of daylight and one overnight period.

Reach 2 and 3 Ramping Rate Schedule

The following schedule as measured at USGS Gaging Station No. 12137800 applies to downramping when the flow range is below 300 cfs. The schedule does not apply to gravel flushing or enhancement actions from operation of the sluice gate at the City's 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 Gaging Station No. 12137800 to be greater than 300 cfs but less than 1000 cfs, the District will attempt, within the constraints of the Project existing equipment, to limit the downramping rate to no more than 6 inches per hour.

Downramping Frequency Limitations

The District will limit Powerhouse downramping to no more than a total of 48 hours from January 1 through May 31. The District will limit Powerhouse downramping to no more than 16 hours of the seasonally allotted 48 allowed in any one month during this January 1 through May 31 period. The downramping frequency limitations apply when downramping is greater than one inch per hour and river flows as measured at USGS Gaging Station 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.

Large Woody Debris Plan

Within 5 years of the Commission's approval of the Large Woody Debris Plan (LWD Plan), the District will install up to eight large woody debris (LWD) structures in the lower Sultan River (RM 0 to RM16) subject to gaining regulatory approval and necessary legal access.

Up to five of the initial eight structures will be main channel LWD structures designed to improve main channel habitat complexity. The District will 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 of the initial eight structures will 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 PME will include a minimum of five and up to 30 key structural pieces and where possible, will be designed to collect additional wood over time. Additionally, each structural piece will be between 24 and 36 inches in diameter (as measured 4 feet from the base, roughly the diameter at breast height (dbh) of a standing tree), and approximately 35 to 40 feet in length, with rootwads intact. The size and length of each structural piece will be limited by the capacity to move the structures to the staging area by truck. Further limitations will be imposed for projects relying on the use of helicopter transport of structural pieces. The weight of each structural piece will be limited by the capabilities of a Chinook helicopter between the staging area and each project site. The structural pieces will be one of the following species: fir, hemlock or cedar. Structural pieces greater than 36 inches dbh will be considered subject to availability and the limitations previously described.

In selecting the specific location of a LWD structure, the District will consult with the Aquatic Resource Committee (ARC) and consider the probability of structure retention and risk to property.

The District will 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. When those projects have been completed, the District will transport, if necessary, future accumulations of woody debris between Culmback Dam and the log boom and deposit them directly downstream of Culmback Dam. The District will consult with the ARC regarding the movement of materials for direct deposition downstream of Culmback Dam. This program will be discontinued when the District deems, in consultation with the ARC, that LWD quantities are adequate in the Sultan River.

To accomplish this, within 1 year of issuance of the license, the District will file with the Commission, for approval, a LWD Plan. This LWD Plan will document how the District will implement a program to install up to eight LWD structures between river mile 0 and river mile 16 in the Sultan River within 5 years of Commission approval of the LWD Plan. The LWD Plan will include provisions that describe (1) the design and location of each LWD structure; (2) the LWD installation schedule; (3) the timing and other 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 be deposited directly downstream of Culmback Dam.

The District will develop the LWD Plan in consultation with the ARC. The District will allow a minimum of 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 District 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 District's plan. If the District does not adopt a recommendation, the filing will include the District's reasons based upon Project-specific information.

Upon Commission approval, the District will implement the LWD Plan.

Side Channel Enhancement Plan

The District will enhance salmonid spawning and rearing conditions in a minimum of 10,000 linear feet of side channel habitat to provide a minimum area of 3 acres of improved habitat function. 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 Powerhouse. This enhancement will be achieved through projects that improve flow connectivity or other habitat modification projects. This enhancement will 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 District will restore and maintain year-round flow connectivity between the mainstem Sultan River and the five prominent side channels at flows greater than 300 cfs (as measured at the USGS Gaging Station No. 12138160). These five prominent side channels are identified in the Preliminary License Proposal (Snohomish County PUD 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 District will 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 District will design the excavation or other means utilized in these side channels so that connectivity is self-maintaining. The District will 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 can not be obtained, the District will develop, in consultation with the 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 District will 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 PM&E, the District will use large woody debris collected at Culmback Dam to add structure and function to side channels.

Within 1 year of issuance of the license, the District will file with the Commission, for approval, a Side Channel Enhancement Plan (SCE Plan). This SCE Plan will document how the District will 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 will 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 into 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 and any subsequent annual licenses.

The District will develop the SCE Plan in consultation with the ARC. The District will allow a minimum of 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 District 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 District's plan. If the District does not adopt a recommendation, the filing will include the District's reasons based upon Project-specific information.

Upon Commission approval and obtaining any necessary regulatory approvals, the District will implement the SCE Plan.

Spada Lake Recreational Fishery Plan

Within 1 year of issuance of the license, the District will file with the Commission, for approval, a Spada Lake Recreational Fishery Plan (SLRF Plan). This SLRF Plan will document how the District will implement a program to enhance the Spada Lake recreational resources. The SCE Plan will include provisions as follows:

1. The District will remove existing man-made barriers to fish passage within tributaries along South Shore Road beyond the South Shore Recreation Site. The removal of these barriers will be done in conjunction with abandonment of portions of the South Shore Road beyond the South Shore Recreation Site.

2. The District will improve the South Fork Recreation Site boat launch by providing boat trailer access. This improvement will provide launch access to elevations as low as 1,410 feet msl. Throughout the license term, the District will maintain the boat launch (including repairing ramp structures down to elevation 1,410 feet msl) and on an annual basis (before the start of the recreation season) remove debris from the boat launch.

3. The District will improve grade and surface of boat launch at the South Shore Recreation Site.

4. The District will prepare a recreational fishing brochure for Spada Lake that describes effective fishing techniques, including the best times and suggested locations. The District will make this brochure available on its website.

The District will develop the SLRF Plan in consultation with the ARC. The District will allow a minimum of 30 days for members of the ARC to comment and make recommendations before submitting the SLRF Plan to the Commission. When filing the SLRF Plan with the Commission, the District 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 District's plan. If the District does not adopt a recommendation, the filing will include the District's reasons based upon Project-specific information.

Upon Commission approval and obtaining any necessary regulatory approvals, the District will implement the SLRF Plan.

Adult and Juvenile Salmonid Migration Flow Releases

The District will release juvenile outmigration flows and upstream migration flows from the Powerhouse. The District will not be required to provide these flows when the District determines that a drought event (as described by the most current version of the City of Everett's Drought Response Plan) is probable or occurring.

Outmigration Flow Releases

Upon issuance of the license and throughout the term of the license and any subsequent annual license, if the daily average flow at USGS Gaging Station No. 12138160 is below 500 cfs for 14 consecutive days between April 15 and May 15 of any given year, the District will release a flow of between 800 cfs and 1,200 cfs from the Powerhouse for a duration of 12 consecutive hours on 3 separate days in May. The purpose of this flow release is to enhance juvenile salmonid outmigration. The District, in consultation with the Aquatic Resources Committee (ARC), on an annual basis, will determine the necessity, schedule, and magnitude (between 800 and 1,200 cfs) of the outmigration flow releases.

Upstream Migration Flow

Upon issuance of the license and throughout the term of the license and any subsequent annual license, if the ARC determines that a flow release is necessary to enhance adult salmonid upstream migration, the District will release a flow of 1,000 cfs from the Powerhouse for 24 hours at least one time during the first week of September.

Monitor Salmon and Steelhead Escapement

The District, in cooperation and coordination with the Joint Agencies, currently conducts annual salmon and steelhead trout spawning surveys in the Sultan River, downstream of RM 9.7. The District will continue to annually monitor steelhead trout and Chinook, pink, and chum salmon escapement in the Sultan River. Methods and procedures will remain unchanged and continue in accordance with Joint Agency protocols.

The District's spawning surveys follow WDFW procedures and include repeated counts of salmon and steelhead adults and/or redds throughout each species' spawning period, coupled with an annual aerial (helicopter-based) count of redds during peak spawning. For pink and chum salmon, the method relies on actual fish counts. For Chinook salmon and steelhead trout, the methods relies primarily on redd counts, supplemented with fish counts. The Sultan River spawning survey index areas include the mainstem (RM 0.0 to 2.7), Chaplain (RM 4.5 to 5.2), Gold Camp (RM 7.0 to 7.3), and the Diversion (RM 9.2 to 9.7). The mainstem index reach is a raft-based survey; the others are pedestrian-based. During each survey, the location of all fish and/or redds is documented, and each redd is marked with survey flagging (to prevent double counting). If high flows or turbidity preclude surveys in the specified time frame, the surveys are performed as soon as conditions allow. During the aerial surveys, a biologist also records the number of redds observed in each index reach as well as in the non-index areas. To facilitate counts, the pilot maintains the slowest airspeed possible at an altitude that provides the best possible view of the river channel. In addition, all flights are scheduled to minimize sampling error by avoiding periods of turbid flow and inclement weather.

Surveys for winter-run steelhead typically begin around March 15 and are performed every 14 days with the assistance of a WDFW biologist. The run typically peaks in late May and extends through the end of June. Chinook and pink salmon (odd year only) surveys are performed every 10 days from September 1 through the end of November.

The historical peak of the Chinook run is October 1. Chum and coho surveys are performed using the same procedures described above and extend into December as conditions allow. All survey results are reported to the resource agencies, the Tulalip Tribes, and FERC. Escapement estimates are developed cooperatively with WDFW. These monitoring efforts provide an important knowledge base about salmon and steelhead populations in the Sultan River, and are used to inform management decisions.

Steelhead Planting Program

Under the existing license, the District supports hatchery winter steelhead programs in the Snohomish River system by compensating WDFW for planting roughly 30,000 smolts annually to enhance the fisheries in the lower Sultan River. The District intends to continue supporting this program as long as it remains effective in providing a public angling opportunity. The District recognizes the need to remain flexible in the use of these funds as steelhead management strategies and recreational harvest goals evolve over time.

Terrestrial Resources

Noxious Weed Management Plan

The District requests that the Commission issue a license article that requires the District to implement the District's Noxious Weed Management Plan (NWMP). The NWMP is attached as Appendix D to the Project's Final License Application (FLA) (May 29, 2009).

This NWMP details measures that formalize and continue implementation of methods to control and contain the spread of Washington State Class A, Washington State Class B Designate and Snohomish County Selected noxious weeds within the Jackson Project boundary. The NWMP also addresses management within the Project boundary of other selected weed species identified by the District and the adjacent land manager, the U.S. Forest Service.

The NWMP includes the following elements:

A. A list of Washington State Class A, Washington State Class B Designate, Snohomish County Selected noxious weeds, and other noxious weed species identified for management at the Project (collectively referred to as target weed species), updated annually to reflect changes in State and County lists.

B. A summary of target weed species occurring within the Project boundary based on ongoing weed management work and the 2007 Noxious Weed Inventory.

C. A summary of ongoing weed management activities within the Project boundary.

D. Treatment options and recommendations for established and new infestations of target weed species including management goals, measurable objectives, and priorities for treatment.

E. Prevention strategies (e.g., best management practices for ground disturbing work, revegetation methods, and education information for Project employees).

F. Monitoring and implementation schedules.

G. Annual updates with Snohomish County Noxious Weed Control Board and U.S. Forest Service, including changes to the list of target weed species and a summary of weed management actions taken during previous year.

H. A review of the plan every five years, in consultation with the Snohomish County Noxious Weed Control Board, U.S. Forest Service, and other stakeholders, addressing progress toward management objectives, modifications of treatment methods and population/species priority for treatment, and the list of target weed species.

Terrestrial Resource Management Plan

The District requests that the Commission issue a license article that requires the District to implement the District's Terrestrial Resource Management Plan (TRMP). The TRMP is attached as Appendix E to the Project's Final License Application (FLA) (May 29, 2009).

The TRMP requires that the District manage and enhance wildlife habitat on the following lands: the Lost Lake Tract, the Project Facility Lands Tract, the Spada Lake Tract, and the Williamson Creek Tract (these tracts are collectively referred to as "TRMP Lands" and are shown in FLA Figure E.6.4-1).

The District will manage TRMP Lands in accordance with the TRMP objectives and priorities. As described in the TRMP, the District's management under the TRMP will be a continuation of the District's existing management established under the Project's Wildlife Habitat Management Plan (WHMP). The objectives and priorities of the TRMP are consistent with the objectives and priorities of the WHMP, except for updates in response to current regional priorities for habitat management.

Rare, Threatened and Endangered Species

Marbled Murrelet Habitat Protection Plan

The District requests that the Commission issue a license article that requires the District to implement the District's Marbled Murrelet Habitat Protection Plan (MMHPP). The MMHPP is attached as Appendix G to the Project's Final License Application (FLA) (May 29, 2009). .The MMHPP includes the following elements:

1. Occupied Habitat

The District will prepare and maintain maps of the Project lands and adjacent areas showing suitable marbled murrelet habitat, occupied marbled murrelet habitat, and other forest within 300 feet of suitable and occupied marbled murrelet habitat. For mapping purposes, suitable and occupied marbled murrelet habitats will be defined according to Washington Forest Practices Rules. At intervals of 10 years or less, the District will update the maps to reflect current habitat conditions. The District may conduct surveys for nesting marbled murrelets in all suitable habitat that is not known to be occupied and has not been surveyed for 10 or more years. If the District chooses not to survey suitable habitat, such habitat would be considered occupied for purposes of this PME. Hereafter in this PME, all references to occupied habitat include suitable habitat that has not been surveyed for 10 or more years. Surveys will be conducted according to the current protocol of the Pacific Seabird Group, or another protocol endorsed by the USFWS and WDFW.

2. Roadside Danger Trees in or within 300 feet of Occupied Habitat

Prior to the scheduled pruning, topping or felling of roadside danger trees in occupied marbled murrelet habitat, District biologists will evaluate each tree proposed for such activity.

The District will not prune, top or fell roadside danger trees in occupied habitat that contain marbled murrelet nesting platforms (as defined in Washington Forest Practice Rules), unless the roadside danger tree poses an imminent threat to the operation of the Project or safe use of a Project road. A roadside danger tree will be considered an imminent threat if it is leaning toward a road at an angle of greater than 20 degrees from vertical, is upslope from a road and being undercut by erosion, or is otherwise in a condition that would lead a professional forester or other similarly qualified person to conclude it has a reasonable potential to fall on or across the road without warning.

The District will not prune, top or fell roadside danger trees in or within 300 feet of occupied habitat during the critical marbled murrelet nesting season (April 1 through August 31), unless the roadside dangers tree poses an imminent threat to the operation of the Project or safe use of a Project road, as described in Section 2.2.

Outside the critical marbled murrelet nesting season and regardless of imminent threat to the operation of the Project or safe use of a Project road, the District may prune, top or fell roadside danger trees in or within 300 feet of occupied habitat that do not contain marbled murrelet nesting platforms.

3. Snags, Decaying Live Trees, Coarse Woody Debris and Forest Canopy Gaps

No thinning, snag creation, decaying live tree creation, coarse woody debris creation or gap creation will occur within occupied marbled murrelet habitat.

Thinning, snag creation, decaying live tree creation, coarse woody debris creation and gap creation may occur within 300 feet of occupied marbled murrelet habitat, provided that:

The activity must result in a residual stand density of at least 75 trees per acre greater than 6 inches diameter at breast height (DBH), of which at least 25 trees per acre are greater than 12 inches DBH and at least 5 trees per acre are greater than 20 inches DBH.

No live coniferous trees with marbled murrelet nesting platforms (as defined in Washington Forest Practices Rules), live coniferous trees with a DBH of 32 inches or greater, or other live dominant or codominant trees within 100 feet of either of these two types of trees, may be modified or felled, except that live western redcedar and Pacific silver fir of any size may be modified to create snags or decaying live trees at a density of up to one per 20 acres per decade.

No activity may be conducted during the critical marbled murrelet nesting season.

No thinning, snag creation, decaying live tree creation, coarse woody debris creation or gap creation will be conducted within 0.25 mile of occupied marbled murrelet habitat during the daily peak activity period (one hour before official sunrise to two hours after official sunrise, and one hour before official sunset to one hour after official sunset) in the critical marbled murrelet nesting season.

4. New Recreation Trails and Associated Facilities

In or within 300 feet of occupied marbled murrelet habitat, the District will lay out trails and associated facilities to minimize the total area of trail and/or facility within 100 feet of potential nest trees (coniferous trees with marbled murrelet nesting platforms), while giving due consideration to other potential environmental and safety considerations.

In or within 300 feet of occupied marbled murrelet habitat, the District will not fell coniferous trees with marbled murrelet nesting platforms, or live dominant or codominant trees directly adjacent to coniferous trees with platforms, to create a new recreation trail or associated facilities, unless doing so is necessary to make the trail or associated facilities safe, keep the overall area of site disturbance to a reasonable level, and/or avoid impacting slope stability, surface erosion or water quality. If the District determines that the felling of such trees is necessary, the District will fell such trees outside the critical marbled murrelet nesting season (April 1 through August 31).

The District will provide wildlife-resistant containers for human refuse during trail and associated facility construction and use, and will empty as needed to prevent wildlife access to refuse. The District will post signs alerting users of the need to contain all refuse.

The District will not conduct the following activities within the specified threshold distances of occupied marbled murrelet habitat during the daily peak activity period (one hour before official sunrise to two hours after official sunrise, and one hour before

official sunset to one hour after official sunset) in the critical marbled murrelet nesting season.

Activity	Threshold Distance[1]
Blast > 2 pounds	1.0 mile
Blast ≤ 2 pounds	120 yards
Impact pile driver, jackhammer, rock drill	60 yards
Helicopter, single-engine airplane	120 yards
Chainsaw	45 yards
Heavy equipment	35 yards

[1] Threshold distance based on USFWS 2003.

Recreation Resources

Recreation Resource Management Plan

The District requests that the Commission issue a license article that requires the District to implement the Recreation Resource Management Plan (RRMP). The RRMP is attached as Appendix H to the Projects's Final License Application (FLA) (May 29, 2009).

The District prepared the RRMP in consultation with USFS, National Park Service, the Tulalip Tribes (Tribe), Washington Department of Fish and Wildlife, the Recreation Conservation Office, the Washington Department of Natural Resources (DNR), the City of Everett and American Whitewater. The RRMP provides a mechanism for reviewing, coordinating and integrating proposed recreation facility development with other resource management plans (e.g., terrestrial, fisheries, noxious weeds, historic properties, etc.) and a schedule of implementatio for measures related to recreation facility development in the Project area. The RRMP includes the following elements:

1. Recreation Sites and Use Areas Program (RSUAP). The RSUAP includes descriptions, proposed locations, public access and conceptual site plans. The RSUAP includes recreation facility development measures for the following recreation sites and/or areas:

    1.1. Olney Pass Recreation Site. The District will continue to maintain the Olney Pass Recreation Site.

    1.2. South Fork Recreation Site. As described in the Spada Lake Fishery PME, the District will continue to maintain the South Fork Recreation Site and

improve the existing boat ramp at the South Fork Recreation Site to accommodate trailered boat access to Spada Reservoir during the fishing season (typically late-April through the end of October).

1.3. South Shore Recreation Site. The District will maintain the South Shore Recreation Site.

1.4. Nighthawk Recreation Site. The District will maintain the Nighthawk Recreation Site for pedestrian access consistent with the DNR's road abandonment strategy. The District will remove the concrete boat ramp to reduce potential water quality impacts. The District may remove the vault toilets from this site and replace them with other acceptable sanitation facilities. Some of the developed recreation facilities (e.g., some of the picnic tables, trash receptacles, etc.) will be moved to other District-managed recreation sites. Disturbed areas will be revegetated with native plant species beneficial to wildlife.

1.5. Bear Creek Recreation Site. The District will maintain the Bear Creek Recreation Site for pedestrian access consistent with the DNR's road abandonment strategy. The District may remove the vault toilets from this site and replace with other acceptable sanitation facilities. Improvements at this site will be new guardrails and minor amenities.

1.6. New Recreation Site. The District will develop a new recreation site along Culmback Dam Road, near the intersection with the 6122 Road. This new recreation site will provide parking (approximately 6 spaces) and picnic sites (approximately 2 to 4). An existing restroom is located near Culmback Dam along a newly opened trail that will provide non-motorized barrier-free access to the North Shore Recreation Site, the new Sultan River Canyon Trail (former 6122 Road) and whitewater access at Culmback Dam. The New Recreation Site and the Culmback Dam area will provide a location for whitewater boater shuttle use (e.g., boater drop-off, turn around) and interpretive signs.

1.7. Culmback Dam Trail (Sultan River Canyon Access From Culmback Dam). The District will provide and maintain access to the Sultan River for whitewater boating from Culmback Dam via the "Culmback Dam Trail". Access will be down the face of the dam along the alignment of the auxiliary release line or at another location on District property near the dam. The District will install and maintain hand railing and enhanced footing at this access point.

1.8. 6122 Road to Trail Conversion. The District will formally abandon the portion of the 6122 Road that is located on District lands (approximately 0.5 mile). The District will convert the District-owned portion of the abandoned

6122 Road into a trail and maintain the trail from the intersection of the Culmback Dam road west, along the District owned land to the boundary of the National Forest System lands. This trail conversion will be constructed to allow for ORV access to mining claimants and for administrative purposes.

1.9. North Shore Access Trail. The District will provide non-motorized access across Culmback Dam during daylight hours to the North Shore Recreation Site. The District may temporarily close Culmback Dam to non-motorized public access based on the National Threat Advisory or if other security, weather or operational concerns are identified.

1.10. North Shore Recreation Site. The District will maintain the North Shore Recreation Site for non-motorized access during daylight hours.

1.11. Trout Farm Road River Access Site. The District will enhance and maintain the Trout Farm Road River Access Site. Improvements will include a better defined parking area, the removal of boulders that inhibit boat launching, native vegetation plantings beneficial to wildlife, noxious weed management, and improved signage. The District will also enhance access at this site by opening the gate during periods of heavy demand (e.g., fishing season) contingent on vandalism issues.

1.12. Other Sultan River Access. The District will continue to allow non-formalized public access to the Sultan River [from District lands] at the designated river access points (including Diversion Dam Road, Old Gaging Station Road, Powerhouse, and Horseshoe Bend/116th Street). The District will keep the 116th Street Gate open to allow greater access to the Sultan River at the Powerhouse. The District will allow pedestrian access across the Powerhouse bridge to allow public access to the western (river right) bank. The District may close both the 116th Street Gate and/or the Powerhouse bridge based on security or operational concerns.

2. Operations and Maintenance Program (OMP) – The OMP defines the District's operations and maintenance responsibilities at Project recreation sites and use areas. It defines typical site maintenance standards for operations and maintenance. The District's operation and maintenance measures include the following:

2.1. The District will increase the level of routine maintenance at the Trout Farm Road River Access Site.

2.2. The District will provide routine maintenance at its developed recreation sites at Spada Lake including: Olney Pass, South Fork, South Shore, Nighthawk, Bear Creek, North Shore, and the proposed new site near the intersection of

Culmback Dam Road and 6122 Road, the Sultan River Canyon Access at Culmback Dam, and the abandoned 6122 Road trail.

3. Recreation Monitoring and Reporting Program (RMRP) – The RMRP defines the District monitoring of recreation use levels and potential Project impacts on recreation over the term of the license and any subsequent annual licenses. Reporting of the required information is to be in accordance with 18 C.F.R. § 8.11, which requires filing FERC Form No. 80. The District's recreation use monitoring measures include:

   3.1. The District will periodically monitor recreation use levels in the Project area. The District will monitor recreation use levels at recreation sites at Spada Lake on an annual basis via Visitor Registration Forms obtained at Olney Pass (or another appropriate location). The District will periodically monitor visitor use levels along the Sultan River and Lost Lake (to coincide with FERC Form 80 reporting requirements).

   3.2. The District will periodically monitor potential impacts from recreation use. The District will monitor potential recreation impacts, focusing primarily in dispersed/lightly developed areas, as they tend to be more susceptible to impacts, and may be coordinated with terrestrial resource monitoring.

   Every 6 years for the term of the license, the District will file the FERC Form 80 with the Commission to assess whether existing recreational facilities are meeting Project-related recreational demands. Reporting is to be in accordance with 18 C.F.R. 8.11, which requires the filing of the FERC Form No. 80. In addition, the District will offer to hold a meeting with the agencies and Tribes to discuss recreation use and demand in the area. Based on consultation with the agencies and Tribes at the meeting, if after two cycles of Form 80 reporting there is a need for additional facilities due to Project impacts, the District shall (1) modify the RRMP to accommodate Project-related recreational needs; (2) document agency consultation and comments on the modifications to the RRMP after it has been prepared and provided to the agencies; and (3) describe how the agencies' comments are accommodated by the RRMP or why the comments were not incorporated.

   The District shall allow a minimum of 30 days for the agencies to comment and make recommendations on the modifications to the RRMP prior to filing them with the Commission.

4. Interpretation and Education Program (IEP) – The IEP defines potential themes and/or topics (such as wildlife, fish, history, hydroelectric power generation, drinking water, and/or appropriate recreation behaviors and/or other themes and topics) that may be interpreted in the Project area, as well as potential locations and media types (such as signs, kiosks, brochures and/or similar media types) for these new opportunities. The District's interpretation and education measures include:

4.1. The District will develop new interpretation and education opportunities at appropriate locations throughout the Project area. These interpretation and education opportunities may include signs and/or kiosks, but may also incorporate other types of media. Potential locations for new interpretation and education signs include the New Recreation Site and the Trout Farm Road River Access Site.

4.2. The District will also review existing interpretation and education signs and/or kiosks and may enhance and/or relocate them as needed.

Whitewater Recreation Plan

Within 12 months after issuance of the license, the District will file with the Commission, for approval, a Whitewater Recreation Plan (WR Plan). This WR Plan will document how the District will implement a 3-year study program to provide occasional higher flows in the Sultan River below Culmback Dam for whitewater boating.

During the 3-year study program, the District will provide a water budget of 900 acre-feet of water (total) for whitewater boating flow releases (Releases). Water released from Culmback Dam pursuant to a scheduled Release and any downramping associated with Release will be deducted from the water budget. In the event that a portion of the 900 acre-feet water budget remains after 3 years of implementing the study, the study program will continue until the balance of the water budget is utilized through additional Releases.

The District will schedule the Releases to attempt to avoid out-of-bank flooding and exacerbation of any downstream flooding, and to take into account maintenance and real-time fishery concerns.

As addressed within the WR Plan, the schedule, duration, and magnitude of each Release will be subject to and consistent with (1) other license article obligations and (2) aquatic resource (including fish and macroinvertebrates) constraints (such as impacts on water temperature conditions). The District will not be required to provide releases when the District determines that a drought event (as described by the City of Everett 2001 Drought Response Plan) is probable or occurring.

Within 6 months of completing the study program, the District will file a Whitewater Recreation Recommendation (WR Recommendation) with the Commission regarding whether the Releases should continue, be modified or terminated. The Commission may require changes to the WR Recommendation. Upon approval, the District will implement the WR Recommendation.

The WR Plan will include provisions that describe: (1) the frequency, magnitude, duration, and timing of Releases during the three-year study program; (2) operational, biological, and other constraints upon Releases; (3) the mechanism for timing Releases to

coincide with natural rainfall events or to coordinate with Project generation to achieve greater flow volumes in desired reaches or habitats; (4) mechanism for notifying whitewater boating stakeholders of whitewater boating opportunities during scheduled Releases and other high flow events within the Sultan River; (5) mechanism for assessing the boaters' satisfaction during Releases and impacts to aquatic and terrestrial resources; (6) mechanism for recording the number of participants, safety incidents, and costs; (7) the timing and other restrictions necessary to minimize impacts to aquatic resources, to not exacerbate flooding in the City of Sultan and prevent out-of-bank flooding; (8) the method and schedule for monitoring flow releases pursuant to the Plan; and (9) the waiver of indemnity for participants in a scheduled flow release.

The District will develop the WR Plan and the WR Recommendation in consultation with the ARC and whitewater boating stakeholder representatives. The District will allow a minimum of 30 days for members of the ARC and the whitewater boating stakeholder representatives to comment and make recommendations before submitting the WR Plan and WR Recommendation to the Commission. When filing the WR Plan and WR Recommendation with the Commission, the District will include documentation of consultation, copies of comments and recommendations, and specific descriptions of how comments and recommendations from the ARC and the whitewater boating stakeholders representatives are accommodated by the WR Plan and WR Recommendation. If the District does not adopt a recommendation, the filing will include the District's reasons based upon Project-specific information.

Upon Commission approval, the District will implement the WR Plan and WR Recommendation.

Cultural Resources

Historic Properties Management Plan

The District requests that the Commission issue a license article that requires the District to implement the District's Historic Properties Management Plan (HPMP). The HPMP is attached as Appendix I of the Project's Final License Application (May 29, 2009).

The purpose of the HPMP is to minimize the potential affects of the Project on cultural resources by providing guidelines for evaluation, monitoring, management and avoidance of potential affects, and determining specific actions to address affects on known or yet to be discovered sites in the Project area.

The HPMP's general management measures require the District to: (1) identify a Historic Preservation Coordinator; (2) maintain confidentiality of sensitive cultural information; (3) provide for ongoing consultation with cultural resource representatives; (4) develop annual reports; (5) train personnel on cultural resources and historic properties management; (6) develop surveying strategies detailing what activities are exempt from additional surveys and the process for activities that are not exempt from archaeology surveys; (7) monitor eligible sites; (8) develop Diversion Dam Maintenance Guidelines to guide the City's routine maintenance of this historic property; (9) implement the

Unanticipated Discovery Plan; and (10) develop the protocols to be undertaken during emergency situations.

The District will implement the HPMP in accordance with the schedule shown in Table 2.

Table 2. Schedule for implementing cultural resources management measures.

Measure	Frequency	Deadline
Conduct Project staff training	Every two years	First Quarter
Monitor recorded archaeological sites	45SN125 annually by HPC; if changes observed, a professional archaeologist will update site form and route to parties. Other sites as determined.	In tandem with other Project activities or when site(s) is exposed
Conduct additional archaeological survey of APE	As needed for planned Project activities	As needed
Review/revise measures in the HPMP	Every 5 years at minimum	Every 5 years
Consultation Meetings	As needed	As needed
Annual Report	Yearly	March 1

Appendix C

Habitat Time Series Under the Three City of Everett Water Demand Scenarios

84 mgd Water Demand

Lifestage	Species	Reach 1 Average Habitat Area (ft^2)			Reach 2 Average Habitat Area (ft^2)			Reach 3 Average Habitat Area (ft^2)			All Reaches Average Habitat Area (ft^2)		
		Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference
WATER YEAR - WET													
Spawning	Chinook	744,165	758,148	1.9	470,483	508,784	8.1	88,807	88,807	0.0	1,303,456	1,355,740	4.0
	Steelhead	655,069	655,228	0.0	428,716	380,695	-11.2	54,311	54,311	0.0	1,138,096	1,090,234	-4.2
	Coho	332,051	332,124	0.0	364,692	362,493	-0.6	110,750	110,750	0.0	807,492	805,367	-0.3
	Chum	370,739	370,901	0.0	373,686	373,686	0.0	205,435	205,435	0.0	949,860	950,021	0.0
	Pink	293,789	309,529	5.4	258,894	234,263	-9.5	229,417	229,417	0.0	782,100	773,209	-1.1
Juvenile	Chinook	498,483	499,619	0.2	555,593	544,865	-1.9	103,336	103,336	0.0	1,157,412	1,147,820	-0.8
	Steelhead	589,722	598,776	1.5	474,629	452,810	-4.6	92,649	92,649	0.0	1,156,999	1,144,235	-1.1
	Coho	158,968	156,505	-1.5	288,965	294,800	2.0	210,363	210,363	0.0	658,296	661,668	0.5
WATER YEAR - AVERAGE													
Spawning	Chinook	638,733	731,371	14.5	454,008	496,859	9.4	74,333	74,333	0.0	1,167,075	1,302,563	11.6
	Steelhead	651,252	651,254	0.0	436,415	395,714	-9.3	56,890	56,890	0.0	1,144,557	1,103,858	-3.6
	Coho	391,330	407,755	4.2	416,133	417,388	0.3	111,609	111,609	0.0	919,072	936,752	1.9
	Chum	488,352	530,135	8.6	445,501	445,501	0.0	192,914	192,914	0.0	1,126,767	1,168,550	3.7
	Pink	361,500	336,912	-6.8	257,978	234,219	-9.2	216,775	216,775	0.0	836,252	787,906	-5.8
Juvenile	Chinook	516,653	517,420	0.1	556,023	545,790	-1.8	97,284	97,284	0.0	1,169,960	1,160,493	-0.8
	Steelhead	568,617	596,413	4.9	460,348	436,859	-5.1	81,020	81,020	0.0	1,109,986	1,114,292	0.4
	Coho	184,354	174,746	-5.2	299,249	305,196	2.0	216,179	216,179	0.0	699,782	696,121	-0.5
WATER YEAR - DRY													
Spawning	Chinook	825,869	846,228	2.5	438,647	486,820	11.0	56,721	56,721	0.0	1,321,238	1,389,770	5.2
	Steelhead	651,228	651,560	0.1	435,781	400,826	-8.0	60,043	60,043	0.0	1,147,052	1,112,429	-3.0
	Coho	532,527	534,629	0.4	433,206	430,203	-0.7	85,040	85,040	0.0	1,050,774	1,049,873	-0.1
	Chum	673,425	675,061	0.2	444,702	444,702	0.0	158,579	158,579	0.0	1,276,705	1,278,342	0.1
	Pink	323,246	344,896	6.7	273,028	248,212	-9.1	216,811	216,811	0.0	813,085	809,919	-0.4
Juvenile	Chinook	548,192	545,649	-0.5	559,349	545,960	-2.4	90,302	90,302	0.0	1,197,843	1,181,910	-1.3
	Steelhead	585,670	603,785	3.1	448,064	422,367	-5.7	73,718	73,718	0.0	1,107,452	1,099,870	-0.7
	Coho	196,257	189,213	-3.6	303,930	314,426	3.5	222,290	222,290	0.0	722,477	725,929	0.5

144 mgd Water Demand

Lifestage	Species	Reach 1 Average Habitat Area (ft^2)			Reach 2 Average Habitat Area (ft^2)			Reach 3 Average Habitat Area (ft^2)			All Reaches Average Habitat Area (ft^2)		
		Stage 2	FLA 3	% Difference	Stage 2	FLA 3	% Difference	Stage 2	FLA 3	% Difference	Stage 2	FLA 3	% Difference
WATER YEAR - WET													
Spawning	Chinook	715,912	756,150	5.6	470,483	508,255	8.0	89,016	102,543	15.2	1,275,411	1,366,948	7.2
	Steelhead	662,290	660,673	-0.2	428,716	380,650	-11.2	54,311	68,008	25.2	1,145,317	1,109,331	-3.1
	Coho	345,711	346,908	0.3	364,692	362,757	-0.5	110,750	101,427	-8.4	821,153	811,092	-1.2
	Chum	395,587	399,101	0.9	373,686	373,492	-0.1	205,435	187,965	-8.5	974,708	960,558	-1.5
	Pink	336,123	354,168	5.4	258,894	234,270	-9.5	229,957	259,528	12.9	824,974	847,966	2.8
Juvenile	Chinook	511,778	511,144	-0.1	555,593	544,919	-1.9	103,336	108,917	5.4	1,170,706	1,164,980	-0.5
	Steelhead	574,021	590,179	2.8	474,629	452,149	-4.7	92,665	95,740	3.3	1,141,316	1,138,068	-0.3
	Coho	174,054	169,374	-2.7	288,965	294,998	2.1	210,397	207,225	-1.5	673,416	671,597	-0.3
WATER YEAR - AVERAGE													
Spawning	Chinook	706,389	779,022	10.3	458,936	515,476	12.3	94,507	150,016	58.7	1,259,833	1,444,514	14.7
	Steelhead	660,754	661,124	0.1	436,415	395,801	-9.3	56,890	70,897	24.6	1,154,059	1,127,822	-2.3
	Coho	426,630	437,357	2.5	416,133	417,872	0.4	111,609	100,523	-9.9	954,373	955,753	0.1
	Chum	563,354	588,901	4.5	445,501	445,667	0.0	192,914	168,905	-12.4	1,201,769	1,203,474	0.1
	Pink	379,439	377,930	-0.4	255,501	205,236	-19.7	206,993	133,818	-35.4	841,933	716,984	-14.8
Juvenile	Chinook	530,117	530,256	0.0	556,023	545,752	-1.8	97,284	102,800	5.7	1,183,423	1,178,808	-0.4
	Steelhead	569,131	594,666	4.5	461,215	443,709	-3.8	84,013	104,286	24.1	1,114,358	1,142,660	2.5
	Coho	192,308	184,615	-4.0	299,076	301,884	0.9	214,641	202,462	-5.7	706,024	688,961	-2.4
WATER YEAR - DRY													
Spawning	Chinook	825,869	824,824	-0.1	438,647	486,820	11.0	56,721	62,649	10.5	1,321,238	1,374,293	4.0
	Steelhead	651,228	653,322	0.3	435,781	400,929	-8.0	60,043	73,305	22.1	1,147,052	1,127,557	-1.7
	Coho	532,527	548,795	3.1	433,206	430,297	-0.7	85,040	72,531	-14.7	1,050,774	1,051,623	0.1
	Chum	673,425	672,152	-0.2	444,702	444,755	0.0	158,579	131,865	-16.8	1,276,705	1,248,772	-2.2
	Pink	323,246	371,689	15.0	273,028	248,212	-9.1	216,811	235,275	8.5	813,085	855,176	5.2
Juvenile	Chinook	548,192	567,662	3.6	559,349	545,892	-2.4	90,302	95,420	5.7	1,197,843	1,208,974	0.9
	Steelhead	585,670	583,773	-0.3	448,064	422,455	-5.7	73,718	75,644	2.6	1,107,452	1,081,872	-2.3
	Coho	196,257	210,806	7.4	303,930	314,365	3.4	222,290	218,007	-1.9	722,477	743,179	2.9

192 mgd Water Demand

Lifestage	Species	Reach 1 Average Habitat Area (ft^2)			Reach 2 Average Habitat Area (ft^2)			Reach 3 Average Habitat Area (ft^2)			All Reaches Average Habitat Area (ft^2)		
		Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference
WATER YEAR - WET													
Spawning	Chinook	717,516	767,931	7.0	470,483	513,065	9.1	134,497	193,285	43.7	1,322,497	1,474,281	11.5
	Steelhead	657,976	658,688	0.1	428,716	380,695	-11.2	60,511	54,833	-9.4	1,147,202	1,094,216	-4.6
	Coho	357,465	361,415	1.1	364,694	364,633	0.0	110,750	113,356	2.4	832,909	839,404	0.8
	Chum	418,653	427,448	2.1	373,693	377,004	0.9	205,435	210,040	2.2	997,782	1,014,492	1.7
	Pink	383,501	386,101	0.7	258,894	234,263	-9.5	290,344	280,942	-3.2	932,738	901,305	-3.4
Juvenile	Chinook	521,735	521,964	0.0	555,593	544,865	-1.9	142,428	138,124	-3.0	1,219,755	1,204,954	-1.2
	Steelhead	561,584	585,333	4.2	474,632	453,210	-4.5	110,072	111,773	1.5	1,146,288	1,150,316	0.4
	Coho	186,316	178,476	-4.2	288,965	294,696	2.0	200,273	199,997	-0.1	675,554	673,169	-0.4
WATER YEAR - AVERAGE													
Spawning	Chinook	725,427	763,489	5.2	499,379	515,509	3.2	157,825	149,563	-5.2	1,382,631	1,428,561	3.3
	Steelhead	661,360	660,985	-0.1	436,415	395,714	-9.3	60,633	56,890	-6.2	1,158,409	1,113,588	-3.9
	Coho	449,660	467,279	3.9	416,133	417,388	0.3	111,609	111,609	0.0	977,403	996,276	1.9
	Chum	606,712	620,087	2.2	445,501	445,501	0.0	192,914	192,914	0.0	1,245,127	1,258,502	1.1
	Pink	413,006	384,312	-6.9	233,394	185,430	-20.6	149,583	103,447	-30.8	795,983	673,188	-15.4
Juvenile	Chinook	541,926	543,014	0.2	556,023	546,716	-1.7	139,238	137,719	-1.1	1,237,186	1,227,449	-0.8
	Steelhead	563,507	586,221	4.0	468,681	453,657	-3.2	118,773	126,064	6.1	1,150,961	1,165,942	1.3
	Coho	203,211	197,495	-2.8	296,446	297,318	0.3	197,064	192,143	-2.5	696,721	686,957	-1.4
WATER YEAR - DRY													
Spawning	Chinook	742,892	757,918	2.0	438,647	486,820	11.0	95,262	165,331	73.6	1,276,802	1,410,069	10.4
	Steelhead	632,154	646,695	2.3	435,781	400,826	-8.0	67,638	60,561	-10.5	1,135,573	1,108,082	-2.4
	Coho	554,205	568,937	2.7	433,206	430,203	-0.7	85,040	85,040	0.0	1,072,451	1,084,180	1.1
	Chum	658,642	643,536	-2.3	444,702	444,702	0.0	158,579	158,579	0.0	1,261,922	1,246,816	-1.2
	Pink	393,204	391,554	-0.4	273,028	248,212	-9.1	274,647	299,906	9.2	940,879	939,672	-0.1
Juvenile	Chinook	578,363	580,415	0.4	559,349	545,960	-2.4	129,094	123,394	-4.4	1,266,806	1,249,769	-1.3
	Steelhead	540,986	563,020	4.1	448,064	422,367	-5.7	90,359	93,753	3.8	1,079,409	1,079,140	0.0
	Coho	235,651	230,637	-2.1	303,930	314,426	3.5	212,040	209,563	-1.2	751,621	754,626	0.4

84 mgd Water Demand

Lifestage	Species	**Reach 1** Average Habitat Area (ft^2)			**Reach 2** Average Habitat Area (ft^2)			**Reach 3** Average Habitat Area (ft^2)			**All Reaches** Average Habitat Area (ft^2)		
		Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference
WATER YEAR - WET													
Spawning	Rainbow	327,398	327,512	0.0	183,362	170,617	-7.0	66,170	66,170	0.0	576,931	564,300	-2.2
	Cutthroat	86,185	90,389	4.9	93,271	100,328	7.6	73,336	73,336	0.0	252,792	264,053	4.5
Juvenile	Rainbow	436,398	440,664	1.0	415,158	406,836	-2.0	98,479	98,479	0.0	950,034	945,978	-0.4
	Cutthroat	355,396	355,707	0.1	399,429	396,502	-0.7	81,661	81,661	0.0	836,487	833,870	-0.3
WATER YEAR - AVERAGE													
Spawning	Rainbow	327,238	329,054	0.6	182,713	170,073	-6.9	64,141	64,141	0.0	574,092	563,268	-1.9
	Cutthroat	101,127	89,679	-11.3	92,307	99,337	7.6	73,221	73,221	0.0	266,655	262,237	-1.7
Juvenile	Rainbow	441,489	453,100	2.6	410,678	402,284	-2.0	90,817	90,817	0.0	942,984	946,202	0.3
	Cutthroat	368,142	368,441	0.1	401,140	398,014	-0.8	74,959	74,959	0.0	844,242	841,414	-0.3
WATER YEAR - DRY													
Spawning	Rainbow	319,394	324,597	1.6	183,305	171,299	-6.5	65,651	65,651	0.0	568,349	561,548	-1.2
	Cutthroat	85,365	90,395	5.9	91,097	98,248	7.8	76,423	76,423	0.0	252,885	265,066	4.8
Juvenile	Rainbow	459,873	466,112	1.4	408,216	398,039	-2.5	84,167	84,167	0.0	952,256	948,317	-0.4
	Cutthroat	380,477	379,306	-0.3	402,917	399,464	-0.9	66,812	66,812	0.0	850,207	845,581	-0.5

144 mgd Water Demand

Lifestage	Species	**Reach 1** Average Habitat Area (ft^2)			**Reach 2** Average Habitat Area (ft^2)			**Reach 3** Average Habitat Area (ft^2)			**All Reaches** Average Habitat Area (ft^2)		
		Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference
WATER YEAR - WET													
Spawning	Rainbow	334,721	334,721	0.0	183,362	170,617	-7.0	66,170	66,170	0.0	584,254	571,508	-2.2
	Cutthroat	103,690	94,928	-8.5	93,271	100,328	7.6	73,336	73,336	0.0	270,298	268,592	-0.6
Juvenile	Rainbow	437,960	445,646	1.8	415,158	406,836	-2.0	98,499	100,613	2.1	951,617	953,095	0.2
	Cutthroat	362,854	364,113	0.3	399,429	396,502	-0.7	81,687	84,908	3.9	843,970	845,522	0.2
WATER YEAR - AVERAGE													
Spawning	Rainbow	329,237	331,041	0.5	182,713	170,073	-6.9	64,141	64,141	0.0	576,091	565,254	-1.9
	Cutthroat	106,039	95,546	-9.9	92,307	99,337	7.6	73,221	73,221	0.0	271,567	268,104	-1.3
Juvenile	Rainbow	447,374	458,745	2.5	411,060	406,022	-1.2	92,776	103,548	11.6	951,210	968,314	1.8
	Cutthroat	373,756	375,725	0.5	401,221	398,014	-0.8	76,855	87,215	13.5	851,833	860,954	1.1
WATER YEAR - DRY													
Spawning	Rainbow	314,434	322,634	2.6	183,305	171,299	-6.5	65,651	65,651	0.0	563,389	559,584	-0.7
	Cutthroat	105,172	98,104	-6.7	91,097	98,248	7.8	76,423	76,423	0.0	272,692	272,775	0.0
Juvenile	Rainbow	461,735	471,223	2.1	408,216	398,039	-2.5	84,167	85,608	1.7	954,118	954,870	0.1
	Cutthroat	392,265	393,383	0.3	402,917	399,464	-0.9	66,812	69,038	3.3	861,994	861,885	0.0

192 mgd Water Demand

Lifestage	Species	Reach 1 Average Habitat Area (ft^2)			Reach 2 Average Habitat Area (ft^2)			Reach 3 Average Habitat Area (ft^2)			All Reaches Average Habitat Area (ft^2)		
		Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference	Stage 2	Proposed	% Difference
WATER YEAR - WET													
Spawning	Rainbow	332,544	332,756	0.1	183,362	170,617	-7.0	76,182	66,698	-12.4	592,088	570,071	-3.7
	Cutthroat	111,928	101,234	-9.6	93,271	100,328	7.6	117,108	105,414	-10.0	322,307	306,975	-4.8
Juvenile	Rainbow	439,661	449,752	2.3	415,159	406,972	-2.0	117,032	118,699	1.4	971,852	975,423	0.4
	Cutthroat	369,434	370,319	0.2	399,429	396,964	-0.6	106,457	107,096	0.6	875,320	874,378	-0.1
WATER YEAR - AVERAGE													
Spawning	Rainbow	322,850	324,081	0.4	182,713	170,073	-6.9	70,420	64,917	-7.8	575,982	559,071	-2.9
	Cutthroat	113,023	103,255	-8.6	92,307	99,337	7.6	111,926	103,817	-7.2	317,256	306,409	-3.4
Juvenile	Rainbow	451,978	463,254	2.5	414,939	411,730	-0.8	119,872	122,531	2.2	986,789	997,516	1.1
	Cutthroat	381,821	384,246	0.6	402,146	399,593	-0.6	108,774	110,512	1.6	892,742	894,350	0.2
WATER YEAR - DRY													
Spawning	Rainbow	304,768	315,392	3.5	183,305	171,299	-6.5	77,963	66,003	-15.3	566,036	552,694	-2.4
	Cutthroat	114,960	105,597	-8.1	91,097	98,248	7.8	123,758	108,976	-11.9	329,814	312,821	-5.2
Juvenile	Rainbow	462,035	474,466	2.7	408,216	398,039	-2.5	101,755	105,214	3.4	972,006	977,718	0.6
	Cutthroat	401,798	406,672	1.2	402,917	399,464	-0.9	90,837	94,244	3.8	895,553	900,380	0.5

Appendix D

Noxious Weed Management Plan

Henry M. Jackson Hydroelectric Project

(FERC No. 2157)

Noxious Weed Management Plan

Prepared for:

Public Utility District No. 1 of Snohomish County
Everett, Washington

Prepared by:

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May 2009

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1.0 PURPOSE

Public Utility District No. 1 of Snohomish County (District) has developed a Noxious Weed Management Plan (plan) for the Henry M. Jackson Hydroelectric Project, FERC 2157 (Project). The plan describes the District's strategy for controlling and containing the spread of Class A, Class B Designate, and Snohomish County Selected noxious weeds occurring within the Jackson Project boundary ("Project lands") as revised under the new license, throughout the term of the new license. The plan also describes the District's ongoing and proposed future voluntary management of other noxious weeds on Project lands.

The Noxious Weed Management Plan is based on the District's ongoing weed management activities at the Project and incorporates by reference existing District programs and plans. The plan includes management methods for new species and sites detected on Project lands during the 2007 Noxious Weed Inventory. The plan includes the following elements:

- A list of Washington State Class A, Washington State Class B Designate and Snohomish County Selected noxious weeds, updated annually to reflect changes in State and County lists.
- A summary of Washington State Class A, Washington State Class B Designate, Snohomish County Selected, and other target species of noxious weeds occurring within the Project boundary based on ongoing weed management work and the 2007 Noxious Weed Inventory.
- A summary of ongoing weed management activities on Project lands.
- Treatment options and recommendations for established and new infestations of target weed species, including management goals, measurable objectives, and priorities for treatment.
- Prevention strategies (*e.g.*, weed prevention practices for ground disturbing work, revegetation methods, and education information for Project employees).
- Monitoring and implementation schedules.
- Annual consultation with Snohomish County Noxious Weed Control Board and other stakeholders.
- Annual updating provided to the consulted organizations listed below, within the Terrestrial Resource Management Plan (TRMP) reports, of updates to the noxious weed list, a summary of weed management actions taken since the previous report, and consultation with Snohomish County Noxious Weed Control Board and other stakeholders.
- Periodic (five-year) review of plan accomplishments and update of lists and appendices, prepared in consultation with the stakeholders listed below. This information will be provided to FERC as part of the TRMP five-year report.
- Estimated costs.

The Noxious Weed Management Plan is being developed in consultation with the Jackson Project Terrestrial Resources Stakeholders, specifically including the City of Everett (City), Snohomish County Noxious Weed Control Board, Washington State

Department of Natural Resources (DNR), U.S. Fish and Wildlife Service (USFWS), Washington Department of Fish Wildlife (WDFW) and U.S. Forest Service (USFS).

2.0 REGULATORY AUTHORITY AND DEFINITIONS

Federal: The major federal authorities for management of non-native plants are the Plant Protection Act (Title IV of the Agricultural Risk Protection Act of 2000), the Amendment to the Federal Noxious Weed Act of 1974, and Executive Order 13112 on Invasive Species (1999).

Washington State: Washington Weed Law (RCW 17.10) requires that noxious weeds be controlled to limit adverse economic effects on agricultural, natural, and human resources of the state. Noxious weeds are plants that, when established, are highly destructive, competitive, or difficult to control by cultural or chemical practices. The State Noxious Weed Control Board coordinates noxious weed control activities throughout the state via local weed districts and county noxious weed control boards. Management goals for noxious weed species may range from complete eradication to containment of the species within a currently infested area.

The State Noxious Weed Control Board updates its list of noxious weeds annually and categorizes the species into three classes (WAC 16-750). Federal noxious weed lists are incorporated in the state list.

Class A species are those noxious weeds not native to the state that are of limited distribution or are unrecorded in the state. Eradication of all Class A species is required by state law. State Class A species are listed on all County Class A weed lists.

Class B species are those noxious weeds not native to the state that are of limited distribution or are unrecorded in a region of the state, and that pose a serious threat to the region. These species are treated differently in different regions of the state, based on their distribution. In regions where a Class B species is of limited distribution or unrecorded, the species is designated by the state for 'control', which is defined under state law as prevention of seed production (WAC 16-750). In regions where a Class B species is already widespread (Class B non-designate species), control is decided at the local weed board level, with containment as the primary goal.

Class C weeds may be widely established in Washington, or may be of particular interest to the agricultural industry. Control of these species is a local weed board option.

The State of Washington also maintains a monitor list of non-native species. Species may be included on the list for a variety of reasons including the need for information on distribution and biology, the need to verify occurrence, and the need to monitor reoccurrence. There is no regulatory or legal authority associated with the monitor weed list.

The Revised Code of Washington (RCW 17.10.140; 17.10 240) specifically addresses the landowner's duty to control the spread of noxious weeds on managed forest lands: forest

lands used solely for the planting, growing, or harvesting of trees, and which are typified, except during a single period of five years following clear-cut logging, by canopies so dense as to prohibit growth of an understory. On these lands, Class A weeds must be eradicated and Class B designates must be controlled and prevented from spreading. Other noxious weeds listed on the county weed list with locally mandated control priorities must be addressed only within a one thousand foot buffer strip of adjacent land uses, and for a single five-year period following harvest of trees.

Snohomish County: The Snohomish County Noxious Weed Control Boards administers state weed laws at the local level on private, county, and state lands. The county weed board also adopts rules and regulations as necessary to administer the County's noxious weed control program. Local weed boards are provided flexibility to determine local weed priorities for Class B non-designate and Class C species, and are responsible for enforcement of weed control responsibilities to ensure resource protection and uniform standards. Although primary responsibility for weed management is assigned to the landowner, the county weed board facilitates implementation of management activities through technical assistance and education on noxious weed species, prevention strategies, and management methods. Appendix 1 presents the current list of noxious weed species in Snohomish County and will be updated whenever a new list is released.

Public Utility District No. 1 of Snohomish County: The Vegetation Management Program (VMP; District 2003) documents the roles, responsibilities, and criteria used to address vegetation management throughout District operations, including the Jackson Project lands. The VMP was designed to provide a safe, economical, and environmentally responsible program of vegetation management using an integrated pest management approach with minimal negative impacts to the environment and human health. A key premise of the VMP is that the District will seek alternatives to the use of herbicides. The VMP is regularly reviewed and updated; the current revision is dated October 2003. This Noxious Weed Management Plan has been developed and will be implemented in compliance with the requirements of the VMP.

City of Everett: City of Everett policy does not allow the use of chemical pesticides within the Lake Chaplain Watershed, where they may conceivably make their way to waters traveling to the reservoir, or the reservoir itself. Within the Spada Watershed, the City of Everett strongly encourages the use of all other means of noxious weed management.

Definitions: This Noxious Weed Management Plan uses the following definitions based on WAC 16-750.

Control (per WAC 16-750) means to prevent all seed production (and to prevent the dispersal of the following propagules of aquatic noxious weeds - turions, fragments, tubers, and nutlets).

Contain means to confine a noxious weed and its propagules to an identified area of infestation.

Eradicate means to eliminate a noxious weed within an area of infestation.

Prevent the spread of noxious weeds means to contain noxious weeds.

3.0 RESPONSIBILITIES

Staff responsibilities for the overall implementation of the District Vegetation Management Plan, including noxious weed management aspects, are defined in the VMP (District 2003). Responsibilities for implementation of the Noxious Weed Management Plan reflect the current VMP, and will be updated to comply with subsequent amendments to the VMP. Any modifications to the Noxious Weed Management Plan that are necessary to comply with the VMP will be reported in the annual updates and documented in the TRMP five-year report submitted to FERC.

District biologists will oversee the implementation of the Noxious Weed Management Plan and prepare reports of management activities. The term "District biologist," includes wildlife biologists that are employed by or under contract to the District. The term District implies that work may be done by someone other than a wildlife biologist, who is directly supervised by a wildlife biologist. The District will be responsible for coordination with District crews implementing weed management methods and training of crews in the use of the most appropriate control and prevention measures. As the FERC licensee, the District will be responsible for documenting weed management activities on all Project lands.

Documentation of weed management activities will be compiled annually by the District, with updates to GIS databases made at least annually as well. A summary of each year's weed management efforts will be sent to the Snohomish County Noxious Weed Board coordinator and other consulted parties. Management activities and updates will be discussed within the annual updates prepared as part of the TRMP reporting process. Review meetings will continue to be offered by the District upon request by the Snohomish County Noxious Weed Board coordinator, the City, DNR, USFWS, WDFW or USFS at any time.

4.0 NOXIOUS WEED MANAGEMENT PLAN

4.1 Background

Integrated pest management is defined by the U.S. Department of Agriculture (National Information System for Regional IPM Centers 2008) as follows:

> "Integrated pest management is socially acceptable, environmentally responsible, and economically practical plant protection."

A more detailed definition is provided in the Healthy Schools Act of 2000 (Assembly Bill 2260):

> "…a pest management strategy that focuses on long-term prevention or suppression of pest problems through a combination of techniques such as monitoring for pest presence and establishing treatment threshold levels, using non-chemical practices to make the habitat less conducive to pest development, improving sanitation, and employing mechanical and physical controls. Pesticides that pose the least possible hazard and are effective in a manner that minimizes risks to people, property, and the environment, are used only after careful monitoring indicates they are needed according to pre-established guidelines and treatment thresholds."

Integrated weed management is based on the principle that a combination of management strategies is often more effective than a single type of treatment. An integrated approach allows selection of the best-suited preventative, cultural, physical, mechanical, chemical, and biological methods for the conditions present at an individual site. In addition, the economic, environmental, and social costs of the selected weed management methods are balanced against the legally required management level and the benefits of weed management. The proposed weed management strategies are designed to be compatible with other resource management objectives for the area; for the Jackson Project these include:

- Maintenance of specified water quality parameters for public drinking water supply;
- Fish and wildlife management objectives;
- Forest stand management;
- Recreation use and scenery values;
- Public access to Project lands

This plan lists the noxious weeds at the Jackson Project and describes their occurrence and threats. A summary of available management methods is provided for each weed species. A recommendation for management of the species is presented, based on the methods most suitable for use on Project lands. The specific treatment applied in any given year will be based on the recommended methods, but may be modified at the time of treatment to reflect site conditions, weather, growth rates, improved techniques and other variables. A set of prevention measures to reduce the opportunity for reintroduction and spread of noxious weeds is included in the plan.

4.1.1 Summary of Noxious Weeds at the Jackson Project

Ongoing weed management activities at the Jackson Project address noxious weeds at Project facilities, recreation areas, and along Project roads. Non-native hawkweeds, tansy ragwort, invasive knotweed, bull thistle and Canada thistle are targeted for control by District weed managers on Project lands. In addition, Scotch broom and herb Robert are managed voluntarily by the District at selected locations on Project lands. Wild carrot, although not specifically targeted for management, is controlled at several Project locations where roadside mowing is performed to control other species.

In order to obtain a comprehensive list of weeds occurring at the Project, a noxious weed inventory was conducted in 2007 (District and City of Everett 2008). The study area included surface lands within the FERC Project boundary; areas where Project operations, or Project-related maintenance, land use practices, or human activities could promote the introduction, establishment, and/or spread of noxious weeds; National Forest System lands within the riparian corridor between Culmback Dam and the Diversion Dam; and selected District and City of Everett properties outside the FERC Project boundary.

Nineteen species of weeds were recorded during the inventory, including seven species currently requiring control per Washington State and/or Snohomish County regulations. Table 1 presents the Class A, Class B designate, and County selected noxious weeds known to occur and currently under management on Project lands. The table also displays five weed species that currently are managed voluntarily by the District at selected locations; the Forest Service requests management of these five species on all Project lands in order to protect nearby National Forest System lands. One Class C species for which the County requests management is also presented. This table represents the target weed species proposed for management on Project lands as of 2008.

Table 1. Noxious Weeds Occurring on Jackson Project Lands and 2008 Management Status

Scientific Name	Common Name	2008 Snohomish County Management Status
Centaurea biebersteinii	spotted knapweed	Class B Designate
Hieracium caespitosum	yellow hawkweed	Class B Designate
Polygonum spp. (invasive)	invasive knotweed	Class B Undesignated, County Selected
Senecio jacobaea	tansy ragwort	Class B Undesignated, County Selected
Cirsium arvense	Canada thistle	Class C, County Selected
Cirsium vulgare	bull thistle	Class C, County Selected
Hieracium spp. (non-native)	invasive hawkweed	Class C, County Selected
Cytisus scoparius [1]	Scotch broom	Class B Undesignated
Daucus carota [1]	wild carrot	Class B Undesignated
Geranium robertianum [1]	Herb Robert	Class B Undesignated
Buddleja davidii [1]	butterfly bush	Class C
Lamiastrum galeobdolon [2]	yellow archangel	Class C
Ilex aquifolia [1]	English holly	Not listed

Class B Designate: Control is required (prevention of all seed production)

County Selected: Control is required (prevention of all seed production)

Class B Undesignated: No specific management required

Class C: No specific management required

[1] No management required by State or County; District voluntarily manages selected sites; Forest Service requests management of these species on all Project lands, in addition to Class A, Class B Designates, and County-selected species

[2] No management required by State or County; County NWCB requests voluntary management of documented site

In addition to the species on Table 1, any species of Class A, Class B designate, or County selected noxious weeds that are reported on Project lands during a given year will be incorporated into the Noxious Weed Management Plan and managed in accordance with applicable Washington State law and County regulations. Appendix 2, Target Weed Species for the Jackson Project, is designed to be updated annually to reflect new species occurrences and changes in management status.

Table 2 shows the number of infestations recorded for each noxious weed species based on existing District data and the 2007 inventory, and displays the data by geographic area within the Project boundary. Figure 1 shows the locations of these infestations.

The Project Facilities tract, including the power pipeline right-of-way and Trout Farm Road site, exhibited the largest number of weed species. All but two of the species listed on Table 2 were observed in this geographic area. The Spada Lake area, including access roads and recreation sites, had the second largest number of species and the greatest number of recorded infestations. Four species on Table 2, invasive knotweed, butterfly bush, yellow archangel, and English holly, were not recorded in the Spada Lake geographic area. Only two species, bull thistle and yellow hawkweed, were recorded in the Williamson Creek area. Herb Robert was the single species from Table 2 that was recorded at the Lost Lake tract.

Spotted knapweed was found at one location along the South Shore Road and was treated (hand pulled) on the 2007 survey date. Knotweed is present at one location along the power pipeline right-of-way.

Bull thistle, Canada thistle, yellow hawkweed, other non-native hawkweeds, and tansy ragwort were observed along roadsides, particularly along portions of the South Shore Road at Spada Lake. They also occur at the Project Facilities tract and along the power pipeline right-of-way. Thistles and hawkweeds are present at Culmback Dam; bull thistle and yellow hawkweed were observed at a small number of locations along an abandoned forest road in the Williamson Creek tract.

The Class B undesignated species Scotch broom, wild carrot, and herb Robert were reported from disturbed roadsides and grassy areas in the Project Facilities geographic area, including the power pipeline right-of-way. A small number of infestations were recorded in the Spada Lake area.

The Class C species butterfly bush and yellow archangel were reported only from the Project Facilities geographic area. Butterfly bush is present along project roads and rights-of-way in this area. Yellow archangel was observed at a single site at the Trout Farm.

English holly, which is currently not listed as a noxious weed in Washington State, was documented at the Trout Farm river access sites and near the transmission line right-of-way at the Project Facilities tract.

Table 2. Summary of Weed Infestations on Project Lands by Geographic Area

Scientific Name	Common Name	Lost Lake	Project Facilities, Power Pipeline ROW, Trout Farm	Spada Lake Area, Rec Site 8, and Roads	Williamson Creek Area	Total number of weed infestations per species
Centaurea biebersteinii	spotted knapweed	0	0	1	0	1
Hieracium caespitosum	yellow hawkweed	0	5	3	1	9
Polygonum sp. (invasive)	invasive knotweed	0	1	0	0	1
Senecio jacobaea	tansy ragwort	0	7	6	0	13
Cirsium arvense	Canada thistle	0	7	20	0	27
Cirsium vulgare	bull thistle	0	12	25	4	41
Hieracium sp. (non-native)	invasive hawkweed	0	0	1	0	1
Cytisus scoparius	Scotch broom	0	7	1	0	8
Daucus carota	wild carrot	0	2	1	0	3
Geranium robertianum	Herb Robert	1	5	4	0	10
Buddleja davidii	butterfly bush	0	3	0	0	3
Lamiastrum galeobdolon	yellow archangel	0	1	0	0	1
Ilex aquifolia	English holly	-	4	-	-	4
Total number of weed infestations per geographic area		1	54	62	5	122

4.2 Weed Management Methods

4.2.1 Project-Specific Considerations

The District Vegetation Management Plan (District 2003) contains several items specific to the Jackson Project, including the following:

- "Mechanical tree and brush cutting equipment will be used to the maximum extent possible.

- Herbicides may be applied as necessary to control unwanted vegetation within the Project Facilities tract, including the transmission line right-of-way, the back slope of the powerhouse, and those portions of the power pipeline right-of-way that are outside of the City of Sultan's watershed, defined as the area between the Lake Bronson Camp chain link fence and the Sultan City chain-link fence line on the powerhouse access road. ."

This Noxious Weed Management Plan reflects the requirements of the current VMP. Any modifications to the Noxious Weed Management Plan that are necessary to comply with the VMP will be reported in the annual updates and documented in the TRMP five-year report submitted to FERC

Lake Chaplain Watershed

City of Everett policy currently does not allow the use of chemical pesticides within the Lake Chaplain Watershed, where they may conceivably make their way to waters traveling to the reservoir, or the reservoir itself. Outside of the drinking water watershed, herbicides may be applied after other methods of weed control have proven ineffective at controlling weeds per State and County requirements.

The Project Facilities tract is located outside of the Lake Chaplain watershed. Herbicides are currently used at selected sites in the Project facilities tract, in accordance with the herbicide use criteria provided in the VMP, State and County regulations, and label directions.

Spada Lake Watershed

Within the Spada Watershed, the City of Everett strongly encourages the use of all means of noxious weed management other than chemical pesticides.

Currently, no herbicides are applied to District lands in the Spada watershed. Given that the primary purpose of the Spada Reservoir is municipal drinking water supply, the use of herbicides for weed management on Project lands has been, and will continue to be, extremely restricted. However, the District acknowledges the challenge of managing noxious weeds over such a large area exclusively by manual and mechanical methods, and reserves the option to investigate the use of chemical herbicides when no other method of weed management is effective at achieving control as required by State and/or

County regulations, or when the available methods are cost prohibitive. The District will consult with the City of Everett on its findings.

4.2.2 Ongoing Weed Management Practices

Weeds at the Jackson Project are currently managed through a variety of methods implemented by District staff. Within the Spada Lake watershed, control measures consist primarily of mowing roadsides or hand pulling and clipping of flower heads, as appropriate. Mowing occurs 1-2 times per year along roadsides, and manual pulling/cutting occurs as flower heads develop throughout the growing season. Hand clipping and removal of seed heads has been conducted for several years on a patch of tansy ragwort and thistle along the road side between the South Shore and Nighthawk Recreation sites at Spada Lake.

The District voluntarily manages Scotch broom and butterfly bush along Project roads and facilities by grubbing out small plants, cutting back larger plants, and by hand clipping of flower heads. Wild carrot has been managed in some locations by roadside mowing. A small patch of herb Robert along the Lost Lake road has been treated by hand pulling for several years.

When necessary, and where allowed, herbicides are used to treat individual plants and populations, but every attempt is made to preserve the adjacent desirable vegetation. Recurring infestations along segments of the pipeline right-of-way outside of the Lake Chaplain Watershed are treated by herbicide application one or more times during the growing season, as necessary.

On selected areas where herbicides are not allowed, experimental techniques have been used. These include a large weed mat applied to the backslope at Culmback Dam to control scotch broom and burning of thistle and scotch broom at recreation site 8. Shading of weeds has also been tested on a limited and experimental basis.

Weed treatment locations are noted on a project map and GPS coordinates are recorded for the general areas where weed treatment occurs. This information is then entered into the District's GIS database.

Ongoing monitoring of weed populations is described in Section 6.

4.2.3 Management Methods for Noxious Weeds

Appendix 3 presents a summary of known weed infestations, weed habitat requirements, flowering time and reproductive characteristics, and available management methods for each weed species to be managed under this plan. A site-specific management recommendation, long-term management goal, and five-year management objectives are provided for each species.

- Appendix 3-1. Spotted knapweed (*Centaurea biebersteinii*)
- Appendix 3-2. Yellow hawkweed (*Hieracium caespitosum*) and other invasive hawkweeds (*Hieracium* spp.).

- Appendix 3-3. Invasive knotweed (*Polygonum* spp.)
- Appendix 3-4. Tansy ragwort (*Senecio jacobaea*)
- Appendix 3-5. Canada thistle (*Cirsium arvense*)
- Appendix 3-6. Bull thistle (*Cirsium vulgare*)
- Appendix 3-7. Scotch broom (*Cytisus scoparius*)
- Appendix 3-8. Wild carrot (*Daucus carota*)
- Appendix 3-9. Herb Robert (*Geranium robertianum*)
- Appendix 3-10. Butterfly bush (*Buddleja davidii*)
- Appendix 3-11. Yellow archangel (*Lamiastrum galeobdolon*)
- Appendix 3-12. English holly (*Ilex aquifolia*)

4.3 Pesticide Application and Management

Specifications for the application of pesticides (herbicides) on District lands, including herbicide toxicity ratings, applicator credentials, sensitive area restrictions, and materials storage, handling, and record keeping are provided in the District Vegetation Management Plan (District 2003).

5.0 PREVENTION

Prevention of the introduction and spread of weeds relies on early detection, effective treatment, ongoing education of land managers and the public about weed issues, and proper planning and management of ground- and habitat-disturbing activities.

5.1 Weed Prevention Practices for Construction and Maintenance Projects

One of the most effective tools for reducing the introduction and spread of weeds is careful planning and management of ground-disturbing activities conducted as part of construction, maintenance, or restoration projects. Weeds are readily spread from infested to non-infested areas on the tires, tracks, or blades of heavy equipment. Trucks, off-road vehicles, and even hand tools can transport weed propagules. Contaminated soil and rock fill, mulch, and seed also are often responsible for new weed infestations. Conversely, the availability of heavy equipment can be an opportunity for the weed manager to reduce existing populations at a reduced cost. The weed plan manager should be an active participant, with project engineers and design professionals, throughout the construction planning and implementation process. By incorporating weed prevention design considerations and practices, weed management costs can be reduced.

Weed prevention practices to be implemented at the Jackson Project are presented in Appendix 4.

5.2 Disposal of Weed Material

Plant material from noxious weed species must be disposed of in a way that ensures that no seeds, roots, or other portions of the plant capable of reproduction, are spread. Plant material should be bagged on site if any flowers or seeds are present; paper or plastic

bags can be used. Some species, particularly members of the aster family, can produce seed from immature heads on cut plants; these plants should be bagged even if only in bud. Plant material should be transported to a contained disposal site or an approved landfill. Alternatively, noxious weed material may be buried deeply below a 24-inch or greater layer of weed free soil or rock fill. This should be accomplished as close to the originating site of the weeds as possible, to avoid transport of the species to new areas. This method may not be 100 percent effective, as seed or other propagules may be inadvertently deposited in surface layers.

Soil excavated from sites with noxious weed populations should not be transported to other sites or used as topsoil, to avoid spreading weed seeds or other propagules. The soil can be disposed of at a contained site or an approved landfill. An alternative disposal method is to bury the weed contaminated topsoil as fill below a 24-inch or greater layer of weed-free topsoil, or beneath a similar depth of rock fill. Burial of weed material should be accomplished as close to the originating site of the weeds as possible, to avoid transport of the species to new areas. This method may not be 100 percent effective, as seed or other propagules may be inadvertently deposited in surface layers. Burial is not recommended for invasive knotweed due to its ability to resprout from extremely small pieces of plant material.

5.3 Education

Education and information programs can be used to expand knowledge of weed identification, weed transport, and basic weed prevention practices. Weeds are not transported only via construction activity: passenger vehicles, off-road vehicles, boats and trailers, livestock, and recreationists themselves are capable of inadvertently transporting weeds from one site to another. Education and information programs at the Jackson Project will include:

- Information for the public on identification of aquatic milfoil, and the prevention of its spread to Project waters via boats and trailers. Informational signs will be maintained at all Jackson Project boat launches.

- Training for District biologists in noxious weed identification, weed treatment methods, and weed prevention practices. In addition, weed crew leaders and field staff will continue to receive training in treatment methods and weed prevention practices, particularly proper disposal of weed material.

5.4 Revegetation

Revegetation of disturbed soils with fast-growing, desirable plant species, is a primary method of preventing weed establishment. Soil disturbance can stimulate germination of weed seed that has accumulated in the soil as well as provide substrate for newly introduced seed. Short term erosion control vegetation can provide protection against weed establishment; however, erosion control seed mixes often are comprised of non-native, and sometimes persistent or invasive, species. In developed, human-maintained habitats, such as landscaped areas, non-native species may be appropriate and acceptable.

However, in native plant communities, it is often desirable to revegetate with a seed mix comprised of natives or non-native, non-invasive species that will not outcompete native species.

The District will revegetate sites where Project-related activities result in substantial areas of habitat and soil disturbance, and where revegetation is practicable (*e.g.*, sites such as rock quarries and the fluctuation zone of the reservoir are not included). Revegetation actions will reflect consideration of each site's vegetative condition and future land use, adjacent land uses, habitat management objectives, and site maintenance requirements.

The use of native plants will be considered for sites located in relatively undisturbed, native plant-dominated communities. Non-invasive, non-native plant species will be used where their use is consistent with current and expected future land uses (*e.g.*, landscaped sites, frequently disturbed sites, managed forest stands) and where necessary to achieve objectives associated with site management and maintenance activities (*e.g.*, forage production, erosion control, temporary cover, soil conditioning, and weed suppression.).

Specific revegetation guidelines and plant community objectives currently exist for the power pipeline right-of-way and other facilities in the Project Facility Lands tract as part of terrestrial resource management. The Project Facility Lands Tract Resource Management Plan (District 2001) and the associated Right-of-Way Management Standard Operating Procedures (District 1997) will continue to direct revegetation activities at these sites and will be updated as needed.

Three seed mixes suitable for general revegetation of native habitats on Jackson Project lands are provided in Appendix 5. These seed mixes were developed by the U.S. Forest Service (2005) for use in erosion and weed control on decommissioned roads and are based on commercially available seed. The species are non-native, non-invasive, and relatively short-lived, allowing native plants to recolonize the reseeded sites over time.

6.0 MONITORING AND REPORTING

6.1 Site-Specific Monitoring

Monitoring of weed populations on Project lands is conducted by District staff. Project lands that are open to the public are regularly patrolled via the road network during the growing season. Locations of weed infestations are noted by District staff and treatment measures are implemented. Roads and pipeline rights-of-way are patrolled several times during the growing season to identify areas where weed control is required.

Currently, District staff note the locations of weed infestations on Project maps and enter the location data into the District's GIS database. The dates and specific information related to implementation of control measures are also documented. Weed monitoring and treatment activities are reported to WDFW, USFWS and the Tribes as part of the WHMP reporting process.

Under this new plan, monitoring of specific weed sites and treated areas within the Project boundary will be continued. New weed sites detected on Project lands during the 2007 inventory will be monitored after treatment, as described in the individual species management methods. Sites where the risk of regrowth and potential for spread are higher, such as heavily visited recreation sites, are scheduled for more frequent monitoring than those sites where those risks are low due to, for example, overstory shading and lack of human disturbance.

A summary of scheduled monitoring activity is provided in Section 9.

6.2 General Monitoring

Incidental observations of weeds on Project lands are reported by staff conducting other activities on Project roads, at Project facilities, and on other Project lands. A primary source of weed information is the District biologists' regular field review of forested stands and wetlands within wildlife habitat management tracts. Monitoring and patrolling of Project roads and recreation facilities also result in new observations of weed species. Currently, the river corridor is not regularly patrolled for weeds, but weeds are identified during annual fish surveys. Several known locations of Scotch broom on gravel bars below the Powerhouse and down to the mouth of the river are managed voluntarily each year. Because weed infestations are most readily eradicated when they are small, early detection is key to successful weed management. Incidental observations of target weed species will be reported by District biologists and other field staff, using a standard District form. Weed sightings will be referred to a trained weed manager so that treatment action can be implemented as soon as possible. Field staff will be instructed to carry a simple digging tool and plastic bags, so that individual plants can be removed from the site immediately. These 'spot treatments' will also be reported to the weed manager so that the sites can be monitored in the future for regrowth.

Incidental observations of target weeds will be included in the Annual Report. In addition to the target weed species listed in Table 2, any species of Class A, Class B designate, or County selected noxious weeds that are reported on Project lands during a given year will be incorporated into the Noxious Weed Management Plan and managed in accordance with applicable Washington State law and County regulations.

6.3 Reporting

As part of the TRMP reporting process, an annual update will be prepared summarizing the noxious weed treatment and monitoring activities of the previous year and any updates to the Noxious Weed Management Plan or its appendices. This summary and update of weed management activities will be distributed to the parties consulted regarding weed management, as listed in this plan under Section 7.0 Consultation, below.

Periodic (five-year) review of plan accomplishments and update of lists and appendices, prepared in consultation with the parties consulted and listed below will be provided to FERC as part of the TRMP five-year report.

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7.0 CONSULTATION

The Noxious Weed Management Plan was developed in consultation with the Terrestrial Resources Stakeholders. Specific entities with regulatory authority and major land owners/managers with holdings abutting the Jackson Project also were consulted during the development of the Plan. These entities include the Snohomish County Noxious Weed Board, the City, DNR, USFWS, WDFW and USFS.

8.0 MODIFICATION OF MANAGEMENT PLAN

The Noxious Weed Management Plan is intended to guide the management of noxious weeds throughout the term of the license. Modifications to the plan may be proposed by the licensee after consultation with the parties listed in Section 7.0 Consultation and will be reported as part of the TRMP reporting process and provided to the Snohomish County Noxious Weed Board coordinator, the City, DNR, USFWS, WDFW and USFS.

Weed management is dynamic in terms of regulatory requirement, weed occurrence, site conditions, and treatment methodology. Specific elements of the plan require annual review and update, including the list of target noxious weed species required to be managed and the list of weed species occurring within the Project boundary. The list of sites to be treated and/or monitored and the list of available treatments and prevention practices also will require periodic review and update, although not necessarily on an annual basis.

8.1 Annual Review of Noxious Weed List

Each year, within 60 days after the County's issuance of its annual updated weed list, the District will update the list of target noxious weed species (Appendix 2) to be managed under the plan in consultation with the Snohomish County Noxious Weed Control Board and other consulted parties, as noted in Section 7.0 Consultation. The updated list of target species will include newly-listed and documented Class A, Class B designate, and County selected noxious weed species, as well as those species managed voluntarily by the District per agreement with the consulted parties.

8.2 Update of Species-Specific Management Methods

Each year, the District will review individual species management methods (Appendix 3) and will revise the appendices as needed to incorporate new species occurrences within the Project boundary and changes to state and county management requirements.

8.3 Five-Year Plan Review

Every five years, the District will review the weed management plan in consultation with the parties listed in Section 7.0 Consultation. The five-year review will provide an opportunity to modify the plan to reflect changing management priorities and the results of ongoing treatment and monitoring. Individual species management methods (Appendix 3) will be revised to incorporate new treatment methods, revised site priorities, and revised management recommendations for Project lands. These

modifications will be reflected in the implementation and monitoring schedules for the next five-year period.

9.0 IMPLEMENTATION AND MONITORING SCHEDULE

Within the first five years after license issuance, the District will implement treatment at all new weed sites on Project lands that were identified during the 2007 inventory. This activity will include treatment of 43 new sites:

- Invasive hawkweeds: 2 sites
- Tansy ragwort: 2 sites
- Canada thistle: 8 sites
- Bull thistle: 8 sites
- Scotch broom: 5 sites
- Wild carrot: 2 sites
- Herb Robert: 9 sites
- Butterfly bush: 2 sites
- Yellow archangel: 1 site
- English holly: 4 sites

Monitoring of Project roads, facilities, and treated weed sites will be conducted annually by District personnel. Newly treated sites as well as those weed sites currently under management on Project lands will be monitored and retreated as necessary. As of summer 2008, a total of 79 sites were under active management by the District, including one knotweed site along the power pipeline right-of-way. Proposed monitoring for each species is described in detail in Appendix 3. The majority of sites are scheduled for annual inspection at a minimum; a few remote sites with small infestations are scheduled for monitoring every other year. District personnel will typically survey the most disturbed and weed-prone Project habitats, such as the Powerhouse, power pipeline right-of-way, and Culmback Dam area, three to four times per growing season.

In addition to monitoring of known weed infestations, District Biologists and other field personnel will conduct general monitoring of Project lands. During the course of field activity, personnel will note and report the occurrence of new infestations of target weed species on Project lands. General monitoring will be conducted each year, with most activity occurring during the spring/summer/early fall field season.

10.0 LITERATURE CITED

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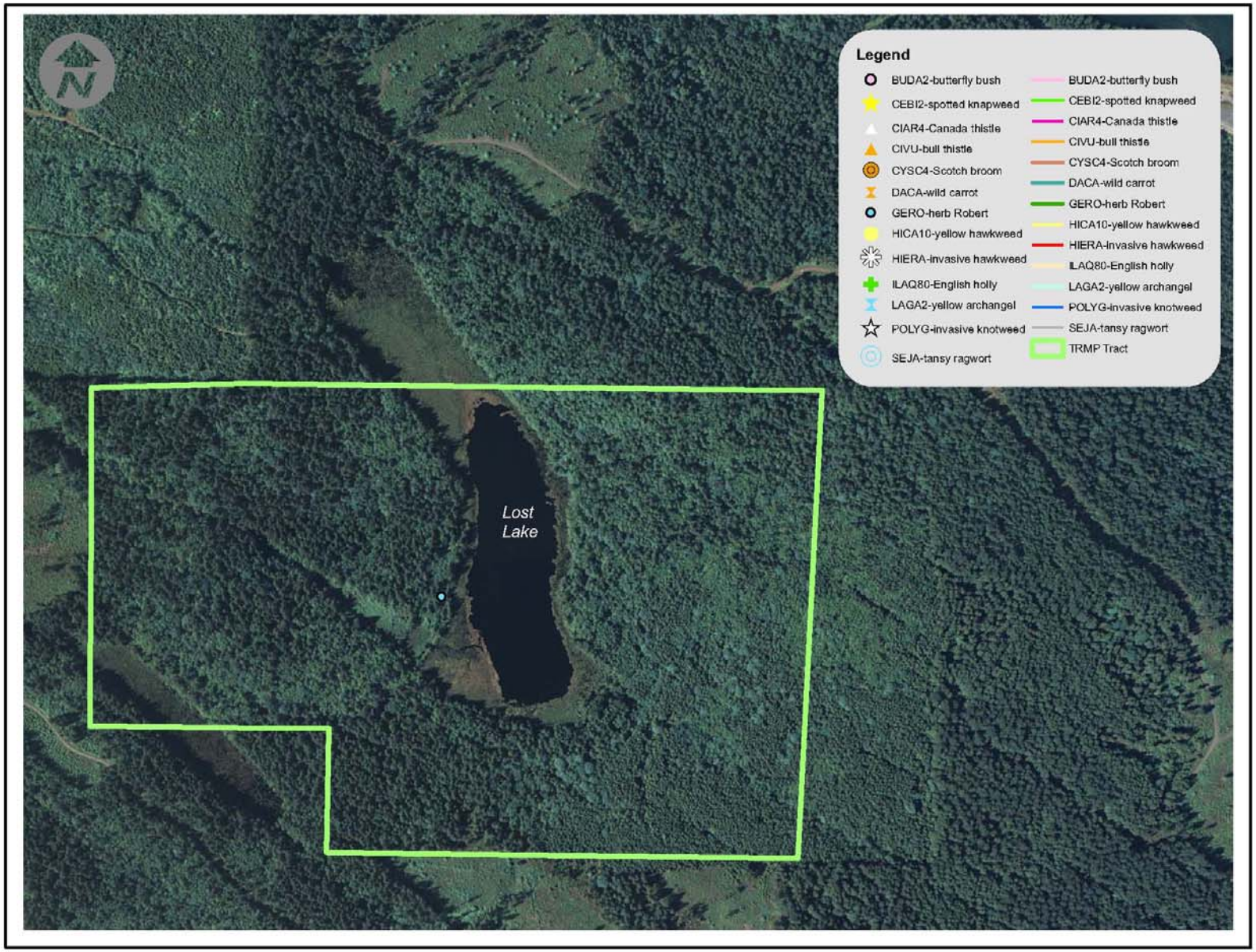

Figure 1 Noxious Weed Locations on the Lost Lake Tract (Map 1 of 6)

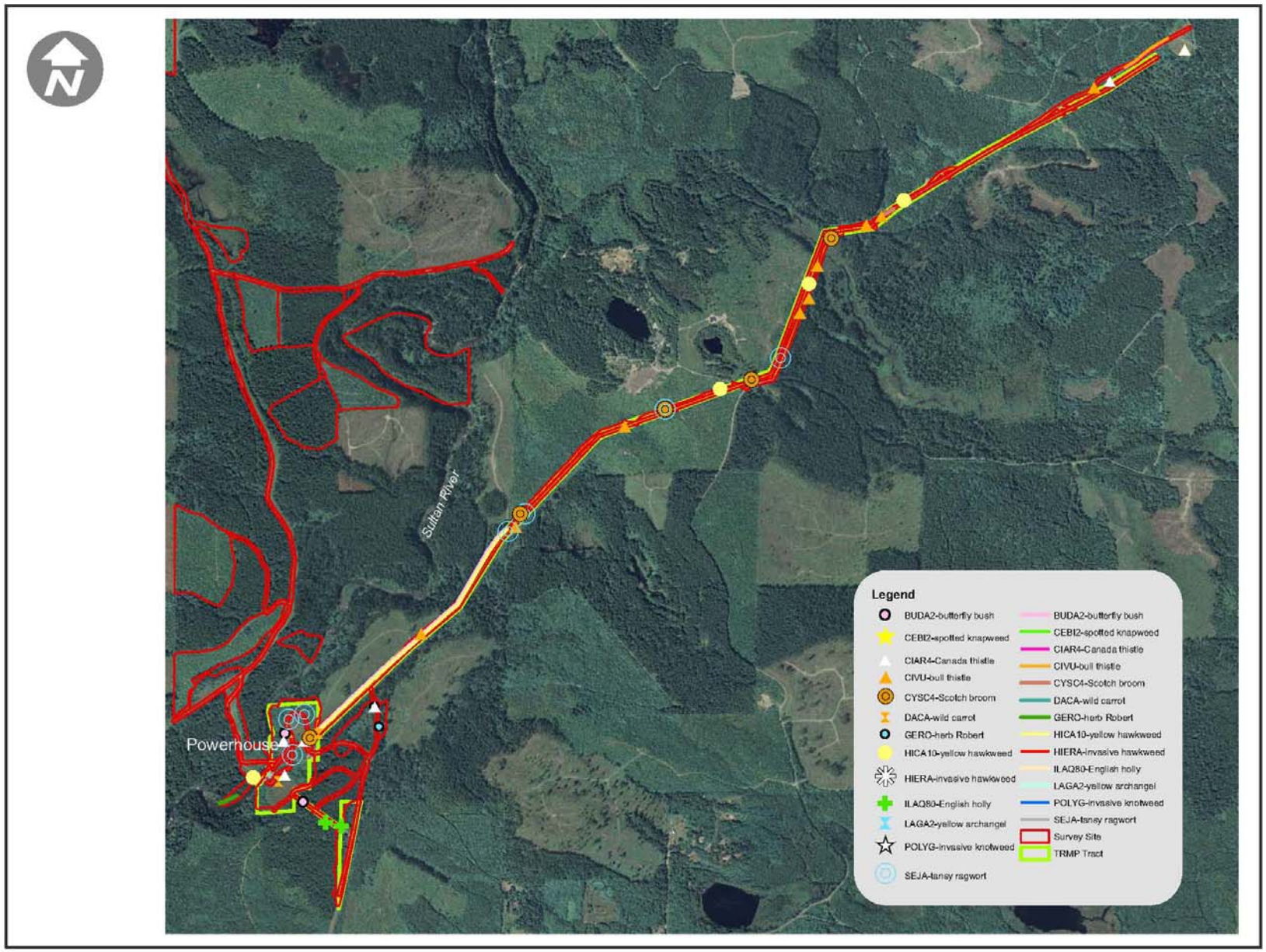

Figure 1 Noxious Weed Locations on the Project Facilities Land Tract (Map 2 of 6)

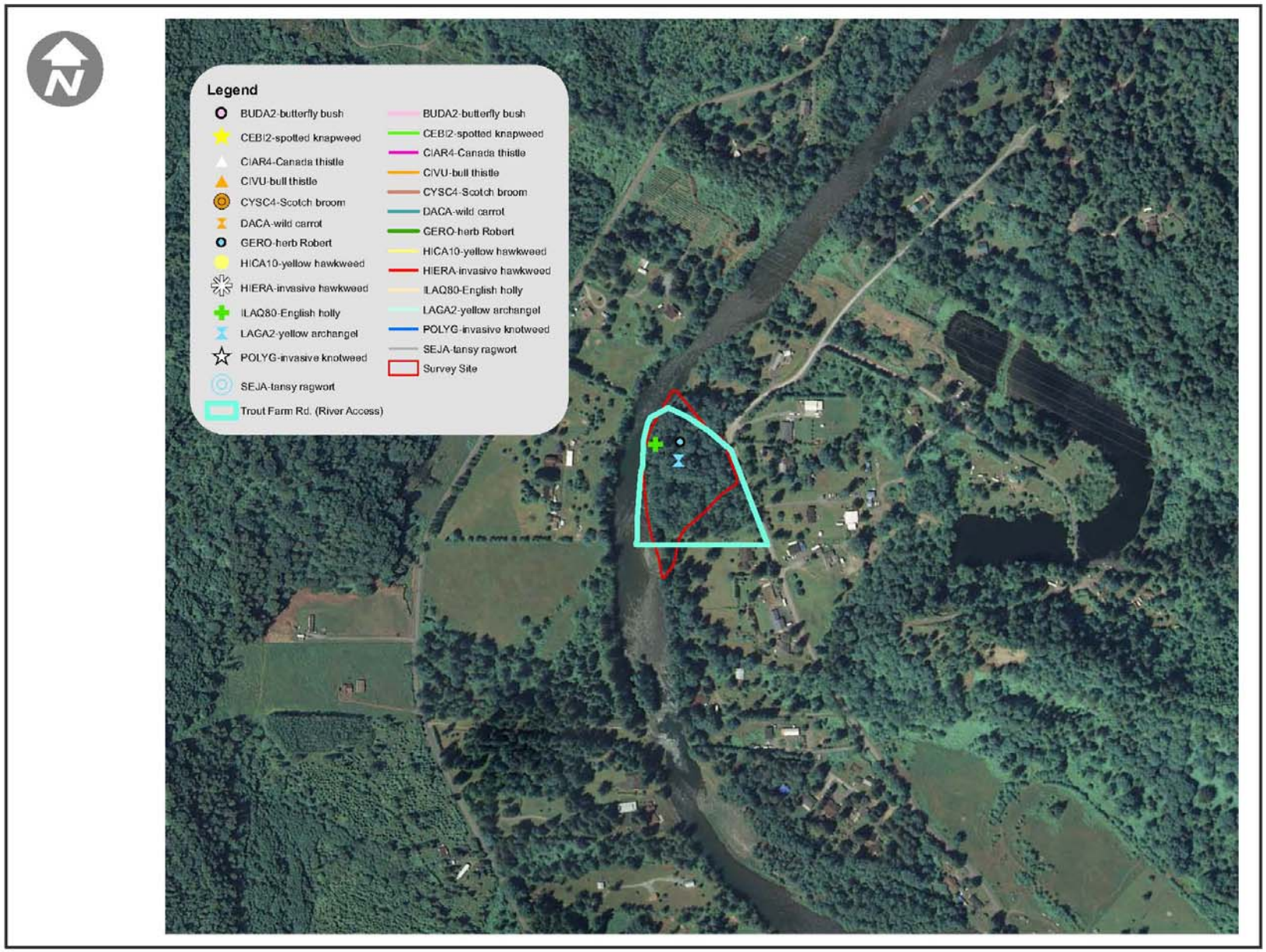

Figure 1 Noxious Weed Locations on the Trout Farm Rd. River Access Site (Map 3 of 6)

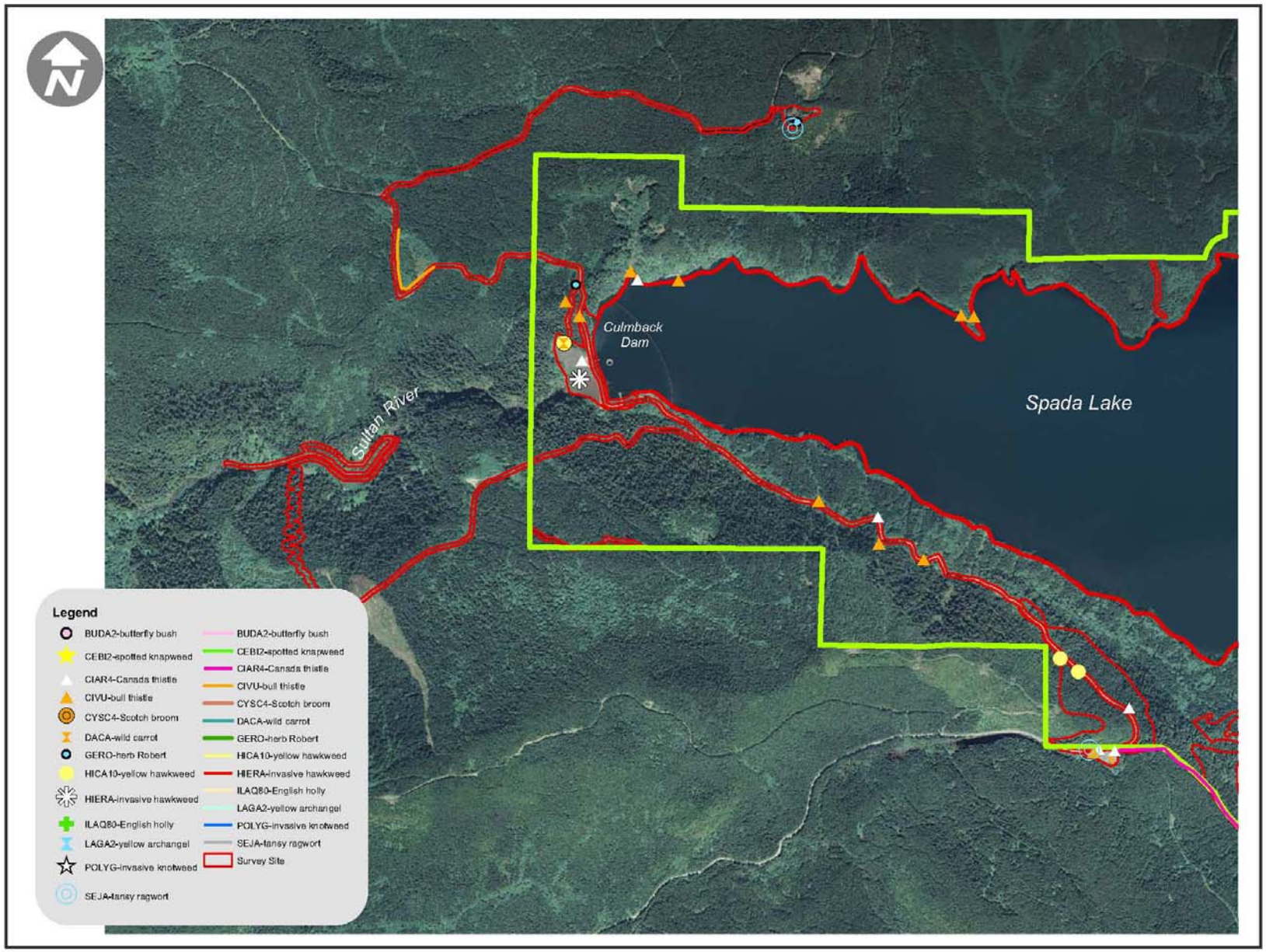

Figure 1 Noxious Weed Locations on the Spada Lake Tract and Recreation Sites (Map 4 of 6)

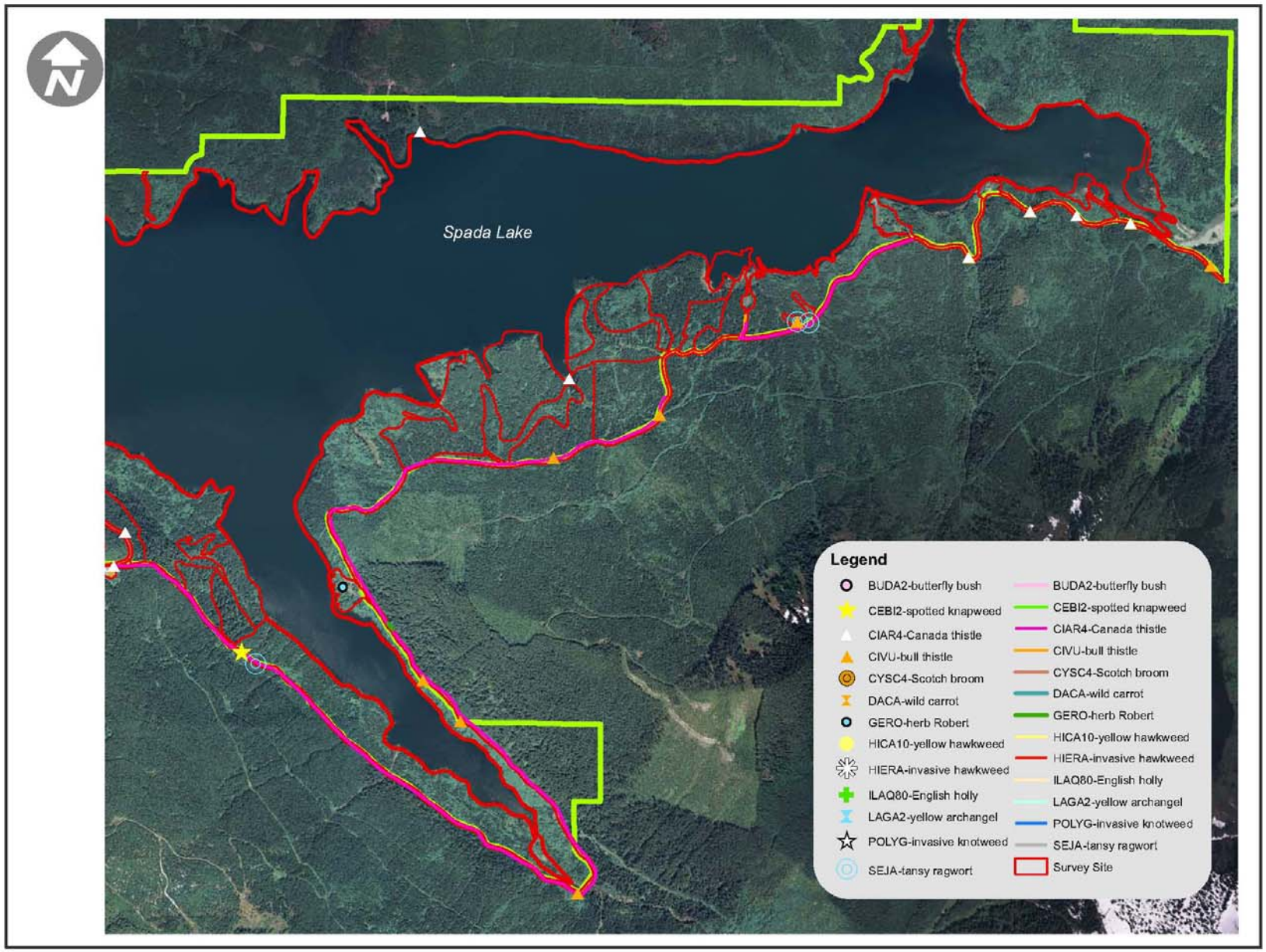

Figure 1 Noxious Weed Locations on the Spada Lake Tract and Recreation Sites (Map 5 of 6)

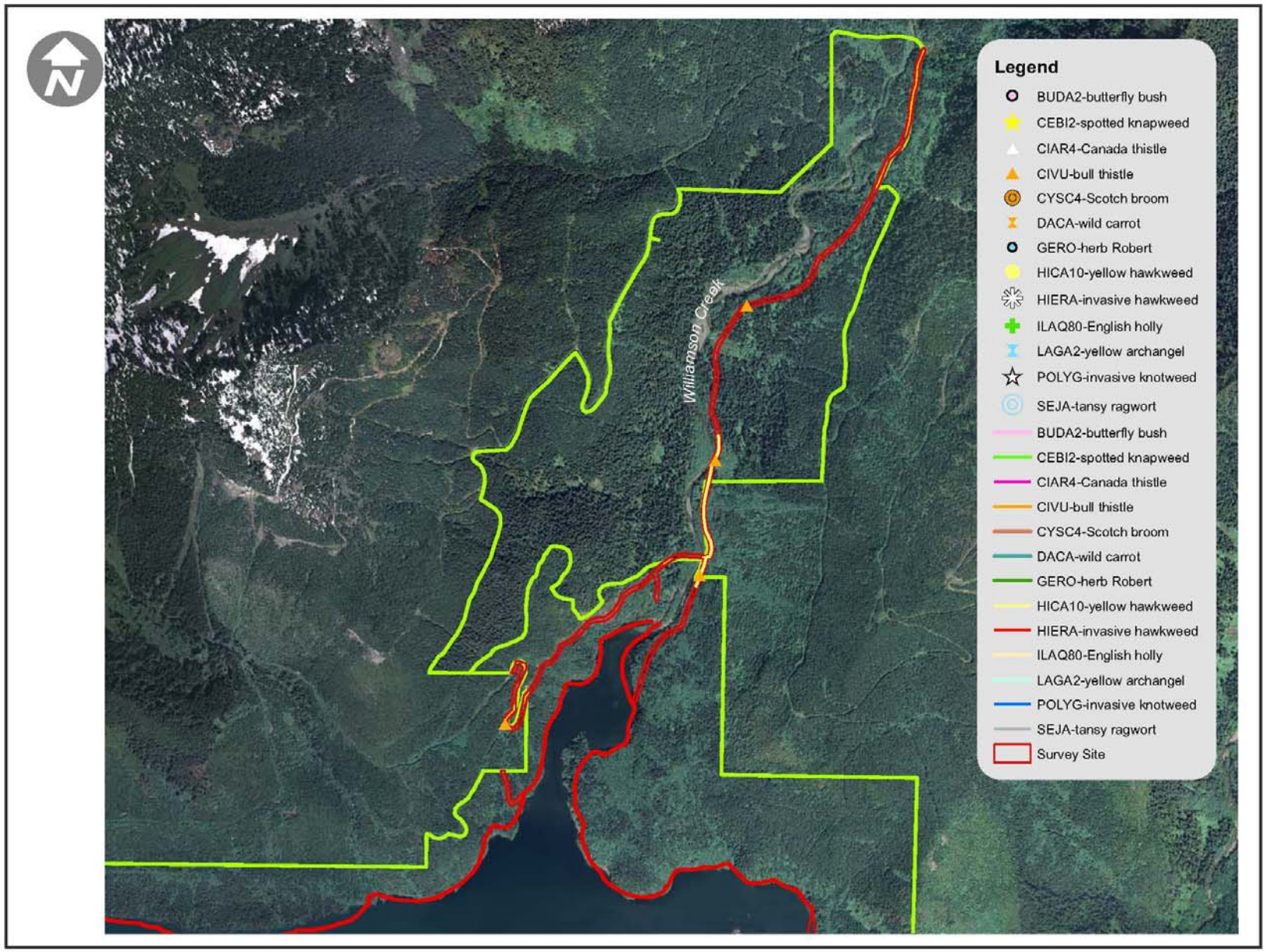

Figure 1 Noxious Weed Locations on the Spada Lake and Williamson Creek Tracts (Map 6 of 6)

Appendix 1. 2008 Washington State Noxious Weed List with Snohomish County Designations

Common Name	*Scientific Name*	Code
CLASS A		
velvetleaf	*Abutilon theophrasti*	ABTH
garlic mustard	*Alliaria petiolata*	ALPE4
thistle: Italian	*Carduus pycnocephalus*	CAPY2
slenderflower	*Carduus tenuiflorus*	CATE2
purple starthistle	*Centaurea calcitrapa*	CECA2
knapweed: bighead	*Centaurea macrocephala*	CEMA9
knapweed: Vochin	*Centaurea nigrescens*	CENI3
common crupina	*Crupina vulgaris*	CRVU2
spurge: eggleaf	*Euphorbia oblongata*	EUOB4
goatsrue	*Galega officinalis*	GAOF
reed sweetgrass	*Glyceria maxima*	GLMA3
Texas blueweed	*Helianthus ciliaris*	HECI
giant hogweed	*Heracleum mantegazzianum*	HEMA17
hawkweed: yellow devil	*Hieracium floribundum*	HIFL3
hawkweed: European	*Hieracium sabaudum*	HISA4
hydrilla	*Hydrilla verticillata*	HYVE3
dyers woad	*Isatis tinctoria*	ISTI
floating primrose-willow	*Ludwigia peploides*	LUPE5
wild four o'clock	*Mirabilis nyctaginea*	MINY
variable-leaf milfoil	*Myriophyllum heterophyllum*	MYHE2
kudzu	*Pueraria montana* var. *lobata*	PUMOL
sage: Mediterranean	*Salvia aethiopis*	SAAE
sage: meadow clary	*Salvia pratensis*	SAPR2
sage: clary	*Salvia sclarea*	SASC2
ricefield bulrush	*Schoenoplectus mucronatus*	SCMU10
thistle: milk	*Silybum marianum*	SIMA3
silverleaf nightshade	*Solanum elaeagnifolium*	SOEL
buffalobur	*Solanum rostratum*	SORO
johnsongrass	*Sorghum halepense*	SOHA
cordgrass: common	*Spartina anglica*	SPAN5
cordgrass: dense flower	*Spartina densiflora*	SPDE2
cordgrass: salt meadow	*Spartina patens*	SPPA
Spanish broom	*Spartium junceum*	SPJU2
spurge flax	*Thymelaea passerina*	THPA7
Syrian bean-caper	*Zygophyllum fabago*	ZYFA
CLASS B		
Russian knapweed	*Acroptilon repens*	ACRE3
camelthorn	*Alhagi maurorum*	ALMA12
blackgrass	*Alopecurus myosuroides*	ALMY
indigobush	*Amorpha fruticosa*	AMFR
bugloss: annual	*Anchusa arvensis*	ANAR16
bugloss: common	*Anchusa officinalis*	ANOF
wild chervil	*Anthriscus sylvestris*	ANSY
hoary alyssum	*Berteroa incana*	BEIN2
white bryony	*Bryonia alba*	BRAL4
fanwort	*Cabomba caroliniana*	CACA
thistle: plumeless	*Carduus acanthoides*	CAAC
thistle: musk	*Carduus nutans*	CANU4

Common Name	***Scientific Name***	**Code**
longspine sandbur	*Cenchrus longispinus*	CELO3
knapweed: diffuse	*Centaurea diffusa*	CEDI3
knapweed: brown	*Centaurea jacea*	CEJA
knapweed: meadow	*Centaurea jacea x nigra*	CEJAN
knapweed: black	*Centaurea nigra*	CENI2
yellow starthistle	*Centaurea solstitialis*	CESO3
knapweed: spotted	*Centaurea stoebe (C. biebersteinii)*	CESTM (CEBI2)
rush skeletonweed	*Chondrilla juncea*	CHJU
poison hemlock	*Conium maculatum*	COMA2
houndstongue	*Cynoglossum officinale*	CYOF
yellow nutsedge	*Cyperus esculentus*	CYES
Scotch broom	*Cytisus scoparius*	CYSC4
spurge laurel	*Daphne laureola*	DALA11
wild carrot	*Daucus carota*	DACA6
blueweed	*Echium vulgare*	ECVU
Brazilian elodea	*Egeria densa*	EGDE
spurge: leafy	*Euphorbia esula*	EUES
spurge: myrtle	*Euphorbia myrsinites*	EUMY2
common fennel	*Foeniculum vulgare*	FOVU
herb-Robert	*Geranium robertianum*	GERO
hawkweed: polar	*Hieracium atratum*	HIAT2
hawkweed: orange	*Hieracium aurantiacum*	HIAU
hawkweed: yellow	*Hieracium caespitosum*	HICA10
hawkweed: queen-devil	*Hieracium glomeratum*	HIGL3
hawkweed: smooth	*Hieracium laevigatum*	HILA4
hawkweed: mouseear	*Hieracium pilosella*	HIPI
common catsear	*Hypochaeris radicata*	HYRA3
policeman's helmet	*Impatiens glandulifera*	IMGL
kochia	*Kochia scoparia (Bassia scoparia)*	KOSC (BASC5)
perennial pepperweed	*Lepidium latifolium*	LELA2
lepyrodiclis	*Lepyrodiclis holosteoides*	LEHO7
oxeye daisy	*Leucanthemum vulgare*	LEVU
Dalmatian toadflax	*Linaria dalmatica* ssp. *dalmatica*	LIDAD
water primrose	*Ludwigia hexapetala (L. grandiflora)*	LUHE5 (LUGRH)
loosestrife: garden	*Lysimachia vulgaris*	LYVU
loosestrife: purple	*Lythrum salicaria*	LYSA2
loosestrife: wand	*Lythrum virgatum*	LYVI3
parrotfeather	*Myriophyllum aquaticum*	MYAQ2
Eurasian watermilfoil	*Myriophyllum spicatum*	MYSP2
yellow floating heart	*Nymphoides peltata*	NYPE
thistle: Scotch	*Onopordum acanthium*	ONAC
common reed	*Phragmites australis*	PHAU7
hawkweed oxtongue	*Picris hieracioides*	PIHI
knotweed: Bohemian	*Polygonum bohemicum*	POBO10
knotweed: Japanese	*Polygonum cuspidatum*	POCU6
knotweed: Himalayan	*Polygonum polystachyum*	POPO5
knotweed: giant	*Polygonum sachalinense*	POSA4
knotweed: unid. invasive spp	*Polygonum sp.*	POINV
sulfur cinquefoil	*Potentilla recta*	PORE5
Austrian fieldcress	*Rorippa austriaca*	ROAU
grass-leaved arrowhead	*Sagittaria graminea*	SAGR
tansy ragwort	*Senecio jacobaea*	SEJA
lawnweed	*Soliva sessilis*	SOSE2
perennial sowthistle	*Sonchus arvensis* ssp. *arvensis*	SOARA2
cordgrass: smooth	*Spartina alterniflora*	SPAL

Common Name	*Scientific Name*	Code
swainsonpea	*Sphaerophysa salsula*	SPSA3
saltcedar	*Tamarix ramosissima*	TARA
puncturevine	*Tribulus terrestris*	TRTE
gorse	*Ulex europaeus*	ULEU
CLASS C		
jointed goatgrass	*Aegilops cylindrica*	AECY
absinth wormwood	*Artemisia absinthium*	ARAB3
butterfly bush	*Buddleja davidii*	BUDA2
hoary cress	*Cardaria draba*	CADR
hairy whitetop	*Cardaria pubescens*	CAPU6
thistle: Canada	*Cirsium arvense*	CIAR4
thistle: bull	*Cirsium vulgare*	CIVU
old man's beard	*Clematis vitalba*	CLVI6
field bindweed	*Convolvulus arvensis*	COAR4
smoothseed alfalfa dodder	*Cuscata approximata*	CUAP2
hairy willow-herb	*Epilobium hirsutum*	EPHI
babysbreath	*Gypsophila paniculata*	GYPA
English ivy: four cultivars only	*Hedera helix* 'Baltica', 'Pittsburgh', 'Star' ;*H. hibernica* 'Hibernica'	HEHE, HEHI12
spikeweed	*Hemizonia pungens*	HEPU5
Hawkweeds, except not listed as A or B, native spp.	*Hieracium* spp.	HISPP
black henbane	*Hyoscyamus niger*	HYNI
common St. Johnswort	*Hypericum perforatum*	HYPE
yellow flag iris	*Iris pseudacorus*	IRPS
yellow archangel	*Lamiastrum galeobdolon*	LAGA2
yellow toadflax	*Linaria vulgaris*	LIVU2
scentless mayweed	*Matricaria perforata*	MAPE2
fragrant water lily	*Nymphaea odorata*	NYOD
reed canarygrass	*Phalaris arundinacea*	PHAR3
curly-leaf pondweed	*Potamogeton crispus*	POCR3
cereal rye	*Secale cereale*	SECE
common groundsel	*Senecio vulgaris*	SEVU
white cockle	*Silene latifolia* ssp. *alba*	SILAA3
common tansy	*Tanacetum vulgare*	TAVU
hedgeparsley	*Torilis arvensis*	TOAR
spiny cocklebur	*Xanthium spinosum*	XASP2

Species in **bold** are Snohomish County Class B designates; **control is required**
Species in italic ***bold*** are Snohomish County Class B or C selected; **control is required**

Class A Weeds: Non-native species whose distribution in Washington is still limited. Preventing new infestations and eradicating existing infestations are the highest priority. **Eradication of all Class A plants is required by law**.

Class B Weeds: Non-native species presently limited to portions of the State. Species are designated for control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal.

Class C Weeds: Noxious weeds which are already widespread in Washington or are of special interest to the state's agricultural industry. The Class C status allows counties to enforce control if locally desired. Other counties may choose to provide education or technical consultation.

Appendix 2. Jackson Project 2008 Target Noxious Weed Species

Scientific Name	Common Name	2008 Snohomish County Management Status
Centaurea biebersteinii	spotted knapweed	Class B Designate
Hieracium caespitosum	yellow hawkweed	Class B Designate
Polygonum spp. (invasive)	invasive knotweed	Class B Undesignated, County Selected
Senecio jacobaea	tansy ragwort	Class B Undesignated, County Selected
Cirsium arvense	Canada thistle	Class C, County Selected
Cirsium vulgare	bull thistle	Class C, County Selected
Hieracium spp. (non-native)	invasive hawkweed	Class C, County Selected
Cytisus scoparius [1]	Scotch broom	Class B Undesignated
Daucus carota [1]	wild carrot	Class B Undesignated
Geranium robertianum [1]	Herb Robert	Class B Undesignated
Buddleja davidii [1]	butterfly bush	Class C
Lamiastrum galeobdolon [2]	yellow archangel	Class C
Ilex aquifolia [1]	English holly	Not listed

Class B Designate: Control is required (prevention of all seed production)

County Selected: Control is required (prevention of all seed production)

Class B Undesignated: No specific management required

Class C: No specific management required

[1] No management required by State or County; District voluntarily manages selected sites; Forest Service requests management of these species on all Project lands, in addition to Class A, Class B Designates, and County-selected species

[2] No management required by State or County; County NWCB requests voluntary management of documented site

Appendix 3. Species-Specific Management Methods for the Jackson Project 2009

Appendix 3-1
Management Methods for Spotted Knapweed
(*Centaurea biebersteinii*)

Known Sites : One site was documented along the South Shore Road of Spada Lake during the 2007 inventory. A single, isolated population, occupying approximately 100 square feet was recorded. All plants were pulled on the survey date of 08-23-07.

Habitat and Threats: Spotted knapweed typically grows in well-drained soils in disturbed, open habitats including meadows, vacant lands, road side ditches, pasturelands, and railroad grades. It is an aggressive, allelopathic invader of pasturelands, and provides low palatability as livestock forage.

Reproduction and Flowering Period: Spotted knapweed reproduces solely by seed. Fall seedlings are able to overwinter as rosettes and produce flowering stalks the following summer. Seed can live in the soil for up to seven years. Each plant can produce up to about 1,000 seeds over an extended flowering period from May through September. In the Project vicinity, flowering is most likely to occur between June and early September.

Identification: Spotted knapweed is a taprooted perennial that grows up to five feet tall. The stems and leaves are green with a silver-gray appearance created by numerous small hairs. Stems are upright and branched; leaves range from lobed to deeply divided. The flowers are pink to lavender and relatively small. The bracts are veined and the upper bract margin is tipped with black and fringed with short spines.

Available Management Methods:
***Prevention*:** Specifying weed-free fill, mulch, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned before moving to or from infested areas. Check for basal leaf rosettes in the spring, and treat early to prevent flowering.

Manual: Hand pulling, digging or grubbing of plants is effective for small populations. Hand pulling is most effective when soils are moist. A digging tool should be used on mature plants and rosettes in dry soils to completely remove the root, which will otherwise resprout. If removal is conducted after flowering commences, plants should be bagged and destroyed to prevent seed set and/or dispersal.

Mechanical: Mechanical methods such as rototilling and plowing are effective on spotted knapweed, but are not appropriate for the small, roadside infestation at the Project. Mowing is effective at removing the flowering heads, but seeds can set from the cut heads and plants likely will flower again in the same season. Mowing will not kill the basal rosette and may induce flowering below the level of the mower blade.

Cultural: Disturbance of soil and desired vegetation in the vicinity of the known infestation should be minimized to reduce the opportunity for germination of seed in the soil. Mulching of areas where spotted knapweed has been removed also will help reduce

seed germination. Large patches of bare soil patches should be seeded or planted with desired plant species if not expected to revegetate naturally.

Chemical: Several selective broadleaf herbicides are effective on spotted knapweed. Due to the small size of the population, the availability of effective manual methods, and the District directive to avoid herbicide use in the watershed whenever practicable, herbicide treatment is not recommended for this isolated infestation.

Biological: Due to the small size of the population and the availability of effective manual methods, biological methods are not appropriate for this site. Biological methods are most effective on very large populations where other methods are not available or effective.

Management Recommendation for Spotted Knapweed at the Jackson Project: Hand pull, dig, or grub out individual plants. Pull plants when soil is moist to facilitate removal of entire root; in dry soil conditions, use a digging tool to remove the entire root. Bag any stalks with buds, flowers, or seeds, and remove from site.

Keep soil disturbance to the minimum possible while removing plants to reduce the potential for germination of seed. Actively revegetate any sites where weed removal activities result in soil disturbance of one square meter or more. Use preventative measures to reduce introduction of spotted knapweed seed onto Project lands.

Long-Term Management Goal: Spotted knapweed is a Class B designate; control (per WAC 16-750) is required in Snohomish County. Control and elimination of the known population within the Project boundary is the Project-level goal.

Five-Year Management Objectives:

- Initial treatment implemented in 2007.
- Monitor site annually in summer and retreat as necessary.
- After two consecutive monitoring events show no presence of the species, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

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Table 3-1.1 Spotted Knapweed Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Watershed	Survey Site	Ownership	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD1210C	SPADA LK	SPADA	ROAD REC SITE 1 TO 3	DISTRICT	100	2	L	PULLED	

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-2
Management Methods for Yellow Hawkweed and other Invasive Hawkweeds (*Hieracium caespitosum; Hieracium* spp.)

Known Sites: Nine yellow hawkweed sites and one invasive hawkweed site have been documented within the Project boundary. These sites include five in the Project Facilities area, four in the Spada Lake area, and one at Williamson Creek.

Sites along the power pipeline right-of-way and at Culmback Dam have been treated during ongoing weed management activities conducted by the District. Treatment of the Williamson Creek infestations was initiated in 2008.

Habitat and Threats: Hawkweeds typically grow in full sun or partial shade in well-drained soils of roadsides, fields, pastures, and other disturbed habitats. Hawkweeds can be found in partial shade in forest openings and edges. Most non-native hawkweeds reproduce by stolons as well as seed, and can rapidly spread to form dense mats, outcompeting native pasture species.

Reproduction and Flowering Period: Hawkweeds produce numerous small seeds from flowers that begin to bloom in May and June; flowering and seed production can continue through September. In the Project vicinity, flowering is most likely to occur between June and September. When mowed, the plants will send up a shorter flower shoot, and stolon production is stimulated. After repeated mowings, a dense, low mat of predominantly basal leaves and short flowering stems is produced.

Identification: Non-native hawkweeds hybridize freely and can be difficult to identify to species. Typically, non-native hawkweeds have stolons and few stem leaves, while natives tend not to produce stolons and have leafy stems. Refer to Wilson (2006) for a key to invasive and native hawkweeds of the Pacific Northwest.

Available Management Methods:
***Prevention*:** Specifying weed-free fill, mulch, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles, equipment, and personal gear should be cleaned regularly when moving to or from infested areas. Check for basal leaf rosettes in the spring, and treat early to prevent flowering.

***Manual*:** Hand pulling, digging or grubbing of plants is effective for small populations. Pull plants after bolting but before flowering, for best results. Hand pulling is most effective when soils are moist. A digging tool should be used on mature plants and rosettes in dry soils to completely remove the fibrous root, which will resprout from very small fragments. Viable seed can be produced from flowers after pulling, so plants in bud, flower, and seed should be bagged for removal from the site. If plants are already in seed, cut seed heads and bag before digging up roots, to avoid spreading the lightweight seeds.

***Mechanical*:** Mowing is not effective for long-term management of invasive hawkweeds, as they are perennial and most reproduce by stolons. Mowing will remove the flowering stalks, but most species will respond by flowering again soon after mowing. Mowing will not kill the basal rosette and may induce flowering below the level of the mower blade.

Cultural: Disturbance of soil and desired vegetation in the vicinity of known infestations should be minimized to reduce the opportunity for germination of seed in the soil. Application of mulch to sites where hawkweed has been manually removed will help to reduce germination of seed. Large patches of bare soil (one square meter or more) that are not expected to revegetate naturally with native seed source should be seeded or planted with desired species.

Shade cloth could be used experimentally to determine its effectiveness at killing hawkweed; it has been demonstrated to kill knotweed infestations. Because the shade cloth will kill associated plants, this treatment is more appropriate for dense hawkweed patches than sparse hawkweed infestations mixed with patches of native habitat. Shade cloth should be placed to cover the infestation plus a border of one to two feet and left in place for one to two growing seasons. The status of the infestation should be monitored periodically to determine if roots and stolons have been killed and to remove any stolons extending out around the edges. To prevent reinfestation of the open soil, treated sites should be revegetated with desirable species. Shrubs can be planted through the shade cloth if a biodegradable product is used; otherwise a grass/forb seed mix appropriate for roadsides should be planted and mulched after removal of the cloth.

Chemical: Several selective broadleaf herbicides are effective on hawkweeds, using spring and early summer applications. Plants sprayed during flowering may still produce viable seed, so flower head clipping and bagging is advised.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of hawkweed require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: There are no biological controls available for hawkweeds at this time.

Management Recommendation for Invasive Hawkweeds at the Jackson Project: Several species of non-native hawkweeds are listed on the Snohomish County noxious weed list, ranging from Class A to Class C, County selected. The most common invasive hawkweed observed during the 2007 inventory at the Jackson Project was yellow hawkweed, a Class B designate species. Several unidentifiable specimens, and possible hybrids, were also collected. No Class A species of hawkweed were identified. It is recommended that all unidentified, non-native hawkweeds at the site be targeted for

control per the WAC 16-750 requirements for a Class B designate or County selected species.

Hand pull, dig, or grub out individual plants. Pull plants when soil is moist to facilitate removal of entire root; in dry soil conditions, use a digging tool to remove the entire root. Remove plants prior to seed production to reduce opportunity for seed dispersal; if plants are in seed, cut and bag seed heads prior to digging out roots. Bag any stalks with buds, flowers, or seeds, and remove from site.

Keep soil disturbance to the minimum possible to reduce the potential for germination of seed. Actively revegetate any sites where weed removal activities result in soil or vegetation disturbance of one square meter or more. Use preventative measures to reduce introduction of hawkweed seed onto Project lands.

If hawkweed population control is not effective with manual, mechanical, or cultural treatments, consultation with the County NWCB, City of Everett, and other affected landowners/managers should be initiated to discuss the possible short-term use of herbicides.

Long-Term Management Goal: Yellow hawkweed is a Class B designate; other invasive hawkweeds are selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of yellow hawkweed and unidentified non-native hawkweed populations (per WAC 16-750), with eventual reduction within the Project boundary, is the Project-level goal.

Five-Year Management Objectives:

- Continue treatment along Project roads, recreation sites, power pipeline right-of-way, and Project facilities.
- Initiate treatment at Williamson Creek site and DNR lands river access within one year.
- Continue to monitor treated sites annually and retreat as necessary.
- After two consecutive monitoring events show no presence of invasive hawkweed, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

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Table 3-2.1 Invasive Hawkweed Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH8501C	PROJECT FACILITIES	DNR LANDS RIVER ACCESS	900	3	L		
EKD0810C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	2000	2	T	MOWED	Rosettes within mowed area
EKD0870C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	20	2	L	MOWED	Within mowed area; few plants in flower
EKD0910C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	100	2	L	MOWED	Mowed roadside; many rosettes, no flowers
SWH1941S	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND		5	L	MOWED	
EKD1091U	SPADA LK	CULMBACK DAM & ROAD		2	T	NOT TREATED	Terraces, with HIAL2 and HIERA
EKD1121U	SPADA LK	CULMBACK DAM & ROAD		2	T	MOWED	Scattered on terraces, face of dam and road
EKD1161C	SPADA LK	CULMBACK DAM & ROAD	16	1	M	MOWED	
EKD1162C	SPADA LK	CULMBACK DAM & ROAD	6	1	T	MOWED	
SWH1831S	WILLIAMSON	WILLIAMSON RDS EAST		5	L		Scattered along road and into forest; HIERA also present; scheduled for initial treatment (hand pulling) in 2008

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-3
Management Methods for Invasive Knotweeds (*Polygonum* spp.)

Known Sites: One population of invasive knotweed is present within the Project boundary, in the Project Facilities tract along the power pipeline right-of-way. This infestation has apparently encroached onto Project lands from adjacent property. Initial treatment of this site with herbicide was implemented in 2007. The site is located on a segment of the power pipeline right-of-way outside of the Lake Chaplain and City of Sultan drinking water supply watersheds.

Habitat and Threats: Knotweed grows in a variety of open to partly shaded disturbed sites, particularly those with moist soils such as roadside ditches, wetland margins and riparian areas. It can rapidly spread rapidly, via rhizomes, seed, and stem fragments, and forms dense monocultures that exclude native understory species.

Reproduction and Flowering Period: Knotweeds spread via thick rhizomes. Stem fragments as small as one-half inch in length can sprout to form new plants. Some species reproduce by seed, although it is believed that some hybrids do not produce viable seed. Knotweed is a deciduous perennial; flowers are produced in mid- to late summer.

Identification: Invasive knotweeds are readily identified by the dense stands of tall, bamboo-like hollow stems with large leaves. Stems range from 4 to over 12 feet tall. Individual species and hybrids are difficult to distinguish and intermediate hybrids are suspected to occur.

Available Management Methods:

Prevention: Project personnel should be instructed on the identification of knotweeds, so that new infestations are detected, reported, and treated quickly. Soil and gravel imported to the Project should be acquired from a knotweed-free source. Vehicles and equipment should be cleaned regularly when working within, and between, infested areas.

Manual: Hand pulling generally is not recommended for invasive knotweeds, as rhizome fragments as small as one-half inch have been shown to resprout. Hand pulling or digging of small, isolated populations (about 50 stems maximum) in moist soil may be effective if great care is taken to remove all plant material including small stem fragments. Otherwise, hand pulling may actually contribute to the spread of the infestation.

Mechanical: Cutting has been shown to be effective in controlling knotweeds when performed on an almost weekly basis for several years. Repeated cutting, beginning before stem senescence, can reduce rhizome reserves. All plant material must be properly disposed of to avoid resprouting or rerooting. Mowing can be effective, if performed on a short interval over many years, on sites accessible to mowing equipment.

Bending of stems, rather than cutting, has been recommended to avoid disposal and resprouting issues.

Deep excavation of soil with knotweed has been successful on sites where soil excavation is desirable and heavy equipment is available. Because knotweed reproduces from very small pieces of rhizome and stem, extreme care must be taken while excavating and stockpiling knotweed contaminated soil.

Cultural: Knotweed is somewhat intolerant of deep shade. Shading of bent or cut stems with fabric can be moderately effective in slowing the spread of small knotweed infestations. The covering should extend 25 feet minimum beyond the edges of the infestation and should be kept in place for a minimum of one year, with frequent checking and removal of regrowth. Reseeding of the treated sites is recommended.

Chemical: Herbicides are effective in controlling knotweed, particularly when applied in late summer and fall when leaves are translocating nutrients to the rhizomes. Herbicide can be delivered by several methods: broadcast spraying of large, monotypic cultures, spot spraying, and stem injection. Late season herbicide application is most effective in combination with cutting or bending stems in the spring and early summer. Stem bending delays flowering and allows the herbicide to be applied later in the growing season on shorter stems. Follow-up treatment is often needed for one to two seasons.

Currently, herbicide application is available only for populations occurring on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of invasive knotweed require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: No biological control agents are currently registered for use on knotweed.

Management Recommendation for Invasive Knotweed at the Jackson Project:
At this time, only one small infestation of knotweed has been detected on Project lands and it has been successfully controlled. The site will be monitored and retreated until it is confirmed to have been eradicated.

The use of herbicides is very limited within the Project boundary, and new infestations of knotweed, should they be detected, will require immediate treatment with manual and/or mechanical methods. If new populations exceed the size for which manual, mechanical, or cultural treatments are effective, consultation with the County NWCB, City of Everett, and other affected landowners/managers should be initiated to discuss the possible short-term use of herbicides.

The District places a high priority on preventing invasive knotweed from becoming established within the Project boundary. It has the ability to rapidly invade stream corridors and, once established, is very difficult to eradicate without the use of herbicides. One small infestation has been treated on the power pipeline right-of-way and two small

infestations have been treated in the Lake Chaplain vicinity. New infestations of invasive knotweed may occur on Project lands in the future, given that established infestations are present in the general vicinity of the Project.

Long-Term Management Goal: Invasive knotweeds are Class B undesignated species that are selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of this single invasive knotweed population (per WAC 16-750), with eventual eradication, is the Project-level goal.

Five-Year Management Objectives:

- Continue to monitor the site annually and retreat as necessary.
- After three consecutive monitoring events show no presence of invasive knotweed, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.
- Continue monitoring Project lands for new infestations and implement treatment as soon as possible.

References:

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Table 3-3.1 Invasive Knotweed Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
MSS####	PROJECT FACILITIES	POWER PIPELINE ROW				CUT AND SPRAYED	

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-4
Management Methods for Tansy Ragwort
(*Senecio jacobaea*)

Known Sites: Thirteen tansy ragwort sites were documented on Project lands during the 2007 weed inventory, including seven sites in the Project Facilities tract, and six at Spada Lake.

At the Project Facilities tract, five of seven sites were treated on the survey date. Sites along the power pipeline right-of-way were treated during ongoing weed management activities conducted by the District.

In the Spada Lake tract, four of six sites were treated on the survey date. Two sites were not treated by the surveyors; these include wetland 9-119 and the South Shore Road adjacent to the wetland. This area, located between recreation sites 3 and 4, has been treated annually for tansy ragwort and thistle by District staff for several years by hand clipping and removal of seed heads.

Habitat and Threats: Tansy ragwort typically grows in disturbed habitats from full sun to partial shade, including pastures, roadsides, trails, and cleared lands, and along their forested margins. Tansy ragwort spreads quickly in overgrazed pastures. The species contains toxic alkaloids that cause irreversible liver damage in livestock and wildlife; the effects are cumulative and prolonged ingestion results in mortality.

Reproduction and Flowering Period: Tansy ragwort is a taprooted biennial, or short-lived perennial, that dies after producing seed. Typically, a basal rosette is produced during the first year of growth and flowering commences during the second year. The plants can reach six feet in height and produce upwards of 100,000 seeds; seeds can remain viable for 10 years or more. In the Project vicinity, flowering is most likely to occur between June and September.

Identification: First season tansy ragwort plants form basal rosettes of divided leaves. Mature plants range from 18 inches to 4 feet in height, with leafy stems of divided leaves with curled margins. Leaves are dark green on top and whitish green underneath. Flowers have yellow petals and centers. Tansy ragwort is sometimes confused with common tansy; common tansy has uniformly dark green leaves, which are divided but flattened, and flowers with yellow button centers but no petals.

Available Management Methods:

***Prevention*:** Specifying weed-free fill, mulch, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when moving to or from infested areas. Check for basal leaf rosettes in the spring and treat early to prevent flowering.

***Manual*:** Hand pulling, digging or grubbing of plants is effective for small populations. Pull plants after bolting but before flowering, for best results. Hand pulling is most effective when soils are moist. A digging tool should be used on mature plants and

rosettes in dry soils to completely remove the root, which will resprout from very small fragments. Viable seed can be produced from flowers after pulling, so plants in bud, flower, and seed should be bagged for removal from the site.

***Mechanical*:** Mowing, by itself, is not effective for long-term management of tansy ragwort. Mowing will remove the flowering stalks, and if performed early in the bolting phase, can slow the occurrence of flower production. However, seeds can set from cut stalks that are already in flower and mowed plants likely will flower again in the same season. Mowing will not kill the basal rosette and may induce flowering below the level of the mower blade.

Cultural: Disturbance of soil and desired vegetation in the vicinity of the known infestation should be minimized to reduce the opportunity for germination of seed in the soil. Application of mulch to sites where tansy has been manually removed will help to reduce germination of seed. Large patches of bare soil (one square meter or more) that are not expected to revegetate naturally with native seed source should be seeded or planted with desired species.

Chemical: Several selective broadleaf herbicides are effective on tansy ragwort.

Currently, herbicide application is available only for populations occurring on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of tansy ragwort require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: Biological methods are available for tansy ragwort, including the ragwort flea beetle, the ragwort seed fly, and the cinnabar moth; these controls are most effective on very large weed populations. Due to the small size of the weed populations and the availability of effective manual methods, biological methods are not proposed for use at the Jackson Project.

Management Recommendation for Tansy Ragwort at the Jackson Project:
Hand pull, dig, or grub out individual plants. Pull plants when soil is moist to facilitate removal of entire root; in dry soil conditions, use a digging tool to remove the entire root. Remove plants prior to seed production to reduce opportunity for seed dispersal. Bag any stalks with buds, flowers, or seeds, and remove from site.

Keep soil disturbance to the minimum possible to reduce the potential for germination of seed. Actively revegetate any sites where weed removal activities result in soil disturbance of 1 square meter or more. Use preventative measures to reduce introduction of tansy ragwort seed onto Project lands.

Long-Term Management Goal: Tansy ragwort is a Class B undesignated species selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of

populations (per WAC 16-750), with eventual reduction within the Project boundary, is the Project-level goal.

Five-Year Management Objectives:

- Continue treatment at Wetland 9-119 and adjacent roads: Hand pull tansy and along South Shore Road site and within wetland. This site is designated as highest priority for treatment due to its location within a wetland and proximity to lands managed for late successional forest.
- Continue treatment along Project roads, recreation sites, power pipeline right-of-way, and Project facilities.
- Initiate treatment at two new sites at Project Facilities tract within one year.
- Continue to monitor these sites annually and retreat as necessary.
- Monitor two treated sites along North Shore Road on a two-year schedule; retreat as necessary.
- After two consecutive monitoring events show no presence of tansy ragwort, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

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Table 3-4.1 Tansy Ragwort Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0800C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	100	2	L	MOWED	Three plants within mowed area
EKD0850C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	5000	2	T		Both sides of road; 10+ plants
EKD0991C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	M	PULLED	
EKD0992C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	M	PULLED	
KWS0461C	PROJECT FACILITIES	POWERHOUSE	100	1	T	PULLED	One plant
KWS0462C	PROJECT FACILITIES	POWERHOUSE	100	1	T	PULLED	Two plants
KWS0463C	PROJECT FACILITIES	POWERHOUSE	1875	2	M		Numerous plants, moderately dense infestation
SWH0690C	SPADA LK	NORTH SHORE RD	100	1	T	PULLED	Two plants
SWH0620C	SPADA LK	NORTH SHORE REC SITE	1	1	T	PULLED	Single plant at overlook area
EKD0360C	SPADA LK	REC SITE 1 OLNEY	4	1	T	PULLED	One plant in flower
EKD1220C	SPADA LK	ROAD REC SITE 1 TO 3	100	1	L	PULLED	
SWH1641C	SPADA LK	ROAD REC SITE 3 TO 4	5000	2	L	CLIPPED	At wetland 9-119
EKD0411U	SPADA LK	WETLAND 9-119, 105; 9-184	2.7 ac	3	L	CLIPPED	9-119, scattered throughout, largest patches near road

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-5
Management Methods for Canada Thistle
(*Cirsium arvense*)

Known Sites: The 2007 weed inventory documented Canada thistle at 27 survey sites on Project lands, including 7 in the Project Facilities tract and 20 in the Spada Lake tract. The majority of sites are located in habitats with regular human disturbance such as roads, facilities, and recreation areas. However, Canada thistle was also recorded along the Spada Reservoir shoreline and in one wetland. Most infestations were 100 square feet or less; the largest was estimated at 3,000 square feet (0.07 acre).

Canada thistle infestations along roadsides at the Project are managed by mowing, pulling, and clipping. In the Project Facilities tract, infestations at the powerhouse and along the power pipeline right-of-way that are located outside the Lake Chaplain watershed are treated with herbicide. Canada thistle at Culmback Dam is typically cut prior to flowering. District staff have clipped flower heads of Canada thistle at wetland 9-119 for several years.

Habitats and Threats: Canada thistle is a widespread invader of croplands, rangelands, pasture, roadsides, lawns, and other disturbed, open, moist habitats. It also spreads to undisturbed sites via rhizomes, where it competes effectively for light, moisture, and nutrients and forms extensive infestations. Canada thistle is tolerant of a wide range of soil types but is intolerant of shade.

Reproduction and Flowering Period: Canada thistle spreads primarily by rhizomes, which can grow up to 20 feet horizontally in one season. Roots have been shown to regenerate successfully from very small pieces of rhizome. Canada thistle spreads secondarily by seed, and a single plant produces an average of 1,500 seeds. Because Canada thistle plants are either male or female, a population that has developed from a single rhizome will not produce seed. Flowers are produced in the Project vicinity beginning in June and extending through late summer.

Identification: First year Canada thistle plants form a basal rosette of linear leaves with lobed, spiny edges. Mature plants have leafy stems with lobed, wave-edged, spiny leaves. Flower heads are typically smaller than other thistles, supporting terminal pink to lavender flowers. Because Canada thistle spreads by rhizomes, extensive colonies are a distinguishing characteristic of the species.

Available Management Methods:
***Prevention*:** Specifying weed-free fill dirt, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

***Manual*:** Hand pulling, digging, or grubbing of plants is effective for very small populations and must be repeated for several years. The entire plant, including the roots, must be removed, to avoid resprouting of rhizome fragments. Pulling plants at the bud

stage is most detrimental to the plant. If flower heads have formed, they should be bagged and destroyed to prevent seed set and/or dispersal.

***Mechanical*:** Tillage of infested sites can be effective if repeated at 21-day intervals for at least two growing seasons. Because new plants sprout from rhizome fragments, less frequent tillage will lead to an increase in plants. Repeated mowings can be used to prevent seed set and to weaken stems, but generally does not kill the plants. This may be an effective short term control on low density infestations.

Cultural: Reseeding of tilled or herbicide-treated areas with fast-growing grasses and/or forbs can help establish a desired plant community. Shade cloth could be used experimentally to determine its effectiveness at killing Canada thistle. Because the shade cloth will kill associated plants, this treatment is more appropriate for dense patches of Canada thistle than for sparse infestations mixed with desirable native plant species. Shade cloth should be placed to cover the infestation plus a border of one to two feet and left in place for one to two growing seasons. The status of the infestation should be monitored periodically to determine if roots and stolons have been killed and to remove any stolons extending out around the edges. To prevent reinfestation of the open soil, treated sites should be revegetated with desirable species. Shrubs can be planted through the shade cloth if a biodegradable product is used; otherwise a grass/forb seed mix appropriate for roadsides should be planted and mulched after removal of the cloth.

***Chemical**:* Chemical control can be effective against Canada thistle, especially in combination with replanting of desired species. Herbicides that act only on broad-leaved species are recommended for sites where desirable grasses comprise a significant portion of the existing plant community. Multiple herbicide applications may be needed if a healthy plant community is not immediately re-established on the site; generally, herbicide application is most effective in the spring.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of Canada thistle require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

***Biological*:** Three biological controls are currently listed for Canada thistle in the Pacific Northwest Weed Management Handbook; two of these species are available in Washington. The two available agents received individual control ratings of ‘good’ and ‘undetermined’. Biological control agents are typically only cost-effective on very large (many acres in size) populations; results may be sporadic and localized. Biological agents may reduce the density and vigor of a population, but are not likely to eradicate it.

Management Recommendation for Canada Thistle at the Jackson Project:
Hand pull small populations, removing entire plant and bagging any flower/seed stalks. Pull plants when soil is moist to facilitate removal of entire root.

Larger infestations in open areas may be mowed to prevent seed production. Multiple mowings may be necessary during the growing season.

To reduce re-establishment of Canada thistle, revegetate any sites where removal activities result in ground or vegetation disturbance of one square meter or more. Mulch and/or reseed with desired fast-growing species such as grasses. Because Canada thistle is shade-intolerant, planting of trees and shrubs can be considered on a site-by-site basis.

If Canada thistle populations at specific locations are not effectively controlled with manual, mechanical, or cultural treatments, consultation with the County NWCB, City of Everett, and other affected landowners/managers should be initiated to discuss the possible short-term use of herbicides.

Long-Term Management Goal: Canada thistle is a Class C species selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of Canada thistle (per WAC 16-750), with eventual reduction, is the Project-level goal. Sites located within managed timber stands, and located at least 1,000 feet from adjacent land uses, will not be treated (RCW17.10.140; 17.10 240). These infestations are expected to be eradicated over time as the forest canopy becomes more dense.

Five-Year Management Objectives:

- Continue ongoing mechanical treatment along Project roads, recreation sites 1 through 5, power pipeline right-of-way, and Project facilities. Continue to monitor these sites annually and retreat as necessary.
- Continue manual treatment at Wetland 9-119. This site is designated as highest priority for treatment due to its location within a wetland and proximity to lands managed for late successional forest.
- Initiate treatment of sites along Spada Lake shoreline and along North Shore Road within two years. Monitor and retreat as needed on a two-year schedule (5 sites).
- After two consecutive monitoring events show no presence of Canada thistle, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2007. Weeds Fact Sheets web page, Canada thistle fact sheet. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/CanadaThistle_factsheet.pdf. April 2007. King County Noxious Weed Control Board, Seattle, WA

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Sheley, R.L. and J.K. Petroff (eds.) 1999. Biology and management of noxious rangeland weeds. Oregon State University Press, Corvallis, OR. 438p

Washington State Noxious Weed Control Board. 2008. Washington's Noxious Weed List Written Findings web page. Written findings of the WSNWCB for Canada

thistle. http://www.nwcb.wa.gov/weed_info/Cirsium_arvense.html . Washington State Noxious Weed Control Board, Olympia, WA.

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, Canada thistle fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/canada_thistle2.pdf Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-5.1 Canada Thistle Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0942C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL		1	L	SPRAYED PRIOR TO FLOWERING	
EKD1010C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1000	4	M	SPRAYED PRIOR TO FLOWERING	
EKD0941S	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL		2	L	SPRAYED PRIOR TO FLOWERING	
KWS0451C	PROJECT FACILITIES	POWERHOUSE	100	1	L	SPRAYED PRIOR TO FLOWERING	1 patch of 6 plants
KWS0452C	PROJECT FACILITIES	POWERHOUSE	100	1	M	SPRAYED PRIOR TO FLOWERING	
KWS0453C	PROJECT FACILITIES	POWERHOUSE	200	1	M	SPRAYED PRIOR TO FLOWERING	
SWH1771C	PROJECT FACILITIES	SB NEAR HORSESHOE BEND KIOSK		2	T	SPRAYED PRIOR TO FLOWERING	
EKD1111C	SPADA LK	CULMBACK DAM & ROAD	100	2	M	CUT PRIOR TO FLOWERING	Within fenced enclosure maintenance shed on N side dam
EKD1151C	SPADA LK	CULMBACK DAM & ROAD	100	1	L	CUT PRIOR TO FLOWERING	
EKD1152C	SPADA LK	CULMBACK DAM & ROAD	100	1	T	CUT PRIOR TO FLOWERING	
EKD1153C	SPADA LK	CULMBACK DAM & ROAD	4	1	T	CUT PRIOR TO FLOWERING	
SWH0680C	SPADA LK	NORTH SHORE RD	100	1	T		
EKD0340C	SPADA LK	REC SITE 1 OLNEY	25	1	M		Trail N of registration parking area, west side of road
SWH0940S	SPADA LK	REC SITE 3 SOUTH SHORE		5	T		
EKD1201S	SPADA LK	ROAD REC SITE 1 TO 3		2	T	CUT PRIOR TO FLOWERING	
EKD1202S	SPADA LK	ROAD REC SITE 1 TO 3		5	T	CUT PRIOR TO FLOWERING	
EKD1203S	SPADA LK	ROAD REC SITE 1 TO 3		5	L	CUT PRIOR TO FLOWERING	
SWH1631S	SPADA LK	ROAD REC SITE 3 TO 4		5	T	CUT PRIOR TO FLOWERING	

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1571C	SPADA LK	ROAD REC SITE 4 TO DNR	54	2	L	CUT PRIOR TO FLOWERING	
SWH1572C	SPADA LK	ROAD REC SITE 4 TO DNR	100	2	L	CUT PRIOR TO FLOWERING	
SWH1573C	SPADA LK	ROAD REC SITE 4 TO DNR	100	2	L	CUT PRIOR TO FLOWERING	
SWH1574C	SPADA LK	ROAD REC SITE 4 TO DNR	100	2	L	CUT PRIOR TO FLOWERING	
EKD0140C	SPADA LK	SPADA REZ NORTH SHORE	25	1	M		5-7 plants
EKD0260C	SPADA LK	SPADA REZ SOUTH SHORE	100	1	L		
SWH1381C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	225	2	L		
SWH1382C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	100	1	L		
EKD0421U	SPADA LK	WETLANDs 9-119, 9-105; UNIT 9-184		3	L		9-119, dense patches scattered throughout

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-6
Management Methods for Bull Thistle (*Cirsium vulgare*)

Known Sites: Bull thistle was documented at 41 sites within the Project boundary during the 2007 inventory. These sites include 12 in the Project Facilities tract, 25 in the Spada Lake tract, and 4 in the Williamson Creek tract. The majority of sites are located in habitats with frequent human disturbance such as roads, facilities, and recreation areas. Bull thistle was also recorded along the Spada Lake shoreline, in one wetland, and along abandoned forest management roads in the Williamson Creek tract. Most infestations were 100 square feet or less; the largest was estimated at 2,000 square feet (0.05 acre).

Bull thistle is controlled on Project lands primarily by hand pulling and mowing along roadsides. Along the power pipeline right-of-way, bull thistle is sprayed prior to flowering; at Culmback Dam it is typically cut prior to flowering. In wetland 9-119, bull thistle has been clipped for several years by District staff. Individual bull thistle plants encountered during the 2007 survey were hand pulled, including several along the Williamson Creek road.

Habitat and Threats: Bull thistle grows in a variety of soil types and is commonly found in disturbed soils. It occurs in meadows, open riparian areas, agricultural fields, pastures, roadsides, and other open habitats. Bull thistle is intolerant of heavy shade.

Reproduction and Flowering Period: Bull thistle is a biennial species that reproduces exclusively by seed. It forms a basal rosette during the first growing season, followed by a flowering stalk in mid-summer of the second season. Each plant can produce up to 4,000 seeds, but no rhizomes, root fragmentation, or other vegetative reproduction occurs.

Identification: Bull thistle is a biennial; basal rosettes are formed the first year and flowering heads form at the ends of branches during the second year. Leaves are hairy above and below, deeply lobed, and edged with sharp spines. Stems are also spiny. Although numerous individual plants may be present at an infested site, bull thistle does not spread by rhizomes, and does not form extensive colonies.

Available Management Methods:

Prevention: Specifying weed-free fill dirt, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

Manual: Hand pulling or digging can be performed; this technique is most readily performed on young plants with a small taproot. The taproot must be cut at least an inch below the ground surface to kill the plant. The resulting disturbed soil may allow sprouting of bull thistle seeds. If flower heads have formed, they should be bagged and destroyed to prevent seed set and/or dispersal.

Mechanical: Cutting the flowering stems at the soil surface when in bud stage can result in some mortality; plants thus treated should be rechecked later in the growing season and the following season. Repeated mowing can be effective at preventing seed production, but will not necessarily kill the plant. Mowing should be performed once between the bolting and flowering stages and again one month later. Repeated cultivation can also be used to effectively control bull thistle.

Biological: The bull thistle gall fly has been used as a biological control in Washington with fair results. Whatcom County NWCB notes that this agent can reduce seed production up to 60 percent. Biological agents are typically only cost-effective for large infestations; they may reduce the density and vigor of a population, but are not likely to eradicate it.

Chemical*:* Herbicides can be effective in controlling bull thistle, especially in combination with replanting of desired species. Herbicides that act only on broad-leaved species are recommended for sites where desirable grasses comprise a significant portion of the existing plant community. For best results, herbicide should be applied to the rosette stage. When non-selective herbicides are used, apply to rosettes in fall when surrounding plants may be less susceptible to the herbicide.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of bull thistle require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Cultural**:** Reseeding of treated areas with fast-growing grasses and/or forbs can help establish a desired plant community. Bull thistle does not tolerate deep shade, and establishment of shrub and tree cover can reduce infestations.

Management Recommendation for Bull Thistle at the Jackson Project:
Remove individual plants in small infestations by digging the taproot completely out and bagging and destroying any flowering heads; remove plants before bud formation to reduce potential for seed formation.

Control larger infestations in open areas by mowing; repeated mowings may be necessary during the growing season.

To reduce re-establishment of bull thistle from seed, revegetate any sites where removal activities result in ground disturbance of one square meter or more. Mulch and/or reseed with desired fast-growing species such as grasses.

If bull thistle populations at specific locations are not controllable with manual, mechanical, or cultural treatments, consultation with the County NWCB, City of Everett,

and other affected landowners/managers should be initiated to discuss the possible short-term use of herbicides.

Long-Term Management Goal: Bull thistle is a Class C species selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of bull thistle (per WAC 16-750), with eventual reduction, is the Project-level goal. Sites located within managed timber stands, and located at least 1,000 feet from adjacent land uses, will not be treated (RCW17.10.140; 17.10 240). These infestations are expected to be eradicated over time as the forest canopy becomes more dense.

Five-Year Management Objectives:

- Continue ongoing mechanical treatment along Project roads, recreation sites 1 through 5, power pipeline right-of-way, and Project facilities. Continue to monitor these sites annually and retreat as necessary.
- Continue manual treatment at Wetland 9-119. This site is designated as highest priority for treatment due to its location within a wetland and proximity to lands managed for late successional forest.
- Initiate treatment of sites along Spada Lake shoreline, along North Shore Road to Recreation Site 8, and one untreated site in the Williamson Creek tract within two years. Monitor and retreat as needed on a two-year schedule (6 sites).
- After two consecutive monitoring events show no presence of bull thistle, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2007. Noxious Weed Control Program web page, bull thistle best management practices bulletin. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/bull-thistle-control.pdf . January 2007. King County Noxious Weed Control Board, Seattle, WA.

Oregon State University. 2008. Pacific Northwest Weed Management Handbook, online edition. http://pnwpest.org/pnw/weeds?01W_INTR06.dat

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, bull thistle fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/bull_thistle2.pdf. Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-6.1 Bull Thistle Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0841C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	25	1	M	SPRAYED PRIOR TO FLOWERING	Plants outside mowed area, east side of road
EKD0842C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	25	1	M	SPRAYED PRIOR TO FLOWERING	Plants outside mowed area, east side of road
EKD0843C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	25	1	M	SPRAYED PRIOR TO FLOWERING	Plants outside mowed area, east side of road
EKD0891C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	L	SPRAYED PRIOR TO FLOWERING	
EKD0892C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	L	SPRAYED PRIOR TO FLOWERING	
EKD0952C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	300	1	M	SPRAYED PRIOR TO FLOWERING	
EKD0953C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	250	1	L	SPRAYED PRIOR TO FLOWERING	
EKD0981C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	M	SPRAYED PRIOR TO FLOWERING	Single plant
EKD0982C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	M	SPRAYED PRIOR TO FLOWERING	
EKD0951S	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL		2	L	SPRAYED PRIOR TO FLOWERING	

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1900C	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND	1	1	T	PULLED	One plant
KWS0441U	PROJECT FACILITIES	POWERHOUSE		2	L	SPRAYED PRIOR TO FLOWERING	Largest patch d/s of bridge, 20' x 75'
EKD1131C	SPADA LK	CULMBACK DAM & ROAD	10	1	T	CUT PRIOR TO FLOWERING	
EKD1132C	SPADA LK	CULMBACK DAM & ROAD	100	1	T	CUT PRIOR TO FLOWERING	
EKD1133C	SPADA LK	CULMBACK DAM & ROAD	100	1	T	CUT PRIOR TO FLOWERING	
EKD1134C	SPADA LK	CULMBACK DAM & ROAD	100	1	T	CUT PRIOR TO FLOWERING	
EKD1041U	SPADA LK	CULMBACK DAM & ROAD		2	T	CUT PRIOR TO FLOWERING	Three small clumps
SWH0671S	SPADA LK	NORTH SHORE RD		5	L		Linear patch
EKD0350C	SPADA LK	REC SITE 1 OLNEY	50	2	L		Mowed island between road and parking
EKD0401S	SPADA LK	REC SITE 1 OLNEY		2	L		
SWH0930S	SPADA LK	REC SITE 3 SOUTH SHORE		5	T		
SWH3271C	SPADA LK	ROAD N OF CULMBACK DAM SECTION 6	1	2	L	PULLED	Recoded; duplicate to SWH127 RULA 08-14-2007 Road between 2005-4 and 1990-4
SWH3272C	SPADA LK	ROAD N OF CULMBACK DAM SECTION 6	1	1	T	PULLED	Recoded; duplicate to SWH127 RULA 08-14-2007 Road between 2005-4 and 1990-4
EKD1191C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	Scattered along entire road segment
EKD1192C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	
EKD1193C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	
EKD1194C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	
EKD1195C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	
SWH1551C	SPADA LK	ROAD REC SITE 4 TO DNR	100	1	T	CUT PRIOR TO FLOWERING	
SWH1552C	SPADA LK	ROAD REC SITE 4 TO DNR	100	1	T	CUT PRIOR TO FLOWERING	
SWH1553C	SPADA LK	ROAD REC SITE 4 TO DNR	100	1	T	CUT PRIOR TO FLOWERING	

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1554C	SPADA LK	ROAD REC SITE 4 TO DNR	1500	2	L	CUT PRIOR TO FLOWERING	
SWH1391C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	100	2	T	PULLED	Three plants pulled
SWH1392C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	1	1	T		Steep bank; single plant not pulled
SWH1393C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	100	1	L		
SWH1394C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	100	1	L		
EKD0431U	SPADA LK	WETLAND 9-119, 9-105; UNIT 9-184		2	T		9-119, scattered throughout, esp. eastern 1/3
SWH1811C	WILLIAMSON	WILLIAMSON RDS EAST	10	1	T	PULLED	Two rosettes pulled
SWH1812C	WILLIAMSON	WILLIAMSON RDS EAST	10	1	T	PULLED	Single rosette pulled
SWH1813C	WILLIAMSON	WILLIAMSON RDS EAST	10	1	T	PULLED	Two plants pulled
SWH0720C	WILLIAMSON	WILLIAMSON RDS WEST	1	1	T	PULLED	

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-7
Management Methods for Scotch Broom
(*Cytisus scoparius*)

Known Sites: Seven Scotch broom infestations are present along roadsides and disturbed habitats in the Project Facilities tract. Sites include the access road to Horseshoe Bend, areas inside and outside the mowed portion of the power pipeline right-of-way, and grassy/shrub areas near the powerhouse. Scotch broom was also documented along the road and dam terraces at Culmback Dam in the Spada Lake tract.

Habitat and Threats: Scotch broom is a drought-tolerant shrub which produces large numbers of long-lived seeds. It is typically found in well-drained soils on sunny sites, but is tolerant of a wide range of soil conditions. Seeds are dispersed explosively from the plants, are transported by birds and ants, and may be unintentionally relocated through vehicle tires, heavy equipment, and in contaminated soils. Seeds and other parts of the plant are toxic to humans, horses, and other livestock. The species can invade open habitats and cleared forestland, excluding many native plant species. In large expanses of dense cover, it may increase the severity of fire events.

Reproduction and Flowering Period. The primary means of reproduction in Scotch broom is by seed. Flower production typically peaks between April and June, although small numbers of flowers can be produced at other times during the growing season. A single plant can produce up to 10,000 seeds, which mature in late summer. Seeds germinate in spring; however many seeds lay dormant in the soil and can remain viable for up to 60 years.

Identification: Scotch broom is an evergreen shrub that can reach a height of ten feet. Branches are upright, angled and dark green; leaves are three parted or single. Yellow flowers are produced in spring and early summer.

Available Management Methods:

Prevention: Specifying weed-free fill whenever possible will help to limit the introduction of seed source. Vehicles, equipment, and boots should be cleaned regularly when working in infested areas. Check for budding and early flowering plants in spring and treat before blooming.

***Manual*:** Hand pulling or grubbing can be effective for small infestations, particularly of young plants. Pull or dig up entire plant, including roots. A Weed Wrench™ or similar tool is recommended for medium to large plants with well-developed root systems. Seeds in the soil will resprout for several years, so repeated treatments will be necessary.

Mechanical: Tilling and bulldozing of large Scotch broom sites is discouraged due to the propensity for seed in the soil to germinate after soil disturbance. Cutting, mowing, or other mechanical methods can be used to manage flower and seed production, but the plants are not likely to be killed. Cutting late in the summer after seeding will use more of the plant's root reserves, and may reduce resprouting. Plants with a stem diameter of

greater than 2 inches are most susceptible to mortality through cutting. Surviving stems and seed in the soil will resprout for several years, so repeat treatment will be needed.

Cultural: Application of mulch to sites where Scotch broom has been treated will help to reduce germination of seed. Reseeding of treated areas with fast-growing grasses can help establish a desired plant community and reduce Scotch broom seed sprouting.

Chemical: A variety of chemical control options are available for Scotch broom, including both selective and non-selective herbicides. If non-selective herbicides are used, reseeding of the site with appropriate species is necessary for effective site restoration. Application of herbicide to cut stems reduces resprouting.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, in the event that large populations of Scotch broom require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: Goats will graze on Scotch broom plants and chickens will consume the seeds. Initial testing is being conducted in Washington State on two insect biological agents, a beetle and a seed weevil, for their effectiveness against Scotch broom. Results of these tests are preliminary.

Disposal Considerations: Scotch broom seeds are long-lived and tolerant of extremely high temperatures. Plant parts, including seeds, should be disposed of in a landfill or other contained disposal facility.

Management Recommendation for Scotch Broom at the Jackson Project:
Hand pull stems less than ½ inch diameter. For small infestations, use Weed Wrench™ or equivalent tool to remove plants with stem diameters between 1/2 and 2 inches. For larger infestations, and plants with stems greater than 2 inches diameter, cut or mow to remove top of plant. On sites located outside of the Lake Chaplain and City of Sultan watersheds, stem cutting and/or mowing may be followed with herbicide treatment of cut stems wherever permissible in accordance with regulations and label directions.

Repeat treatment at least once each year for several years, until resprouting plants have been killed and seed bank is diminished.

Minimize soil disturbance to the extent practicable during treatment to reduce the potential for seed germination. Actively revegetate sites where Scotch broom removal results in ground disturbance of one square meter or more. Use preventative measures to reduce introduction of Scotch broom seed into the area.

Long-Term Management Goal: Scotch broom is a Class B undesignated species in Snohomish County, but is a weed of concern to the City of Everett and U.S. Forest Service. Containment and eventual reduction of Scotch broom populations is the Project-level goal.

Five-Year Management Objectives:

- Continue treatment of Scotch broom at known locations.
- Initiate treatment at newly detected sites within three years.
- Continue to monitor these sites annually and retreat as necessary.
- After two consecutive monitoring events show no presence of Scotch broom at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2008. Noxious Weed Control Program web page, Scotch broom best management practices bulletin. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/scotch-spanish-broom-control.pdf. January 2008. King County Noxious Weed Control Board, Seattle, WA.

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Oregon State University. 2008. Pacific Northwest Weed Management Handbook, online edition. http://pnwpest.org/pnw/weeds?01W_INTR06.dat

Washington State Noxious Weed Control Board. 2001. Washington's Noxious Weed List Written Findings web page. Written findings of the WSNWCB for Scotch broom. http://www.nwcb.wa.gov/weed_info/written_findings/CLASS%20B%20PDFs/Cytisis%20scoparius,%20partial%202001.pdf. Washington State Noxious Weed Control Board, Olympia, WA.

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Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, Scotch broom fact sheet. http://www.co.whatcom.wa.us/publicworks/weeds/factsheets.jsp. Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-7.1 Scotch Broom Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0791C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	400	2	M	MOWED	Within mowed area
EKD0792C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	10	1	L	PULLED	Outside mowed area; one plant
EKD0901S	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL		2	L		Stream nearby
EKD0902C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	25	1	L		
EKD1000C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	100	3	M		
SWH1911S	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND		5	T		Scattered along road, not on pipeline
KWS0510C	PROJECT FACILITIES	POWERHOUSE	3000	2	L		Scattered from comm. tower area down to road
EKD1081U	SPADA LK	CULMBACK DAM & ROAD		2	T	CUT/ WEED MAT INSTALLED	Terraces and roads, not base of dam

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-8
Management Methods for Wild Carrot (*Daucus carota*)

Known Sites: Wild carrot was documented at three locations during the 2007 weed inventory of Project lands. In the Project Facilities tract, wild carrot is present along the power pipeline access road between the powerhouse and Horseshoe Bend; it is also present in the grassy roadside habitats and terraces near the powerhouse. Wild carrot was observed on the terraces at Culmback Dam in the Spada Lake tract. Currently, wild carrot is not monitored or managed by the District, although some sites where it occurs are mowed regularly.

Habitat and Threats: Wild carrot, also known as Queen Anne's lace, is an herbaceous biennial which occasionally behaves as an annual or short-lived perennial. It is found in meadows, pastures, roadsides, and other disturbed, herbaceous-dominated habitats. Wild carrot can invade open habitats, outcompeting many native grasses and forbs. It can also contaminate hay and can taint milk in dairy cows. A primary threat posed by wild carrot is to commercial carrot crops; because they are the same species, wild carrot can damage carrot crops through shared diseases and insect pests, and loss of seed production through hybridization.

Reproduction and Flowering Period: Wild carrot typically forms rosette in the first growing season and a flowering stem the following season. It can reproduce rapidly, germinates readily after rain and producing seeds within six weeks. Flowering peaks in July in Washington and seeds are produced from mid-summer through mid-winter. Seeds have been shown to germinate in vegetated habitats as well as in disturbed soils. Taproots extend deep into the soil and will resprout if not completely removed.

Identification: A member of the parsley family, wild carrot is readily identifiable by its large, flat-topped umbels comprised of numerous small white flowers. The stems range from 1 to 4 feet in height and are uniformly green. Leaves are finely divided and fern-like. The entire plant is covered with short, stiff hairs.

Available Management Methods:

Prevention: Specifying weed-free fill whenever possible will help to limit the introduction of seed source. Vehicles, equipment, and boots should be cleaned regularly when working in infested areas. Check for rosettes and early flowering plants in spring and again after significant rainfall events throughout the growing season.

Manual: Hand pulling or grubbing can be effective for small infestations. Pull or dig up entire plant, including roots. Seeds in the soil will resprout for several years, necessitating repeated treatment.

Mechanical: Cutting, mowing, or other mechanical methods can be effective in preventing flowering in young plants, 7 to 10 inches tall. The plants may not be killed and follow-up treatment will likely be required. Seed in the soil will resprout for several years; therefore, repeated follow-up hand pulling of young plants will be needed. On

sites where tillage is feasible, repeated plowing and planting of a cultivated crop will help deplete the soil seed source and kill young seedlings.

Cultural: Establishment of healthy populations of native and/or desirable non-native grasses and forbs can be effective in reducing re-establishment of wild carrot populations.

Chemical*:* Herbicides have been shown to be more effective on wild carrot seedlings than on older plants. Repeated applications may be necessary to kill older plants and new seedlings germinating from the seed bank.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, in the event that large populations of wild carrot require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: Wild carrot is the same species as commercial carrot. For this reason, the use of biological control agents is not an option.

Management Recommendation for Wild Carrot at the Jackson Project:
Hand pull rosettes and small plants and dig out larger plants, being careful to remove the entire taproot. Repeat treatment at least once each year for several years, until resprouting plants have been killed and seed bank is diminished. Along roadsides, mow or weed whack established plants to prevent flowering and seed set.

On well-established infestations on sites located outside of the Lake Chaplain and City of Sultan watersheds, supplement pulling or cutting by application of herbicide to new seedlings, in accordance with regulations and label directions.

Minimize soil disturbance to the extent practicable during treatment to reduce the potential for seed germination. Actively revegetate sites where wild carrot removal results in ground disturbance of one square meter or more. Use preventative measures to reduce introduction of wild carrot seed into the area.

Long-Term Management Goal: Wild carrot is a Class B undesignated weed and currently is not required to be controlled in Snohomish County. Containment and eventual reduction of wild carrot populations is the Project-level goal.

Five-Year Objectives:

- Continue treatment of wild carrot at known locations.
- Initiate treatment at newly detected sites within three years.
- Continue to monitor these sites annually and retreat as necessary.

- After two consecutive monitoring events show no presence of wild carrot at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

Oregon State University. 2008. Pacific Northwest Weed Management Handbook, online edition. http://pnwpest.org/pnw/weeds?01W_INTR06.dat

Washington State Noxious Weed Control Board. 2005. Washington's Noxious Weed List Written Findings web page. Written findings of the WSNWCB for wild carrot. http://www.nwcb.wa.gov/weed_info/Written_findings/Daucus_carota.html . November 1999. Washington State Noxious Weed Control Board, Olympia, WA.

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, wild carrot fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/wild_carrot_t.pdf . Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-8.1 Wild Carrot Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1930C	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND	75	1	L		Scattered along road and pipeline; four large patches
KWS3331U	PROJECT FACILITIES	POWERHOUSE		2	T		Upper terraces and scattered sites
EKD1101U	SPADA LK	CULMBACK DAM & ROAD		2	T	CUT	Terraces

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-9
Management Methods for Herb Robert
(*Geranium robertianum*)

Known Sites: Herb Robert was documented at ten survey sites during the 2007 weed inventory. One infestation along the Lost Lake Road has been treated for several years by hand pulling. In the Project Facilities tract, herb Robert was detected at two locations near the Horseshoe Bend kiosk and one site on DNR lands river access site downstream of the powerhouse. Two infestations were recorded at the Trout Farm site. In the Spada Lake area, herb Robert was present at the North Shore recreation site, along the road north of Culmback Dam in Section 6, and along the road between recreation sites 1 and 3, including an infestation within recreation site 2.

Habitats and Threats: Herb Robert is an herbaceous geranium that may grow as a winter or spring annual, a biennial, or a perennial. It initially colonizes disturbed open areas along roadsides, forest openings, and dry rocky outcrops, but has been shown to rapidly invade adjacent, undisturbed habitats. Aided by its mechanically-dispersed seeds, herb Robert can invade undisturbed forest understory, outcompeting native species and forming a dense ground cover.

Reproduction and Flowering Period: Herb Robert reproduces by seeds. Seeds are ejected from the drying capsules and may travel distances of 15 to 20 feet. Each seed is attached to sticky thread which can cling to animals or people, increasing dispersal distances. Seed production can be prolific under 50-60 percent canopy cover, but is usually lower under closed canopies. In western Washington, two peaks of flower production are typical. Overwintering rosettes flower in early to mid-summer; seeds germinating in the spring flower primarily during mid- to late summer. However, individual plants may be seen flowering at almost any time of year in lowland areas of western Washington.

Identification: Herb Robert is an annual or biennial, herbaceous species with deeply divided leaves and dark red stems, both covered densely with hairs. Flowers are pink to lavender. A distinguishing characteristic of the species is its musty odor when leaves are pulled or crushed.

Available Management Methods:
***Prevention*:** Specifying weed-free fill dirt, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

Manual: Hand pulling is effective and easily performed due to the shallow root systems of herb Robert. To be most effective, plants should be pulled at least twice a year, prior to each of the primary flowering seasons, early to mid-summer and mid- to late summer.

Mechanical: Mechanical cutting can be effective in controlling herb Robert on sites accessible to mowing and/or weed whacking equipment. Desirable species growing

intermixed with herb Robert are likely to be affected by mowing, and for this reason mowing is most suitable for large patches of the weed, or sites dominated by herb Robert and other weed species. Cutting should be performed prior to each of the primary flowering seasons, early to mid-summer and mid- to late summer.

Cultural: On sites where herb Robert treatment results in patches of bare ground, reseeding with fast-growing grasses and/or forbs can help speed the establishment of a desired plant community. Mulch is also useful in reducing the germination of herb Robert seeds in the soil.

Chemical: Herbicides are very effective in controlling herb Robert, but will also affect desirable species growing with the weed. Herbicide application is most suitable for large, dense infestations.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, in the event that large populations of herb Robert require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: No biological controls are currently available for herb Robert. Because this weed is so closely related to many horticultural geranium species, it is not likely that biological controls will be developed.

Management Recommendation for Herb Robert at the Jackson Project:
Hand pull small populations of herb Robert where it is growing interspersed with desirable native species. For best results, pull plants prior to each of the primary flowering seasons, early to mid-summer and mid- to late summer. On sites where herb Robert has formed extensive, dense patches, use mechanical cutting methods if site access conditions allow.

To reduce re-establishment of herb Robert from seed, actively revegetate sites where treatment activities result in ground disturbance of one square meter or more. Reseed with desired fast-growing species such as grasses and apply mulch. Use preventative measures to reduce introduction of herb Robert seed into the area.

Long-Term Management Goal: Herb Robert is a Class B undesignated species in Snohomish County. Containment of existing populations, with eventual reduction, is the goal for Project lands.

Five-Year Management Objectives:

- Continue to monitor Lost Lake infestation and retreat as needed.
- Initiate treatment at nine additional sites within the Project boundary within four years.

- Monitor treated sites annually and retreat as necessary.
- After two consecutive monitoring events show no presence of herb Robert at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2007. Noxious Weed Control Program web page, herb Robert weed alert. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/Herb_Robert_Factsheet.pdf. October 2007. King County Noxious Weed Control Board, Seattle, WA.

King County Noxious Weed Control Board. 2008. Noxious Weed Control Program web page, herb Robert best management practices bulletin. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/Herb-Robert-Control.pdf. January 2008. King County Noxious Weed Control Board, Seattle, WA.

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Washington State Noxious Weed Control Board. 2008. Washington's Noxious Weed Information web page. Weed information for herb Robert. http://www.nwcb.wa.gov/weed_info/Geranium_robertianum.html . Washington State Noxious Weed Control Board, Olympia, WA.

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, herb Robert fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/herb_robert2.pdf . Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-9.1 Herb Robert Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH0350C	LOST LAKE	LOST LAKE RD AND REC SITE	350	5	L	PULLED	One linear patch, pulled by District staff in August 2007
SWH0800S	PROJECT FACILITIES	DNR LANDS RIVER ACCESS		5	L		
SWH1761C	PROJECT FACILITIES	SB NEAR HORSESHOE BEND KIOSK		2	L		
SWH1762C	PROJECT FACILITIES	SB NEAR HORSESHOE BEND KIOSK		ND	ND		
EKD0471C	PROJECT FACILITIES	TROUT FARM RD RIVER ACCESS	400	2	L		
EKD0472C	PROJECT FACILITIES	TROUT FARM RD RIVER ACCESS	100	1	L		
SWH0600C	SPADA LK	NORTH SHORE REC SITE	600	1	L		About 30 plants at overlook site
EKD0370C	SPADA LK	REC SITE 2 SOUTH FORK	400	4	H		Dominant over 1/2 of picnic site and entering forest
SWH3250C	SPADA LK	ROAD N OF CULMBACK DAM SECTION 6	300	2	L		
EKD1241S	SPADA LK	ROAD REC SITE 1 TO 3		2	L		Both sides of road

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-10
Management Methods for Butterfly Bush
(*Buddleja davidii*)

Known Sites: Butterfly bush was recorded at three locations in the Project Facilities tract during the 2007 inventory. The largest infestation is along the transmission line right-of-way at the powerhouse; this site is mowed regularly. Butterfly bush is also present as scattered individuals in the powerhouse area and along the power pipeline access road between the powerhouse and Horseshoe Bend.

Habitat and Threats: Butterfly bush is an ornamental species from China that has escaped from cultivation. It spreads rapidly via its small, wind and water dispersed seeds, colonizing disturbed habitats such as roadsides, pastures, clear cuts, riparian areas, and gravel bars. It can become established in low nutrient soils and can form dense thickets that exclude native plants. Butterfly bush does not function as a host plant for native butterflies and may adversely affect butterfly populations by displacing native host plants.

Reproduction and Flowering Period: Butterfly bush reproduces very effectively by seeds. Flowering occurs from mid-summer to fall and plants may produce seed the first year. Mature plants may produce upwards of three million seeds, which can remain viable and dormant in the soil for many years. Butterfly bush also reproduces vegetatively, as stem segments can form adventitious roots. Cut stumps will resprout readily.

Identification: Butterfly bush is a deciduous shrub that may reach 10 to 15 feet in height. Leaves are lance-shaped, green above with whitish hairs providing a green-gray appearance below. Flowers are produced on terminal spikes and are typically lavender. White, pink and other color varieties also occur.

Available Management Methods:

Prevention: Specifying weed-free fill, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

Manual: Hand pulling, digging, or grubbing of plants is effective for small populations. The disadvantage of this method is that soil disturbance stimulates the sprouting of seeds; treatment must be repeated for several years.

Mechanical: Clipping or cutting of flowering heads is recommended as the most effective means of preventing seed production. Flowering heads must be bagged and disposed of at an approved landfill or other contained disposal site. Treatment must be repeated annually. Plants may also be cut to the base; however, this will not kill the plant, and seeds may be produced again the following year. If annual flower clipping is

selected as a long-term management method, plants can be maintained at a moderate height (4-5 feet) to facilitate access and clipping.

Tilling of infested sites is not recommended due to its stimulation of germination of the soil seedbank.

Cultural: Application of mulch around treated plants can help reduce seed germination. At sites where plants have been treated with herbicide or grubbed out, reseeding with fast-growing species can help quickly establish a desired plant community and suppress butterfly bush seed sprouting.

Chemical: Glyphosate-based herbicides without surfactants have been shown effective on small butterfly bush plants.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, in the event that large populations of butterfly bush require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: Experimental studies have been conducted with seed weevils and a wasp species; however, no insect controls are currently available for use in the U.S.

Management Recommendation for Butterfly Bush at the Jackson Project:
Hand pull, dig, or grub out small plants, being careful to remove the entire root system. Large, established shrubs should be treated by clipping and bagging flowerheads annually. Plants may be pruned to a manageable size to facilitate flower head removal. All flowerheads and other plant material should be bagged and disposed of at an approved landfill or other contained disposal facility.

To reduce re-establishment of butterfly bush, revegetate any sites where treatment activities result in ground disturbance of one square meter or more. Reseed with desired fast-growing species and mulch.

Long-Term Management Goal: Butterfly bush is a Class C weed and currently is not selected for control in Snohomish County. Containment of existing populations on Project lands, and eventual reduction, is the District's goal for butterfly bush.

Five-Year Objectives:

- Continue to monitor treated sites annually, and hand pull or dig out seedlings.
- Initiate treatment at new sites within three years.
- After two consecutive monitoring events show no presence of butterfly bush at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

Oregon State University. 2008. Pacific Northwest Weed Management Handbook, online edition. http://pnwpest.org/pnw/weeds?01W_INTR06.dat

Washington State Noxious Weed Control Board. 2006. Washington's Noxious Weed List Written Findings web page. Written findings of the WSNWCB for butterfly bush. http://www.nwcb.wa.gov/weed_info/Written_Findings1/Buddleja_davidii_wf.pdf Washington State Noxious Weed Control Board, Olympia, WA.

Washington State Noxious Weed Control Board. 2008. Washington's Noxious Weed Information web page. Weed information for butterfly bush. http://www.nwcb.wa.gov/weed_info/buddleja_davidii.html. Washington State Noxious Weed Control Board, Olympia, WA.

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, butterfly bush fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/butterflybush_t.pdf Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-10.1 Butterfly Bush Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1921S	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND		5	T		Scattered along road, not on pipeline
KWS0471U	PROJECT FACILITIES	POWERHOUSE		2	L		Scattered across site; numerous seedlings
EKD0561C	PROJECT FACILITIES	POWERHOUSE TLINE AREA	4000	2	L	MOWED	Mowed and resprouting

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-11
Management Methods for Yellow Archangel
(*Lamiastrum galeobdolon*)

Known Sites: Yellow archangel was located at the Trout Farm river access site during the 2007 weed inventory. Two patches totaling approximately 2400 square feet were reported.

Habitat and Threats: Yellow archangel is a member of the mint family introduced from Europe as an ornamental. It is an herbaceous perennial groundcover, tolerant of a wide range of soil types, moisture regimes, and light exposures. Yellow archangel invades open and forested habitats, outcompeting native species to form large, dense patches.

Reproduction and Flowering Period: Vegetative reproduction by stolons is the primary means of the rapid spread of yellow archangel. It also reproduces by stem fragments and by seed. Flowering extends between April and June. Yellow archangel can grow prostrate, upright, or as a vine.

Identification: Yellow archangel has opposite, oval, toothed leaves that are variegated from green to silvery-gray. The yellow, hooded flowers are borne in pairs at the base of leaves. The plant contains aromatic oils which are released when foliage is bruised. It forms dense patches of groundcover in both shade and sun.

Available Management Methods:
Prevention: Specifying weed-free fill, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

Manual: Hand pulling can be effective for small infestations and sites where yellow archangel grows intermixed with desirable species. Because the roots and stems will readily resprout, sites treated by hand pulling will likely require several repeat treatments. Pull plants when the soil is moist.

Mechanical: Clipping or mowing will reduce flowering, but will not kill the plants. Cutting can be effective when used in combination with herbicide application. Yellow archangel is susceptible to trampling.

Cultural: Several sources suggest experimentation with sheet mulching to determine its value as a means of control. Weed cloth, or heavy cardboard covered with 4 or more inches of arborists chips or other heavy mulch, would be applied to fully cover the infestation for one or more growing seasons. The covering should extend beyond the edges of the infestation one or more feet and the edges should be monitored for stolon growth. Once the plants are killed, the site should be revegetated.

Chemical: A variety of selective and non-selective herbicides can be effective on yellow archangel. Summer or fall application, when temperatures are above 54 degrees, have shown most effective in British Columbia. Follow-up treatment may be needed.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is proposed as an available treatment method under this plan, as the only currently known infestation is located outside of the Lake Chaplain watershed. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: No biological controls are available for yellow archangel.

Management Recommendation for Yellow Archangel at the Jackson Project:
Hand pull small, localized infestations. Mow or weed whack larger infestations on sites where herbicide application is not permissible; cover with sheet mulch after cutting. Monitor treated sites several times during the growing season and retreat as necessary. It may take more than one growing season to kill the plants; sheet mulch will need to be checked periodically and maintained in good condition. Reseed the site after the plants have been killed.

Herbicide application is recommended, where allowable, for treatment of the populations that occupy an area of more than a few square meters. Conduct a site inspection and consult with the County NWCB to determine which herbicide to use and application strength.

To reduce re-establishment of yellow archangel, revegetate any sites where treatment activities result in ground disturbance of one square meter or more. Reseed with desired fast-growing species and cover with mulch.

Long-Term Management Goal: Yellow archangel is a Class C weed and currently is not required to be controlled in Snohomish County. It was noted as a species of concern by the county in the 2007 inventory. Control and eventual reduction of the known Trout Farm population is the Project-level goal.

Five-Year Objectives:

- Initiate treatment of yellow archangel at the Trout Farm site within one year.
- Monitor the treated site annually; retreat as necessary.
- After two consecutive monitoring events show no presence of yellow archangel at the site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2008. Noxious Weed Control Program web page, yellow archangel weed alert.

http://dnr.metrokc.gov/wlr/lands/weeds/pdf/Yellow_Archangel_FactSheet.pdf . February 2008. King County Noxious Weed Control Board, Seattle, WA.

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Table 3-11.1 Yellow Archangel Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0490C	PROJECT FACILITIES	TROUT FARM RD RIVER ACCESS	2400	4	M		Two main patches beneath large ACMA trees

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-12
Management Methods for English Holly (*Ilex aquifolium*)

Known Sites: English holly was reported at four sites during the 2007 weed inventory. Three of the infestations are in the vicinity of the powerhouse transmission line; the fourth is at the Trout Farm river access site. The District currently manages this species at several locations within the Project Facilities tract, including the power pipeline right-of-way.

Habitat and Threats: English holly is an evergreen tree introduced from Europe as an ornamental. It has naturalized widely in lowland forests of western Washington State. It can invade native forest stands and form dense thickets that block light from the understory and suppress the growth of native species.

Reproduction and Flowering Period: Reproduction in English holly is primarily by seeds, which are dispersed by birds. Holly also reproduces by suckering and by layering of branches. Holly flowers in early to mid summer; male and female flowers are found on separate plants. Berries mature on the female plants in winter.

Identification: English holly is a small evergreen tree or multi-stemmed shrub. Holly is readily identifiable by its dark green, waxy, shiny leaves, from 1-3 inches in length and typically edged with spines. Some varieties, and mature leaves, may be spineless; variegated varieties also occur. Berries are bright red.

Available Management Methods:
Prevention: Prevention of the spread of holly consists primarily of control of existing plants to prevent seed production. Soil from infested areas should not be reused; equipment and tools used in infested areas should be cleaned after use.

Manual: Small holly plants can be pulled or dug out of the ground; removal is easiest when the soil is moist. Root fragments will resprout, so complete removal of the root is desirable. Due to the extensive root system of English holly, removal of large plants by digging is not effective.

Mechanical: Plants cut off at the base will resprout; repeated cuttings may eventually kill the plant. Use of heavy equipment to dig up large plants is not practical, due to the cost of access, difficulty of removing all roots, and the extent of soil disturbance.

Cultural: Application of mulch around treated plants can help reduce seed germination. At sites where plants have been cut at the base or grubbed out, reseeding with fast-growing species can help quickly establish a desired plant community and suppress re-establishment of holly from seed in the soil.

Biological: No biological controls for English holly are available.

Chemical: Foliar herbicide applications to English holly typically are not effective due to the waxy cuticle on the leaves. Application of herbicide to cut stumps, or via frilling of the stem, can be an effective means of control.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, as cut stump application is a very effective means of killing English holly. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Management Recommendation for English Holly at the Jackson Project:
Hand pull, dig, or grub out small plants, being careful to remove the entire root system. Weed Wrench™ or equivalent tool may be used. Plants are removed more readily when soils are moist. Treat large plants by cutting near the base of trunk/stems prior to berry maturation. Plant material may be left to decompose on site as long as mature berries are not present. Retreatment of cut stumps will be necessary, as they will sucker and resprout aggressively. In those areas where herbicide use is approved, apply herbicide to cut stumps to reduce or eliminate resprouting.

To reduce re-establishment of English holly from seed in the soil, revegetate and/or mulch any sites where treatment activities result in ground disturbance of one square meter or more.

Long-Term Management Goal: English holly currently is not listed on the Washington State Noxious Weed List. Containment, and eventual reduction, of existing populations on Project lands is the District's goal for English holly.

Five-Year Objectives:

- Initiate treatment of English holly at four new sites within five years.
- Monitor treated sites annually; retreat as necessary.
- Beginning in Year 1, record new infestations of English holly on Project lands in weed database, incorporate new sites into management plan; treat new sites within five years of observation.
- After two consecutive monitoring events show no presence of English holly at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

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Table 3-12.1 English Holly Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover		Survey Notes
EKD0521C	PROJECT FACILITIES	POWERHOUSE TLINE AREA	100	1	L		
EKD0522C	PROJECT FACILITIES	POWERHOUSE TLINE AREA	100	1	L		
EKD0523C	PROJECT FACILITIES	POWERHOUSE TLINE AREA	100	1	L		
EKD0510C	PROJECT FACILITIES	TROUT FARM RD RIVER ACCESS	100	1	M		GPS recorded 40' NW of infestation

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 4
Weed Prevention Practices for the Jackson Project

- Consider weed risk factors during planning of proposed ground and habitat disturbing projects, such as road and facility maintenance, road and facility construction and decommissioning, fish and wildlife restoration projects, and recreation developments. Consult weed inventory maps to determine known occurrences of regulated noxious weed species within the Project boundary.

- Clarify the roles and responsibilities of all parties involved in day-to-day maintenance performed by District staff.

- Utilize performance bonds, responsibility clauses, or accountability statements for contractors and subcontractors to effect weed management to a desired condition.

- Seek to minimize ground and habitat disturbance, and removal of overstory shrubs and trees, to reduce opportunity for weed establishment, when feasible and not required for other project purposes or safety.

- When feasible, incorporate weed removal into projects involving excavation; utilize heavy equipment to remove weed infestations, provided that appropriate disposal sites can be secured.

- When feasible, defer disturbance of weed-infested sites until weed treatments have been implemented and allowed appropriate time to take effect. When work in untreated, weed-infested areas is necessary, work from the outer edges of the infestation inward if possible, to avoid spreading the infestation.

- Specify in all contracts that heavy equipment, hand tools, personal vehicles, and off-road vehicles brought onto the Project for construction or maintenance projects outside of the road prism, be free of all dirt, mud, and plant parts.

- Specify in all contracts that all heavy equipment, including mowing equipment, excavators, trucks, personal vehicles, and off-road vehicles used in a weed-infested site be power washed to remove dirt, mud, and plant parts before leaving the area to avoid spreading the infestation. Hand tools, small power tools, and personal gear should also be inspected and manually cleaned to remove all dirt, mud, and plant parts before being transported from the site. To the extent practical, District staff will inspect all District equipment brought onto Project lands and remove dirt, mud and plant parts as needed. Exception to this practice may be made during emergency repairs.

- District biologists will work with District staff and contractors conducting construction and maintenance work in weed-infested areas to, when feasible, schedule the work to reduce potential spreading of weeds. This may involve conducting the work outside the flowering/seed production season, or controlling

weeds prior to work being conducted. When this is not feasible, equipment will be washed down prior to leaving each weed-infested area.

- Dispose of noxious weed plant material and weed-contaminated soils in a way that ensures that no seeds, roots, or other portions of the plant capable of reproduction, are spread. Material may be disposed of at an approved landfill or contained disposal site. District staff will coordinate with District Biologists regarding appropriate weed disposal.

- Provide contractors, survey crews, inspectors, and visitors weed awareness information and weed transport prevention techniques.

- Specify that contractors use regulated commercial gravel pits and fill sources to reduce the potential for weed transport onto Project lands. Specify that non commercial gravel pits and fill sources will be inspected to identify weed-free sources; treat weeds at infested sites prior to use or transport.

- To the extent practicable, require that all mulch be weed free. The Washington Wilderness Hay and Mulch (WWHAM) program now provides a list of growers whose hay and straw crops have been certified to North American Weed Management (NAWMA) standards. WWHAM/ NAWMA hay and straw bales will have a self-adhesive, tamper-proof WWHAM certification tag attached to the bale twine, or will have at least one strand of purple and yellow proprietary twine encircling the bale. A list of WWHAM producers and sellers is provided at: http://www.nwcb.wa.gov/WWHAM/WWHAM_suppliers.htm .

- Specify in all construction specifications that all seed used on site is certified 'free of noxious weeds'.

- Actively revegetate all disturbed sites, using a native seed mix; or a non-native seed mix based on non-invasive species. Apply mulch to conserve moisture and protect seed and soil. The Mt. Baker-Snoqualmie National Forest has developed a set of seed mixes for temporary site revegetation using commercially available, non-invasive species (refer to Appendix 5). These seed mixes include relatively short-lived species that are intended to be replaced over time by natural seeding of natives.

Appendix 5
USDA-FS Mt. Baker-Snoqualmie National Forest Non-Native Seed Mixes for Road Decommissioning

Source: U.S. Forest Service. 2005. Proposed treatment of invasive plants and new invaders strategy (Forest Plan Amendment #26), Environmental Assessment and Decision Notice, June 3, 2005. USDA Forest Service, Mt. Baker-Snoqualmie National Forest, Mountlake Terrace, WA.

Table 4. Desirable Non-Native Seed Mixes for Mount Baker-Snoqualmie National Forest sites ≤ 3500 feet elevation.

Droughty: Soil lacks moisture in mid-summer	Not Droughty: Soil has moisture in mid-summer	
Seed Mix A	Soils Saturated - Seed Mix B	Soils Not Saturated - Seed Mix C
Soft white winter wheat @ 50 lbs/acre	White oats @ 60 lbs/acre	Tufted hairgrass* @ 4 lbs/acre
Slender wheatgrass @ 20 lbs/acre	Tufted hairgrass* @ 4 lbs/acre	Annual ryegrass @ 10 lbs/acre
Annual ryegrass @ 20 lbs/acre	Annual ryegrass @ 10 lbs/acre	Winter triticale @ 60 lbs/acre
Austrian winter peas @ 5 lbs/acre	Alsike clover @ 2 lbs/acre	Alsike clover @ 2 lbs/acre

Goal = 170 seeds per square foot
*In areas adjacent to wetlands, eliminate tufted hairgrass and increase sowing rate of annual ryegrass to 60 lbs/acre.

Appendix 6

Stakeholder Consultation

Relicensing stakeholders were consulted prior to the submittal of the Notice of Intent to relicense (NOI) and Pre-application Document (PAD), and again during the scoping and study proposal process. They were informed of study progress and received drafts and final versions of the terrestrial resources studies (See the Updated Study Report for more information). On 8 September 2008, a meeting was held for the Jackson Project Relicensing Terrestrial Resources Group (TRG) to review the terrestrial study reports and to discuss proposed Protection, Mitigation and Enhancement (PM&E) measures for terrestrial resources, including a proposed Noxious Weed Management Plan (NWMP). A PowerPoint presentation was given at the meeting and paper copies of the presentation and of draft Noxious Weed PM&E measure were distributed to those in attendance. Digital copies were also emailed to all TRG members. Meeting minutes are included in Appendix 7. The USFS and Tulalip Tribes provided comments (see below), which were incorporated into the Noxious Weed PM&E measure and the draft NWMP.

The Preliminary License Proposal (PLP) that was filed with the FERC on 31 December 2008 included the proposed Noxious Weed PM&E measure, a draft of the NWMP, and a discussion of the terrestrial resources in the Project area. Written comments regarding the NWMP were received from the FERC and the USFS (See Appendix A of the FLA) and were incorporated into the NWMP and FLA as requested.

A meeting for the TRG was held on 23 February 2009 to discuss the terrestrial PM&E measures and the NWMP that were presented in the PLP and solicit input on preparation of the draft TRMP. Meeting minutes and comments are included in Appendix 7.

Table 6-1. Stakeholder comments on the Noxious Weed Management Plan, and District responses to comments.

STAKEHOLDER COMMENT	DISTRICT RESPONSE
US Forest Service, Ann Risvold via email dated September 9, 2008	
Because the Forest Service has national policy to restore and maintain native plant communities, we are concerned not only with State and County listed noxious weeds, but also un-listed, non-native, invasive plants. That's why focusing only on the State and County weed lists is of concern. Nevertheless, there are some Class C weeds that are so thoroughly wide-spread that we do not try to control or eradicate them because it would be so overwhelming. Of the invasive plants found during the noxious weed surveys, these are the ones we would want to see control work done on - Any Class A weeds; any current B designates; any current County selected species; and then scotch broom, wild carrot, herb Robert, butterfly bush, yellow archangel, and English holly. So that means, for instance, that if knotweed becomes un-selected in Snohomish County, we would still be very concerned about it. We have in fact put years and much money into knotweed control as have our many partners.	The USFS comments on noxious weed species were incorporated into the draft Noxious Weed Management Plan that was filed with the PLP.
I like the idea of annually updating the weed plan to consider changes to the weed lists and to monitor treatment methods and success, but I also think it would be good to make a provision in the plan that all interested parties will conduct a thorough review of the entire document, perhaps on a 5 year rotation, to make more substantive changes. After 5 years, I would hope that some populations would be eliminated or greatly reduced, and that may be our opportunity to make some other populations a higher priority.	The USFS comments on the review intervals were incorporated into the draft Noxious Weed Management Plan that was filed with the PLP.
I admit I'm still uneasy about the City's blanket ban on herbicides. There are so much data and information on the effects of herbicides that should moderate the worry.	The City of Everett's herbicide policy and the District's use of herbicides on lands within the Project boundary were discussed in the draft Noxious Weed Management Plan that was filed with the PLP.

US Forest Service, Ann Risvold via email dated September 22, 2008	
I looked over the PME for noxious weeds and I think it looks good. The only other thing that comes to mind is revegetation of sites after weed treatment, once we are confident that a particular population has been eradicated. Long term success of weed treatment typically includes a revegetation component to prevent re-infestation. Do you need these comments in letter form rather than e-mail?	Comment noted. Revegetation is addressed in Section 5.4 of the final NWMP.
Tulalip Tribes, via letter dated October 10, 2008	
The following recommendations are meant to serve as a starting point for the discussion and development of Protection, Mitigation and Enhancement measures (PMEs) designed to protect terrestrial resources. The PMEs include those for implementation of a Terrestrial Resource Management Plan (TRMP), formalization of a Noxious Weed Plan, and development of a Marbled Murrelet Habitat Protection Plan. These recommendations should be considered preliminary and will need to be refined further under the direction of the Terrestrial Resources Work Group (or its successor).	Comment noted. The District thanks the Tulalip Tribes for their comments, and welcomes further involvement in PME development.
The Tulalip Tribes appreciates the opportunity to provide Project input, and is generally satisfied with the information contained within the Terrestrial Resources PMEs. Recommendations that follow reflect our ideas to further promote the success of the Project.	Comment noted.
Abbreviated terms should be specified at first use for the following: Page 1 Paragraph 1: “WDFW” and “USFWS” Page 1 Paragraph 2: “FERC” Page 1 Paragraph 3: “PME”. Additionally, on page 3 *Description of the Action*, TRMP and WHMP were specified previously in the document.	The District agrees with these suggested acronyms. All abbreviations and acronyms will be defined at their first use in the NWMP.
The Tulalip Tribes are pleased to see the formalization of current weed management methods into a Jackson Project Noxious Weed Plan, and is looking forward to the opportunity for review. The Tulalip Tribes would like to ensure that the plan includes objectives and strategies for immediate reclamation of disturbed areas in addition to general avoidance of ground	The draft Noxious Weed Management Plan that was filed with the PLP addressed management for specific weed species and sites, and included weed prevention methods and revegetation methods for disturbed soils.

disturbance activities, and an objective to minimize establishment of noxious weeds rather than only containing and controlling.	
The *Description of Action* section lists providing education information for Project employees; the Tulalip Tribes would like to emphasize continual training for Project employees, including recognition of noxious weed species, in addition to an internal reporting and tracking mechanism of weed infestations.	The draft Noxious Weed Management Plan that was filed with the PLP included ongoing training for District staff, including weed identification. Monitoring of existing infestations and reporting of new weed occurrences also were addressed.
US Forest Service on PLP (including Draft Noxious Weed Plan), via letter dated March 31, 2009	
45. Knotweed is missing from the bullet list of sites and species to be treated. Knotweed should be included in the bullet list of sites and species to be treated in Section 9.0, Implementation and Monitoring, as it is referred to in the rest of the noxious weed sections (PLP, p. 16). **Recommendation:** Knotweed should be included in the bullet list of sites and species to be treated, as it is referred to in the rest of the noxious weed sections.	The bulleted list of sites and species referred to in Section 9.0 addresses new weed sites that were discovered during the 2007 survey, but not treated that season. The knotweed site has been treated by the District, and therefore is discussed in the second paragraph of Section 9.0. This paragraph has been revised to specifically call out knotweed as one of the managed sites that will continue to be monitored and retreated as necessary.
46. Management methods for invasive knotweeds should be more aggressive. The Five-Year Management Objectives for invasive knotweed describe a reduced monitoring frequency after two consecutive monitoring events show no presence of knotweed (PLP, p. 35). It is not at all unusual for knotweed to appear dead for two or more years and then show up again. Knotweed is highly resistant to a quick eradication. **Recommendation:** The PUD should conduct annual monitoring for at least three years before reducing the monitoring frequency.	The knotweed management objectives have been revised to show at least three years of annual monitoring before reducing monitoring frequency.

Appendix 7

Stakeholder Meeting Summaries

Jackson Project Relicensing
Terrestrial Resources Group

Monday, September 8, 2008

Meeting Summary

Start Time: 9:05 a.m.	**End Time:** 12:10 p.m.
Subject: Terrestrial Resource Group Meeting Summary	

Attendees:

- American Whitewater – Tom O'Keefe
- Biota Pacific – Marty Vaughn
- City of Everett – Julie Sklare
- District – Karen Bedrossian, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler
- FERC – David Turner (via conference phone)
- Meridian Environmental Inc – Pam Klatt
- North Cascades Conservation Council et al. – Rick McGuire
- Smayda Environmental Associates, Inc.– Kathy Smayda
- US Forest Service – Don Gay, Ann Risvold
- WA Dept of Fish and Wildlife – Rich Johnson

DISCUSSION ITEMS

Introductions

The group introduced themselves and their organizations.

Study Results Presentation

Karen, Kathy and Marty presented study results information contained in the attached slides.

Special Status Plant Survey discussion included the following:
Four lichens considered rare by the US Forest Service were located during the survey. Three of the species were in locations on non-NFS lands that are not impacted by the project. The fourth species was found on both NFS and private lands and is fairly common in the Project vicinity, despite its rare status. No special management methods were recommended by the FS for this species.

Noxious Weed Survey discussion included the following:
Blackberry is considered an invasive species, but it is not included on Snohomish County's noxious weed list. It is very common throughout the county. The District has a District-wide Vegetation Management Plan that covers general weed management for all District properties, including Jackson.

Wetland Survey discussion included the following:
Rich noted that the wetland rating system is misleading to persons unfamiliar with it. The rating system can somewhat counter-intuitively assign high scores to wetlands in the poor condition The pristine wetlands in the project area ended up with low ratings because of their limited opportunities for improving water quality and reducing flooding and erosion. Karen noted that reading the descriptions of the wetlands provides a better understanding of the quality of the wetland rather than reviewing the rating alone, that the system provided a standardized method of describing the wetlands, that the habitat scores and descriptions are useful, and that this system is the accepted method at both the state and county level. She and Bernice Tannenbaum discussed this issue with the author of the rating system while taking his wetlands rating class. (Note: this issue is addressed on the first page of the Western Washington Wetland Rating System ([Ecology Publication # 04-06-025.]).

- **Action:** Karen – per Rich's request, provide a cross reference for SP10 Amphibian wetland numbers with those from the SP9 Wetland Survey, since the two studies numbered the wetlands differently.

- **Action:** Dawn – resend link to SP9 and SP10 draft report appendices on web site.

Amphibian Survey discussion included the following:
Slide 21 should state that three (not four) state monitor species are potentially present. A fourth species, Oregon spotted frog, is listed as State Endangered, but its presence in the area is very unlikely.

Bull frogs (an invasive species) were found at Lost Lake, Chaplain Marsh and off-channel habitats along the lower Sultan River. While they are common in lowlands throughout western Washington, they were not found in the upper Sultan Basin.

Rich noted that there may be opportunities for management in the fluctuation zone and river channel to provide better habitat for amphibians; management activities could include timing and amount of flows/drawdown. Although, he is not necessarily saying the District should do so based on other resource needs/benefits. Karen noted that in the report conclusion it states that increase in flows on the river could have a negative impact on amphibians, and that existing conditions at the reservoir indicate that the amphibians are using areas outside the drawdown, so impacts from stranding are minimal.

Marbled Murrelet Survey discussion included the following:
The District has been operating as if the Culmback Dam West and East are occupied habitat since presence was first detected in the 1990s. Rich expressed gratitude that the District was treating the extent of occupancy as the entire survey area, as per PSG protocols.

Spotted Owl Survey discussion included the following:
The definition used during the study for suitable habitat is pretty broad since spotted owls have been found in non-typical or marginal habitat. Incidental potential sightings of spotted owls were treated as a possible sighting during the study and additional stations were added in those areas.

Karen noted that "owl detection" on the maps does not refer to spotted owls but to other species.

Marty discussed the latest research on the interaction of spotted and barred owls. They are competitors for the same habitat/food sources; this competition displaces the spotted owl. There is also some evidence of predation; however, the two species are not natural predators. There is some potential for spotted owl habitat improvement over the long term in the region, particularly on public lands, but the prospects for recovery of the species are still not good because of the presence of the barred owl.

Proposed Protection, Mitigation and Enhancement (PM&E) Measures Presentation

Karen, Kathy and Marty presented proposed PM&E information contained in the attached slides.

Noxious Weed Management Plan discussion included the following:
The District proposes a plan for the management of the 7 noxious weed species for which control must be provided under State and County regulations. The plan calls for an annual report and meeting, and review for additions/deletions from the County's list. The State gives authority for noxious weed control to the County governments.

During the discussion several stakeholders questioned why all noxious weeds would not be managed under the proposed plan. Karen stated that the plan will focus on the noxious weeds that are required to be controlled by state and county regulation. The survey included other noxious weeds and invasive species not listed as noxious weeds. The weed management plan will include general measures to prevent the introduction and spread of weeds, which will be effective both on the target weed species and other invasive species. The plan will bring prevention and management into the planning stages of ground-disturbing activities. Marty noted that the number of weeds for management is a concern due to the cost; managing for all invasive species, including those that have become widespread like blackberry and reed canarygrass, could be cost prohibitive.

The FS noted that they have concerns about the potential spread of weed species onto NFS lands, including several species not included in the draft weed management plan. They indicated that they recognize the difficulty of managing for species that are very common and widespread, such as blackberry and reed canarygrass, but would like to have other, less widespread species considered for addition to the plan. Ann Risvold indicated she will provide a list of FS weed species of concern to Karen.

Ann asked if the District uses herbicides. Karen responded that herbicides are not allowed in the watersheds due to water quality concerns as the water is for municipal drinking water supply. The two areas where knotweed is located are outside the watersheds and herbicides have been used, in combination with cutting, to treat those locations.

David noted that there are two options for the plan: 1) have a separate weed management plan or 2) incorporate the plan into the Terrestrial Resource Management Plan.

- **Action: Ann** – forward list of USFS weeds of concern to Karen.

- **Action**: Kathy – finalize draft Noxious Weed Plan for stakeholder review ASAP so it can be included in the PLP.

Marbled Murrelet Protection Plan discussion included the following:
The District proposes a plan for the protection of marbled murrelet habitat as it relates to road maintenance. Additional activities to be included in the plan are snag management and trails development; Marty will update accordingly for stakeholder review and comment. The District currently ensures protection of marbled murrelet habitat through the Washington Forest Practices Rules. Marty explained the implications of continuing to work through the Forest Practices Rules versus a PME with an incidental take statement for murrelets. A PME and incidental take statement are recommended because they would consolidate and clarify all murrelet habitat protection for District activities (including recreation trail development), and give the District more operational flexibility than the Forest Practices Rules.

A danger tree is one that is defined as having the potential to fall over a road or other facility where it could cause damage, restrict access or cause bodily harm.

Terrestrial Resources Management Plan discussion included the following:
The District is proposing a TRMP to cover the lands the District owns, including 1,745 additional acres around Spada Lake not covered in the original HEP analysis and 139 acres near Williamson Creek not currently in the WHMP or original HEP analysis. The City's lands on the Lake Chaplain Tract, which are used primarily for filtration plant/water supply purposes, as well as timber management, would not be in the TRMP, but would be managed under the current WHMP as an off-license agreement through which the District would maintain oversight of wildlife management activities. The City of Everett will no longer be a co-licensee for the project, and the preference is to continue managing the tract according to the WHMP, but under a separate, off-license agreement. Karen noted that the City of Everett had a timber management plan for the land prior to the preparation of the WHMP and proposed to include the Chaplain Tract in the WHMP as a means to provide more mitigation, while still harvesting timber. By implementing the harvesting plan in the WHMP rather than implementing the existing more aggressive timber management plan for the tract, wildlife habitat was improved. The value to the WHMP was measured by the HEP analysis as the difference between the two plans. The intention of including the lands in the WHMP was not to optimize the wildlife values, but to improve them over the original timber harvesting plan.

Rick expressed concern that there are differing beliefs on the management goals for these lands, the WHMP was outdated when it was written, more lands should be acquired, and the WHMP should be totally re-evaluated. He and Rich both suggested the WHMP places too much emphasis on management for deer. Rich expressed that he had very little disagreement with our current management but that he would like to see a change in management to less even-age stand management and focus on SP6 changes. Karen understands that there are differing philosophies on the management goals; however, the District is managing according to the goals established by the stakeholders under the WHMP's development and the objectives established by the State's current management plan, which includes managing habitat for deer. The WHMP emphasizes habitat for old-growth wildlife species because this was clearly a priority when it was written in the late 1980's, but it also includes management for deer because "in-kind" habitat mitigation was requested by the wildlife agencies as well. Don Gay, USFS asked if WDFW had had a recent change in policy to de-emphasize management for deer. Karen noted that a detailed response to NCCC comments was provided in the ICP response filed with FERC and that FERC made a determination on requests for modifications to study plans.

Rich expressed concern about not having regulatory authority over the Lake Chaplain lands if they are not in the project boundary. Enforcement efforts would be the obligation of the State rather than FERC. He did support the efforts currently underway at the Spada Lake Tract to promote late successional habitat. The District stated that the side agreement could include some oversight provisions, and that the side agreement warrants further discussion.

David Turner stated that the licensee needs to demonstrate to FERC that the Lake Chaplain lands are no longer needed within the project boundary for their original purpose (wildlife mitigation) or for any new purpose, such as recreation.

Tom asked if any lands would be added to the TRMP to replace the Lake Chaplain tract. Karen explained how the 1,745 acres at Spada Lake were added after the HEP analysis was conducted and 139 acres at Williamson Creek would be added, and how the total mitigation value and acreage would be more than adequate under the current FERC view of continuing project impacts.

- **Action: Rich** – identify specific habitat enhancement activities in SP6 that WDFW (including game management) would like to see occur on the mitigation lands so the District can begin analysis cost/benefit for the license application.

- **Action: Jeff** – develop bullet points or whitepaper on TRMP as it relates to an off license agreement relating to Lake Chaplain so Rich has something to give to his AG's Office for their review and approval of direction and for review by the TRG.

- **Action**: **Dawn** – route ICP response and FERC's study plan determination to TRG.

Next Steps for Process

The District will consider and update the PM&E documents based on comments received today at the meeting; the updated PM&Es will be routed via email for TRG review and comment next week. The TRG will have a 2-week comment period. The District seeks TRG input so what is proposed in the Preliminary Licensing Proposal (PLP) is close to/if not the final. In order for input into the PLP, Karen needs to have a "final" proposal ready for analysis by November 1.

Members can contact Karen via email and phone to discuss the proposals. A meeting will be scheduled for October 1, 9:00-11:00 to continue discussion of PM&E issues that do not get resolved between this and the next meeting.

- **Action: Marty** – forward the updated Marbled Murrelet PME to Don Gay for review.

END MEETING

Jackson Project Relicensing
Terrestrial Resources Group

Monday, February 23, 2009

Meeting Summary

Start Time: 2:05 p.m.	**End Time:** 3:40 p.m.
Subject: Terrestrial Resource Group Meeting Summary	
Attendees: • Biota Pacific – Marty Vaughn • City of Everett (City) – Julie Sklare • District – Karen Bedrossian, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler, Matt Love (outside counsel at VanNessFeldman) • Snohomish County (SnoCo) – Carly Summers (via phone) • Tulalip Tribes (Tribes) – Reid Allison • US Forest Service (USFS) – Kristen Bonanno (via phone) • WA Dept of Fish and Wildlife (WDFW) – Rich Johnson	

DISCUSSION ITEMS

Introductions

The group introduced themselves and their organizations.

Status of Relicensing; Settlement Process and Protocols

The entire Terrestrial Resources Group (TRG) was invited to this meeting. Since the attendees were familiar with the status of relicensing and the settlement process, these topics were not heavily discussed. The Confidentiality Agreement and Ground Rules are ready for signature by the agencies with an expectation of a required sign-off by each party by the March 11 Aquatic Resources Settlement Group meeting.

Review of PM&Es in PLP

Karen reviewed the PM&Es and Management Plans (in PLP Appendices) for terrestrial resources including the 1) TRMP, 2) Noxious Weed Plan, and 3) Marbled Murrelet Habitat Protection Plan.

TRMP – see handout

- Williamson Creek – additional acres (not in current WHMP) contain second-growth and wetland and are contiguous with Williamson Creek. Rich stated that WDFW prefers active management to accelerate habitat growth/diversity to allow for a variety of species.
- Lost Lake – no commercial harvest has been done there by the District but it is economically feasible to do so.

Noxious Weed Plan – no comments

Marbled Murrelet Habitat Protection Plan – received comments from Don Gay (USFS) which were incorporated into the version filed in the PLP. Tim Romanski provided comments to Karen on PLP version stating that USFWS is not likely to allow "take" for marbled murrelets. Access trail in upper river gorge area in marbled murrelet habitat could pose a problem. Karen will further discuss with Tim.

Issues

WDFW would like to see in TRMP:

- bigger gaps (1/4 acre), not necessarily more gaps, to provide a variety of habitat and not monocultural habitat
- Snag creation in mature growth areas, including larger diameter snags but in balance with the needs of marbled murrelets
- Fewer roads the better - better for wildlife
- Annual review good, but due to staffing concerns not sure if they will actively participate. 10 years for plan review too long to be proactive. 3-5 years may be better for plan review.
- Flexibility in the plan. Provide management concepts but not as detailed prescriptions as in current WHMP.

Karen and Biota are currently working on a draft TRMP. The District will provide a copy of the working draft to Rich and Mark Hunter by 16 March to be reviewed/commented on before Rich's one-month vacation that begins on 25 March. The TRG review of the TRMP will occur following that review.

WDFW expressed a desire to ensure that the general public continues to have the ability to access Project lands during state-approved hunting seasons. The Tribe expressed a similar interest for their members; no other terrestrial resource issues were identified. WDFW also mentioned concern that the Lake Chaplain Tract is managed for deer; however, the public is not allowed in the area for hunting.

Lake Chaplain Tract (LCT)
The City would like to have a meeting with WDFW and the City forester to discuss the management of the LCT. Rich said that he is interested in the meeting and site visit in March up to the 20th.

A list of issues Rich noted for the LCT were:

- Current clear cuts – he believes there is a short term gain but it is lost within 15 years when it doesn't provide browse any more and stays unproductive until the next cut.
- Minimize the use of clear cuts in favor of thinning
- Minimize size of clear cuts
- Lengthen seral stage (increase length of rotation)
- Minimize number of roads
- Develop corridors between the different habitat types
- Land not open to public should be managed for old growth

Rich would prefer management that targets critters losing habitat rather than target for deer. Karen pointed out that the WHMP was designed specifically to avoid and reduce the unproductive stages of clear cuts and that the overall wildlife habitat management program for Jackson Project will provide well over 100% of mitigation for late seral species. Rich would like for the District and City to look at the overall landscape. Karen said that mitigation was designed to make up for losses resulting from the Project (project nexus).

LCT management plan would be an off-license agreement signed by the District, City of Everett, WDFW and possibly the Tribes. USFS and Snohomish County indicated they were unlikely to be a signing party but would like to see drafts of the TRMP and LCT management plan.

Assignments:

Karen, Rich and Julie will set up a meeting for Rich and anyone else he wants to attend from WDFW to talk to the City forester in March.

Karen will send Rich and Mark Hunter a working draft version of the TRMP by 16 March so that Rich can review it prior to being gone during the month of April when the other stakeholders will be reviewing the draft plan.

Dawn will provide Karen with Justin Casing and Carly Summers' email addresses and will send terrestrial related emails to both Justin and Carly as requested by Carly.

END MEETING

Appendix E

Terrestrial Resource Management Plan

Terrestrial Resource Management Plan

Henry M. Jackson Hydroelectric Project

(FERC Project No. 2157)

Public Utility District No. 1 of Snohomish County

Everett, Washington

May 2009

TERRESTRIAL RESOURCE MANAGEMENT PLAN

For the

HENRY M. JACKSON HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION PROJECT NUMBER 2157

Submitted by:

PUBLIC UTILITY DISTRICT NO. 1
OF
SNOHOMISH COUNTY

Everett, Washington

May 2009

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NAME	AFFILIATION	RESPONSIBILITY
Karen Bedrossian	Snohomish County PUD	Project Management and Plan Preparation
Mike Schutt	Snohomish County PUD	Plan Preparation
Martin Vaughn	Biota Pacific	Plan Preparation
Emily Drew	Biota Pacific	Plan Preparation and Document Editing
Joel Capello	Snohomish County PUD	GIS / Map Preparation
Mark Hitchcock	Fairweather Forestry	Silviculture and Forest Ecology

1.0 INTRODUCTION

1.0 Introduction

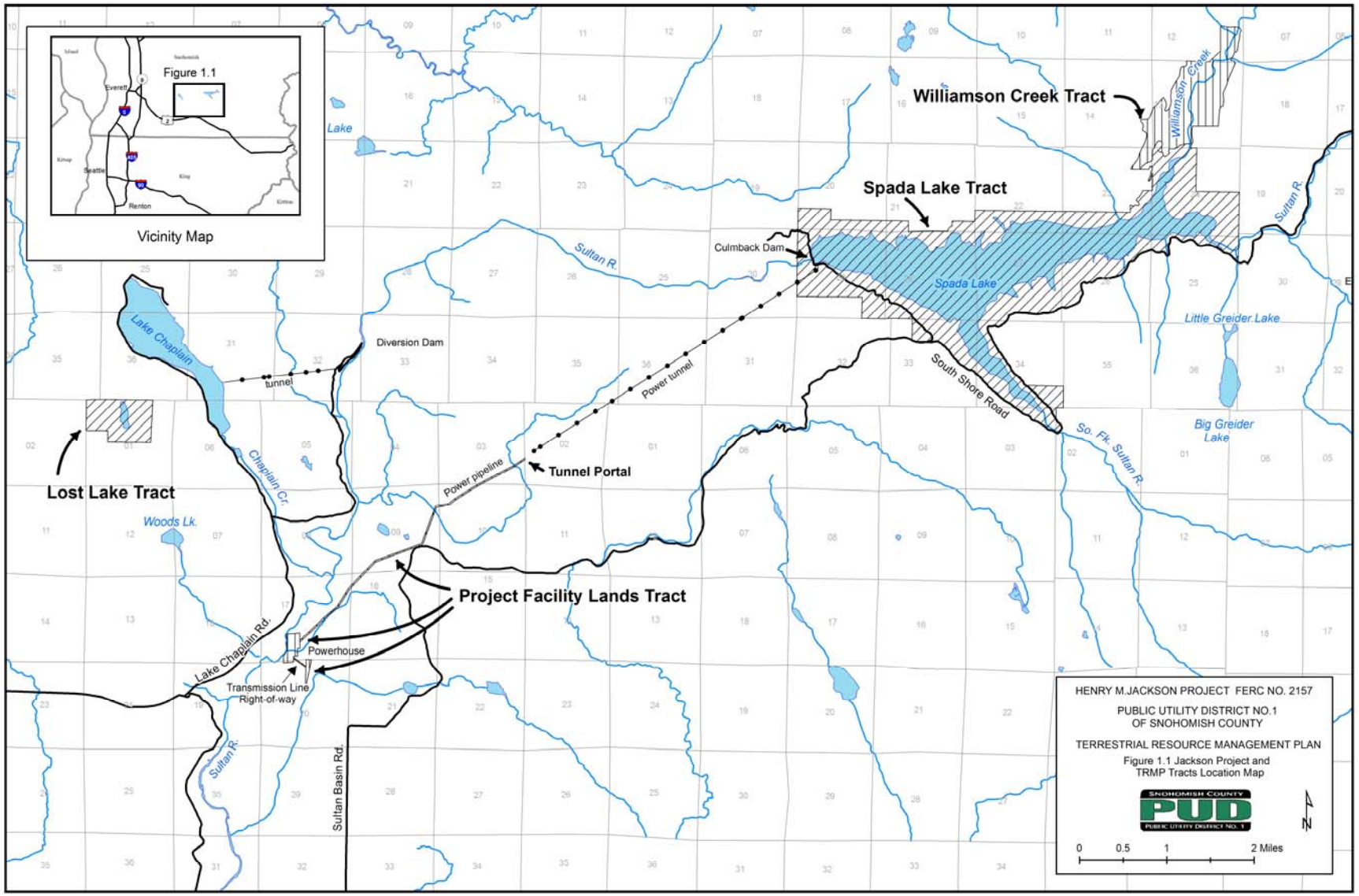
This Terrestrial Resource Management Plan (TRMP) describes the actions Public Utility District No. 1 of Snohomish County (District) will take to mitigate impacts to wildlife resources associated with the Henry M. Jackson Hydroelectric Project (FERC Project Number 2157). It is submitted in support of the District's Final License Application before the Federal Energy Regulatory Commission (FERC). It has been prepared in consultation with the U.S. Fish and Wildlife Service (USFWS), the U.S. Forest Service, Mt. Baker – Snoqualmie National Forest (USFS), the Washington Department of Fish and Wildlife (WDFW), and the Tulalip Tribes (Tribes).

1.1 Background

The District owns and operates the Jackson Project (Project) on the Sultan River in Snohomish County, Washington. The Project includes a 262-foot high rock-fill dam, a 1,870-acre reservoir (Spada Lake), 7.6 miles of tunnel and pipeline, and a powerhouse with a generating capacity of 112 megawatts (Figure 1.1). It provides fisheries enhancement, water supply, hydroelectric power and flood control. The Project was constructed in two stages between 1961 and 1984. Stage I was a 200-foot high dam and 750-acre reservoir completed in 1965. Stage I was operated only to provide water supply and fisheries instream flows. The dam was raised to 262 feet in 1983; enlarging the reservoir to its present size. The power facilities were added by 1984, completing Stage II development. Detailed descriptions of all Project features are provided in the District's Application for New License.

The original license for the Project issued in 1961 included the City of Everett (City) as a co-licensee. In 2007, the City and District requested and received FERC approval to remove the City as a co-licensee. The District will be the sole licensee for the Project in the new license term, and the sole party responsible for implementation of this TRMP.

The impacts of original Project construction and operation on fish and wildlife were estimated in studies conducted by the Washington Department of Game (currently WDFW) between 1979 and 1982 (WDG 1982). Wildlife impacts were assessed by collecting cursory population data and performing a habitat assessment using the USFWS Habitat Evaluation Procedures (HEP). At the direction of the FERC, the District and the City prepared a Wildlife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Renton
Williamson Creek Tract
Williamson Creek
Spada Lake Tract
Sultan R.
Culmback Dam
Spada Lake
Little Greider Lake
Big Greider Lake
So. Fk. Sultan R.
South Shore Road
Lake Chaplain
Diversion Dam
tunnel
Power tunnel
Tunnel Portal
Power pipeline
Lost Lake Tract
Woods Lk.
Chaplain Cr.
Project Facility Lands Tract
Powerhouse
Transmission Line
Right-of-way
Lake Chaplain Rd.
Sultan Basin Rd.
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1
OF SNOHOMISH COUNTY
TERRESTRIAL RESOURCE MANAGEMENT PLAN
Figure 1.1 Jackson Project and
TRMP Tracts Location Map
SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
0 0.5 1 2 Miles
N

Habitat Management Plan (WHMP) to mitigate impacts to wildlife from Project construction and operation. The WHMP was designed to mitigate for these impacts for 100 years (through 2060). The WHMP was prepared in cooperation with the USFWS, WDFW, Tribes and USFS, and was approved by the FERC in 1989. The District has managed most of the lands covered by this TRMP under the WHMP since 1989. The WHMP also covered the management of 2,657 acres of forest, wetland and lake owned by the City and known as the Lake Chaplain Tract.

District and City lands have been managed under the WHMP to provide early-successional forest, old-growth forest, riparian forest and wetlands. Habitat for early-successional species like the black-tailed deer, black-capped chickadee and ruffed grouse has been provided primarily in the Lake Chaplain Tract, concurrent with commercial timber production by the City. Habitat for late-successional and old-growth species like the pileated woodpecker, Douglas squirrel and marten, as well as riparian habitat for species such as black-tailed deer and ruffed grouse, has been provided primarily on District lands. Wetland habitat has been provided on both District and City lands.

Since 1989, the District has acquired additional early-successional, old-growth and wetland habitat, and the regional priorities for wildlife mitigation have shifted away from early-successional habitat and toward old-growth habitat. As a result, the Lake Chaplain Tract is no longer essential to Project mitigation. The District now has sufficient lands without Lake Chaplain to mitigate for Project impacts to high priority habitats such as old-growth forest, riparian forest and wetland. Consequently, the Lake Chaplain Tract is not covered by this TRMP.

1.2 Objectives

The primary objective of this plan is to direct the management of District owned and controlled wildlife mitigation lands for the term of the new license. Management under the TRMP will be a continuation of management established under the WHMP. The objectives of the TRMP are consistent with the objectives of the WHMP, except for updates in response to current regional priorities for habitat management. The following objectives were established for the WHMP by the District, City, USFWS, USFS, WDFW and Tribes and approved by the FERC. They will serve as the objectives for the TRMP as well, with updates and modifications as noted.

1.2.1 FERC Order Directives

1.2.1.1 Identify the Type of Habitat to be Used for Replacement

The TRMP lands include old-growth and second-growth conifer forest, mixed deciduous/conifer forest, riparian forest, wetland, lake and reservoir. The present conditions of all TRMP lands are summarized in Table 1.1. Detailed descriptions of all lands are provided in Chapter 3.0. Due to land acquisitions by the District since1989, the TRMP lands include a larger proportion of old-growth conifer forest and a smaller proportion of second-growth forest than the original WHMP.

1.2.1.2 Determine the Location and Number of Acres of Habitat to be Used for Replacement

The TRMP lands include 4,456 acres in four management tracts located in or directly adjacent to the Sultan River basin. None are more than 10 miles from the areas affected by the Project. The locations of all tracts are described in Chapter 3.0.

1.2.1.3 Provide a Schedule of Implementation

The TRMP will be implemented through the term of the new license. A summary schedule is provided in Chapter 5.

1.2.1.4 Develop a Monitoring Program to Determine the Effectiveness of the Mitigation Measures

The TRMP lands will be monitored regularly to ensure the habitat objectives outlined in this plan are met. Reports on implementation will be made annually to the USFWS, WDFW and Tribes, and every five years to the FERC. The monitoring program is presented in Chapter 4.0.

1.2.1.5 Document Agency Consultation on the Adequacy of the Plan

The plan has been prepared in consultation with the agencies. All written agency correspondence is included in Appendix B.

Table 1.1 Current distribution of cover types on the Jackson Project TRMP lands.

Cover Type	Acres by Management Tract				
	Lost Lake	Project Facility Lands	Spada Lake	Williamson Creek	All TRMP Lands
Early-successional Forest	0.0	6.4	10.6	1.0	18.0
Open Canopy Sapling / Pole Conifer Forest	0.0	0.0	25.0	0.0	25.0
Closed Canopy Sapling / Pole Conifer Forest	41.8	0.1	328.6	89.0	459.5
Small Sawtimber Conifer Forest	19.8	3.1	582.7	0.0	605.6
Large Sawtimber Conifer Forest	0.0	0.0	11.3	0.0	11.3
Old-growth Forest	0.0	0.0	226.7	275.0	501.7
Mixed Deciduous / Conifer Forest	114.8	2.6	300.8	36.8	455.0
Mosaic Deciduous / Conifer Forest	0.0	0.0	169.0	0.0	169.0
Deciduous Forest	0.3	0.0	46.5	3.4	50.2
Riparian Forest	0.0	0.0	18.4	38.5	56.9
Mixed Shrub / Brush	0.0	10.3	9.7	1.8	21.8
Grass / Meadow	0.0	18.6	1.2	0.5	20.3
Wetland	22.8	0.0	6.7	10.1	39.6
Rock	0.0	0.0	12.2	0.0	12.2
Landslide	0.0	0.0	2.9	0.0	2.9
Managed Right-of-Way	0.0	37.5	0.0	0.0	37.5
Natural Open Water	14.2	0.0	7.2	23.8	45.2
Reservoir	0.0	0.0	1,908.3	0.0	1908.3
Non-vegetated / Unclassified	0.0	1.5	13.6	0.8	15.9
Totals	**213.7**	**80.1**	**3,681.4**	**480.7**	**4,455.9**

1.2.2 Agency Habitat Priorities

The USFWS, WDW, USFS and Tribes provided the District with letters of comment on the Draft Revised Exhibit S in mid-December 1982 (District 1983). Additional input on habitat priorities was provided by the WDFW during the relicensing process in 2007 through 2009. Habitat priorities identified by the agencies and Tribes include the following:

1.2.2.1 Mitigate for the Loss of Terrestrial Habitat by Creating or Enhancing Habitat Similar to That Which was Lost

The Project caused the loss of old-growth forest, second-growth forest, riparian forest and wetlands. The losses of old-growth and mature forest due to the Project were relatively small because much of the Sultan Basin was already scheduled for logging prior to creation of the Project. However, old-growth forest and mature forest are currently management priorities in the lowlands of western Washington due to their relative scarcity. The TRMP therefore emphasizes the protection of old-growth and mature forest disproportionate to Project impacts. Conversely, second-growth forest, which is common in lowland western Washington, is deemphasized in the TRMP. Wetlands, which are a habitat priority in Washington, are protected in the TRMP as well. Management details are presented in Chapters 2.0 and 3.0.

1.2.2.2 Provide Mitigation Lands in the Vicinity of the Lost Habitat Whenever Possible

All of the TRMP lands are within or directly adjacent to the Sultan River basin and within 10 miles of the areas affected by the Project. Their locations are presented in Chapter 3.0.

1.2.2.3 Show a Priority or Preference for the Following Types of Habitat in the Management Plan: (a) Old-growth Coniferous Forest, (b) Mature Riparian Forest, (c) Wetland and (d) Young Riparian Forest

The TRMP calls for the preservation of 502 acres of existing old-growth conifer forest and management of 1,119 acres of second-growth conifer forest to promote the development of old-growth characteristics without even-aged timber harvest (clearcutting). Another 731 acres of mixed, deciduous and riparian forest will be managed in a similar way to promote old-growth or late-successional characteristics. Forty acres of wetlands also will be protected from human disturbance and maintained as high-quality habitat.

1.2.2.4 Compensate for the Average Annual Habitat Units (AAHU) Lost to the Project, as Estimated by the HEP Study Conducted by the WDW in 1982

The 1982 HEP report (WDG 1982) was updated in 1988 and included in the WHMP as documentation of compensation for original Project impacts. The HEP evaluated habitat impacts for ten representative species, including the black-tailed deer, black-capped chickadee, ruffed grouse, pileated woodpecker, Douglas squirrel, marten, beaver, osprey, common merganser and mallard. Management in the WHMP for the deer, chickadee and grouse emphasized early-successional forest, management for the woodpecker, squirrel and marten called for late-successional forest, and management for the remaining species occurred on reservoir and wetland habitat.

Since the preparation of the WHMP and completion of the 1988 HEP, there have been four developments that influence the assessment of compensation for AAHU lost to the Project. First, the priorities of the WDFW, USFWS, USFS and other stakeholder for wildlife habitat have shifted away from early-successional forest and toward old-growth and mature forest. Second, the FERC baseline condition for relicensing is now the existing (constructed) Project rather than the pre-project environment, so the 1988 HEP analysis is an overestimate of the wildlife impacts of relicensing. Third, 1,745 acres have been added to the Spada Lake Tract and 137 acres have been added at the Williamson Creek Tract; none of which are accounted for in the 1988 HEP analysis. Fourth, the Lake Chaplain Tract is not included in the TRMP. The net effect of these four changes is that the TRMP, with its increased emphasis on management for old-growth forest species, sufficiently compensates for the loss of AAHU associated with relicensing of the Project.

1.3 Management Lands

The TRMP lands consist of approximately 2,548 acres of upland, wetland and natural lake and 1,908 acres of reservoir in the Sultan River Basin of Snohomish County, Washington (Figure 1.2). The lands are divided into four management tracts based on location. The following paragraphs summarize the tracts. Detailed descriptions are provided in Chapter 3.0.

1.3.1 Lost Lake Tract

Lost Lake is a 14-acre natural lake located approximately 6 miles north-northwest of Sultan, Washington. The management tract also includes 23 acres of wetlands and 177 acres of second-growth forest (Table 1.1). The entire 214-acre tract has been managed under the WHMP since 1989. The lake and wetlands have been protected from site disturbance, and one of the forest stands has undergone precommercial thinning to open it up to promote accelerated tree growth and increased forage in the understory. Even-aged harvesting of the forest was scheduled under the WHMP, but never conducted. Under the TRMP, the lake and wetlands will continue to be protected and the forest will be allowed to develop into old-growth habitat. No even-aged timber harvesting will occur in the tract, and thinning will only occur outside lake and wetland buffers, and only where it will accelerate old-growth forest development. The killing or topping of trees for forest gaps, snags, live decaying trees and coarse woody debris will be the primary method of providing openings in the forest canopy.

1.3.2 Project Facility Lands Tract

Approximately 80 acres of right-of-way, grass, shrubs and forest under District control downstream of Spada Lake make up the Project Facility Lands Tract (Table 1.1). Lands include the power pipeline right-of-way, the transmission line right-of-way, the powerhouse site and a small stand of timber. Most lands in the tract must be maintained in non-forested upland vegetation (grass and shrubs) for operational and/or safety reasons. They have been enhanced to provide meadow, shrub and open woodland under the WHMP since 1989. Management for high-quality meadow, shrub and woodland habitat will continue under the TRMP.

1.3.3 Spada Lake Tract

The Spada Lake Tract consists of 1,908 acres of reservoir (normal maximum pool elevation 1,450 feet above mean sea level [MSL]) and 1,773 acres of adjacent land (Table 1.1). The reservoir and approximately 28 acres of upland were included in the WHMP in 1989. The remaining 1,745 acres were added to the tract after they were acquired from the USFS and Washington Department of Natural Resources (WDNR) in 1991. Roughly 1,720 acres of the tract are forested. All but 227 acres of the forest are second-growth (conifer, mixed, and deciduous) that originated after clearcutting since the 1960's. All forestlands in the tract will be managed for natural habitat conditions, except where precluded by operational constraints (primarily reservoir fluctuation) or recreational improvements. Existing old-growth forest will be

maintained without management intervention. Young upland conifer will be allowed to develop into old-growth forest. Deciduous and mixed forest stands will be allowed to remain in these states as long as natural processes allow. Periodic thinning and creation of gaps, snags, decaying live trees and coarse woody debris that began under the WHMP will continue, as needed, under the TRMP. These measures will be used to promote old-growth characteristics in conifer stands, allow deciduous trees to persist in deciduous and mixed forest stands, and increase understory vegetation in all stands.

1.3.4 Williamson Creek Tract

This tract consists of approximately 481 acres of upland forest, riparian forest and wetland along Williamson Creek, northeast of Spada Lake (Table 1.1). It contains one of the largest remaining low-elevation stands of old-growth forest in the Spada Lake Basin. The lands were acquired from WDNR and USFS in 1991. As part of the land exchange, an additional 137 acres were obtained beyond the original WHMP tract boundary and they are being added to the TRMP. Road access to the tract was eliminated in 1999. WHMP prescriptions for the tract called for minimal intervention. No activity has occurred in old-growth forest, and the creation of snags and decaying live trees has been the only activity in young forest. Management for old-growth habitat will continue under the TRMP. Existing old-growth will be maintained without intervention. Young conifer and mixed forest will be allowed to develop into old-growth forest, with periodic creation of snags, decaying live trees and coarse woody debris.

1.4 Changes from the Wildlife Habitat Management Plan

This TRMP is based on the WHMP approved by the FERC in 1989, as modified by annual reports from 1989 through 2007. It is an extension of the management prescribed in the WHMP, with the following modifications:

- Management of the Spada Lake Tract is based in part on the Spada Lake Tract Supplemental Plan (Spada Supplement) dated 31 January 2007 and approved by the FERC on 21 August 2007. The Spada Supplement addressed the addition of 1,745 acres of forestland above elevation 1,460 feet along Spada Lake that were not included in the original HEP analysis of WHMP benefits. The Spada Supplement has been incorporated into the TRMP, with modifications, to be consistent with the TRMP

emphasis on management for old-growth forest characteristics. All management of the Spada Lake Tract will now be directed by the TRMP. The Spada Supplement will no longer be necessary.

- The Williamson Creek Tract will increase by 137 acres. Three land parcels in Sections 12 and 13 of Township 29 North, Range 9 East, acquired by the District from the WDNR in 1991, will be added to the tract and managed to provide wetland and old-growth conifer forest habitat. These parcels were not included in the WHMP or associated HEP analysis of habitat benefits.

- Even-aged timber harvesting in the Lost Lake Tract and Spada Lake Tract will occur only with prior site-specific approval of the USFWS and WDFW. Single tree removal, variable density thinning, and patch clearings of up to 1.0 acre may occur without site-specific review and approval where determined necessary by the District to maintain or promote old-growth habitat conditions.

- Artificial nesting islands are not included in the TRMP because they have proven ineffective at increasing nesting by the target waterfowl species on TRMP lands.

- Osprey nest structures are not included in the TRMP because they have not received use in recent years.

- Prescriptions for the creation of snags, decaying live trees, forest canopy gaps and coarse woody debris have been updated based on the results of Revised Study Plan 6, as presented in *Habitat Management Methods Literature Review and Evaluation* (Tannenbaum and Schutt 2007).

- The Lake Chaplain Tract (441 acres of reservoir and 2,216 acres of forest and wetland owned by the City) will not be included in the TRMP.

1.5 Approach and Organization

The TRMP is presented in the form of land management prescriptions. The four tracts of TRMP lands (Chapter 3.0) are divided into stands, which are contiguous areas with homogeneous vegetative cover and site conditions (e.g., slope, access, etc). In forested areas,

stands are differentiated primarily on the basis of the age, species, size and density of the overstory trees; and each of these variables is fairly constant within a stand. The term stand is expanded in this TRMP to include non-forested ecological communities such as meadows and wetlands.

The TRMP will be in effect for the term of the new license. During that time, the theory and practice of wildlife habitat management may change. Also, certain existing techniques may be adapted and prove more effective for the TRMP lands. The TRMP is based on current theory and practice, but it would have limited long-term value if not open to future change. For that reason, the TRMP is designed to accommodate changes and improvements in wildlife habitat management as they become available. The overall objectives of the TRMP, which are adopted from the WHMP, are clearly stated in Section 1.2. These objectives will continue to serve as a guide for all future management. Adjustments have been made to the management prescriptions under the WHMP since 1989, and they will continue to be made under the TRMP, as needed. New techniques have been, and will continue to be, substituted for existing ones if they are more effective and/or economical, but all changes will be made within the single constraint of meeting the objectives of the TRMP.

2.0 HABITAT ENHANCEMENT METHODS

2.0 Habitat Enhancement Methods

2.1 Forest Vegetation Management

2.1.1 Background and Rationale

Conifer forest on TRMP lands will be managed to develop and maintain old-growth habitat conditions. Stands that are currently in an old-growth condition will be managed with minimal human intervention for the term of the TRMP. Young conifer forest stands with a history of timber harvesting will be enhanced by creating overstory gaps, snags, decaying live trees and coarse woody debris, all characteristic of old-growth forest (Franklin et al. 1981) that are typically lacking in young managed forest. Thinning of the overstory may also occur in young conifer stands where it is operationally feasible, economically viable, consistent with the maintenance of water quality, and would not inhibit wildlife use and movement. Once young stands reach 100 years of age, active management will cease and natural processes of plant succession and disturbance will be allowed to proceed without intervention.

The TRMP lands are predominantly conifer forest and mixed forest with a history of logging. Many stands are characterized by dense, uniform overstories of small trees and a general lack of legacy features (residual live trees, large snags and logs). Returning these stands to old-growth condition will require: a) overall increase in live tree size, b) reduction in total live tree density, c) introduction of heterogeneity (variable density and patchiness) to the overstory, d) establishment of understory shrubs, forbs and trees, and e) creation of snags, decaying live trees and coarse woody debris. These conditions will develop naturally over several decades or centuries (Oliver and Larson 1990), but they can be accelerated by creating gaps in the overstory (as defined in Section 2.1.3) to increase growing space for the remaining trees and accelerate the rate at which they grow in diameter. Gaps can also increase the amount of sunlight reaching the forest floor and stimulate the development of understory shrubs and forbs and the establishment of new trees. Snags, decaying live trees and coarse woody debris can also be created outside gaps by topping or killing live trees. Additional heterogeneity can be provided by variable density thinning of the overstory, but opportunities to thin are limited on the TRMP lands by steep terrain, poor access, water quality concerns, and limited markets for the thinned material. Thinning should only be considered where it does not require new roads, does not increase surface erosion, and does not result in accumulations of slash (tree

limbs and boles) that interfere with wildlife movement. During all forest management activities, noxious weeds and other invasive species will be managed in accordance with the Jackson Hydroelectric Project Noxious Weed Management Plan.

2.1.2 Old-growth Management

Existing old-growth stands will be preserved and managed with minimal intervention. No overstory thinning, gap creation, snag creation or coarse woody debris creation will occur in old-growth stands.

2.1.3 Young Forest Management

All conifer dominated forest on the TRMP lands that is less than 100 years old will be managed to accelerate natural succession and hasten the development of old-growth characteristics. Once a stand reaches 100 years, active management will cease and the forest will be treated the same as existing old-growth (Section 2.1.2).

Gaps will be created in young forest stands by felling, live-topping or otherwise treating all trees within small contiguous areas to create a collection of snags, decaying live trees and coarse woody debris. Gap creation will occur where needed to add structural diversity to dense, uniform overstories, to increase the amount of deer forage and understory production, or as part of snag and coarse woody debris creation, as determined by District biologists (see also Section 2.3.2). Live trees in gap areas may be felled and left as logs, topped and left as snags, live-topped to create decaying live trees, removed from the site during thinning, or a combination of these methods depending on the sizes of the trees and site-specific needs for snags, coarse woody debris and understory vegetation. Maximum gap size outside lake and wetland buffers will be 1.0 acre. Maximum gap size within lake and wetland buffers will be 0.25 acre, as specified in Section 2.2. No gaps will be created within the inner-most 50 feet of any buffer zone; however, snags, decaying live trees and coarse woody debris may be created within this area, where allowed under Forest Practices Rules.

Young forest stands will also be evaluated individually for overstory thinning. The evaluation will consider overstory age, species composition, management history and site conditions. Dense, overstocked conifer and mixed forest stands on upland sites may be thinned where it is operationally and economically feasible. Thinning will not occur where it would require new road construction, have a negative impact on water quality, or result in excessive

accumulations of logging debris. Where thinning is feasible and appropriate, it will occur at intervals of no less than 10 years within individual stands, and will reduce average stand canopy closure to no less than 60 percent or Relative Density (Curtis 1982) to no less than 30. The metric used to monitor thinning intensity (canopy closure or Relative Density) will be determined by the District on a stand by stand basis. Thinning intensity will vary within stands (variable density thinning), and at least 20 percent of each stand will be left unthinned to promote suppression mortality in accordance with Section 2.3.2.

Stands dominated by deciduous hardwood trees or mixtures of hardwoods and conifers may be managed like conifer dominated stands, or they may be left unthinned and allowed to develop naturally. Some mixed stands will progress toward old-growth conifer forest without management intervention, as the shorter-lived deciduous hardwoods die and create canopy gaps. Other deciduous and mixed stands may remain permanently in deciduous forest characterized by frequent natural disturbances, particularly in riparian areas and on unstable uplands. Because deciduous and mixed stands make up a small percentage of the TRMP lands, management of these types will focus on retention of deciduous trees where feasible. Periodic thinning and creation of gaps, snags, decaying live trees and coarse woody debris that began under the WHMP will continue in deciduous and mixed forest stands, as needed, with emphasis on the retention of deciduous trees. Deciduous and mixed forest that is the result of frequent natural disturbance or site-specific soil conditions (e.g., high water table) likely will not benefit from or require active manipulation of the overstory, so gap creation and thinning will be avoided in these stands.

2.1.4 Understory Management

Much of the second-growth forest on the TRMP lands is characterized by poorly developed shrub and forb communities because little direct sunlight reaches the ground. Studies conducted in an Oregon Douglas-fir forest by Witler (1975) showed an increase in herbaceous cover and shrub biomass in stands thinned to canopy closure of 70 percent or less.

Gap creation and thinning on TRMP lands will open the forest canopy, and the resulting understory growing space will be managed to increase the production of forage for deer and promote the development of shrub and herbaceous layers as habitat for smaller animals. Deer forage production may be increased by seeding gaps and thinned areas with grasses and forbs from the list in Table 2.1, or others approved by a District biologist.

Table 2.1 Plant species available for forage enhancement of forested TRMP lands.

Common Name	Scientific Name
GRASSES AND GRASSLIKE PLANTS	
Creeping Red Fescue [1]	*Festuca rubra*
Annual ryegrass [6]	*Lolium multiflorum*
Reedgrass [2, 3]	*Calamagrostis canadensis*
Bulrush [2]	*Scirpus microcarpus*
Mannagrass [3]	*Glyceria spp.* (except *maxima)*
Sedge [2]	*Carex spp.*
Rush [2]	*Juncus spp.*
White oats [6]	*Avena sativa*
Tufted hairgrass [6]	*Deschampsia cespitosa*
Slender wheatgrass [6]	*Elymus (Agropyron) trachycaulis*
Blue wildrye [6]	*Elymus glaucus*
Soft white winter wheat [6]	*Triticum aestivum*
Gala brome [6]	*Bromus stamineus*
Winter triticale [6]	*Triticum aestivum* x *Secale cereale*
FORBS	
Agoseris [4]	*Agoseris heterophylla*
Pearly-everlasting [4]	*Anaphalis margaritacea*
Subclover [6]	*Trifolium subterranium*
Plantain [4]	*Plantago spp*
Yarrow [4]	*Achillea lanulosa*
Speedwell [2]	*Veronica spp.*
Valerian [2]	*Valeriana spp.*
False Solomon's Seal [2]	*Smilacina spp.*
Prunella [l]	*Prunella vulgaris*
Fireweed [5]	*Epilobium angustifolium*
Willow-weed [2]	*Epilobium watsonii*
Fleabane [5]	*Erigeron spp.*
Hawksbeard [5]	*Crepis spp*
Austrian winter peas [6]	*Pisium sativum arvense*
Alsike clover [6]	*Trifolium hybridum*

[1] Raedeke and Taber 1983
[2] Hanley 1980
[3] Cowan 1945
[4] Brown 1961
[5] Campbell 1987
[6] Potash 2006

2.2 Lake, Wetland and Stream Buffers

2.2.1 Background and Rationale

The riparian interface between upland and aquatic habitats supports a wide variety of plant and animal species and forms an important part of the forest community. Riparian forest vegetation stabilizes streamside soils and provides shade, large woody debris and nutrients to the aquatic system (Franklin et al. 1981). With the proximity of surface water, riparian vegetation is typically more diverse and includes plant species not found in adjacent upland forest, thereby providing locally unique habitats. As a result, the density and diversity of wildlife species are greater in riparian zones and wetlands than in most adjacent uplands (Odum 1979). Of the 414 western Washington and Oregon wildlife species listed by Oakley et al. (1985), 359 use riparian habitats during all or part of their life cycles.

The management of riparian forest in Washington has evolved a great deal in recent years. A series of revisions to the Washington Forest Practices Rules (WAC 222-30) since 2001 have dramatically increased the width of riparian management zones and decreased the amount of tree removal (thinning) that can occur within them. Lake, wetland and stream buffers on the TRMP lands will meet or exceed the riparian management zone requirements of the current Washington Forest Practices Rules. In most cases, the TRMP buffers will be wider and more restrictive on thinning than those required under the Forest Practices Rules. Since there will be no even-aged timber harvesting on the TRMP lands (Section 2.1), the effective widths of buffers will be considerably greater than stated below.

2.2.2 Lake and Wetland Buffers

Overstory management activities will be restricted within 500 feet of Lost Lake (and its associated wetland complex), Spada Lake, and other non-forested wetlands of 0.25 acre and larger (Table 2.2). Thinning will not occur within 200 feet and forest gap creation will not occur within 100 feet (measured horizontally) of the outer edge of the bankfull width or wetland boundary, whichever is greater. However, snags, decaying live trees and coarse woody debris may be created up to the lake or wetland edge, where allowed under Forest Practices Rules. These will typically be individuals or small groupings of these woody habitat structures. Gap creation (Section 2.1) would provide structural diversity to the overstory and/or increase understory vegetation. Maximum gap size within a lake or wetland buffer will be 0.25 acre. Thinning (Section 2.1) would also increase understory vegetation or accelerate the development

of old-growth forest conditions in dense second-growth stands. Minimum post-thinning canopy closure will be 60 percent. Alternately, the District may use the Relative Density (RD) metric described by Curtis (1982) to monitor thinning. The minimum post-thinning RD will be 30. The minimum time between thinnings in individual stands will be 10 years. No thinning or gap creation will occur within forested wetlands, but snag and coarse woody debris creation may occur in accordance with Section 2.3.

Table 2.2 Lake and non-forested wetland overstory management buffers.

Horizontal Distance from Bankfull Width or Wetland Edge	Overstory Management Activities Allowed [1]
0 – 100 feet	- Snag and decaying live tree creation - Coarse woody debris creation
101 – 200 feet	- Snag and decaying live tree creation - Coarse woody debris creation - Gap creation [2]
201 – 500 feet	- Snag and decaying live tree creation - Coarse woody debris creation - Gap creation [2] - Thinning [3]

[1] All activities will be subject to compliance with Washington Forest Practices Rules

[2] Maximum gap size of 0.25 acre

[3] Minimum post-thinning canopy closure of 60 percent or Relative Density of 30; minimum interval between thinnings of 10 years

2.2.3 Stream Buffers

Buffers will be maintained along all streams and rivers on the TRMP lands in accordance with the Riparian Management Zone requirements of the Washington Forest Practices Rules (WAC 222-30). In addition, 50-foot buffers will be extended to include both sides of all perennial non-fish (WDNR Type Np) and seasonal non-fish (WDNR Type Ns) streams. Buffer width on all streams will be measured horizontally from the outer edge of the bankfull width or channel migration zone, whichever is greater. Buffer width may be increased on steep and/or unstable soils or between roads and streams where additional distance is needed to adequately protect the stream. No overstory thinning or creation of gaps will occur within the first 50 feet of buffer closest to the stream. Thinning and gap creation may occur beyond 50 feet as allowed under Washington Forest Practices Rules. Snags, decaying live trees and coarse woody debris may be created within the first 50 feet, where allowed under Washington Forest Practices Rules. Tree removal may also occur within a buffer to construct new stream-crossing roads or yarding corridors.

2.3 Snags and Decaying Live Trees

2.3.1 Background and Rationale

Snags (dead trees) and decaying live trees are important habitat components for many species of wildlife. They are used extensively for a number of activities, including nesting, hiding, foraging, and food storage (Neitro et al. 1985). Cavity-dwelling birds can represent 30 to 45 percent of the total bird population in forested areas (Raphael and White 1984), and the absence of suitable nest sites can be a major factor limiting their populations. Numerous studies have documented the importance of snags. More recently, decaying live trees have also been recognized as important for cavity-nesting birds (Rose et al. 2001). For example, studies have shown substantial use of decaying live trees by nesting woodpeckers in the Pacific Northwest (Aubry and Raley 1992, Aubry and Raley 2002, Duncan 2003).

Naturally-created snags and decaying live trees can be divided into three general types based on origin: a) residual snags, b) suppression killed snags, and c) codominant cohort snags. Residual snags are remnants of a previous stand found in early and mid-successional forest. They survived the stand replacement event (e.g., fire, windstorm or even-aged timber harvest) so they are typically larger than the live trees in the stand and in middle to advanced

stages of decay. Residual snags are rare in commercial forests because past timber harvest methods and safety concerns generally mandated their removal.

Suppression killed snags result from competition-induced mortality in early and mid-successional forest. As trees in a fully-stocked stand increase in size they compete for growing space (Oliver and Larson 1990). Smaller and slower-growing trees are over-shadowed by their larger neighbors and they eventually succumb to pathogens or simple lack of photosynthesis. Suppression killed snags are typically smaller than the live trees in the stand. Since they have high ratios of sapwood to heartwood, suppression killed snags tend to decay and fall faster than large residual snags. They also decay from the outside in, providing foraging habitat for insectivorous animals and nesting habitat for weak excavators like chickadees and some woodpeckers. Suppression killed snags are often the most abundant snags in the forest (Cline et al. 1980), but their numbers and sizes are highly variable and dependent on live tree density. Small suppression killed snags can be plentiful in forest with high seedling density, where competition between live trees begins early. Many of the naturally-regenerated stands in the Spada Lake Tract are in this condition. Suppression killed snags can be less common, or occur later in stand development, if initial live tree density is low due to poor regeneration or if thinning occurs before competition between live trees results in mortality.

Codominant cohort snags are the result of mortality among the trees that survive competition during the early stages of stand development and become the codominant cohort of overstory trees in mid- and late-successional forest. Wind, lightning, insects and pathogens can kill otherwise healthy individuals or clumps of trees at any time. Depending on the cause of mortality (e.g., wind breakage vs. root rot), a codominant cohort snag may persist several decades or it may fall within a few years of death. At the time they are created, codominant cohort snags are representative of the average size of overstory trees. If they persist as snags, they are eventually smaller than the average live tree. Codominant cohort snags are generally larger than suppression killed snags, and more likely than suppression-killed snags to form hard snags that provide habitat for strong cavity nesters. Cline et al. (1980) found that codominant cohort snags make up a small percentage of the total snag resource in young unmanaged forest, and do not become common until after stand age 50.

Decaying live trees typically come from the codominant cohort of a stand, although they or the snags they become may persist to become residuals in the next stand. Decaying live trees result from damage to the top or bark of a tree that allows heart rot fungus to enter while the

tree is still alive. The fungus thrives in live trees, so the extent of heart rot depends on how long the tree survives after infection. In western Washington, heart rot is most common in western redcedar and Pacific silver fir, and these are the two species most commonly selected for nesting by the preeminent cavity nester in the region, the pileated woodpecker (Aubry and Raley 2002). Western hemlock is also used by cavity nesters, but less than western redcedar and Pacific silver fir because it tends to rot more quickly from the outside. Most primary cavity nesters seek snags and live trees with hard outer wood and soft inner wood. Hard outer wood allows birds to control the size of the cavity opening and thus protect eggs and nestlings from predators, while soft inner wood makes excavation of the cavity easier.

Snag management prescriptions should account for all three types of snags as well as decaying live trees, but the ability of forest managers to create these will vary with the type of snag or live tree and the condition of the forest. Residual snags are survivors of stand initiation that persist into early and mid-successional stages. They can be provided in managed forests by retaining some of the largest snags and live trees present at the time of timber harvest (i.e., clearcutting). The TRMP lands will be managed without clearcutting unless approved by the WDFW and USFWS on a site-specific basis, and most stands are well into mid-successional stages where residual snags play a decreasing role. Existing residual snags will be retained on TRMP lands where it is safe and operationally feasible to do so, but there will be little opportunity to create new residual snags because existing stands contain very few residual trees. Suppression killed snags can be replaced relatively easily by killing live trees from the smaller size classes, but they can also be provided by retaining portions of managed stands at sufficient tree densities to cause natural suppression mortality. Variable density thinning will be the primary tool for providing suppression killed snags on TRMP lands, with augmentation by direct snag creation in those portions of stands that are thinned to provide deer forage and/or promote old-growth conditions. Codominant cohort snags and decaying live trees are expected to be the most prevalent cavity resources on TRMP lands due to the management histories and ages of most of the forest stands. These are best created by topping of live trees to kill the tree or initiate natural decay processes while the tree is still alive.

The sizes and numbers of snags and decaying live trees to be created in managed forest are determined by a number of considerations. The three most important considerations are the cavity needs of native wildlife species; the sizes, densities and decay stages of snags and decaying live trees found in natural forests of the type being managed; and the sizes and numbers of healthy live trees available in the forest stands being managed.

The snag needs of native wildlife species can be estimated from the work of Neitro et al. (1985). They relied upon three basic assumptions to determine the numbers of snags needed for snag-dependent wildlife in managed forests:

a) The snag requirements of most snag-dependent species will be met if the breeding requirements of all woodpeckers are met;

b) Large snags can be substituted for small snags but not vice versa; and

c) The total number of snags required in a forest stand is the sum of the snag requirements of the individual primary cavity nesting species (woodpeckers) present (Table 2.3). Snags are frequently used by different individuals of the same or different wildlife species in subsequent years, but they are rarely shared during the same year.

Table 2.3 Snag size and density requirements of primary cavity nesters common to the Jackson Project TRMP lands (from Neitro et al. 1985).

Species	Snags / 100 acres	Hard	Soft	Minimum size	
				DBH (inches)	Height (feet)
Red-breasted sapsucker	45	x		15	20
Downy woodpecker	16		x	11	10
Hairy woodpecker	192		x	15	20
Common flicker	48		x	17	10
Pileated woodpecker	6	x		25	40
Total	307	-	-	-	-

According to Neitro et al. (1985), a total of 307 snags per 100 acres, ranging in DBH from 11 inches to 25 inches, would be needed to provide optimal habitat conditions. This should provide 100 percent of the snag needs of the primary and secondary cavity nesters common to the area (Table 2.4).

Table 2.4 Snag size requirements of secondary cavity nesters common to the Jackson Project TRMP lands (from Neitro et al. 1985).

Species	Minimum Size	
	DBH (inches)	Height (feet)
Douglas squirrel	17	20
Black-capped chickadee	9	10
Pine marten	17	20
Common merganser	25	10

The approach suggested by Neitro et al. (1985) may be appropriate for commercial timberlands, where each created snag can reduce final timber harvest volume. The TRMP lands are not constrained by timber harvest objectives, however, so management under the TRMP will consider snags in a broader context. The sizes and numbers of snags present in unmanaged forest are important to consider because snag targets based solely on the nesting requirements of cavity-dwelling species can underestimate total snag needs for all life requisites (including foraging) over the long term (Aubrey and Raley 2002, Brett 1997, Knutson and Naef 1995, Rose et al. 2001).

Accurate estimation of natural snag sizes and densities is complicated by the fact that both can vary widely with the age and history of the stand. Cline et al. (1980) reported total snag densities of 7.4 to 19.5 per acre, including residual snag densities of 2.1 to 5.8 per acre, in forest of 100 yeas and older in western Oregon. The average size of snags in measured stands was as high as 28.3 inches DBH. Ohmann and Waddell (2002) estimated the density of all snags over 10 inches DBH in “late-successional” forest of western Oregon and Washington to be 13.8 per acre, with 6.3 of these snags per acre over 20 inches DBH. Despite the differences in terminology and classification of forest types between the two sources, the results are similar. They suggest a target for stands over 100 years old of 14 snags per acre, including 6 residual snags per acre. Since there are no opportunities to create new residual snags on the TRMP lands, the full target of 14 snags per acre will need to come from codominant cohort snags

The above estimates by Cline at al. (1980) and Ohmann and Waddell (2002) are from mid- and late-successional stands, so they include limited numbers of suppression killed snags.

Data for younger forest, where suppression kills make up a larger proportion of the total snag resource, are not nearly as consistent. Cline et al. (1980) found total snag densities in unmanaged forest 35 to 40 years old ranged from 45.2 to 329.9 per acre. Management targets within this range would be impractical in most managed stands, as they would require managers to either hold stand densities at very high levels, thereby counteracting efforts to accelerate tree growth rates, or kill large numbers of trees and thereby threaten long-term viability of the stands. Targets for suppression killed snags will therefore be based on site-specific operational and economic considerations, as explained below.

Few studies have documented the numbers of decaying trees present in unmanaged forest or distinguished decaying live trees from snags. For purposes of the TRMP, decaying live trees will be included in the management targets based on codominant cohort snags.

Cline et al. (1980) also provided data on the rate at which snags decay and fall over. They identified five stages of deterioration, with Stage 1 being hard, recently-killed snags and Stage 5 being soft, highly decayed snags. They found that large snags (>18.5 inches DBH) persist 50 to 100 years or more and spend 7 to 18 years in Stage 1. Those of medium size (7.5 – 18.5 inches DBH) persist from 30 to 60 years and spend 6 to 13 years in Stage 1. Small snags, which are predominantly suppression killed, persist less than 20 years and spend 5 to 8 years in Stage 1. Since Stage 1 are the only snags that can be created directly from live trees, snag management needs to focus on providing enough Stage 1 snags at appropriate intervals to produce the total numbers and decay stages found in unmanaged stands. An appropriate management prescription for medium and large snags in mid- to late-successional forest, based on Cline et al. (1980), would be to create three snags per acre every 10 years. Of the three created snags, two should come from the larger live trees in the stand at the time of creation (a subset of the codominant cohort) and one could come from the overall codominant cohort. In this way, the size of created snags would increase in each successive 10-year period as the size of live trees increases. To avoid underestimating snag creation needs, this prescription assumes: a) the overall target at age 100 years is 14 snags per acre, b) a minimum of 25 percent of all snags are in Stage 1, c) Stage 1 lasts a maximum of 10 years, and d) attrition of created snags is balanced over time by the appearance of natural snags. Over five decades, the result would be15 large created snags of varying decay stages per acre. Snags that appear naturally would provide additional habitat value.

The management history of the TRMP lands will also play a role in determining the need for snag and decaying live tree creation. The TRMP lands contain forest stands of two basic types; those that originated after commercial timber harvest in the past (managed stands) and those of natural origin (unmanaged stands). Managed stands range in age from 20 to 100 years, although most are the result of even-aged timber harvesting in the 1960's. Unmanaged stands are 160 years and older. Managed stands tend to have dense, uniform overstories, variable numbers of small snags, and few large snags or decaying live trees. Thinning and gap creation will continue in managed stands until they reach an age of 100 years (see Section 2.1). The District has managed young stands since 1989 to increase the numbers of snags and decaying live trees. Snag and decaying live tree creation will continue under the TRMP until stand age 100 years to provide the full range of natural snag sizes and decay stages. Unmanaged stands also have variable snag and decaying live tree numbers, but natural tree mortality processes are at work in these stands. Consequently, no snag or decaying live tree creation will occur in unmanaged stands.

2.3.2 Snag Management

Codominant cohort snags and decaying live trees will be created in forest stands less than 100 years old that have at least 40 live trees per acre over 10 inches DBH. No minimum diameter is specified for snags, but the District biologist and contractor must agree that the tree is safe to be climbed. Individual stands will be entered at intervals of 8 to 12 years (as determined by operational and annual budgeting constraints) to create three snags or decaying live trees per acre. All three will be created from the larger live trees (by DBH) in the stand. Snags will be created by removing all live limbs. Decaying live trees will be created by topping trees but leaving enough live limbs to keep the tree alive for at least 5 years. At least one of the three will be a created snag and one will be a decaying live tree. The third will be determined on a site-specific basis by District biologists, based on the species of live trees present, the observed numbers of natural snags and decaying live trees present, the observed persistence of created snags and decaying live trees and the observed wildlife use of created snags and decaying live trees (see Section 4.0, Monitoring). The species composition of created snags and decaying live trees will be representative of the species composition of the live trees in the codominant cohort. Created snag and decaying live tree densities will be averaged across a stand or management unit. They may be in clumps or dispersed evenly throughout the unit, depending on live tree distribution, safety considerations, and operational constraints. To minimize firewood cutting, snags and decaying live trees will not be created within 200 feet of

roads that are open to the public. Snags and decaying live trees will be protected from felling during subsequent thinning and gap creation, except where they conflict with operational or safety considerations.

Suppression killed snags will be produced naturally by maintaining high tree densities in portions of young stands. When a stand less than 100 years old is thinned, at least 20 percent of the stand will be left unthinned to allow suppression to occur. An unthinned lake or wetland buffer within or adjacent to a management unit may be counted toward the unthinned 20 percent for that management unit. If the stand is thinned multiple times, the same area will be left unthinned in all entries.

2.4 Coarse Woody Debris

2.4.1 Background and Rationale

Coarse woody debris serves a number of wildlife habitat functions in the forested environment. Logs can provide cover for small mammals, birds and amphibians, a source of food for insectivorous and herbivorous species, and drumming sites for birds like the ruffed grouse (Bartels et al. 1985). The size and amount of coarse woody debris in natural forest stands is quite variable, depending on the species composition, microclimate and fire history of the site. Franklin et al. (1981) found an average of 24 percent (range 11 to 35%) of the ground surface occupied by logs in the old-growth Douglas-fir forests of western Oregon, but noted the optimum amount for wildlife was unknown. Defining good wildlife habitat is complicated by the fact that each species of wildlife probably finds optimal habitat in different amounts of coarse woody debris. For example, large amounts of material may provide good cover and travel lanes for small mammals, but seriously inhibit big game movement. Stage of decomposition is also important. Franklin et al. (1981) identified five decay classes for logs in Douglas-fir forests, and discussed unique wildlife values of each. Bartels et al. (1985) re-emphasized that each decay class is important, but again pointed out that the amount of each class needed to provide good wildlife habitat is unknown.

2.4.2 Coarse Woody Debris Management

Existing logs will be retained on all forested TRMP lands, and new logs will be created in stands less than 100 years old. All existing logs will be left on-site during thinning and gap creation in young forest stands, although some logs may need to be moved or disturbed during

felling and yarding, or for safety or access. New coarse woody debris will be created in forest stands less than 100 years old by felling four live trees per acre from the larger live trees (by DBH) every 8 to 12 years. The timing of coarse woody debris creation will be adjusted within this range to accommodate annual budgetary and operational considerations. Coarse woody debris creation will be timed to coincide with gap, snag and decaying live tree creation where operationally feasible. Trees felled during gap creation may be counted as coarse woody debris if they originate from the codominant cohort. Trees felled by natural causes (e.g., wind and root rot) also may be counted as coarse woody debris if they originate from the codominant cohort and are in Log Decomposition Class 1 (Maser et al. 1979). Felled trees may be limbed and/or bucked into logs no less than 20 feet long for safety or operational reasons. The species of felled trees will be representative of the species composition of the codominant overstory. Felled trees may be distributed throughout a management unit, or left in patches such as those resulting from gap creation. To discourage firewood gathering, coarse woody debris trees will not be felled within 200 feet of roads that are open to the public.

2.5 Right-of-Way Management

Permanent meadows and grasslands are rare in western Washington where natural succession favors dense conifer forest. Grasslands that are created and maintained artificially, such as powerline rights-of-way, provide locally unique habitats that typically receive heavy wildlife use (Taber 1977). They create edge where they adjoin forest and wetland, they provide travel lanes for large and small mammals, and they support persistent communities of shrubs and grasses that provide habitat and forage for birds and mammals, including deer.

The Project Facility Lands Tract includes the power pipeline right-of-way and a short segment of transmission line right-of-way. These lands are managed primarily for power generation and transmission, but enhancement for wildlife habitat will also occur where it is consistent with safe and efficient operation of the Project. Habitat management on the rights-of-way will continue to emphasize three main factors: a) increased production of grasses, forbs and shrubs for deer forage, b) placement of trees, shrubs and brush piles for cover and habitat diversity, and c) limited human use, particularly off-road vehicle use on the power pipeline right-of-way. A list of species suitable for right-of-way planting is presented in Table 2.5. This list will be updated, if needed, to remove any that become designated as noxious weeds.

Table 2.5 Plant species suitable for wildlife habitat enhancement on TRMP rights-of-way.

Common Name	Scientific Name
GRASSES	
Annual ryegrass[1]	*Lolium multiflorum*
Blue wildrye[3]	*Elymus glaucus*
Creeping red fescue[1,3]	*Festuca rubra*
Chewings fescue	*Festuca rubra var. commutata*
Gala brome[3]	*Bromus stamineus*
Tufted hairgrass[2,3]	*Deschampsia cespitosa*
Slender wheatgrass[3]	*Elymus (Agropyron) trachycaulis*
Soft white winter wheat[2,3]	*Triticum aestivum*
Winter triticale[2,3]	*Triticum aestivum* x *Secale cereale*
White oats[2,3]	*Avena sativa*
FORBS	
Plantain	*Plantago spp.*
Alsike clover[2,3]	*Trifolium aestivum*
Subclover	*Trifolium subterranium*
Austrian winter peas[2,3]	*Pisum sativum arvense*
Fireweed	*Epilobium angustifolium*
Willow-weed	*Epilobium watsonii*
SHRUBS	
Trailing blackberry	*Rubus ursinus*
Elderberry	*Sambucus spp.*
Huckleberry[1]	*Vaccinium spp.*
Thimbleberry[1]	*Rubus parviflorus*
Nootka Rose[1]	*Rosa nutkana*
Salmonberry[1]	*Rubus spectabilis*
Snowberry	*Symphoricarpos albus*
Serviceberry[1]	*Amelanchier alnifolia*
Spiraea[1]	*Spiraea douglasii*
Red-flowering currant	*Ribes sanguineum*
Vine maple	*Acer circinatum*
Oceanspray	*Holodiscus discolor*
Willow	*Salix spp.*
TREES	
Cottonwood	*Populus spp.*
Dogwood	*Cornus spp.*
Cherry	*Prunus spp.*
Bigleaf maple	*Acer macrophyllum*
Apple	*Pyrus spp.*
Hazelnut	*Corylus cornuta*
Oregon ash[1]	*Fraxinus latifolia*
Black hawthorne[1]	*Crataegus douglasii*
Red alder	*Alnus rubra*
Douglas-fir[1]	*Pseudotsuga menziesii*
Western redcedar[1]	*Thuja plicata*

[1] Used on ROW lands prior to 2011, as recorded in Annual Reports 1989-2007.
[2] U.S. Forest Service 2005
[3] Potash 2006

2.6 Waterfowl Nest Boxes

Cavity nesting ducks are listed as Priority Species in Washington. Numerous studies have demonstrated the value of nest boxes in enhancing wood duck populations. Bellrose (1976) provided an extensive summary of research on wood duck use of nest boxes. Additional species utilize boxes designed for wood ducks; common and hooded mergansers are both known to nest in wood duck boxes in the Sultan Basin.

The WDFW recommends providing potential nest cavities near open water wetlands. They also recommend that boxes be placed at least 150 feet apart to reduce predation. Boxes that are hidden from view have lower rates of nest parasitism (Semel and Sherman 1995).

Waterfowl nest boxes will be placed at Lost Lake. Boxes will be made of rough-cut cedar and attached 12 to 20 feet above the ground on snags in the water or trees adjacent to the water. They will be lined with 3 to 4 inches of wood chips that will be replaced as needed. Boxes may be replaced as needed due to bear damage or predation, and they may be moved to new areas if original locations become prone to predation by bears or other predators. Nest boxes will be checked soon after the end of each nesting season to avoid disturbing nesting waterfowl and to ensure accurate determination of use.

3.0 MANAGEMENT TRACT DESCRIPTIONS AND PRESCRIPTIONS

3.0 Management Tract Descriptions and Prescriptions

3.1 Lost Lake Tract

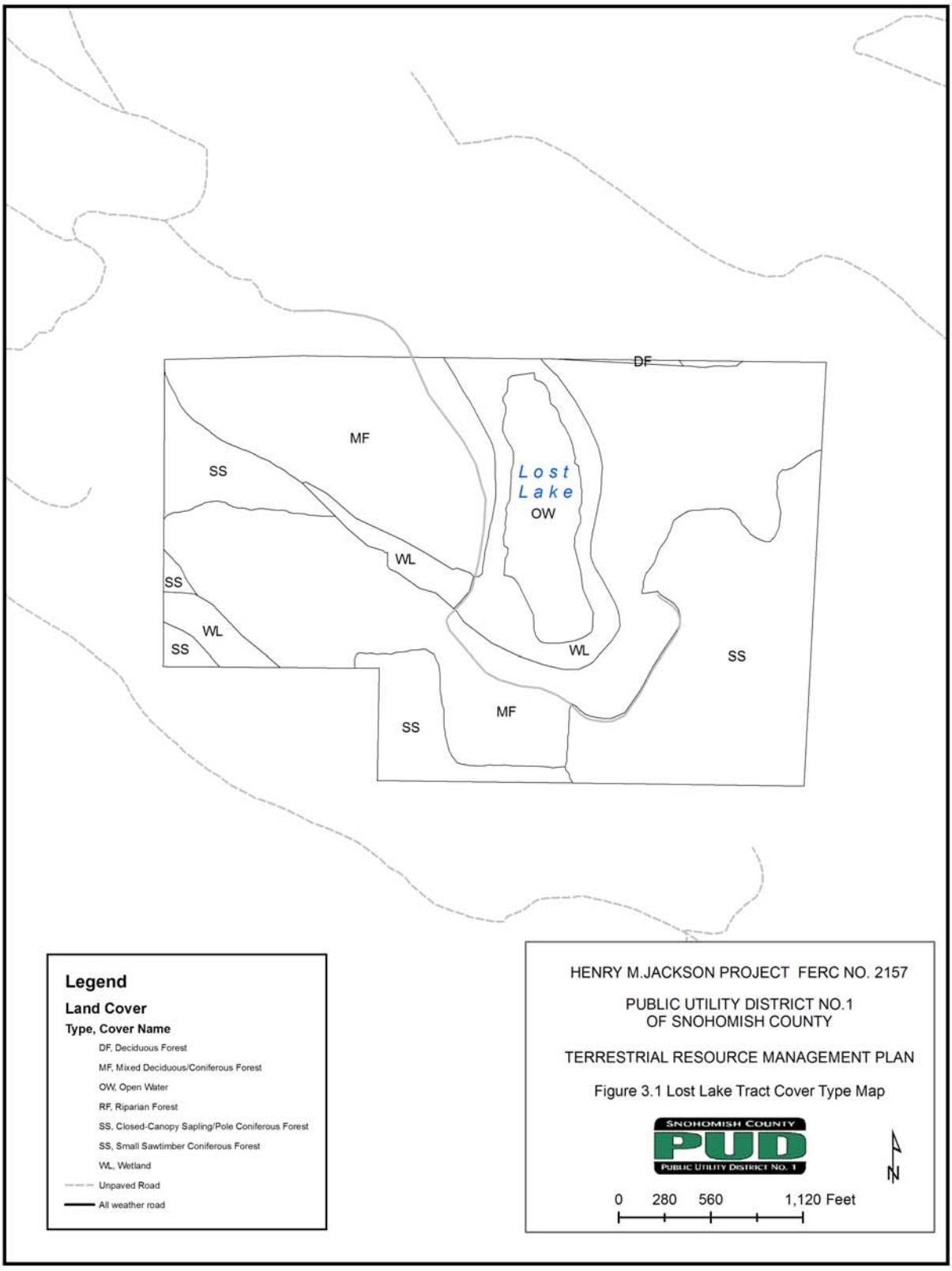
3.1.1 Existing Habitat Conditions

The Lost Lake Tract consists of approximately 37 acres of lake and wetland and 177 acres of young second-growth forest (Figure 3.1). It is located approximately 6 miles north-northwest of the Town of Sultan. The tract was proposed for subdivision into 20-acre suburban residential lots by the previous owner. The District acquired the tract in 1988 as part of the WHMP and is managing it for wildlife habitat.

The Lost Lake tract lies within the *Tsuga heterophylla* Zone described by Franklin and Dyrness (1973). The dominant vegetation on upland sites in this zone is dense forest of western hemlock (*Tsuga heterophylla*), Douglas-fir (*Pseudotsuga menziesii*) and western redcedar (*Thuja plicata*). Scattered throughout the conifer forests are individuals and small stands of red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*) and black cottonwood (*Populus trichocarpa*). Hardwoods are found primarily on wet and/or recently disturbed soils.

All upland sites on the Lost Lake Tract have been logged at least once in the past 100 years and left to regenerate naturally. Some sites were high-graded in the 1970s. All are now dominated by mixed second-growth stands of hemlock, red alder, Douglas-fir, cedar, bigleaf maple and black cottonwood (Figure 3.1).

The primary wetland complex within the tract consists of 14 acres of open water (Lost Lake) surrounded by persistent emergent, deciduous scrub-shrub, evergreen scrub-shrub (peat bog) and deciduous forest wetland. The large number and even distribution of wetland types make this a diverse, high-quality wetland complex. Human disturbance of the tract is minimal because access is by hike-in only, to protect the wildlife values of the lake, wetlands, and surrounding uplands. A fishing platform on Lost Lake is maintained cooperatively by the Snohomish Sportsman's Club and the District to provide fishing access and protect the floating bog around Lost Lake. A smaller wetland, surrounded by mixed forest, exists in the southwest corner of the tract.


DF
MF
SS
Lost
Lake
OW
WL
SS
WL
SS
WL
SS
MF
SS
Legend
Land Cover
Type, Cover Name
DF, Deciduous Forest
MF, Mixed Deciduous/Coniferous Forest
OW, Open Water
RF, Riparian Forest
SS, Closed-Canopy Sapling/Pole Coniferous Forest
SS, Small Sawtimber Coniferous Forest
WL, Wetland
Unpaved Road
All weather road
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1
OF SNOHOMISH COUNTY
TERRESTRIAL RESOURCE MANAGEMENT PLAN
Figure 3.1 Lost Lake Tract Cover Type Map
SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1
N
0 280 560 1,120 Feet

3.1.2 Existing Habitat Value

The mixed forest cover type which dominates the tract has high wildlife value for species such as ruffed grouse, black-capped chickadee and black-tailed deer due to the large amount of edge adjacent to the wetland complex, quality forage, and high diversity of overstory tree species. The existing forest provides good forage for deer and ruffed grouse, but forage quality is decreasing as young conifers begin to dominate the site and crowd out palatable shrubs and forbs. Food and nesting sites for late-successional species such as pileated woodpecker and marten can be limited in mixed forest and small sawtimber forest due to the absence of snags, large diameter logs and large diameter trees. The WHMP snag program has been implemented on the Lost Lake tract and there are currently at least three snags per acre in the forested stands, most in the early stages of decay.

The wetland complex has high habitat value because of its diversity of wetland types. The lake was stocked with trout from 1964 through 1979 and has been stocked annually since 1989. The resulting fish population provides a food source for species such as osprey and hooded mergansers. The ratio of open water and emergent vegetation is favorable for mallard nesting. The District has provided waterfowl nest boxes for wood ducks, hooded mergansers and bufflehead since 1989. The abundance of young deciduous trees in the surrounding uplands provides an excellent food source for beaver.

3.1.3 Management Constraints

Management constraints affecting wildlife enhancement of the Lost Lake Tract are minimal. The lake is not covered under the County's Shoreline Management Master Program because it is less than 20 acres. Washington Forest Practices Rules, Snohomish County Critical Areas Ordinance, and general zoning apply to the tract, but they do not restrict any potential management activities proposed in this plan.

The north end of Lost Lake is contained by a low earthen dam. The City is concerned that water from Lost Lake could drain into Lake Chaplain, the municipal water supply for most of Snohomish County, in the event of a flood and/or dam breach. The City therefore periodically monitors use of Lost Lake and encourages low impact activity on the tract.

3.1.4 Habitat Management Objectives

a) Continue to protect the tract from development for the term of the new license.

b) Protect and enhance the wetland by maintaining a forested buffer zone around it, providing and maintaining waterfowl nest boxes.

c) Manage forested lands outside the buffer zone for mixed forest and late–successional conifer forest wildlife by creating gaps and thinning the overstory.

d) Implement the snag, decaying live tree and coarse woody debris management programs on forested lands.

3.1.5 Habitat Management

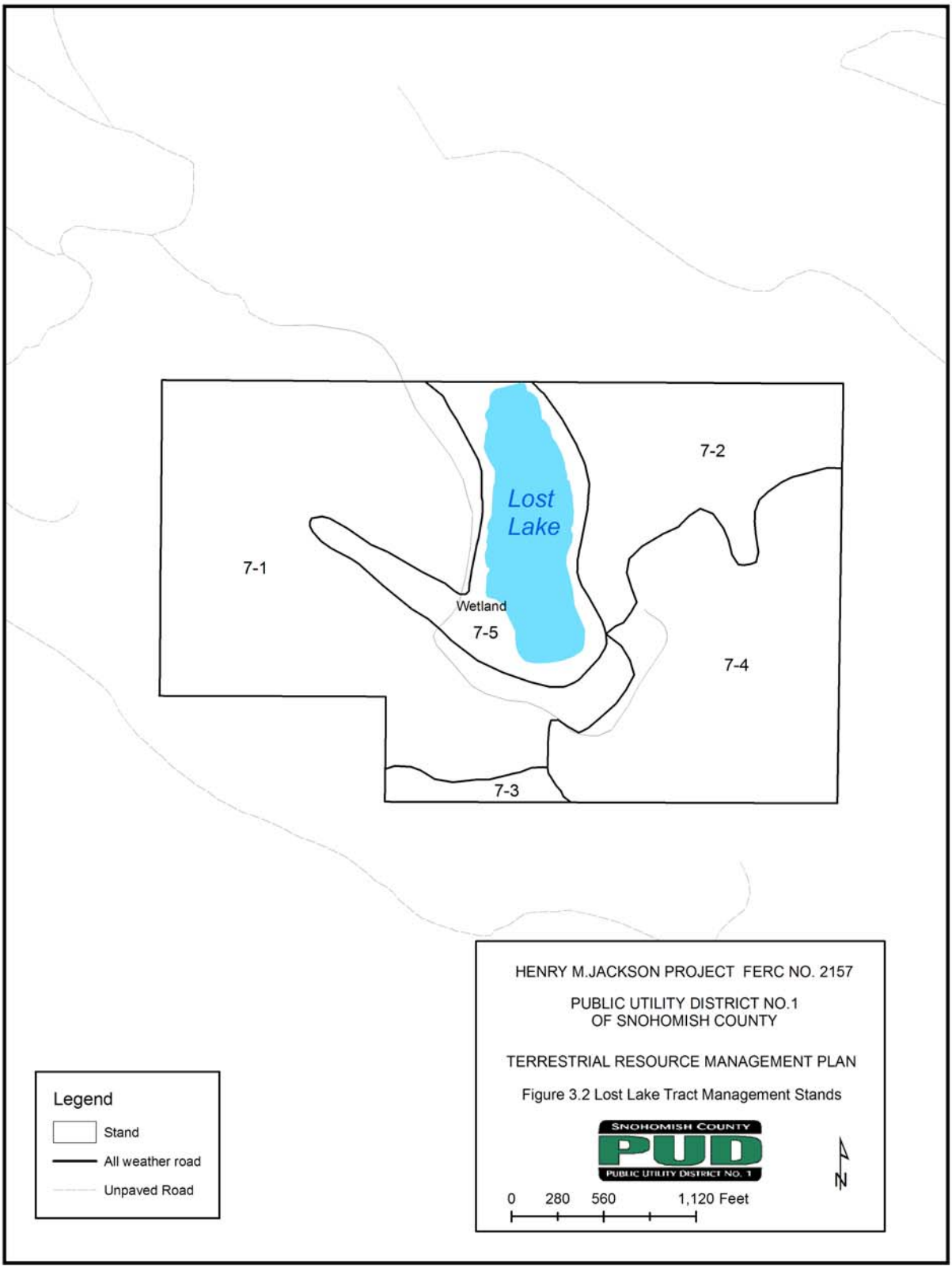
Management of the tract will involve three major habitat systems: 1) lake/wetland, 2) wetland buffer and 3) young forest management (Figure 3.2). These elements are described in the following sections and in Chapter 2.

3.1.5.1 Lake/Wetland Management

The Lost Lake/wetland complex and the smaller wetland on the southwest portion of the tract will be retained for the term of the new license. They will be protected by limiting human access to the tract to hike-in only.

3.1.5.2 Wetland Buffer Zone Management

Approximately 80 acres of second-growth forest will be maintained as a 500-foot wide permanent buffer surrounding the Lost Lake/wetland complex. The buffer will be managed in four zones following the guidelines in Section 2.2.2 and Table 2.2. Waterfowl nesting boxes will be maintained and replaced, as needed, in trees directly adjacent to the lake/wetland following the guidelines described in Section 2.6.


Lost Lake
7-1
7-2
7-3
7-4
7-5
Wetland
Legend
Stand
All weather road
Unpaved Road
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1
OF SNOHOMISH COUNTY
TERRESTRIAL RESOURCE MANAGEMENT PLAN
Figure 3.2 Lost Lake Tract Management Stands
SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1
0 280 560 1,120 Feet
N

3.1.5.3 Forest Management

Forestland outside the wetland buffer zone will be managed following the protocols described in Section 2.1.3, Young Forest Management, and Section 2.1.4, Understory Management. Retention of the hardwood component to the extent site conditions allow will be an objective in mixed forest stands. Gap creation will be the primary tool for promoting a healthy understory where needed. Variable density thinning will be considered where access is feasible. Snags, decaying live trees and coarse woody debris will be provided as described in Sections 2.3 and 2.4.

3.1.6 Detailed Prescriptions

The following prescriptions direct the management of all stands on the Lost Lake Tract over the life of this TRMP. Each prescription contains a summary of the management constraints, habitat objectives and enhancement methods applicable to a particular stand. Each is intended to be used in conjunction with the details provided in other sections of this TRMP, particularly the enhancement measures in Chapter 2.0.

Stands 7-1, 7-2, 7-3

Area: 7-1 = 81.0 acres
7-2 = 37.0 acres
7-3 = 4.0 acres

Year of Origin: 1934-1938

Site Index: 126

Cover Types: Stand 7-1 – Mixed Forest
Stand 7-2 – Mixed Forest
Stand 7-3 – Small Sawtimber Conifer Forest

Constraints: None

Notable Features: Adjacent to Lost Lake, wetlands

Access: Fair to excellent; level site, adjacent to existing road system

Management: Augment natural forest processes through overstory thinning and gap creation to accelerate late-successional forest development.

Restrict activity within 500 feet of Lost Lake and wetlands, as per Section 2.2.

Implement snag, decaying live tree and coarse woody debris creation until stand age 100 years.

Perpetuate mixed forest conditions by retaining live deciduous trees during gap creation, overstory thinning, snag creation, decaying live tree creation, and coarse woody debris creation.

Stand 7-4

Area: 65.0 acres **Year of Origin:** 1970 **Site Index:** 126

Cover Types: Closed Canopy Sapling/Pole Conifer Forest and Mixed-Shrub/Brush

Constraints: Small Drainage

Notable Features: None

Access: Good to excellent; level site, adjacent to existing road system

Management: Augment natural forest processes through overstory thinning and gap creation to accelerate late-successional forest development.

Restrict activity within 500 feet of Lost Lake and non-forest wetlands, as per Section 2.2.

Implement snag, decaying live tree and coarse woody debris creation until stand age 100 years.

Stand 7-5 (Lost Lake and associated wetland)

Area: 27.0 acres **Year of Origin:** N/A **Site Index:** N/A

Cover Types: Lake and Wetland

Constraints: None

Notable Features: Lake/wetland complex

Access: Good; gravel road to site

Management: Preserve and protect existing wetland by restricting vehicle access.

Improve value as wetland habitat by maintaining waterfowl nest boxes.

3.2 Project Facility Lands Tract

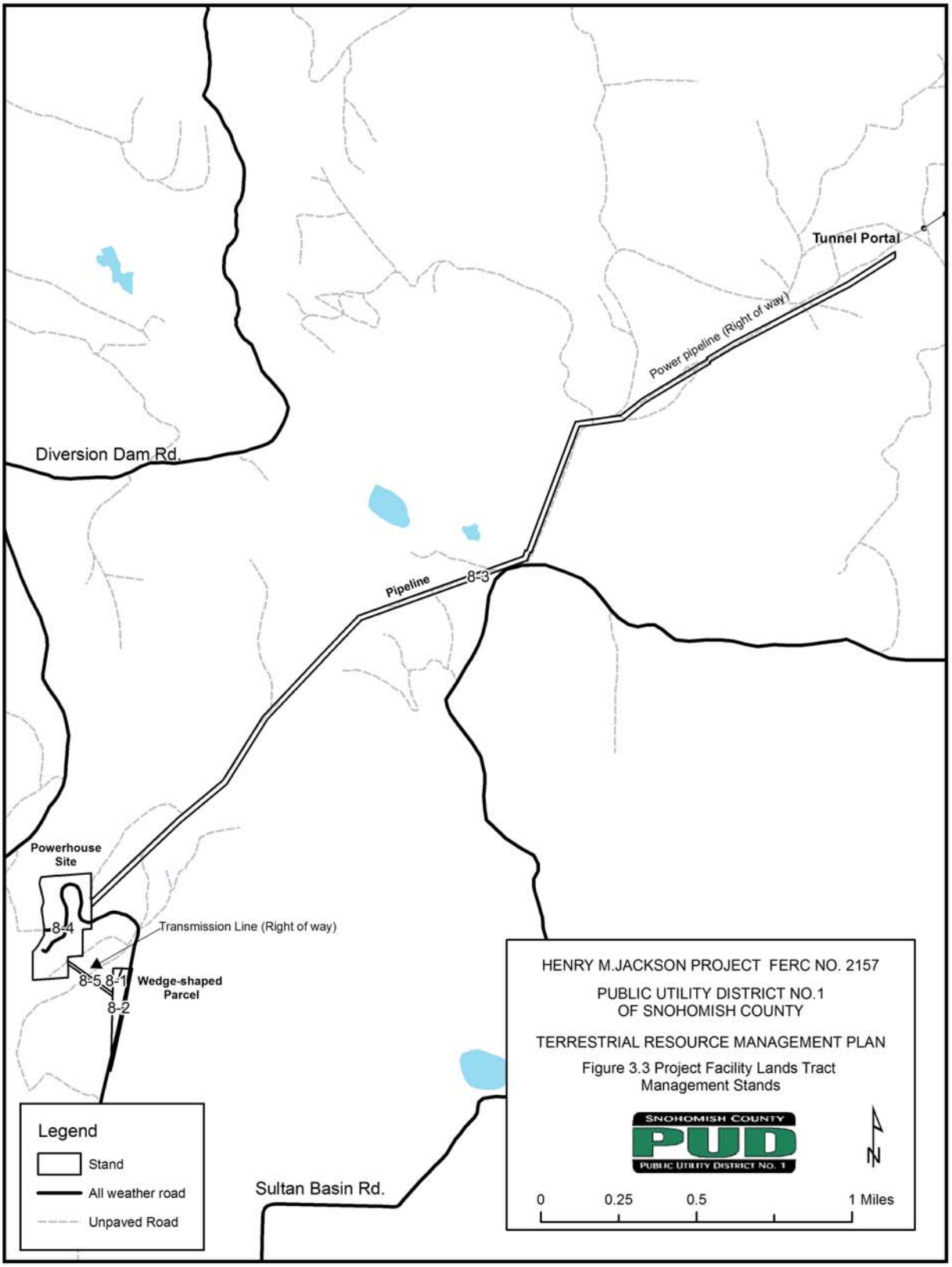
3.2.1 Existing Habitat Conditions

Approximately 80 acres of Project facility lands downstream of Spada Lake are available for management and enhancement as wildlife habitat. They include the power pipeline right-of-way between the tunnel and the powerhouse (41 acres), the powerhouse site (27 acres), a portion of the transmission line right-of-way (1 acre), and a wedge-shaped parcel of land adjacent to the powerhouse access road (11 acres) (Figure 3.3). All lands in the tract are owned and/or controlled by the District.

The permanent power pipeline right-of-way is 90 feet wide and 3.7 miles long. It is moderately level with a few very steep slopes. Soils are coarse and rocky and were heavily disturbed during the burial of the pipeline. A 200-foot wide right-of-way was cleared for original construction, but only the permanent right-of-way, which is held in easement by the District, is available for wildlife management. The portion not in permanent right-of-way has been planted with Douglas-fir trees. The lands outside the 200-foot right-of-way were predominantly second-growth commercial timberland, most of which have been logged a second time since 1989. The right-of-way also crosses Marsh Creek and its associated wetland for a distance of approximately 500 feet.

Immediately after Project construction, the pipeline right-of-way was sparsely vegetated with young red alder and other pioneering species. Brush piles have been placed along the pipeline right of way over the past 20 years as part of WHMP implementation to provide cover and structural diversity, and limit ORV use, which was a problem for habitat restoration efforts when implementation of the WHMP began. Gates and an aggressive program by the District to place barriers and rocks at strategic points of access have reduced vehicle access problems. Seeding and annual fertilizing during the first 20 years of the WHMP have resulted in a healthy herbaceous layer over the majority of the right-of-way. Native shrubs were also planted during this time. A program of placing biosolids on the pipeline right-of-way was implemented in 2008 to help augment soils.

The powerhouse site is predominantly steep terrain of grass, shrub and early-successional forest. The grassy slope above the powerhouse was re-contoured and seeded to grasses following Project construction. Portions of the site that were harvested prior to construction have been allowed to re-vegetate naturally and now consist of shrubby vegetation.


Tunnel Portal
Power pipeline (Right of way)
Diversion Dam Rd.
Pipeline
8-3
Powerhouse Site
8-4
Transmission Line (Right of way)
8-5
8-1
Wedge-shaped Parcel
8-2
Legend
Stand
All weather road
Unpaved Road
Sultan Basin Rd.
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1 OF SNOHOMISH COUNTY
TERRESTRIAL RESOURCE MANAGEMENT PLAN
Figure 3.3 Project Facility Lands Tract Management Stands
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO. 1
N
0 0.25 0.5 1 Miles

A riparian strip along the Sultan River supports deciduous trees and shrubs that regenerated naturally after construction. Shrubs and small trees were planted at the powerhouse site in 1993 and 2003. At the top of the slope above the powerhouse there is approximately 1 acre of small sawtimber Douglas-fir forest.

The transmission line right-of-way is 50 feet wide and extends 800 feet from the powerhouse to the powerhouse access road. A portion is occupied by a graveled access road. The remainder is maintained in low-growing vegetation that is available to be managed for wildlife.

The wedge-shaped parcel along the powerhouse access road supports a young stand of shrubs, hardwood trees and conifers that invaded the site after it was logged in the late 1970s. Part of the site (less than 2 acres) was logged and replanted in 1960 and now contains a well-stocked stand of Douglas-fir.

3.2.2 Existing Habitat Value

Prior to WHMP implementation, the pipeline right-of-way was sparsely vegetated and provided minimal forage or hiding cover. Successful seeding and plantings since 1989 have added forage and hiding cover. Brush piles have been placed along the pipeline right-of-way and shrubs have been planted close to them to inhibit vehicle access and provide structure and hiding cover. The powerhouse site provides habitat for species using early-successional cover types, but lacked hiding cover prior to 1989. Plantings during the first years of WHMP implementation and natural vegetation growth have added hiding cover. The transmission line right-of-way and most of the wedge-shaped parcel provide habitat for species requiring early-successional vegetation. All four sites provide edge habitat, and their habitat quality is improving with management.

3.2.3 Management Constraints

The center of the pipeline right-of-way must remain in shallow-rooted vegetation (grasses and shrubs) to facilitate pipeline maintenance and avoid root damage to the pipeline. Only grasses, forbs and shallow rooted shrubs may be planted directly above the pipeline (30-foot wide strip centered over the pipeline). Vehicle access to service points must also be maintained. A portion of the pipeline right-of-way passes through the Town of Sultan's watershed. Currently, no fertilizer or herbicides may be applied to the right-of-way within the

watershed, but noxious weed treatment will be approached on a case-by-case basis and the City of Sultan would be consulted prior to any application of herbicide in this area.

The powerhouse site is on a steep slope adjacent to the Sultan River. Heavy equipment should not be used in this area, as erosion and sloughing could have serious consequences on Project operation. Vegetation should not be planted where it might obstruct the view of traffic on the access road or cause a road-related hazard. Tall-growing vegetation is also prohibited in the microwave transmission pathway and the transmission line right-of-way. Applications of fertilizer or herbicide will follow all applicable laws regarding buffer distance, application timing, etc.

3.2.4 Habitat Management Objectives

a) Enhance early-successional habitats by seeding with grasses and forbs, planting shrubs and trees, fertilizing, and creating brush piles to benefit black-tailed deer, ruffed grouse and black-capped chickadee.

b) Preserve existing forested stands and create snags to facilitate the development of late-successional habitat.

3.2.5 Habitat Management

The Project Facility Lands consist of 5 stands. They will all be managed to enhance habitat for early-successional and mixed forest wildlife species as described in Section 2.5 within the context of project operations and facility needs.

3.2.5.1 Wedge-shaped Parcel

The two small stands of coniferous and mixed forest will be retained in forest cover with no even-aged timber harvesting for the term of the license to provide permanent cover. Snag and decaying live tree creation will be implemented.

3.2.5.2 Pipeline Right-of-Way

The pipeline right-of-way has been seeded with a mixture of grasses and forbs suited to the site as part of WHMP implementation. Reseeding will continue as needed. Hedgerows and clumps of shrubs and trees will continue to be planted as needed (at a maximum spacing of 600 feet). In addition, when material is available, brush piles will continue to be placed along the

right-of-way as appropriate to improve habitat. The brush piles will be placed in strategic locations to control off-road vehicle use and break up the line of sight (Figure 3.4). Operational requirements to inspect and maintain the pipeline right-of-way will be included in the decision-making process for placement of brush piles and other right-of-way enhancements.

3.2.5.3 Powerhouse Site

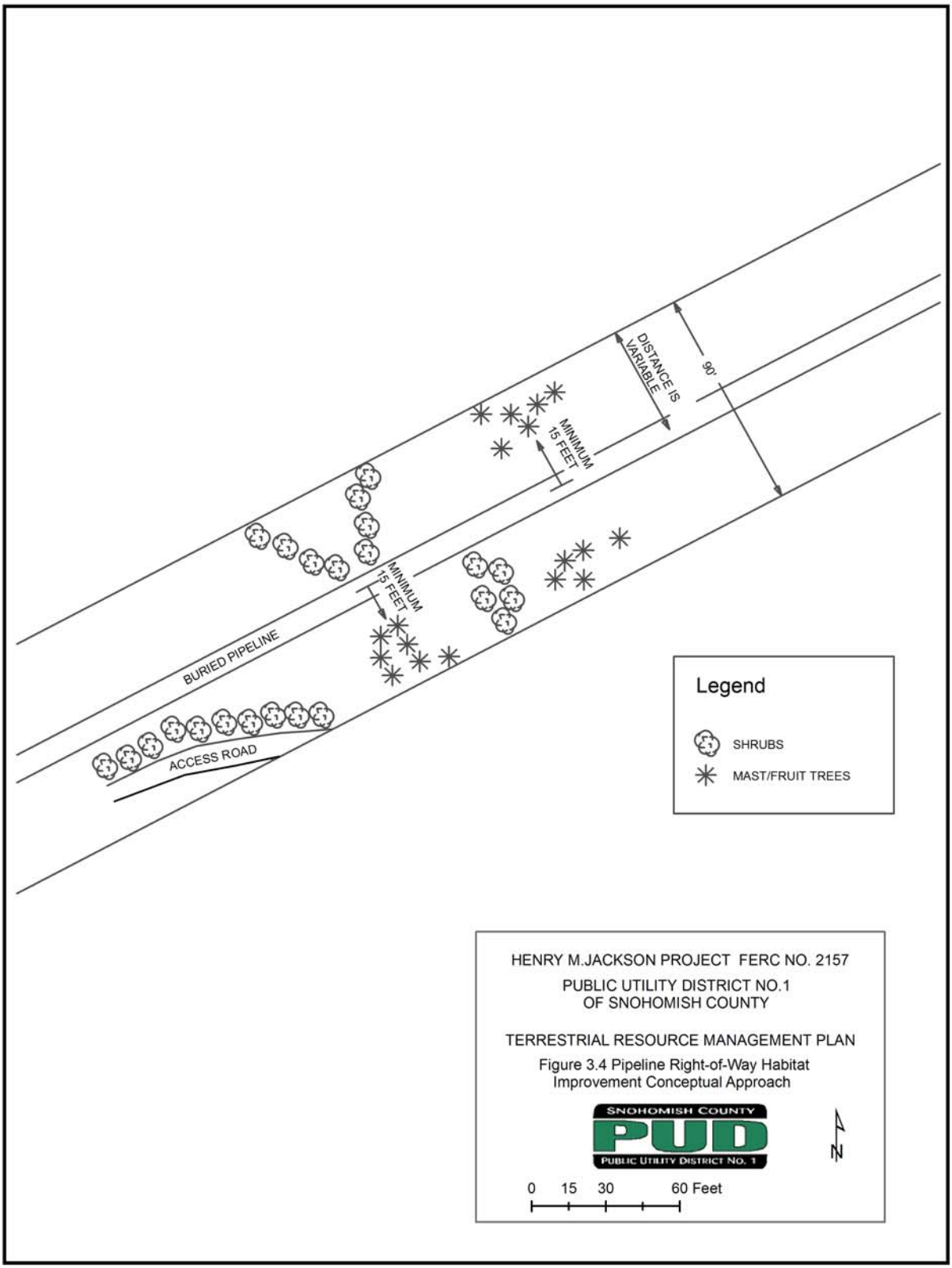
Those portions of the powerhouse site presently in grasses will be maintained permanently as a grass/shrub community. Grasses and forbs will be seeded and fertilized as needed to maintain ground cover, and hedgerows of native shrubs will be planted. Fruit trees have been and will continue to be planted throughout the area to provide food, nest sites and perches for birds. The forested portions of the powerhouse site will be maintained and allowed to mature into conifer and riparian forest, with minimal intervention. Large trees will be retained along the Sultan River to serve as perches for osprey and bald eagles that occasionally use the area. Small operational improvements may be made at the Powerhouse site over the term of the TRMP. District biologists will be involved in the design and construction monitoring of any operational improvements within the Project Facility Lands Tract.

3.2.5.4 Transmission Line Right-of-Way

The portion of the transmission line right-of-way not maintained as access road will be managed as low-growing vegetation for the term of the new license. Trees will be removed manually when they exceed a height of 10 feet.

3.2.6 Detailed Prescriptions

The following prescriptions direct the management of all stands on the Project Facility Lands Tract over the life of this plan. They each contain a summary of the management constraints, habitat objectives and enhancement methods applicable to a particular stand. They are intended to be used in conjunction with the details provided in other sections of this plan, particularly the enhancement measures in Chapter 2.0.


DISTANCE IS VARIABLE
90'
MINIMUM 15 FEET
MINIMUM 15 FEET
BURIED PIPELINE
ACCESS ROAD
Legend
SHRUBS
MAST/FRUIT TREES
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1
OF SNOHOMISH COUNTY
TERRESTRIAL RESOURCE MANAGEMENT PLAN
Figure 3.4 Pipeline Right-of-Way Habitat
Improvement Conceptual Approach
SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1
N
0 15 30 60 Feet

Stand 8-1 (Wedge-shaped Parcel)

Area: 1.7 acres **Year of Origin:** 1960 **Site Index:** N/A

Cover Types: Closed Canopy Sapling/Pole Coniferous Forest

Constraints: Adjacent to the transmission line right-of-way

Notable Features: Small, isolated stand

Access: Excellent; level site, near existing road system

Management: Allow natural forest processes.

Implement snag, decaying live tree and coarse woody debris creation until stand age 100 years.

Stand 8-2 (Wedge-shaped Parcel)

Area: 9.3 acres **Year of Origin:** 1982 **Site Index:** N/A

Cover Type: Mixed Shrub/Brush

Constraints: Adjacent to the transmission line right-of-way and access road

Notable Features: Small, isolated stand

Access: Excellent; level site, adjacent to existing road

Management: Allow natural forest processes.

Implement snag, decaying live tree and coarse woody debris creation until stand age 100 years.

Stand 8-3 (Pipeline Right-of-Way)

Area: 41.0 acres **Year of Origin:** 1982 **Site Index:** N/A

Cover Types: Grass/Meadow

Constraints: No trees or large shrubs allowed within 15 feet of the center of the pipeline.

Vehicular access must be maintained to service points.

Microwave pathway cannot be obstructed.

Fertilizer may not be applied within the Town of Sultan watershed.

Fertilizer may not be applied directly to surface water or allowed to drift into surface water during application.

Fertilizer may not be applied during periods of heavy precipitation.

Notable Features: Linear feature

Access: Excellent; permanent access road maintained

Management: Manage as permanent grass/meadow or shrub/brush with scattered trees to maximize habitat value for early-successional species.

Seed with locally adapted grasses and forbs and fertilize to compensate for poor soils (except no fertilizing adjacent to the town of Sultan watershed and Marsh Creek).

Plant hedgerows and/or clumps of shrubs and trees with a maximum spacing of 600 feet. See Table 2.3 for appropriate species.

Prevent off-road vehicle access.

Place brush and stump piles to add structural diversity and reduce off-road vehicle access when appropriate and materials are available.

Stand 8-4 (Powerhouse Site)

Area: 27.0 acres **Year of Origin:** 1960-1982 **Site Index:** N/A

Cover Types: Grass/Meadow, Early-Successional, Sapling Pole Conifer Forest and Mixed Forest

Constraints: No heavy equipment is allowed on steep slopes or highly erodible soils.

The area is exposed to daily human activity.

The area is partially within 200 feet of the Sultan River.

The powerhouse and access road must be kept clear of visual obstructions and shade.

Fertilizer may not be applied within 100 feet of Cascade Creek or the Sultan River, or allowed to enter surface water during application.

Fertilizer may not be applied during periods of heavy precipitation.

Notable Features: None

Access: Excellent; permanent all-weather road

Management: Manage as permanent grass/shrub with small pockets of cover to maximize habitat value for early-successional species.

Fertilize existing grasses to maintain productivity.

Seed desirable forbs such as clover as needed.

Retain existing conifer and mixed forest stands to provide habitat diversity to the surrounding area.

Stand 8-5 (Transmission Line Right-of-Way)

Area: 1.0 acre **Year of Origin:** N/A **Site Index:** N/A

Cover Types: Mixed Shrub/Brush

Constraints: Vegetation beneath power lines must be low-growing.

Fertilizer may not be applied within 100 feet of surface waters or allowed to enter surface water during application.

Fertilize may not be applied during periods of heavy precipitation.

Notable Features: Long, narrow shape

Access: Good; level site, near existing road

Management: Maintain non-roaded portion as mixed shrub and brush to maximize its value as edge and for early-successional species such as black-tailed deer and ruffed grouse.

Seed with grasses and forbs and fertilize to provide complete ground cover.

3.3 Spada Lake Tract

3.3.1 Existing Habitat Conditions

The Spada Lake Tract consists of the reservoir and shoreline up to elevation 1,460 feet MSL (Figure 3.5). It also includes the approximately 1,745 acres of forest and wetland above elevation 1,460 feet that were acquired by the District in 1991.

The 1987 Project boundary around Spada Lake was at elevation 1,460 feet MSL. The normal maximum pool elevation of the lake is 1,450 feet. Between these two elevations lie patches of young conifer forest, mixed forest and deciduous forest. Between elevation 1,450 feet and the preferred maximum operating pool at 1,445 feet lie additional patches of deciduous riparian forest that are occasionally inundated. Below elevation 1,445 feet, the reservoir bottom is mostly unvegetated, except for scattered live and dead alder and cottonwood trees and willows between 1,445 and 1,440 feet, and varying densities of sedges, rushes, forbs and grasses as low as 1,435 feet.

During preparation of the WHMP, the District, USFS and WDNR were in the process of conducting an exchange for lands under and surrounding Spada Lake. The WHMP stated that if and when lands above elevation 1,460 feet were acquired by the District, they would be managed for black-tailed deer, with due regard for other species. Management of the acquired Spada Lake lands was to be compatible with the Jackson Project Recreation Plan, and the lands were to be open to public access subject to water quality protection constraints. It was estimated that at least 700 acres above elevation 1,460 feet would be obtained by the District in the exchange.

The Spada Lake land exchange was completed in 1991 when the District acquired approximately 1,549 acres from the USFS and 196 acres from the WDNR above elevation 1,460 feet. None of the lands acquired in the exchange were included in the HEP assessment or accounted for in the summary of wildlife habitat benefits associated with the WHMP. Management of the acquired lands has been directed by the *Wildlife Habitat Management Plan Supplement for the Spada Lake Tract* (District 1997, 2007) (Spada Supplement). All acquired lands are now included in the TRMP lands, and the management direction prescribed in the Spada Supplement is incorporated into this TRMP, as appropriate. The Spada Supplement will no longer direct the management of the Spada Lake Tract.

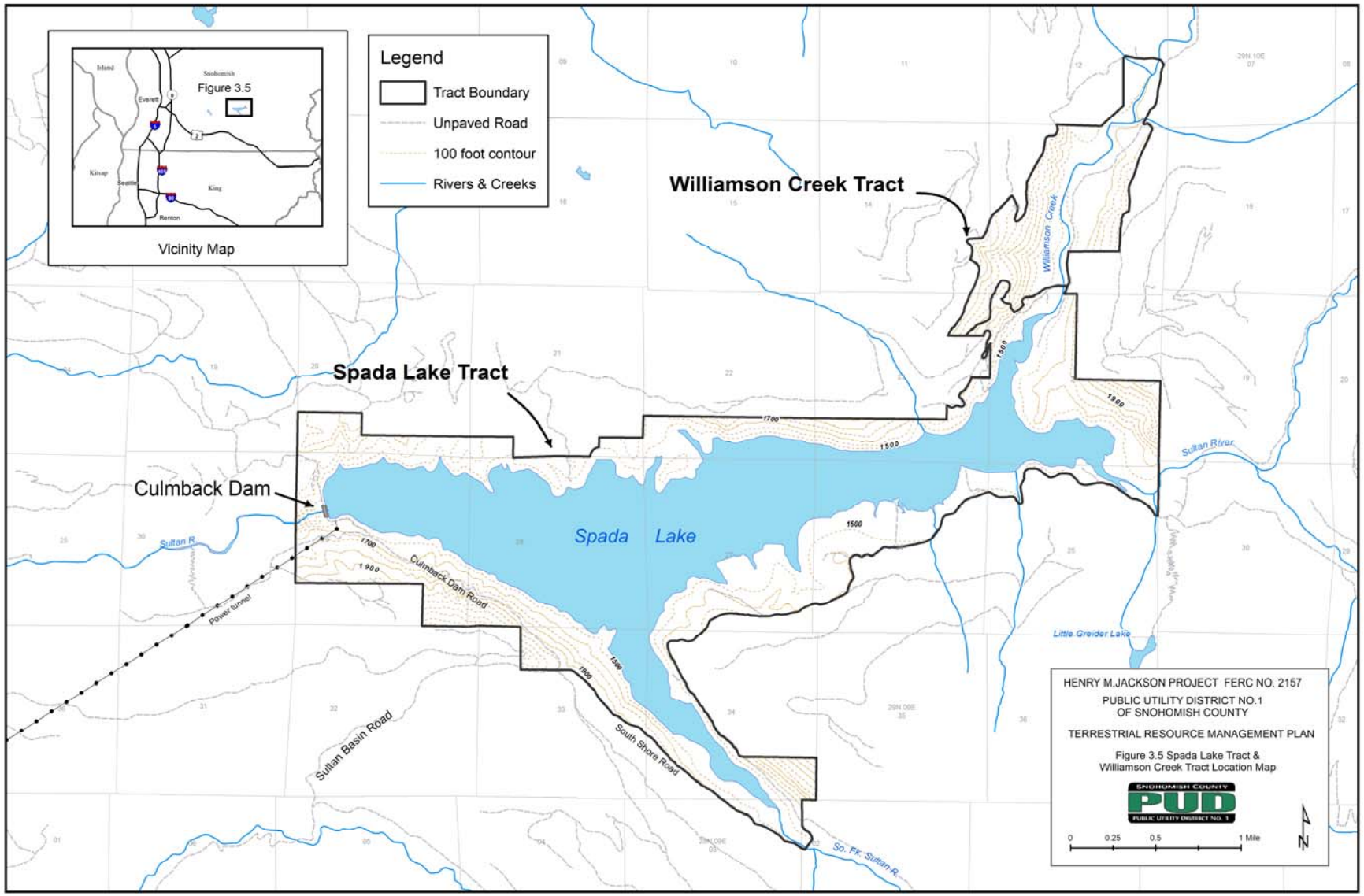


Figure 3.5
Vicinity Map
Legend
Tract Boundary
Unpaved Road
100 foot contour
Rivers & Creeks
Williamson Creek Tract
Spada Lake Tract
Culmback Dam
Spada Lake
Sultan R.
Sultan River
Culmback Dam Road
Power tunnel
Sultan Basin Road
South Shore Road
Little Greider Lake
So. Fk. Sultan R.
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1
OF SNOHOMISH COUNTY
TERRESTRIAL RESOURCE MANAGEMENT PLAN
Figure 3.5 Spada Lake Tract &
Williamson Creek Tract Location Map
0 0.25 0.5 1 Mile

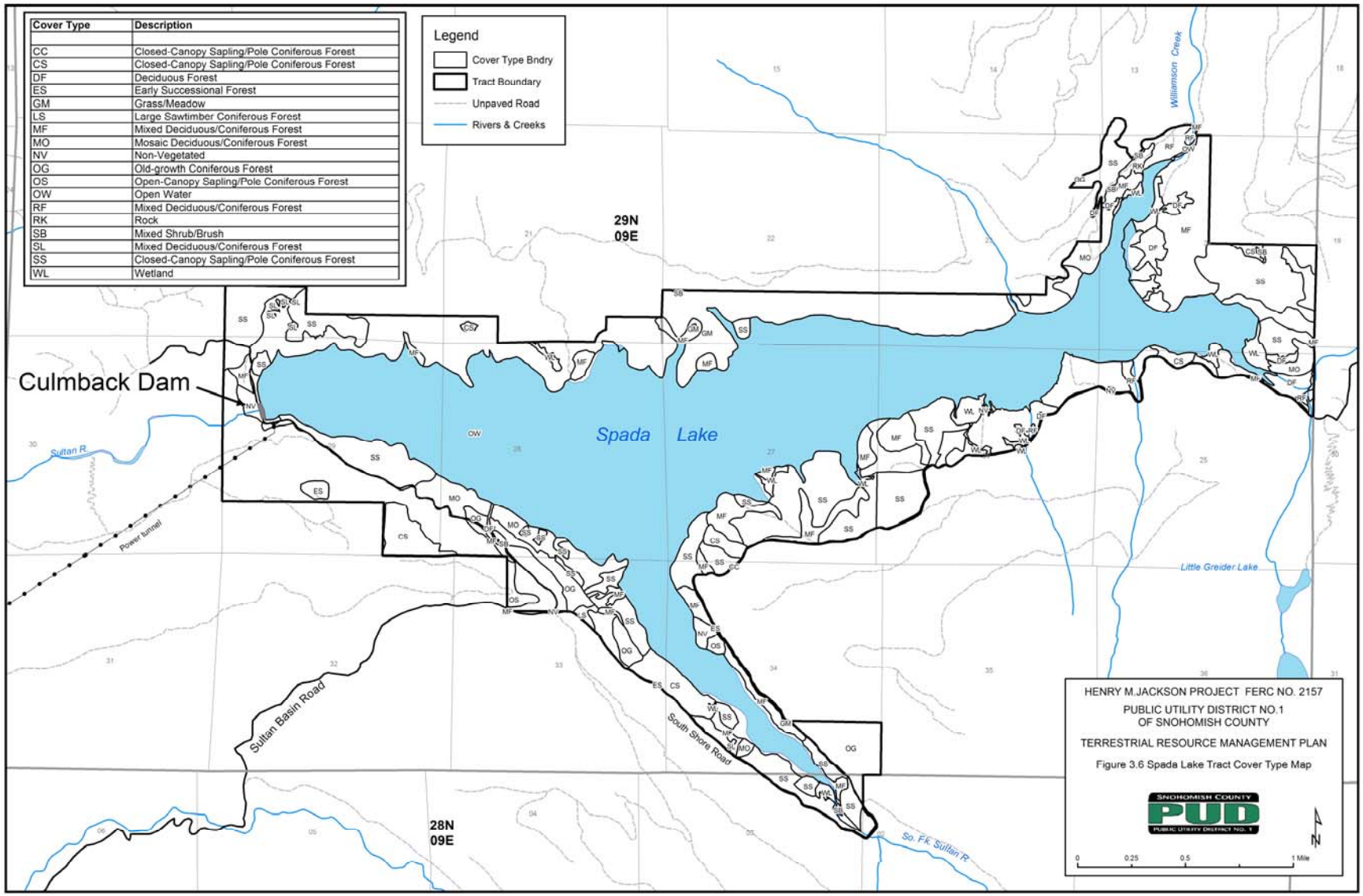
Spada Lake lies in the *Abies amabilis* Zone of the Northern Cascades Physiographic Province (Franklin and Dyrness 1973), where the native vegetation is dense forests of Pacific silver fir (*Abies amabilis*), western hemlock, Douglas-fir, western redcedar, red alder, bigleaf maple and black cottonwood. Most of the Spada Lake Basin, including what is now the shoreline of Spada Lake, was logged between 1950 and 1965. It is now dominated by 40- to 55-year-old stands of pure conifer, mixed forest and hardwood forest that are the result of planting and natural regeneration, as modified by a number of silvicultural practices (Figure 3.6). There are also small patches of old-growth forest and wetland within the tract. The slope of the shoreline is variable, ranging from gentle (0-10%) to vertical cliff. The moderate slopes are poorly drained and dominated by alder, cottonwood and maple, while the steeper, well-drained soils support mixed stands or stands of pure conifers.

The target reservoir elevation for Spada Lake in the spring is 1,445 feet. The water level is lowered during August and September to provide water supply for the City, instream flows for the fishery below Culmback Dam, and flood storage capacity for fall runoff. The normal annual fluctuation is 40 feet. This is an unnatural water regime for freshwater systems in the Pacific Northwest, and the local flora offers a limited number of species that can survive these extreme conditions (Whitlow and Harris 1979). Flooding restricts the availability of free oxygen to plant roots, increases soil carbon dioxide accumulation, induces toxin production and creates anaerobic conditions around the inundated roots (Gill 1970).

As part of WHMP implementation, the District planted test species to determine rates of survival and ability to reproduce in the drawdown zone of Spada Lake. Test plots of five wetland emergent species (*Carex obnupta, C. utriulata [formerly C. rostrata], Sparganium species, Scirpus acutus and Scirpus microcarpus*) were planted at two sites in 1994 and monitored annually through 2000. Most plantings were damaged by wave action and floating debris. Two sedge species and small-fruited bulrush became established and spread vegetatively at one site in the Williamson Creek arm. Natural in-seeding of wetland plants, especially small fruited bulrush and other herbaceous species, has been far more effective at providing ground cover than the test plantings.

3.3.2 Existing Habitat Value

The Spada Lake Tract supports a variety of wildlife species typical of undeveloped areas in the *Abies amabilis* Zone. Black-tailed deer, black bear, mountain lion, bobcat, beaver,


Cover Type | Description
CC | Closed-Canopy Sapling/Pole Coniferous Forest
CS | Closed-Canopy Sapling/Pole Coniferous Forest
DF | Deciduous Forest
ES | Early Successional Forest
GM | Grass/Meadow
LS | Large Sawtimber Coniferous Forest
MF | Mixed Deciduous/Coniferous Forest
MO | Mosaic Deciduous/Coniferous Forest
NV | Non-Vegetated
OG | Old-growth Coniferous Forest
OS | Open-Canopy Sapling/Pole Coniferous Forest
OW | Open Water
RF | Mixed Deciduous/Coniferous Forest
RK | Rock
SB | Mixed Shrub/Brush
SL | Mixed Deciduous/Coniferous Forest
SS | Closed-Canopy Sapling/Pole Coniferous Forest
WL | Wetland
Legend
Cover Type Bndry
Tract Boundary
Unpaved Road
Rivers & Creeks
29N
09E
28N
09E
Culmback Dam
Spada Lake
Sultan R.
Power tunnel
Sultan Basin Road
South Shore Road
Williamson Creek
Little Greider Lake
So. Fk. Sultan R.
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1
OF SNOHOMISH COUNTY
TERRESTRIAL RESOURCE MANAGEMENT PLAN
Figure 3.6 Spada Lake Tract Cover Type Map
SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
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0.25
0.5
1 Mile

mountain beaver, raccoon, mink, coyote, otter, and chipmunks or their sign are frequently observed by District biologists in forested portions of the tract. Many species of birds are observed including common mergansers, common loon, goldeneye, osprey, woodpeckers, and owls. The principal limitation to wildlife use of the tract, as in much of the Spada Lake Basin, is the dense, over-stocked nature of much of the second-growth forest. Average overstory tree size is small, thereby limiting habitat for species that nest, roost or forage in large trees. Understory vegetation and the animal species associated with it are generally scarce due to a lack of sunlight reaching the forest floor. Cavity nesting birds have made some use of the small snags left standing below elevation 1,450 feet. The area between 1,445 feet and 1,440 feet is vegetated with shrubs, grass and forbs, including willow and fireweed. Vegetation is sparse where slopes are steep. The area below 1,440 feet receives limited wildlife use due to the general lack of live vegetation. Patches of dense wetland vegetation have established in relatively flat areas between 1,437 and 1,445 feet. Where slopes are gentle, vegetation is present but often sparse, patchy and interspersed with mud and gravel deposits, stumps and woody debris. Sparse sedges, rushes, grasses and forbs occur as low as 1,435 feet.

3.3.3 Management Constraints

Under the Snohomish County Shoreline Management Master Program, the Spada Lake shoreline is a Shoreline of State-wide Significance with a designation of Conservancy Shoreline. Development is restricted within 200 feet of the reservoir, and timber harvest is limited to no more than 30 percent of the merchantable volume in any 10-year period. A proposed revision to the Program would re-designate it as a, “Municipal Watershed Utility Shoreline Environment.”

Spada Lake and the Sultan River are components of the City’s municipal drinking water supply system. Spada Lake reservoir and the surrounding shoreline are managed to ensure that water quality is maintained for the municipal supply. The City and District, with the support of Washington Department of Health, developed use restrictions in the form of regulations that apply to the reservoir, its shorelines, and the watershed as a whole. These regulations are described in District Directive Number 73, FERC license article 44, and Snohomish County Codes 12.08.030 and 12.28.020.

Spada Lake is operated for hydroelectric power, water supply, fisheries enhancement and flood control and the reservoir level is dictated by those concerns. Any other management activities on the reservoir must conform to the established water level regime.

Several aspects of the Washington Forest Practices Rules have been modified since the WHMP and the Spada Supplement were first prepared. These include restrictions on timber harvest, including snag and coarse woody debris creation, in forest that is occupied by spotted owls or marbled murrelets (WAC 222-16), and increased riparian protection along fish-bearing and perennial non-fish streams (WAC 222-30). Altogether, these regulatory restrictions may affect roughly 40 percent of the forested acreage in the Spada Lake Tract.

3.3.4 Habitat Management Objectives

a) Protect old-growth and other forest stands over 100 years old.

b) Manage second-growth forest to promote late-successional conifer forest characteristics by creating overstory gaps and thinning.

c) Create snags, decaying live trees and coarse woody debris in forest stands less than 100 years old.

d) Protect and enhance existing wetlands by maintaining forested buffers around them.

e) Manage the land adjacent to the Spada Lake shoreline as a permanent forested buffer to promote late-successional and mixed forest habitat features.

3.3.5 Habitat Management

Management of the tract will focus on four types of habitat: a) old-growth forest, b) young forest, c) wetland buffers, and d) Spada Lake reservoir and shoreline. These habitats, and protection and enhancement measures for them, are described in the following sections and in Chapter 2.

3.3.5.1 Old-growth Forest Management

Existing old-growth stands and stands of 100 years or older in the Spada Lake Tract will be preserved and managed with minimal intervention.

3.3.5.2 Young Forest Management

Forest outside of lake, stream and wetland buffers will be managed as described in Section 2.1.3, Young Forest Management, and Section 2.1.4, Understory Management. Gap

creation will be the primary tool for promoting a healthy understory where needed. Variable density thinning will be considered where access is feasible. Snags, decaying live trees and coarse woody debris will be created as described in Sections 2.3 and 2.4. Young forest at Spada Lake can be divided into three different types for management purposes: Young conifer forest, mixed forest and deciduous forest.

Young Conifer Forest: Approximately 958 acres of second-growth conifer forest exist in the Tract. These are closed canopy sapling pole, small sawtimber, and large sawtimber conifer forest.

Mixed Forest: The Spada Lake Tract contains 301 acres of mixed deciduous / conifer forest and 169 acres of mosaic deciduous / conifer forest. Many stands typed as mixed deciduous / conifer forests in previous documents were re-typed as mosaic forest in the 2007 Spada Supplement to more accurately reflect the clumped spatial distribution of deciduous and conifer trees. Mixed and mosaic forest stands will be managed to preserve their current qualities, where feasible. Some deciduous and mixed stands will likely remain in this condition with little intervention. Management measures may include thinning, gap creation, or selective tree removal to promote hardwood or mixed characteristics. Others will become coniferous stands over time, and will be managed under the second-growth coniferous forest management guidelines.

Deciduous Forest: Deciduous forest covers about 47 acres of the Spada Lake Tract. Areas within this cover type currently do not require treatment. In the long term, these stands may develop a shade-tolerant conifer understory.

3.3.5.3 Wetland Buffers

Wetland buffers will be managed by following the guidelines in Section 2.2.2 and Table 2.2. Management of the wetlands in the Spada Lake Tract consists primarily of designating appropriate buffer zones around them, and prohibiting most activities within them.

3.3.5.4 Spada Lake Reservoir and Shoreline

The forested areas on the shoreline of Spada Lake will be managed as permanent forest buffer. Existing snags will be retained. Native vegetation will be protected by limiting ORV access to the shoreline.

3.3.6 Detailed Prescriptions

The following prescriptions direct the management of stands within the Spada Lake Tract. They each contain a summary of the management constraints and enhancement methods applicable to a particular type of stand. They are intended to be used in conjunction with the details provided in other sections of this plan, particularly the measures in Chapter 2.0.

Old-growth Forest

Area: 227.0 acres	**Date of Origin:** 1850 - 1910	**Site Index:** N/A
Cover Types:	Old-growth Conifer Forest	
Constraints:	Municipal watershed Steep and unstable slopes Lake, wetland and stream buffers Shoreline of Statewide Significance Occupied marbled murrelet habitat	
Notable Features:	Old-growth forest	
Access:	Good to moderate via South Shore Road or Culmback Dam Road	
Management:	Retain as old-growth with minimal intervention.	

Second-growth Forest

Area: 1,493.0 acres

Date of Origin: 1960 - 1989

Site Index: 80 - 111 (50-year Western Hemlock)

Cover Types:

Open Canopy Sapling / Pole Conifer Forest
Closed Canopy Sapling / Pole Conifer Forest
Small Sawtimber Conifer Forest
Mixed Deciduous / Conifer Forest
Mosaic Deciduous / Conifer Forest

Constraints:

Municipal watershed
Steep and unstable slopes
Loose, erosive soils
Lake, wetland and stream buffers
Shorelines of Statewide Significance
Occupied marbled murrelet habitat
Areas of dwarf-mistletoe infection

Notable Features:

Adjacent to old-growth forest
Scattered large residual redcedar, hemlock and cottonwood
Wetlands

Access:

Good to poor via South Shore Road, remaining portion of North Shore Road, Culmback Dam Road or boat

Management:

Augment natural forest processes through overstory thinning and gap creation to accelerate late-successional forest development until stand age of 100 years.

Implement snag, decaying live tree and coarse woody debris creation until stand age 100 years.

Perpetuate mixed forest conditions by retaining live deciduous trees during gap creation, overstory thinning, snag creation, decaying live tree creation, and coarse woody debris creation.

Maintain redcedar as a component of conifer stands by selectively retaining live redcedar trees during gap creation, overstory thinning, snag creation, decaying live tree creation, and coarse woody debris creation.

Restrict activity within lake, stream and wetland buffers as per Chapter 2.

Spada Lake and Shoreline (below elevation 1,450 feet MSL)

Area: 1,908.0 acres **Year of Origin:** 1925 -1984 **Site Index:** N/A

Cover Types:
Grass / Meadow
Early-successional Forest
Closed Canopy Sapling / Pole Conifer Forest
Small Sawtimber Conifer Forest
Mixed Forest
Deciduous Forest
Riparian Forest
Reservoir

Constraints:
Municipal watershed
Steep and unstable slopes
Loose, erosive soils
Lake and stream buffers
Shorelines of Statewide Significance

Notable Features: Reservoir and shoreline

Access: Poor; lake access only in limited locations

Management: Retain permanent forested buffer around shoreline.

3.4 Williamson Creek Tract

3.4.1 Existing Habitat Conditions

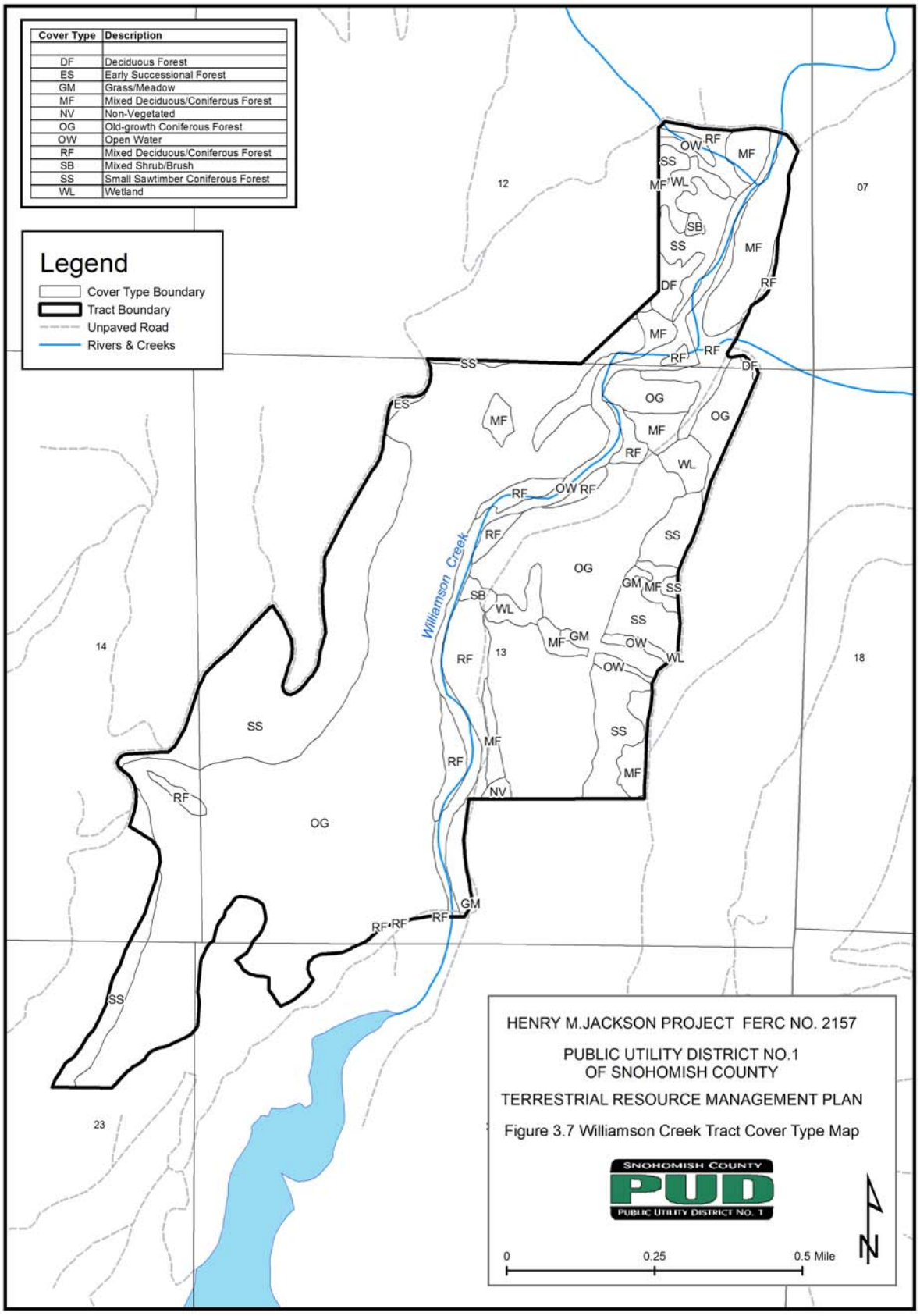
The Williamson Creek Tract consists of approximately 481 acres located 0.5 mile northeast of Spada Lake (Figure 3.5). It contains one of the last stands of low-elevation old-growth forest in the Sultan Basin. This tract was owned by WDNR and USFS at the initiation of the WHMP in 1989, but the District acquired the land through a land exchange in 1991. Most of the tract, particularly the old-growth, was scheduled for even-aged timber harvest by the mid 1980's, but logging was postponed during WHMP development and the tract is now part of the TRMP. The WHMP Williamson Creek Tract consisted of 344 acres. Three additional stands have been added for management under the TRMP.

The elevation of the Williamson Creek Tract varies from 1,480 feet to 2,500 feet MSL. Slopes range from very flat along the creek to very steep (greater than 100%) in some of the old-growth. The tract is within the *Abies amabilis* Zone as described by Franklin and Dyrness (1973) (See Section 3.3.1 for a more detailed description of this zone). The tract contains approximately 275 acres of old-growth, 89 acres of second-growth conifer forest, 37 acres of mixed forest, 3 acres of deciduous forest, 39 acres of riparian forest, 2 acres of mixed shrub/brush, 1 acre of grass/meadow and 10 acres of wetland (Figure 3.7). Old-growth stands contain trees of two distinct age classes; 155 years and 270+ years. Trees range in size from 10 to 50+ inches DBH. Canopy closure varies between 50 and 80 percent. Snags and logs greater than 30 inches in diameter are common. The second-growth forest is mostly small sawtimber or mixed forest that is about 95 years old.

The riparian forest is composed of alder, black cottonwood, western hemlock, Douglas-fir, Pacific silver fir and western redcedar. The riparian areas lie in narrow strips adjacent to Williamson Creek and receive some seasonal flooding. At least two small wetlands occur east of Williamson Creek and a high quality wetland has been added to the northwest corner of the Tract, west of the creek. Beaver activity influences the size and condition of these wetlands.

3.4.2 Existing Habitat Value

The old-growth forest at Williamson Creek has high value for late-successional species such as pileated woodpecker and marten that require large diameter trees, large snags and logs for foraging and nesting. The old-growth also provides good cover and forage for black-tailed


Cover Type | Description
DF | Deciduous Forest
ES | Early Successional Forest
GM | Grass/Meadow
MF | Mixed Deciduous/Coniferous Forest
NV | Non-Vegetated
OG | Old-growth Coniferous Forest
OW | Open Water
RF | Mixed Deciduous/Coniferous Forest
SB | Mixed Shrub/Brush
SS | Small Sawtimber Coniferous Forest
WL | Wetland
Legend
Cover Type Boundary
Tract Boundary
Unpaved Road
Rivers & Creeks
Williamson Creek
12
07
14
13
18
23
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1
OF SNOHOMISH COUNTY
TERRESTRIAL RESOURCE MANAGEMENT PLAN
Figure 3.7 Williamson Creek Tract Cover Type Map
SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
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0.25
0.5 Mile
N

deer and moderate habitat for Douglas squirrel. The second-growth forest is structurally diverse for second-growth, and provides average to good habitat for many late-successional species.

The riparian forest along Williamson Creek has high habitat value for early- and mid-successional species like deer, grouse and chickadee. The overstory is mostly hardwoods (red alder, bigleaf maple and black cottonwood) and relatively open, allowing for a well developed shrub layer.

The wetlands provide diversity and a developed shrub layer for early-successional and edge species, as well as open water and emergent vegetation for wetland species such as mallard, common merganser and wood duck.

3.4.3 Management Constraints

Williamson Creek is a Shoreline of the State with a designation of Natural, and a Type S stream under Washington Forest Practices Rules. Activities such as road construction, timber harvesting and chemical application are regulated within 140 feet of the outer edge of the bankfull width or channel migration zone, whichever is greater.

Williamson Creek is a tributary to Spada Lake. Spada Lake and the Sultan River are components of the City's municipal drinking water supply system. Spada Lake reservoir and the surrounding shoreline are managed to ensure that water quality is maintained for the municipal supply. The City and District, with the support of Washington Department of Health, developed use restrictions in the form of regulations that apply to the reservoir, its shorelines, and the watershed as a whole. These regulations are described in District Directive Number 73, FERC license article 44, and Snohomish County Codes 12.08.030 and 12.28.020.

The WDNR abandoned the road to the Williamson Tract in1999, so it is now only accessible by boat and on foot.

3.4.4 Habitat Management Objectives

a) Retain all existing old-growth.

b) Retain riparian lands along Williamson Creek and enhance their value for late-successional wildlife species by creating snags where appropriate.

c) Protect existing wetlands and allow natural wetland processes to occur.

d) Retain all other forested areas and enhance their value for late-successional wildlife species by creating snags.

3.4.5 Habitat Management

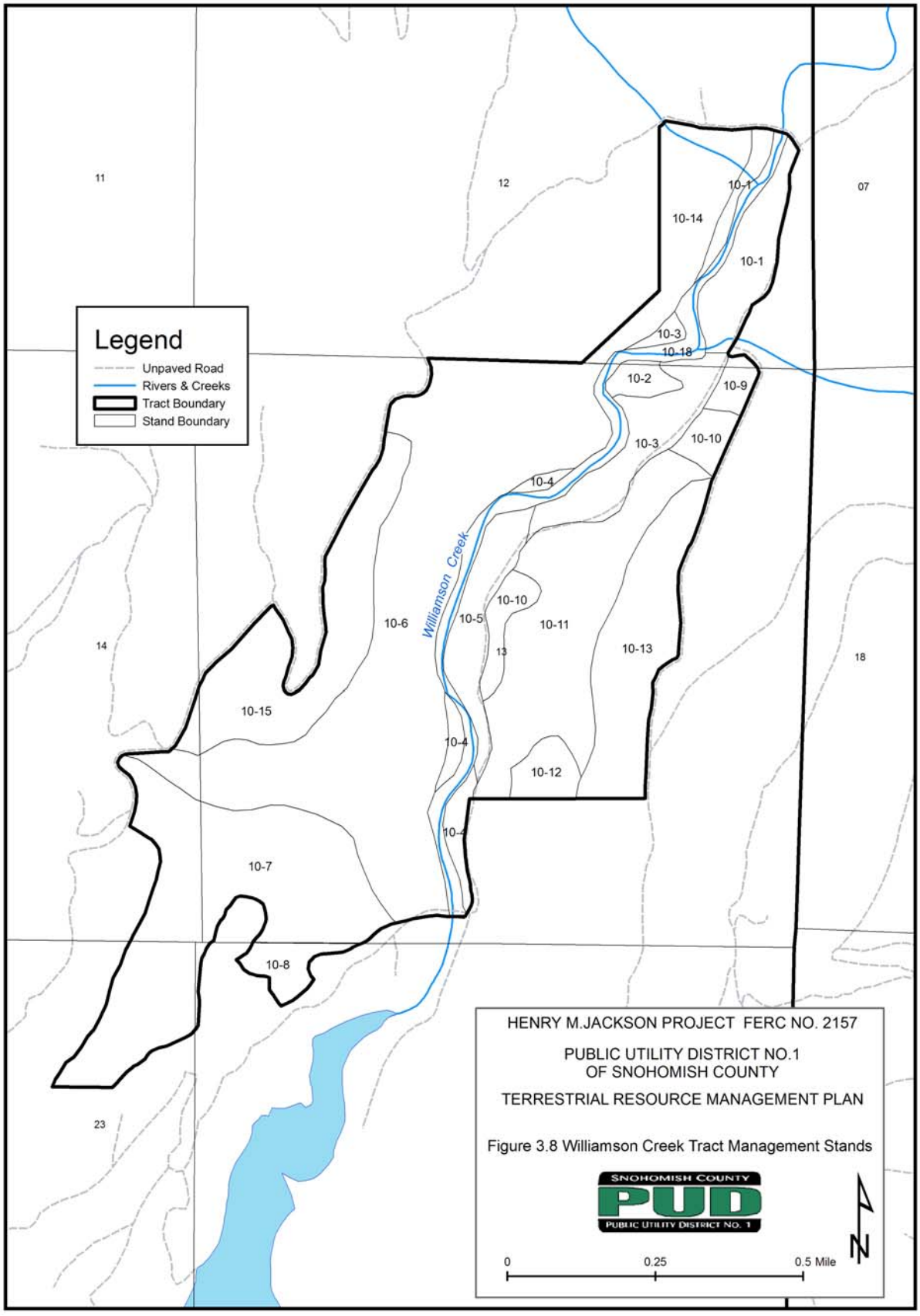
The Williamson Creek Tract is a single management unit with 15 stands (Figure 3.8). The tract will be managed to preserve existing old-growth forest, riparian forest and wetlands, and allow second-growth forest to develop into old-growth. Management activities in second-growth forest and wetlands will be limited to the creation of snags and logs for dead wood-dependent species such as black-capped chickadee, pileated woodpecker, pine marten and Douglas squirrel. Baseline inventories for snags, coarse woody debris, and understory vegetation were completed in 2003. As of 2009, 338 snags have been created in the Williamson Creek Tract.

3.4.6 Detailed Prescriptions

The following prescriptions direct the management of all stands on the Williamson Creek Tract over the life of the TRMP. They each contain a summary of the management constraints, and enhancement methods applicable to a particular stand. They are intended to be used in conjunction with the details provided in other sections of this plan, particularly Chapter 2.0.

Stand 10-1

Area: 29.7 acres	**Year of Origin:** 1958	**Site Index:** 113
Cover Types:	Large Sawtimber Conifer Forest Riparian Forest Mixed Forest	
Constraints:	Partially within 200 feet of Williamson Creek	
Notable Features:	Williamson Creek, flooded forest	
Access:	Moderate terrain, no road access, distant from Spada Lake access point	
Management:	Allow natural forest processes to occur. Create snags, decaying live trees and coarse woody debris outside riparian core zone and channel migration zone until stand age 100 years.	


Legend
Unpaved Road
Rivers & Creeks
Tract Boundary
Stand Boundary
Williamson Creek
11
12
07
14
13
18
23
10-1
10-14
10-1
10-3
10-18
10-2
10-9
10-3
10-10
10-4
10-10
10-5
10-6
10-11
10-13
10-15
10-4
10-12
10-4
10-7
10-8
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1
OF SNOHOMISH COUNTY
TERRESTRIAL RESOURCE MANAGEMENT PLAN
Figure 3.8 Williamson Creek Tract Management Stands
SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1
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0.5 Mile
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Stands 10-2, 10-6, 10-7, 10-8, 10-9, 10-11, 10-12

Area: 10-2 = 4.3 acres
10-6 = 125.9 acres
10-7 = 71.1 acres
10-8 = 9.6 acres
10-9 = 6.7 acres
10-11 = 42.8 acres
10-12 = 12.0 acres

Year of Origin: pre-1850

Site Index: 108-127

Cover Types: Old-growth Conifer Forest

Constraints: Steep slopes,
Many drainages
Partially within 200 feet of Williamson Creek

Notable Features: Williamson Creek, old-growth trees

Access: Steep slopes, no road access, variable distances from Spada Lake access point

Management: Allow natural forest processes to occur.

Stand 10-3

Area: 12.0 acres

Year of Origin: 1940

Site Index: 65

Cover Types: Mixed Forest
Deciduous Forest
Riparian Forest

Constraints: Partially within 200 feet of Williamson Creek

Notable Features: Williamson Creek

Access: Moderate terrain, no road access, distant from Spada Lake access point

Management: Allow natural forest processes to occur.

Create snags, decaying live trees and coarse woody debris outside riparian core zone and channel migration zone until stand age 100 years.

Stand 10-4

Area: 11.0 acres **Year of Origin:** 1945 **Site Index:** 72

Cover Types: Riparian Forest

Constraints: Mostly within 200 feet of Williamson Creek

Notable Features: Williamson Creek

Access: Moderate terrain, no road access, variable distance from Spada Lake access point

Management: Allow natural forest processes to occur.

Create snags, decaying live trees and coarse woody debris outside riparian core zone and channel migration zone until stand age 100.

Stand 10-5

Area: 13.5 acres **Year of Origin:** 1850-1910 **Site Index:** 124

Cover Types: Small Sawtimber Conifer Forest
Riparian Forest

Constraints: Partially within 200 feet of Williamson Creek

Notable Features: Williamson Creek

Access: Moderate terrain, no road access, variable distance from Spada Lake access point

Management: Allow natural forest processes to occur.

Stand 10-10

Area: 5.4 acres **Year of Origin:** N/A **Site Index:** N/A

Cover Types: Wetland and Mixed Shrub/Brush

Constraints: Difficult access

Notable Features: Wetland, adjacent old-growth coniferous forest

Access: Moderate terrain, no road access, distant from Spada Lake

Management: Allow natural wetland processes to occur.

Stands 10-13, 10-15

Area: unknown **Year of Origin:** unknown **Site Index:** unknown

Cover Types:
Old-growth Conifer Forest
Small Sawtimber Conifer Forest
Mixed Deciduous/Conifer Forest
Grass/Meadow
Wetland

Constraints: Steep Slopes, difficult access

Notable Features: Isolated stand, no vehicular access, adjacent to old-growth forest

Access: Moderate to steep terrain, no road access, variable distances from Spada Lake access point

Management: Augment natural forest processes through gap creation to accelerate late-seral forest development.

Create snags, decaying live trees and coarse woody debris outside riparian core zones and channel migration zones until stand age 100 years.

Stand 10-14

Area: unknown **Year of Origin:** unknown **Site Index:** unknown

Cover Types:
Old-growth Conifer Forest
Riparian Forest
Deciduous Forest
Mixed Deciduous/Conifer Forest
Small Sawtimber Conifer Forest
Wetland

Constraints: Partially within 200 feet of Williamson Creek and Everett Creek

Notable Features: High-quality Wetland

Access: Moderate to steep terrain, no road access, distant from Spada Lake access point

Management: Allow natural wetland processes to occur.

Augment natural forest processes through gap creation to accelerate late-seral forest development.

Create snags, decaying live trees and coarse woody debris outside riparian core zones and channel migration zones until stand age 100 years.

4.0 MONITORING AND REPORTING

4.0 Monitoring and Reporting

Two types of habitat enhancement monitoring will occur on TRMP lands. Compliance monitoring will occur during the implementation of habitat enhancement activities, and will be documented in annual reports. Long-term effectiveness monitoring will also be conducted to verify that desired habitat conditions are being achieved. All implementation and monitoring of the TRMP will occur under the supervision of a wildlife biologist. The term "District biologist," as used in this chapter, includes wildlife biologists that are employed by or under contract to the District. The term "District," as used in this chapter, implies the monitoring may be done by someone other than a wildlife biologist, who is directly supervised by a wildlife biologist.

Compliance monitoring is relatively straight-forward. A District biologist will be directly involved in the design of enhancement activities (e.g., gap creation, thinning, snag creation), the development of performance specifications, and the supervision of implementation contractors. Effectiveness monitoring will require the long-term qualitative or quantitative measurement of specific habitat features, and the comparison of observed values to target values or assumptions made in this TRMP. Adjustments to habitat enhancement methods can be made through the adaptive management process if effectiveness monitoring suggests the habitat objectives of the TRMP are not being achieved. Monitoring will be done as described in the following sections.

4.1 Forest Overstory

4.1.1 Purpose

Compliance Monitoring: Forest overstory condition will be monitored to verify the TRMP lands are being managed for the desired habitat conditions. Individual forest overstory management activities will be designed and monitored by District biologists to ensure they conform to the requirements of the TRMP.

Effectiveness Monitoring: A sample of the overstory gaps will be monitored for understory vegetation response and wildlife use of created snags. Thinned stands will be monitored to document overstory and understory response and determine the need for additional thinning.

4.1.2 Tracts to be Monitored

Lost Lake, Project Facility Lands, Spada Lake and Williamson Creek

4.1.3 Methods

Compliance Monitoring: The District will maintain current cover type maps for all TRMP lands. Maps will be updated at intervals of no more than 10 years based on direct field evaluation and/or examination of remotely-sensed data. The first update will be completed within 10 years after license issuance. Biologists will also maintain written and electronic records (i.e., GPS data to be entered into the GIS database) of all overstory thinning and gap creation conducted in forest stands.

District biologists will determine the need for overstory thinning and gap creation on a stand by stand basis. When thinning or gap creation is warranted, a District biologist will design the activity, prepare detailed contract specifications, mark trees as needed to direct contractors, provide contractors with written and verbal instructions, observe and/or supervise contractors in the field, and inspect treated stands for contract compliance. Opportunities for improvement to activity design and contract administration will also be noted during inspections.

Effectiveness Monitoring: Ten percent of created gaps will be monitored at 5 and 10 years after creation to evaluate understory vegetation response. Understory vegetation will be evaluated by visually estimating canopy cover (percent of total ground area covered) of shrubs, grasses and forbs combined in gaps and adjacent forests, and by photographically documenting understory conditions in the gaps and adjacent forest. If gaps do not have at least 50 percent canopy cover of shrubs, grasses and forbs combined at 10 years after creation, District biologists will identify modifications to gap size and/or creation methods to increase understory vegetation. Adjustments to gap creation methods beyond the limits described in Section 2.1.3 will only be made with the approval of the USFWS, WDFW and Tulalip Tribes. Sample gaps selected through 2020 will also form part of the snag and coarse woody debris samples described in Section 4.2.3, and monitored for snag persistence.

All stands that have been thinned will be visited 10 years after thinning to evaluate overstory response and determine the need for additional thinning. Live trees will be visually examined for signs of competition (overlapping crowns, slow diameter growth, recent or imminent mortality of smaller trees) and a sample will be cored to examine annual growth rings.

Stands with less than 70 percent overstory canopy closure and continuing signs of moderate to rapid diameter growth (as determined by examination of annual growth rings) will be left to grow without additional thinning. Stands with greater than 70 percent canopy closure and signs of slowing diameter growth or competition-induced mortality will be considered for additional thinning. The decision to conduct additional thinning will also account for other site-specific conditions and management objectives for the stand.

4.1.4 Data to be Collected

Compliance Monitoring: Cover type maps will indicate the vegetative cover type of each stand or management unit on the TRMP lands according to the definitions in Appendix A, or an appropriate substitute. Records of management activities will include the year of the activity, the type of activity (thinning or gap creation), a summary of the activity (e.g., size in acres, number of trees felled), and any recommendations for adjustment to future activities.

Effectiveness Monitoring: Snag and decaying live tree data will be collected in sample gaps as described in Section 4.2. Understory vegetation data will include a list of the dominant understory species present, a visual estimate of average understory vegetation canopy cover, and photographs of understory vegetation within each sample gap. Photographs of understory vegetation will also be taken in the adjacent forest in all four cardinal directions from each sample gap. Data for thinned stands will include visual estimates of average overstory canopy closure, qualitative descriptions of overstory health and vigor, and qualitative descriptions of tree growth rings from cored trees.

4.1.5 Use of Data

Compliance Monitoring: Current cover type maps will be produced to document the maintenance of existing old-growth forest on the TRMP lands. Forest habitat management activities will be summarized in annual TRMP reports to document the enhancement of young forest for old-growth habitat conditions.

Effectiveness Monitoring: Snag and decaying live tree data from gaps will be used to evaluate and improve the snag and decaying live tree program, as described in Section 4.2. Understory vegetation data from gaps will be used to evaluate and improve the gap creation program. Data on overstory response to thinning will be used to determine the need for additional thinning.

4.2 Snags and Decaying Live Trees

4.2.1 Purpose

Compliance Monitoring: Snags and decaying live trees will be created at a rate of three per acre every 10 years in forest stands under 100 years old. Implementation of snag and decaying live tree creation will be supervised by a District biologist to ensure the specified numbers and types are being created.

Effectiveness Monitoring: Snags and decaying live trees will be created at regular intervals to achieve a full range of decay stages by a stand age of 100 years. A sample of created snags and decaying live trees will be visited at regular intervals to: a) observe the rate of decay and subsequent distribution of snags among decay stages, and b) observe wildlife use of snags and decaying live trees.

4.2.2 Tracts to be Monitored

Lost Lake, Project Facility Lands, Spada Lake and Williamson Creek

4.2.3 Methods

Compliance Monitoring: The District will prepare detailed contract specifications for all snag and decaying live tree creation activities, mark trees as needed to direct contractors, provide contractors with written and verbal instructions, observe and/or supervise contractors in the field, and inspect stands for contract compliance. Opportunities for improvement to creation methods and contract administration will also be noted during inspections.

Effectiveness Monitoring: Up to ten percent of all snags and ten percent of all decaying live trees created between 1990 and 2020 will be selected for long-term monitoring. For efficiency, gaps selected for sampling during this period (see Subsection 4.1.3) will form part of the snag sample as well. Those that are selected will be permanently marked with numbered tags, and their locations will be recorded by GPS to aid in relocation. Date of creation, identification number, type (snag or decaying live tree), species, height (after topping), DBH and spatial distribution (individual or group) will be recorded at the time of initial marking. All selected snags and decaying live trees will be visited at 10-year intervals beginning in 2021 and ending when the oldest snags (those created in 1990) reach 50 years of age (2041). Current height, decay stage (Cline at al. 1980), and signs of wildlife use will be recorded for each

selected snag and decaying live tree on each visit. Snags and decaying live trees of natural origin will also be reported if observed during visits.

4.2.4 Data to be Collected

Compliance Monitoring: District biologists will record the numbers, species, types and sizes (height and DBH) of snags and decaying live trees created in each stand or management unit in each year. They will also report annually on any difficulties encountered during implementation, and any adjustments made to the snag and decaying live tree creation program.

Effectiveness Monitoring: District biologists or contractors will record the date of creation, identification number, type (snag or decaying live tree), species, height (after topping), DBH and spatial distribution (individual or group) for each created snag and decaying live tree selected for monitoring. At each subsequent re-visit, current height, decay stage (Cline at al. 1980), and signs of wildlife use will be reported.

4.2.5 Use of Data

Compliance Monitoring: Data on the numbers, species, types and sizes of created snags and decaying live trees will be provided in annual reports to demonstrate compliance with the TRMP.

Effectiveness Monitoring: Data on snag persistence and use will be evaluated in 2022, 2032 and 2042 to determine whether snag and decaying live tree creation methods, rates and/or frequencies should be modified to increase persistence and/or wildlife use. The snag program may be adjusted after 2022 if monitoring data indicate low persistence or disproportionately low wildlife use of one or more types of snags or decaying live trees. The sampling program will be evaluated no later than 2022 to determine whether the sample size can be reduced. Sample size will be reduced to less than 10 percent if it is determined a smaller sample will provide sufficient statistical power for given use of the data.

4.3 Coarse Woody Debris

4.3.1 Purpose

Compliance Monitoring: Coarse woody debris will be created by felling codominant trees in forest stands under 100 years old. Implementation of coarse woody debris creation will be supervised by a District biologist to ensure the specified numbers and types of trees are felled.

Effectiveness Monitoring: Live trees will be felled at regular intervals to produce a range of log sizes and decay stages. A sample of the felled trees will be visited at regular intervals to monitor decay rates and wildlife use.

4.3.2 Tracts to be Monitored

Lost Lake, Spada Lake, and Williamson Creek

4.3.3 Methods

Compliance Monitoring: The District will prepare detailed contract specifications for all coarse woody debris creation, mark trees as needed to direct contractors, provide contractors with written and verbal instructions, observe and/or supervise contractors in the field, and inspect stands for contract compliance. Opportunities for improvement to coarse woody debris creation methods and contract administration will also be noted during inspections.

Effectiveness Monitoring: Ten percent of all trees felled for coarse woody debris from 1997 through 2020 will be selected for long-term monitoring. For efficiency, gaps selected for sampling during this period (see Subsection 4.1.3) will form part of the coarse woody debris sample as well. Selected coarse woody debris will be permanently marked with numbered tags, and their locations will be recorded by GPS to aid in relocation. Date of felling, identification number, species, length, butt diameter, and spatial distribution (individual or group) will be recorded at the time of initial marking. All selected trees will be visited at 10-year intervals beginning in 2021 and ending in 2041. Decomposition class (Maser at al. 1979) and signs of wildlife use will be recorded for each selected tree in each visit.

4.3.4 Data to be Collected

Compliance Monitoring: District biologists will report the numbers and species of trees felled to create coarse woody debris in each stand or management unit in each year. They will

also report annually on any difficulties encountered during implementation, and any adjustments made to the coarse woody debris creation program.

Effectiveness Monitoring: District biologists or contractors will record the date of creation, identification number, species, length, butt diameter and spatial distribution (individual or group) for each felled tree selected for monitoring. Decomposition class and signs of wildlife use will be reported at each subsequent visit.

4.3.5 Use of Data

Compliance Monitoring: Data on the numbers and species of felled trees will be provided in annual reports to demonstrate compliance with the TRMP.

Effectiveness Monitoring: Data on log decay and use will be evaluated in 2022, 2032 and 2042 to determine whether coarse woody debris creation methods, rates and/or frequencies should be modified to increase persistence and/or wildlife use. The coarse woody debris program may be adjusted after 2022 if monitoring data indicate low persistence or disproportionately low wildlife use of one or more types of felled trees. The sampling program will also be evaluated in 2022 to determine whether the sample size can be reduced. Sample size will be reduced to less than 10 percent after 2022 if it determined a smaller sample will provide sufficient statistical power for given use of the data.

4.4 Waterfowl Nest Boxes

4.4.1 Purpose

Compliance Monitoring: Nest boxes have been placed at Lost Lake to enhance habitat for cavity-nesting waterfowl. Compliance monitoring by District biologists will ensure the boxes are maintained and repaired as needed.

Effectiveness Monitoring: Waterfowl use of nest boxes will be monitored to verify the boxes are having a benefit to wildlife. Lack of use by waterfowl may result in modification to the nest box design, movement of boxes, or replacement of the boxes with nest boxes designed for species that are more likely to use them on TRMP lands.

4.4.2 Tract to be Monitored

Lost Lake

4.4.3 Methods

Compliance Monitoring: Nest boxes will be checked, cleaned, and provided with fresh nesting material each year prior to the waterfowl breeding season. Damaged or deteriorated boxes will be repaired or replaced as needed.

Effectiveness Monitoring: All waterfowl nest boxes will be visited at least once each year during or immediately after the breeding season to determine use and productivity. Nest boxes that show signs of unsuccessful use by waterfowl will be modified, as needed, to increase the potential for nesting success. Boxes that show no sign of waterfowl use for three consecutive years will be modified, moved to locations more likely to receive waterfowl use, or replaced with boxes designed for wildlife species that are more likely to benefit from nest boxes on the TRMP lands.

4.4.4 Data to be Collected

Compliance Monitoring: District biologists will document the dates each nest box is visited each year, the condition of the box, and the actions taken to keep the box functional.

Effectiveness Monitoring: Each box will be visited annually to record the species and nesting success (estimated number of young hatched) of waterfowl using the box.

4.4.5 Use of Data

Compliance Monitoring: Data on nest box condition and maintenance will be used to ensure the boxes remain functional and to document compliance with the TRMP.

Effectiveness Monitoring: Data on waterfowl use of nest boxes will be used to determine whether nest box design and/or location should be modified, or whether the box should be replace with one more likely to benefit wildlife on the TRMP lands.

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4.5 Reporting

4.5.1 Purpose

Reports will be prepared at regular intervals and submitted to the USFWS, WDFW, Tribes and FERC to document implementation of the TRMP, verify the success of enhancement measures, and initiate discussion on items requiring review or modification.

4.5.2 Tracts

Lost Lake, Project Facility Lands, Spada Lake and Williamson Creek

4.5.3 Methods

Reports will be submitted annually to the USFWS, WDFW and Tulalip Tribes, and every 5 years to the FERC. Reports will summarize activities during the intervening period and identify those planned for the next period. Monitoring data will be presented in summary form and analyzed. Problems and proposed changes in the TRMP, if any, will be discussed in the reports. Review meetings will be scheduled by the District after reports are provided to the above listed parties, unless none of the parties desires a meeting. The District will summarize the information in the reports at the meetings.

4.5.4 Information to be Provided in Reports

a) Summary of forest management measures, including acres thinned, gaps created, etc.;

b) Documentation of other habitat enhancement measures, including snag and live decaying tree creation, coarse woody debris creation, and nest box maintenance;

c) Results of monitoring programs;

d) Activities planned for the next year (or five years in the reports submitted to the FERC);

e) Discussion of problems or changes needed; and

f) Updated maps of TRMP lands showing the current distribution of cover types (every 10 years).

4.5.5 Use of Reports

The reports will serve as written documentation of TRMP implementation and success, and a focal point for meetings between the District, the agencies, and the tribes.

5.0 SCHEDULE

5.0 Schedule

Table 5.1 Summary schedule for implementation of the Jackson Project TRMP.

PROGRAM	ACTIVITY	SCHEDULE
Forest Gaps	- Evaluate all forest stands less than 100 years old to identify those in need of gap creation	Within 10 years after license issuance
	- Complete initial round of forest gap creation where needed	Within 10 years after license issuance
	- Create additional forest gaps where needed after 2021	As needed
Forest Overstory Thinning	- Evaluate forest stands less than 100 years old to idnetify those in need of overstory thinning	Within 10 years after license issuance
	- Conduct overstory thinning where needed and feasible	As needed
Snags and Decaying Live Trees	- Complete first round of snag and decaying live tree creation in all forest stands less than 100 years old	Within 10 years after license issuance
	- Complete subsequent rounds of snag and decaying live tree creation in all stands less than 100 years old	Every 8 – 12 years thereafter
Coarse Woody Debris	- Complete first round of coarse woody debris creation in all forest stands less than 100 years old	Within 10 years after license issuance
	- Complete subsequent rounds of coarse woody debris creation in all stands less than 100 years old	Every 8 – 12 years thereafter
Waterfowl Nest Boxes	- Install waterfowl nest boxes at Lost Lake	By March 1 of first full year after license issuance
Pipeline Right-of-Way Management	- Reseed with grasses and forbs palatable to deer	As needed
	- Plant hedgerows and shrubs for visual screening	As needed
	- Place brush piles to restrict public vehicle access	As needed
Powerhouse Site Management	- Seed and fertilize existing grasses and forbs	As needed
	- Plant hedgerows and shrubs for visual screening	As needed
	- Plant fruit trees for forage and perches	As needed

Table 5.1 (continued).

PROGRAM	ACTIVITY	SCHEDULE
Compliance Monitoring	- Prepare initial update of cover type maps for all TRMP lands	Within 10 years after license issuance
	- Prepare subsequent updates to cover type maps for all TRMP lands	Every 10 years thereafter
	- Maintain written records of overstory thinning and gap creation	Annually
	- Design, supervise and monitor overstory thinning and gap creation	As needed
	- Design, supervise and monitor creation of snags, decaying live trees and coarse woody debris	As needed
	- Check, clean and repair waterfowl nest boxes	Annually by March 1
Effectiveness Monitoring	- Evaluate 10 percent of created gaps for understory response	5 and 10 years after creation
	- Evaluate thinned forest stands	10 years after thinning
	- Evaluate 10 percent of snags and decaying live trees created between 1990 and 2020	2021, 2031 and 2041
	- Evaluate 10 percent of coarse woody debris created between 1997 and 2020	2021, 2031 and 2041
	- Check waterfowl nest boxes for signs of use	Annually by June 30
Reporting	- Reports to USFWS, WDFW and Tulalip Tribes	Annually
	- Reports to the FERC	Every 5 years

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6.0 References

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7.0 GLOSSARY

7.0 Glossary

Average Annual Habitat Units (AAHU) - the total number of habitat units lost or gained as a result of a project or proposed action, divided by the life of the project or action.

Age Class - an aggregation of trees with a range in age between the oldest and the youngest of no more than 20 years.

Canopy - the continuous cover of branches and foliage formed by the crowns of adjacent trees and other woody growth.

Canopy Closure - a measure of the percent of potential open space occupied by the collective tree crowns in a stand.

Codominant Trees – a tree that extends its crown into the canopy and receives direct sunlight from above but limited sunlight from the sides.

Cover - vegetation and/or physiographic features used by wildlife for protection from predators or to lessen the effects of weather.

Cover Type - a classification of environmental conditions based upon plant associations or physiography.

Decaying Live Tree – (decadent tree) – a tree topped above sufficient whorls of live limbs such that the tree will remain living for a period of time, with the intention being that heart rot fungus can infiltrate the tree and begin cavity creation.

Diameter at Breast Height (DBH) - a measurement taken of tree diameter at the breast height of a person standing next to the tree (usually considered 42 inches).

Dominant Trees - trees in the forest stand whose crowns rise above the general canopy level and receive sunlight from the top and sides.

Drumming Site - usually a log or stump used by a ruffed grouse for drumming courtship display.

Early-successional Species - wildlife species that find optimal habitat in early-successional stand condition forests.

Edge - the unique set of habitat conditions formed at the boundary between two or more plant communities of differing structure, such as forest and meadow.

Emergent Vegetation - aquatic plants that are rooted below water but not wholly submerged.

Emergent Wetland - wetland area dominated by perennial plants like herbaceous hydrophytes, excluding mosses and lichens; vegetation is present for most of the growing season in most years.

Forage - vegetation used for food by wildlife

Forb - a non-woody, broadleaf plant.

Forested Wetland - wetland area characterized by woody vegetation at least 20 feet tall.

Gap – An opening in the forest canopy large enough to allow sunlight to reach the forest floor and understory vegetation to grow

Habitat Evaluation Procedures (HEP) - a method devised by the U.S. Fish and Wildlife Service to quantify and assess impacts and relative values of wildlife habitat changes.

Hardwoods - trees distinguished by the presence of vessels in wood; usually broad-leaved trees such as alder, maple, cottonwood and madrone.

Hard Snag - a snag composed of sound wood, often merchantable.

Harvest - see Timber Harvest.

Heart Rot - fungal rot confined to the heartwood of a tree and typically leading to the death of the tree.

Herbaceous Vegetation - vegetation growing close to the ground that does not develop persistent woody tissue, usually lasting for a single growing season.

Hiding Cover - any vegetation capable of hiding 90 percent of standing adult deer from the view of a human at a distance of 200 feet or more.

Late-successional Species - wildlife species that find optimal habitat in late-successional stand condition forests.

Management Unit - a subdivision of a management tract based on topography, management constraints or some other concern; made up of a number of stands.

Multi-layered Canopy - forest stand condition with two or more distinct tree layers in the canopy.

Old-growth Forest - coniferous forest that is at least 200 years old and has minimal history of human disturbance.

Overstory - a collective term for the trees in a forest stand that are greater than 20 feet tall.

Pre-commercial Thin - the practice of removing some trees of less than merchantable size from a stand to alter tree growth and form and/or alter habitat.

Primary Cavity Nester (Excavator) - wildlife species that excavate cavities in snags.

Riparian - transitional area between true wetlands and upland terrestrial areas where the vegetation and microclimate are influenced by perennial or seasonal water; may extend inland for considerable distances.

Sapling - a young deciduous or coniferous tree with a DBH between 1 and 4 inches.

Scrub-shrub Wetland - wetland area dominated by woody vegetation less than 20 feet tall; includes trees or shrubs that are small or stunted because of environmental conditions.

Secondary Cavity Nester - wildlife species that nest in cavities created by cavity excavating species.

Secondary Roads - temporarily or seasonally used gravel roads that may be unfit for passenger cars.

Second-growth Forest - term commonly used to refer to a forest that is in the process of regrowth after timber harvest of old-growth.

Site Index - a measurement of forest site productivity based upon the average height of the dominant trees at a specified age, typically 50 years.

Slash - the residue, usually branches, logs and small trees left on the ground following timber harvest.

Snag - a standing dead tree.

Soft Snag - a snag composed of wood primarily in advanced stages of decay.

Stand - a forest or other community sufficiently uniform in species composition, age or arrangement to be distinguished from other communities.

Succession - the predictable process of change in species composition and structure of a forest community as it develops after fire or logging.

Timber Harvest - removal of trees from all or part of a forested stand; can include even-aged harvest (clearcutting) and partial harvest (thinning).

Tract - one of the five major parcels of the management lands.

Understory - vegetation growing beneath a forest canopy up to a height of approximately 20 feet.

Upland - term used to distinguish terrestrial habitat from aquatic, wetland, or low-lying habitat.

Watershed - the geographic area that contributes surface water to a single river, lake or reservoir.

Wetland - lands that are covered by shallow water or are seasonally or permanently saturated with water at, near or above the soil surface; usually supports the growth of hydrophytes.

APPENDIX A

DESCRIPTIONS OF VEGETATION COVER TYPES

Appendix A

Descriptions of Vegetation Cover Types

Introduction

These summary descriptions of the major vegetation cover types for the wildlife habitat management lands include existing as well as future cover types that will be created by the proposed management. Cover type classifications are derived from the combined perspectives of forestry and wildlife habitat. Forested cover types are separated by species composition into conifer, deciduous and mixed forest. The wetlands fall into a number of palustrine classes as described by Cowardin et al. (1979) but they are all grouped into the single category of wetland for this plan.

Conifer Forest Cover Type

The conifer forest type is separated into successional stand conditions in a manner similar to Hall et al. (1985), which takes into account the characteristics that contribute to wildlife habitat. Stand conditions change dramatically over time as stands mature, and as they are affected by natural events or management activities. On the TRMP lands, past management practices have had a significant impact on stand development and current stand characteristics, including tree size and density, canopy closure, snag and coarse woody debris density, and the composition and abundance of understory vegetation.

Early-Successional Stand Condition

The early-successional condition is characterized by small coniferous trees, shrubs and herbaceous vegetation. Trees are generally less than 1 inch in diameter, and less than 15 feet tall, providing no greater than 30 percent canopy cover. Dominant shrub species include vine maple, salal, Oregon grape, salmonberry, red huckleberry and thimbleberry. This stage may last for 10 to 15 years after even-aged timber harvest or forest fire depending on management. Amounts of coarse woody debris vary depending on stand conditions prior to timber harvest and post-harvest management practices.

Open Canopy Sapling/Pole Stand Condition

This condition is dominated by coniferous trees between 15 and 40 feet tall. Tree canopy closure is generally less than 60 percent and a shrub understory is present. This condition usually follows early-successional forest as a result of tree height growth. Trees are generally between 10 and 30 years of age, depending on management. The herbaceous and shrub layers are sparser and less diverse than in the early-successional stand conditions due to shading by the dominant tree layer, but some shrubs such as huckleberry, Oregon grape and salal may persist. Sword fern and moss dominate the herbaceous layer. The amount of coarse woody debris varies greatly between stands, but most is in later stages of decay (Class 3 or older). Snags are usually absent unless intentionally left during timber harvest to enhance wildlife habitat.

Closed Canopy Sapling/Pole Stand Condition

Trees in the closed canopy sapling/pole condition are generally 20 to 40 years of age and between 30 and 60 feet tall, depending on management. Canopy closure is often greater than 90 percent, resulting in a sparsely vegetated understory of low-growing shrubs such as Oregon grape and sword fern. Snags are generally absent unless intentionally left during previous timber harvests or created to enhance wildlife habitat. Coarse woody debris is usually absent or in late stages of decay.

Small Sawtimber Stand Condition

The small sawtimber condition is characterized by trees between 9 and 20 inches DBH and between 50 and 100 feet tall. Ground vegetation is usually more developed than the closed sapling/pole stage, but is still sparse, and often dominated by moss and sword fern. Existing unmanaged small sawtimber stands are usually between 40 and 80 years of age, while ages will range from 30 to 50 years under managed conditions. Canopy closure is generally uniform within the stand, averaging between 60 and 100 percent. Conifers are usually of a cone-bearing age. Snags are generally suppression killed and of small diameter. Some stands in this condition have had snags created in them, resulting in an average of 3 snags per acre. Coarse woody debris is often small in diameter or in late stages of decay (Class 3 or older).

Large Sawtimber Stand Condition

Large sawtimber is generally characterized by trees greater than 20 inches DBH and an increase in the development of ground vegetation as compared to the sapling/pole and small sawtimber stand conditions. Scattered deciduous trees such as vine maple are usually present along with a distinct shrub layer. Average tree height is greater than 100 feet. Existing unmanaged large sawtimber stands are greater than 80 years of age, while stands under managed conditions will be as young as 50 years. Large-diameter snags, coarse woody debris and a multi-layered canopy are usually absent, although smaller coarse woody debris may persist from earlier suppression-related mortality of the small sawtimber stage. Canopy closure is generally uniform within the stand, varying between 60 and nearly 100 percent.

Old-Growth Stand Condition

Characteristics of the old-growth condition include live trees, snags and coarse woody debris greater than 24 inches DBH, a multi-layered canopy with understory trees between 10 and 40 feet tall, and highly variable canopy closure ranging from 30 to 90 percent within a stand. Shrub layers are well developed and composed of both tall and low-growing species. Average age of dominant overstory trees is 200 years or older. Scattered deciduous trees, such as vine maple, black cottonwood and bigleaf maple are often present.

Mixed Deciduous/Coniferous Forest Cover Type and Mosaic Deciduous/Coniferous Forest Cover Type

Both mosaic and mixed deciduous/coniferous forest cover types are a mosaic of small stands of deciduous trees such as red alder, bigleaf maple and black cottonwood, interspersed with small stands of Douglas-fir, western hemlock, Pacific silver fir and western redcedar. Deciduous trees provide between 30 and 70 percent of the canopy cover in these mosaics. A dense and varied shrub layer often dominates the understory. Stands defined as mixed or mosaic deciduous/coniferous reach this condition when trees are 15 to 20 years old, and remain in this cover type until hardwoods become scarce and coniferous trees dominate the stand, unless site conditions such as high soil saturation or slope instability preclude advancement into confer forest. The transition generally occurs when dominant trees are between 100 and 150 years old. Densities of snags and logs vary widely in this cover type.

These two cover types are differentiated by the distribution of coniferous trees: Mosaic deciduous/coniferous have a distinctly clumped distribution of deciduous and conifers trees; the majority of upper canopy conifer trees are contained in groups covering one or more acres. Mixed deciduous/conifer forests tend to have a more uniform distribution of deciduous trees and conifers. Though somewhat subjective, the difference between the two types is readily distinguished on aerial photographs.

The distinction between these two types is important from the standpoint of habitat management. Understory forage is usually present in deciduous stands and is usually absent from conifer stands, which are generally in the closed-canopy condition. These conifer stands are better suited for winter thermal cover. Mosaic stands may offer a valuable interspersion of cover and forage not found in uniformly-distributed mixed stands.

Deciduous Forest Cover Type

Deciduous forests within the TRMP lands are composed of greater than 70 percent deciduous species, including red alder, bigleaf maple and black cottonwood. Conifers are often scattered through both the overstory and understory, and a tall, dense shrub layer is usually present. Canopy closure ranges from 50 to 90 percent. Soils are often saturated and/or unstable. Snags and coarse woody debris are generally small in diameter and uncommon. Individual stand area does not exceed 20 acres.

Young Riparian Forest Cover Type

Young riparian forest is primarily composed of deciduous and coniferous trees and shrubs such as red alder, western redcedar, black cottonwood, vine maple, bigleaf maple, red huckleberry, snowberry and salal. The canopy is fairly open, allowing development of the shrub layer. Stand age ranges from 1 to 20 years. Because these stands are associated with waterways, soils are usually either saturated and/or unstable. Frequent disturbance (i.e., flooding) is common.

Mature Riparian Forest Cover Type

Mature riparian forests are similar to young riparian forests except that stands are generally older than 20 years of age. Average tree DBH ranges from 10 to 15 inches. Larger (15 to 50 inches DBH) black cottonwood and bigleaf maple trees are often interspersed with

smaller red alders. Snags and coarse woody debris are generally small in diameter but common.

Mixed Shrub/Brush Cover Type

This cover type is primarily composed of small deciduous trees and shrubs. Shrubs generally dominate the stand, varying widely in species composition. Red alder is the dominant tree species present. Coniferous trees make up less than 5 percent of the canopy cover. Trees are generally less than 20 feet tall and less than 15 years of age. Larger trees may be present, but they will be widely scattered throughout the stand. This stand condition often occurs after timber harvest when a clearcut area has not been replanted and coniferous trees have not re-established themselves naturally.

Grass/Meadow Cover Type

The grass/meadow cover type is composed of both naturally occurring meadow areas with shallow soils and areas maintained artificially in low growing vegetation. It is included as a separate cover type from early-successional forest because it is often permanently maintained in the grass/meadow condition and is generally not associated with timber harvest. Grasses, forbs and scattered low-growing shrubs are characteristic of this cover type. Coarse woody debris is usually absent.

Wetland Cover Types

Wetlands are transitional lands between terrestrial and aquatic habitats, where the water table is at or near the surface or the land is covered by shallow water. Both forested and non-forested wetlands are found on TRMP lands. Non-forested wetlands contain open water, emergent, and scrub-shrub habitat types resulting in high structural diversity. The amount and distribution of the habitat types varies due to a number of factors, including beaver activity and road construction. Wetland vegetation includes cat-tail, sedges, rushes, hardhack spirea, devil's club, skunk cabbage, red-osier dogwood and pondweed. Devil's club and skunk cabbage are common among forested wetlands. Willow, red alder, black cottonwood, vine maple and western redcedar are commonly found at the wetland perimeter.

Rock/Talus Cover Type

This cover type represents areas of rock outcrop and/or talus. Because of limited soil development, vegetation is not likely to develop along successional pathways typical of the assigned cover type. This distinction is also important because the WDFW designates cliffs and talus as Priority Habitats. Talus is defined as homogenous areas of rock rubble ranging in average size from 0.5 to 6.5 feet, composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. Cliffs, which may be associated with talus, are greater than 25 feet high and occur below 5,000 feet in elevation.

REFERENCES

Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRoe. 1979. Classification of wetlands and deep water habitats of the United States. U.S. Fish and Wildl. Serv. Publ. No. FWS/OBS-79/31. 103p.

Hall, F.C., L.W. Breser, J.F. Franklin and R.L. Werner. 1985. Plant communities and stand conditions. Pages 17-31 in E.R. Brown, ed. Management of wildlife and fish habitats in forests of western Oregon and Washington, Parts 1 and 2. U.S. For. Serv. Publ. No. R6-F&WL-192-1985, Portland, OR.

APPENDIX B

STAKEHOLDER CONSULTATION

Appendix B

STAKEHOLDER CONSULTATION

Record of Consultation

The Washington Department of Fish and Wildlife (WDFW), U. S. Fish and Wildlife Service (USFWS), U. S. Forest Service (USFS) and Tulalip Tribes (Tribes) have been actively involved in wildlife habitat management at the Jackson Project since the initial development of the Wildlife Habitat Management Plan (WHMP) in the mid 1980's. The USFS requested to be removed from consultation once the District completed a land exchange with the federal government to obtain mitigation lands in 1991, but the other three stakeholders have remained involved. All three stakeholders received annual reports on implementation of the WHMP and participated in meetings that were held in conjunction with the annual reports whenever changes in the management techniques were proposed by the District, or when one or more of the stakeholders accepted the District's annual invitation to meet. It was through these annual meetings that proposed terrestrial studies for relicensing were first discussed.

Relicensing stakeholders, including WDFW, USFWS, USFS, the Tribes and others, were consulted prior to the submittal of the Notice of Intent to relicense (NOI) and Pre-application Document (PAD), and again during the scoping and study proposal process. They were informed of study progress and received drafts and final versions of the terrestrial resources studies (See the Updated Study Report for more information). On 8 September 2008, a meeting was held for the Jackson Project Relicensing Terrestrial Resources Group (TRG) to review the terrestrial study reports and to discuss proposed Protection, Mitigation and Enhancement (PM&E) measures for terrestrial resources, including a proposed Terrestrial Resources Management Plan (TRMP). A PowerPoint presentation was given at the meeting and paper copies of the presentation and of draft PM&E measures were distributed to those in attendance. Digital copies were also emailed to all TRG members. Meeting minutes are included in Appendix C.

The Preliminary License Proposal (PLP) that was filed with the FERC on 31 December 2008 included the proposed TRMP PM&E measure, a draft outline of the TRMP, and a discussion of the terrestrial resources in the Project area. The only written comments regarding the TRMP presentation in the PLP were received from the FERC (See Appendix A of the Final License Application [FLA]). The FERC requested that the District develop the TRMP, including an implementation schedule, and file it along with the FLA.

A meeting for the TRG was held on 23 February 2009 to discuss the terrestrial PM&E measures that were presented in the PLP and solicit input on preparation of the draft TRMP. Meeting minutes and comments are included in Appendix C.

The District developed a draft TRMP based on the above described stakeholder consultations. A preliminary draft of the TRMP was sent to WDFW representatives (Richard Johnson and Mark Hunter) to accommodate their schedules, as promised in the 23 February 2009 meeting minutes. Following favorable review of the preliminary draft by WDFW, the TRMP was completed and a draft was sent to the full TRG membership on 31 March 2009 for a 30-day review. Comments on the full draft were received from USFS; these are included in the comment matrix (Table B-1).

A conference call meeting with the TRG was scheduled for 21 April 2009 to address comments or questions regarding the draft TRMP, but no stakeholders participated. One stakeholder provided written comments; these are included in the matrix (Table B-1). During and after the 30-day review period for the draft TRMP, the District also engaged in informal discussions with WDFW and USFWS representatives regarding the contents of the TRMP.

As directed by the FERC, the District is filing the TRMP with the FLA. The District has included discussions of the terrestrial resource benefits of TRMP implementation within the TRMP, as well as in the Environmental Analysis section of the FLA. Cost estimates are included in the Cost of Environmental Measures section of the FLA.

Table B-1. Stakeholder comments on the TRMP, and District responses to comments.

STAKEHOLDER COMMENT	DISTRICT RESPONSE
WDFW, Rich Johnson via email dated October 1, 2008	
The WDFW finds the PUD's proposed PMEs for lands to be included in the new Terrestrial Management Plan will meet the objectives of providing diverse habitat with an emphasis on mature forest characteristics.	Comment noted.
WDFW recommends inclusion of some of the potential relevant alternative techniques listed in Appendix 4 of the Habitat Management Methods Literature Review and Evaluation, November 2007, including the creation of canopy gaps; the creation of roosting snags; the creation of nesting snags; and the protection and creation of decadent live trees.	As recommended by WDFW, the TRMP incorporates management techniques for the creation of canopy gaps, the creation of roosting snags, the creation of nesting snags, and the protection and creation of decadent live trees as described in Appendix 4 of the Habitat Management Methods Literature Review and Evaluation.
WDFW recommends a change in the management of the 1,100 acres in the Lake Chaplain tract currently managed for a 60-year harvest rotation using even-age (clear-cut) harvest in 26-acre units. The existing Wildlife Habitat Management Plan for Lake Chaplain was developed to modify a previous timber harvest plan into a plan that provides better habitat for black-tailed deer. The WHMP does provide for better deer habitat than the previous timber harvest plan, however, between the age of 15 and 80, even-age stands generally provide poor habitat for deer and for most other wildlife species. Under the existing plan, at any given time 75% of the harvest units will fall into the age class that provides poor habitat.	The TRMP no longer covers management of the Lake Chaplain Tract. The City of Everett intends to continue managing the tract outside the FERC license to benefit a variety of species, including black-tailed deer, as described in the WHMP. Management of even-aged stands in the WHMP was specifically designed to increase the amount of time stands would remain in a higher quality habitat condition (See WHMP Section 2.1). According to the Jackson Project HEP prepared by the District, City, WDFW and USFWS in 1988, it would be incorrect to assume that managed forest up to 80 years old is poor habitat for all wildlife. The variation in forest habitat conditions between the ages of 15 and 80 years is substantial under any management regime, and particularly dramatic under the WHMP. As noted in the HEP, the black-tailed deer Habitat Suitability Index (HSI) for forest managed under the WHMP is 0.9 (out of a possible maximum of 1.0) from age 15 to 20 years, 0.3 from age 20 to 30, 0.6 from age 30 to 50, and 0.8 from age 50 to 60. By comparison, old-growth forest has an HSI of 0.9 for black-tailed deer. The HSI values for the pileated woodpecker, a species generally associated with mature forest, are 0.2 from age 15 to 20 years, 0.3 from age 20 to 30, 0.8 from age 30 to 50, and 0.9 after age 50. There are clearly differences in habitat quality over time, and reduced habitat values for some species during the early stages of forest stand development, but a

STAKEHOLDER COMMENT	DISTRICT RESPONSE
	generalization that all forest less than 80 years old is poor quality wildlife habitat is not supported by the scientific literature.
To provide both browse and cover for deer over a long period of time, and to provide diverse habitat for other species, the WHMP should be adapted to a primarily uneven age harvest (selective tree removal) regime. This change will still allow the commercial harvest of timber, but with an emphasis of providing understory browse vegetation within a multi-aged tree stand. This could include pre-commercial and commercial thinning over large areas of existing even-age forest, and gap creation by the removal of all trees in areas generally less that an acre in size. Evaluation of the stand characteristics may result in the decision to clear-cut certain units, but with a goal of moving to an uneven age management for those units.	In response to concerns expressed by the WDFW and others, even-aged timber harvesting (clearcutting) has been eliminated from the TRMP. All forested TRMP lands, including the 1,745 acres added to the Spada Lake Tract since the WHMP was developed, will be managed to protect old-growth forest where it currently exists and promote its development where it does not exist due to past timber harvesting. Selective tree removal will be employed to accelerate the development of old-growth forest, but only when it can meet environmental and economic criteria stated in the TRMP. The City of Everett intends to continue managing the Lake Chaplain Tract on an even-aged timber harvest regime as described in the WHMP. When the District, City, WDFW, USFWS and the Tulalip Tribes developed the WHMP, they considered it desirable to manage the Lake Chaplain Tract for a combination of early-seral and late-seral wildlife species. Portions of the tract are set aside as old-growth management areas, and the remaining forestlands are managed on a 60-year even-aged harvest rotation with enhancements (residual live trees, snags and logs) for late-seral wildlife species. The resulting balance of commercial forestry and wildlife habitat enhancement was made deliberately by all parties involved in development of the WHMP, and is integral to its continued implementation. Conversion to an uneven-aged forest management regime would reduce the amount of forage for early-seral species like black-tailed deer in the short to mid-term, and modify the overstory species composition of the forest to the detriment of other target wildlife species in the long term. Uneven-aged management favors shade tolerant trees like western hemlock, and excludes intolerant species like Douglas-fir that require periodic large-scale disturbance to persist. A reduction in Douglas-fir would lead to decreased habitat value for at least two of the late-seral wildlife species addressed in the Jackson Project HEP (Douglas squirrel and marten).

STAKEHOLDER COMMENT	DISTRICT RESPONSE
This proposed change would also help provide habitat linkage between the now isolated smaller units of riparian, multi-species, and mature stands of timber that are not part of a harvest plan, and thus would provide more critical habitat for a multitude of wildlife species.	The management of all TRMP lands for the development and protection of old-growth forest will eliminate the potential for individual stands within the tracts to become isolated. The potential for riparian, multi-species and mature forest stands in the Lake Chaplain Tract to become isolated and in need of linkage is low. Few wildlife species are sensitive to habitat fragmentation at the scale that could occur within the 2,657-acre tract, and those that are sensitive are addressed by the spatial and temporal constraints on even-aged harvesting already incorporated into the WHMP. The issue of habitat isolation was raised when the WHMP was initially prepared, and the harvest constraints were developed specifically to address it.
WDFW prefers the Lake Chaplain unit be retained as part of the project unless the long-term wildlife habitat objectives of providing more multi-storied mature forest habitat can be achieved through an off-license agreement for the management of this tract.	The District, City, WDFW and Tribes are working on an off-license agreement for the management of Lake Chaplain lands according to the WHMP.
Tulalip Tribes, letter dated October 20, 2008	
The following recommendations are meant to serve as a starting point for the discussion and development of Protection, Mitigation and Enhancement measures (PMEs) designed to protect terrestrial resources. The PMEs include those for implementation of a Terrestrial Resource Management Plan (TRMP), formalization of a Noxious Weed Plan, and development of a Marbled Murrelet Habitat Protection Plan. These recommendations should be considered preliminary and will need to be refined further under the direction of the Terrestrial Resources Work Group (or its successor).	Comment noted.
The Tulalip Tribes appreciates the opportunity to provide Project input, and is generally satisfied with the information contained within the Terrestrial Resources PMEs. Recommendations that follow reflect our ideas to further promote the success of the Project.	Comment noted.

STAKEHOLDER COMMENT	DISTRICT RESPONSE
Abbreviated terms should be specified at first use for the following: Page 1 Paragraph 1: "WDFW" and "USFWS" Page 1 Paragraph 2: "FERC" Page 1 Paragraph 3: "PME". Additionally, on page 3 *Description of the Action*, TRMP and WHMP were specified previously in the document.	The District agrees with these suggested acronyms. All abbreviations and acronyms will be defined at their first use in the TRMP.
The Tulalip Tribes recognize that the City of Everett will not be a co-licensee under the new license. The Tribes encourage prompt development of a Memorandum of Agreement for management of wildlife resources within the Lake Chaplain Tract between the Snohomish County Public Utilities Department (District) and the City of Everett.	The District, City, WDFW and Tribes are working on an off-license agreement for the management of Lake Chaplain lands according to the WHMP.
The Tulalip Tribes believe that habitat **protection and minimization** of habitat loss should be of greater focus for all lands in the TRMP as the current objectives seem to be heavily focused on mitigation of already lost habitat. The Tribes are not aware of a system or decision process in place to promote habitat protection or minimization of habitat loss rather than mitigation, and highly recommends the use of this type of system. Management of this process by a dedicated committee and establishment of a credit/debit program is also suggested.	Avoidance and minimization of wildlife habitat impacts were considered at the time of project construction. The WHMP was then prepared to address all remaining impacts through the creation and enhancement of wildlife habitat on City and District lands. The USFWS Habitat Evaluation Procedures (HEP) methodology was used to quantify the habitat impacts of the Project and the habitat benefits of the WHMP. Since there will be no further Project construction, there are no further opportunities to avoid or minimize the impacts of construction and operation on wildlife. There are, however, opportunities to improve the effectiveness of the WHMP at creating and enhancing habitat for wildlife on the mitigation lands. Since 1988, these opportunities have been identified, and implemented where appropriate, through the adaptive management process. The WHMP annual reports and the Spada Supplement, all of which are available on the Jackson Project relicensing website, document the improvements that have been made to the WHMP since 1988. All improvements, except those pertaining to the Lake Chaplain Tract, are incorporated into the TRMP. Additional improvements have been included in the TRMP in response to Study Plan 6 (Habitat Management Methods Literature Review and Evaluation). The District will continue to consider the Tribes part of this established adaptive management process for the TRMP, along with the USFWS and WDFW.

STAKEHOLDER COMMENT	DISTRICT RESPONSE
WDFW, Rich Johnson via email dated March 23, 2009	
I did read through chapter 2 and a bit of chapter 3 of the draft TRMP. It looks very good.	Comment noted.
US Forest Service, Ann Risvold via email dated April 9, 2009 (comments dated April 8, 2009)	
Section 2.5 and Table 2.5, pages 26 and 28: this section discusses habitat management on right-of-way lands including increased production of grasses and forbs for deer forage. Included in the list of suitable plant species for wildlife enhancement are several grasses and one forb which the Forest Service stopped using long ago because they are invasive and/or very persistent in the environment. These species are perennial ryegrass (*Lolium perenne*), tall fescue, (*Festuca arundinaceae*), bentgrass (*Agrostis alba*) orchard-grass (*Dactylis glomerata*), and clover (*Trifolium spp*). The Forest Service does use Alsike clover (*Trifolium hybridum*) in some applications where it will eventually be over-topped and shaded out; otherwise it will persist as well. It appears that the TRMP proposes to use some or all of these species over the power tunnel across NF lands. Because it is our national policy to use only locally adapted native species, we would not be in favor of these particular species being used on right-of-way lands. Further, we would encourage the PUD to refrain from using these species in any areas where movement onto the NF is likely to occur. The other forbs, the shrubs, and the trees listed in Table 2.5 are very appropriate.	Table 2.5 has been modified to remove the following species of concern to the Forest Service: perennial ryegrass (*Lolium perenne*), tall fescue (*Festuca arundinaceae*), bentgrass (*Agrostis alba*), orchard-grass (*Dactylis glomerata*), and generic clover (*Trifolium spp*). Alsike and subclover (*Trifolium aestivum* and *T. subterranium*) are included on the list of suitable species. No seeding or planting is proposed to occur above the power tunnel on NFS lands. The species on Table 2.5 are proposed only for use on the power pipeline right-of-way, located on District lands. Habitats on NFS lands are far from the power pipeline right-of-way, forested, and do not receive regular disturbance by humans; therefore, movement of these right-of-way species onto NFS lands is not anticipated.
Section 3.2.6, page 41, Stand 8-4: the paragraph under “Management” again describes “seeding desirable forbs such as clover” in this area. Comments are same as above regarding the invasive and persistent nature of most clovers.	Table 2.5 has been modified to remove the generic listing of clover (*Trifolium spp*). Alsike and subclover (*Trifolium aestivum* and *T. subterranium*) are included on the list of suitable species.

STAKEHOLDER COMMENT	DISTRICT RESPONSE
North Cascades Conservation Council / Alpine Lakes Protection Society / Pilchuck Audubon Society, Rick McGuire via email dated April 21, 2009	
The one question I had for the PUD was to hopefully get some clarification about what is meant by "timber harvest." I was pleased to read that there will be 2000 more acres managed without "timber harvest" under the TRMP compared to the WHMP. However, reading further, I kept seeing references to thinning in nearly all the tracts other than the Williamson Creek old growth. So, my question is, do you define "timber harvest" only as even aged cutting, or clearcutting? Do you not count thinning as "timber harvest?"	As specified in TRMP Section 2.1.3, there will be no removal of trees from stands over 100 years old, and no even-aged harvesting or clearcutting in younger stands unless approved on a site-specific basis by WDFW and USFWS. Thinning (selective removal of a portion of the trees), gap creation (removal of all trees in patches of up to 1 acre), snag creation, decaying live tree creation, and coarse woody debris (log) creation may occur in stands less than 100 years old to reduce tree density and accelerate the development of old-growth characteristics. Most second-growth stands on the TRMP lands originated after clearcutting in the mid 1900's. Unlike natural stands that originate after wildfires or windstorms, these second-growth stands have very dense overstories of small, uniformly-sized trees, and little or no residual wood (large trees, snags and logs). Because of the unusually high tree densities in these second-growth stands, they have a tendency to stagnate if left unmanaged. Judicious thinning early in stand development (prior to age 100) can increase the rate of growth among the remaining trees. Creation of snags, decaying live trees, logs and overstory gaps will provide additional structural diversity characteristic of natural stands. Active management of the overstory will cease at stand age 100 and the forest will be treated the same as existing old-growth. The District agrees that the definition of harvest in the draft TRMP as only total overstory removal was somewhat confusing, so we have changed that definition in the TRMP to include thinning and we have reworded the TRMP accordingly. We do have thinning included as one of the methods for accelerating tree growth, reducing tree density, introducing heterogeneity (variable density and patchiness) to the overstory and increasing the understory of shrubs, forbs and small trees. Thinning may be commercial or non-commercial depending on the stand. Opportunities to thin are limited by the steep terrain, poor access, and water quality concerns. Thinning will only be considered where it does not

STAKEHOLDER COMMENT	DISTRICT RESPONSE
	require new roads, does not increase surface erosion and does not result in accumulations of slash that interfere with wildlife movement.

APPENDIX C

STAKEHOLDER MEETING SUMMARIES

Jackson Project Relicensing
Terrestrial Resources Group

Monday, September 8, 2008

Meeting Summary

Start Time: 9:05 a.m.	**End Time:** 12:10 p.m.
Subject: Terrestrial Resource Group Meeting Summary	

Attendees:

- American Whitewater – Tom O'Keefe
- Biota Pacific – Marty Vaughn
- City of Everett – Julie Sklare
- District – Karen Bedrossian, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler
- FERC – David Turner (via conference phone)
- Meridian Environmental Inc – Pam Klatt
- North Cascades Conservation Council et al. – Rick McGuire
- Smayda Environmental Associates, Inc.– Kathy Smayda
- US Forest Service – Don Gay, Ann Risvold
- WA Dept of Fish and Wildlife – Rich Johnson

DISCUSSION ITEMS

Introductions

The group introduced themselves and their organizations.

Study Results Presentation

Karen, Kathy and Marty presented study results information contained in the attached slides.

Special Status Plant Survey discussion included the following:
Four lichens considered rare by the US Forest Service were located during the survey. Three of the species were in locations on non-NFS lands that are not impacted by the project. The fourth species was found on both NFS and private lands and is fairly common in the Project vicinity, despite its rare status. No special management methods were recommended by the FS for this species.

Noxious Weed Survey discussion included the following:
Blackberry is considered an invasive species, but it is not included on Snohomish County's noxious weed list. It is very common throughout the county. The District has a District-wide Vegetation Management Plan that covers general weed management for all District properties, including Jackson.

Wetland Survey discussion included the following:
Rich noted that the wetland rating system is misleading to persons unfamiliar with it. The rating system can somewhat counter-intuitively assign high scores to wetlands in the poor condition The pristine wetlands in the project area ended up with low ratings because of their limited opportunities for improving water quality and reducing flooding and erosion. Karen noted that reading the descriptions of the wetlands provides a better understanding of the quality of the wetland rather than reviewing the rating alone, that the system provided a standardized method of describing the wetlands, that the habitat scores and descriptions are useful, and that this system is the accepted method at both the state and county level. She and Bernice Tannenbaum discussed this issue with the author of the rating system while taking his wetlands rating class. (Note: this issue is addressed on the first page of the Western Washington Wetland Rating System ([Ecology Publication # 04-06-025.]).

- **Action:** Karen – per Rich's request, provide a cross reference for SP10 Amphibian wetland numbers with those from the SP9 Wetland Survey, since the two studies numbered the wetlands differently.

- **Action:** Dawn – resend link to SP9 and SP10 draft report appendices on web site.

Amphibian Survey discussion included the following:
Slide 21 should state that three (not four) state monitor species are potentially present. A fourth species, Oregon spotted frog, is listed as State Endangered, but its presence in the area is very unlikely.

Bull frogs (an invasive species) were found at Lost Lake, Chaplain Marsh and off-channel habitats along the lower Sultan River. While they are common in lowlands throughout western Washington, they were not found in the upper Sultan Basin.

Rich noted that there may be opportunities for management in the fluctuation zone and river channel to provide better habitat for amphibians; management activities could include timing and amount of flows/drawdown. Although, he is not necessarily saying the District should do so based on other resource needs/benefits. Karen noted that in the report conclusion it states that increase in flows on the river could have a negative impact on amphibians, and that existing conditions at the reservoir indicate that the amphibians are using areas outside the drawdown, so impacts from stranding are minimal.

Marbled Murrelet Survey discussion included the following:
The District has been operating as if the Culmback Dam West and East are occupied habitat since presence was first detected in the 1990s. Rich expressed gratitude that the District was treating the extent of occupancy as the entire survey area, as per PSG protocols.

Spotted Owl Survey discussion included the following:
The definition used during the study for suitable habitat is pretty broad since spotted owls have been found in non-typical or marginal habitat. Incidental potential sightings of spotted owls were treated as a possible sighting during the study and additional stations were added in those areas.

Karen noted that "owl detection" on the maps does not refer to spotted owls but to other species.

Marty discussed the latest research on the interaction of spotted and barred owls. They are competitors for the same habitat/food sources; this competition displaces the spotted owl. There is also some evidence of predation; however, the two species are not natural predators. There is some potential for spotted owl habitat improvement over the long term in the region, particularly on public lands, but the prospects for recovery of the species are still not good because of the presence of the barred owl.

Proposed Protection, Mitigation and Enhancement (PM&E) Measures Presentation

Karen, Kathy and Marty presented proposed PM&E information contained in the attached slides.

Noxious Weed Management Plan discussion included the following:
The District proposes a plan for the management of the 7 noxious weed species for which control must be provided under State and County regulations. The plan calls for an annual report and meeting, and review for additions/deletions from the County's list. The State gives authority for noxious weed control to the County governments.

During the discussion several stakeholders questioned why all noxious weeds would not be managed under the proposed plan. Karen stated that the plan will focus on the noxious weeds that are required to be controlled by state and county regulation. The survey included other noxious weeds and invasive species not listed as noxious weeds. The weed management plan will include general measures to prevent the introduction and spread of weeds, which will be effective both on the target weed species and other invasive species. The plan will bring prevention and management into the planning stages of ground-disturbing activities. Marty noted that the number of weeds for management is a concern due to the cost; managing for all invasive species, including those that have become widespread like blackberry and reed canarygrass, could be cost prohibitive.

The FS noted that they have concerns about the potential spread of weed species onto NFS lands, including several species not included in the draft weed management plan. They indicated that they recognize the difficulty of managing for species that are very common and widespread, such as blackberry and reed canarygrass, but would like to have other, less widespread species considered for addition to the plan. Ann Risvold indicated she will provide a list of FS weed species of concern to Karen.

Ann asked if the District uses herbicides. Karen responded that herbicides are not allowed in the watersheds due to water quality concerns as the water is for municipal drinking water supply. The two areas where knotweed is located are outside the watersheds and herbicides have been used, in combination with cutting, to treat those locations.

David noted that there are two options for the plan: 1) have a separate weed management plan or 2) incorporate the plan into the Terrestrial Resource Management Plan.

- **Action: Ann** – forward list of USFS weeds of concern to Karen.

- **Action**: Kathy – finalize draft Noxious Weed Plan for stakeholder review ASAP so it can be included in the PLP.

Marbled Murrelet Protection Plan discussion included the following:
The District proposes a plan for the protection of marbled murrelet habitat as it relates to road maintenance. Additional activities to be included in the plan are snag management and trails development; Marty will update accordingly for stakeholder review and comment. The District currently ensures protection of marbled murrelet habitat through the Washington Forest Practices Rules. Marty explained the implications of continuing to work through the Forest Practices Rules versus a PME with an incidental take statement for murrelets. A PME and incidental take statement are recommended because they would consolidate and clarify all murrelet habitat protection for District activities (including recreation trail development), and give the District more operational flexibility than the Forest Practices Rules.

A danger tree is one that is defined as having the potential to fall over a road or other facility where it could cause damage, restrict access or cause bodily harm.

Terrestrial Resources Management Plan discussion included the following:
The District is proposing a TRMP to cover the lands the District owns, including 1,745 additional acres around Spada Lake not covered in the original HEP analysis and 139 acres near Williamson Creek not currently in the WHMP or original HEP analysis. The City's lands on the Lake Chaplain Tract, which are used primarily for filtration plant/water supply purposes, as well as timber management, would not be in the TRMP, but would be managed under the current WHMP as an off-license agreement through which the District would maintain oversight of wildlife management activities. The City of Everett will no longer be a co-licensee for the project, and the preference is to continue managing the tract according to the WHMP, but under a separate, off-license agreement. Karen noted that the City of Everett had a timber management plan for the land prior to the preparation of the WHMP and proposed to include the Chaplain Tract in the WHMP as a means to provide more mitigation, while still harvesting timber. By implementing the harvesting plan in the WHMP rather than implementing the existing more aggressive timber management plan for the tract, wildlife habitat was improved. The value to the WHMP was measured by the HEP analysis as the difference between the two plans. The intention of including the lands in the WHMP was not to optimize the wildlife values, but to improve them over the original timber harvesting plan.

Rick expressed concern that there are differing beliefs on the management goals for these lands, the WHMP was outdated when it was written, more lands should be acquired, and the WHMP should be totally re-evaluated. He and Rich both suggested the WHMP places too much emphasis on management for deer. Rich expressed that he had very little disagreement with our current management but that he would like to see a change in management to less even-age stand management and focus on SP6 changes. Karen understands that there are differing philosophies on the management goals; however, the District is managing according to the goals established by the stakeholders under the WHMP's development and the objectives established by the State's current management plan, which includes managing habitat for deer. The WHMP emphasizes habitat for old-growth wildlife species because this was clearly a priority when it was written in the late 1980's, but it also includes management for deer because "in-kind" habitat mitigation was requested by the wildlife agencies as well. Don Gay, USFS asked if WDFW had had a recent change in policy to de-emphasize management for deer. Karen noted that a detailed response to NCCC comments was provided in the ICP response filed with FERC and that FERC made a determination on requests for modifications to study plans.

Rich expressed concern about not having regulatory authority over the Lake Chaplain lands if they are not in the project boundary. Enforcement efforts would be the obligation of the State rather than FERC. He did support the efforts currently underway at the Spada Lake Tract to promote late successional habitat. The District stated that the side agreement could include some oversight provisions, and that the side agreement warrants further discussion.

David Turner stated that the licensee needs to demonstrate to FERC that the Lake Chaplain lands are no longer needed within the project boundary for their original purpose (wildlife mitigation) or for any new purpose, such as recreation.

Tom asked if any lands would be added to the TRMP to replace the Lake Chaplain tract. Karen explained how the 1,745 acres at Spada Lake were added after the HEP analysis was conducted and 139 acres at Williamson Creek would be added, and how the total mitigation value and acreage would be more than adequate under the current FERC view of continuing project impacts.

- **Action: Rich** – identify specific habitat enhancement activities in SP6 that WDFW (including game management) would like to see occur on the mitigation lands so the District can begin analysis cost/benefit for the license application.

- **Action: Jeff** – develop bullet points or whitepaper on TRMP as it relates to an off license agreement relating to Lake Chaplain so Rich has something to give to his AG's Office for their review and approval of direction and for review by the TRG.

- **Action**: **Dawn** – route ICP response and FERC's study plan determination to TRG.

Next Steps for Process

The District will consider and update the PM&E documents based on comments received today at the meeting; the updated PM&Es will be routed via email for TRG review and comment next week. The TRG will have a 2-week comment period. The District seeks TRG input so what is proposed in the Preliminary Licensing Proposal (PLP) is close to/if not the final. In order for input into the PLP, Karen needs to have a "final" proposal ready for analysis by November 1.

Members can contact Karen via email and phone to discuss the proposals. A meeting will be scheduled for October 1, 9:00-11:00 to continue discussion of PM&E issues that do not get resolved between this and the next meeting.

- **Action: Marty** – forward the updated Marbled Murrelet PME to Don Gay for review.

END MEETING

Jackson Project Relicensing
Terrestrial Resources Group

Monday, February 23, 2009

Meeting Summary

Start Time: 2:05 p.m.	**End Time:** 3:40 p.m.
Subject: Terrestrial Resource Group Meeting Summary	
Attendees: • Biota Pacific – Marty Vaughn • City of Everett (City) – Julie Sklare • District – Karen Bedrossian, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler, Matt Love (outside counsel at VanNessFeldman) • Snohomish County (SnoCo) – Carly Summers (via phone) • Tulalip Tribes (Tribes) – Reid Allison • US Forest Service (USFS) – Kristen Bonanno (via phone) • WA Dept of Fish and Wildlife (WDFW) – Rich Johnson	

DISCUSSION ITEMS

Introductions

The group introduced themselves and their organizations.

Status of Relicensing; Settlement Process and Protocols

The entire Terrestrial Resources Group (TRG) was invited to this meeting. Since the attendees were familiar with the status of relicensing and the settlement process, these topics were not heavily discussed. The Confidentiality Agreement and Ground Rules are ready for signature by the agencies with an expectation of a required sign-off by each party by the March 11 Aquatic Resources Settlement Group meeting.

Review of PM&Es in PLP

Karen reviewed the PM&Es and Management Plans (in PLP Appendices) for terrestrial resources including the 1) TRMP, 2) Noxious Weed Plan, and 3) Marbled Murrelet Habitat Protection Plan.

TRMP – see handout

- Williamson Creek – additional acres (not in current WHMP) contain second-growth and wetland and are contiguous with Williamson Creek. Rich stated that WDFW prefers active management to accelerate habitat growth/diversity to allow for a variety of species.
- Lost Lake – no commercial harvest has been done there by the District but it is economically feasible to do so.

Noxious Weed Plan – no comments

Marbled Murrelet Habitat Protection Plan – received comments from Don Gay (USFS) which were incorporated into the version filed in the PLP. Tim Romanski provided comments to Karen on PLP version stating that USFWS is not likely to allow "take" for marbled murrelets. Access trail in upper river gorge area in marbled murrelet habitat could pose a problem. Karen will further discuss with Tim.

Issues

WDFW would like to see in TRMP:

- bigger gaps (1/4 acre), not necessarily more gaps, to provide a variety of habitat and not monocultural habitat
- Snag creation in mature growth areas, including larger diameter snags but in balance with the needs of marbled murrelets
- Fewer roads the better - better for wildlife
- Annual review good, but due to staffing concerns not sure if they will actively participate. 10 years for plan review too long to be proactive. 3-5 years may be better for plan review.
- Flexibility in the plan. Provide management concepts but not as detailed prescriptions as in current WHMP.

Karen and Biota are currently working on a draft TRMP. The District will provide a copy of the working draft to Rich and Mark Hunter by 16 March to be reviewed/commented on before Rich's one-month vacation that begins on 25 March. The TRG review of the TRMP will occur following that review.

WDFW expressed a desire to ensure that the general public continues to have the ability to access Project lands during state-approved hunting seasons. The Tribe expressed a similar interest for their members; no other terrestrial resource issues were identified. WDFW also mentioned concern that the Lake Chaplain Tract is managed for deer; however, the public is not allowed in the area for hunting.

Lake Chaplain Tract (LCT)

The City would like to have a meeting with WDFW and the City forester to discuss the management of the LCT. Rich said that he is interested in the meeting and site visit in March up to the 20th.

A list of issues Rich noted for the LCT were:

- Current clear cuts – he believes there is a short term gain but it is lost within 15 years when it doesn't provide browse any more and stays unproductive until the next cut.
- Minimize the use of clear cuts in favor of thinning
- Minimize size of clear cuts
- Lengthen seral stage (increase length of rotation)
- Minimize number of roads
- Develop corridors between the different habitat types
- Land not open to public should be managed for old growth

Rich would prefer management that targets critters losing habitat rather than target for deer. Karen pointed out that the WHMP was designed specifically to avoid and reduce the unproductive stages of clear cuts and that the overall wildlife habitat management program for Jackson Project will provide well over 100% of mitigation for late seral species. Rich would like for the District and City to look at the overall landscape. Karen said that mitigation was designed to make up for losses resulting from the Project (project nexus).

LCT management plan would be an off-license agreement signed by the District, City of Everett, WDFW and possibly the Tribes. USFS and Snohomish County indicated they were unlikely to be a signing party but would like to see drafts of the TRMP and LCT management plan.

Assignments:

Karen, Rich and Julie will set up a meeting for Rich and anyone else he wants to attend from WDFW to talk to the City forester in March.

Karen will send Rich and Mark Hunter a working draft version of the TRMP by 16 March so that Rich can review it prior to being gone during the month of April when the other stakeholders will be reviewing the draft plan.

Dawn will provide Karen with Justin Casing and Carly Summers' email addresses and will send terrestrial related emails to both Justin and Carly as requested by Carly.

END MEETING

Appendix F

Matrix of Pathways and Indicators

Table F-1. MATRIX of PATHWAYS AND INDICATORS (the ranges of criteria presented here are not absolute, and they may be adjusted for unique watersheds).

PATHWAY	INDICATORS	PROPERLY FUNCTIONING	AT RISK	NOT PROPERLY FUNCTIONING
Water Quality:	Temperature	50-57° F[1]	57-60° (spawning) 57-64° (migration &rearing)[2]	> 60° (spawning) > 64° (migration & rearing)[2]
	Sediment/Turbidity	< 12% fines (<0.85mm) in gravel[3], turbidity low	12-17% (west-side)[3], 12-20% (east-side)[2], turbidity moderate	>17% (west-side)[3], >20% (east side)[2] fines at surface or depth in spawning habitat[2], turbidity high
	Chemical Contamination/ Nutrients	low levels of chemical contamination from agricultural, industrial and other sources, no excess nutrients, no CWA 303d designated reaches[5]	moderate levels of chemical contamination from agricultural, industrial and other sources, some excess nutrients, one CWA 303d designated reach[5]	high levels of chemical contamination from agricultural, industrial and other sources, high levels of excess nutrients, more than one CWA 303d designated reach[5]
Habitat Access:	Physical Barriers	any man-made barriers present in watershed allow upstream and downstream fish passage at all flows	any man-made barriers present in watershed do not allow upstream and/or downstream fish passage at base/low flows	any man-made barriers present in watershed do not allow upstream and/or downstream fish passage at a range of flows
Habitat Elements:	Substrate	dominant substrate is gravel or cobble (interstitial spaces clear), or embeddedness <20%[3]	gravel and cobble is subdominant, or if dominant, embeddedness 20-30%[3]	bedrock, sand, silt or small gravel dominant, or if gravel and cobble dominant, embeddedness >30%[2]
	Large Woody Debris	Coast: >80 pieces/mile >24"diameter >50 ft. length[4]; East-side: >20 pieces/ mile >12"diameter >35 ft. length[2]; and adequate sources of woody debris recruitment in riparian areas	currently meets standards for properly functioning, but lacks potential sources from riparian areas of woody debris recruitment to maintain that standard	does not meet standards for properly functioning and lacks potential large woody debris recruitment

PATHWAY	INDICATORS	PROPERLY FUNCTIONING	AT RISK	NOT PROPERLY FUNCTIONING
	Pool Frequency channel width / # pools/ mile [6] 5 feet 184 10 " 96 15 " 70 20 " 56 25 " 47 50 " 26 75 " 23 100 " 18	meets pool frequency standards (left) and large woody debris recruitment standards for properly functioning habitat (above)	meets pool frequency standards but large woody debris recruitment inadequate to maintain pools over time	does not meet pool frequency standards
	Pool Quality	pools >1 meter deep (holding pools) with good cover and cool water[3], minor reduction of pool volume by fine sediment	few deeper pools (>1 meter) present or inadequate cover/temperature[3], moderate reduction of pool volume by fine sediment	no deep pools (>1 meter) and inadequate cover/temperature[3], major reduction of pool volume by fine sediment
	Off-channel Habitat	backwaters with cover, and low energy off-channel areas (ponds, oxbows, etc.)[3]	some backwaters and high energy side channels[3]	few or no backwaters, no off-channel ponds[3]
	Refugia (important remnant habitat for sensitive aquatic species)	habitat refugia exist and are adequately buffered (e.g., by intact riparian reserves); existing refugia are sufficient in size, number and connectivity to maintain viable populations or sub-populations[7]	habitat refugia exist but are not adequately buffered (e.g., by intact riparian reserves); existing refugia are insufficient in size, number and connectivity to maintain viable populations or sub-populations[7]	adequate habitat refugia do not exist[7]
Channel Condition & Dynamics:	Streambank Condition	>90% stable; i.e., on average, less than 10% of banks are actively eroding[2]	80-90% stable	<80% stable

PATHWAY	INDICATORS	PROPERLY FUNCTIONING	AT RISK	NOT PROPERLY FUNCTIONING
	Floodplain Connectivity	off-channel areas are frequently hydrologically linked to main channel; overbank flows occur and maintain wetland functions, riparian vegetation and succession	reduced linkage of wetland, floodplains and riparian areas to main channel; overbank flows are reduced relative to historic frequency, as evidenced by moderate degradation of wetland function, riparian vegetation/succession	severe reduction in hydrologic connectivity between off-channel, wetland, floodplain and riparian areas; wetland extent drastically reduced and riparian vegetation/succession altered significantly
Flow/ Hydrology:	Change in Peak/Base Flows	watershed hydrograph indicates peak flow, base flow and flow timing characteristics comparable to an undisturbed watershed of similar size, geology and geography	some evidence of altered peak flow, baseflow and/or flow timing relative to an undisturbed watershed of similar size, geology and geography	pronounced changes in peak flow, baseflow and/or flow timing relative to an undisturbed watershed of similar size, geology and geography
Watershed Conditions:	Road Density & Location	<2 mi/mi^2 [11], no valley bottom roads	2-3 mi/mi^2, some valley bottom roads	>3 mi/mi^2, many valley bottom roads
	Disturbance History	<15% ECA (entire watershed) with no concentration of disturbance in unstable or potentially unstable areas, and/or refugia, and/or riparian area; and for NWFP area (except AMAs), 15% retention of LSOG in watershed[10]	<15% ECA (entire watershed) but disturbance concentrated in unstable or potentially unstable areas, and/or refugia, and/or riparian area; and for NWFP area (except AMAs), 15% retention of LSOG in watershed[10]	>15% ECA (entire watershed) and disturbance concentrated in unstable or potentially unstable areas, and/or refugia, and/or riparian area; does not meet NWFP standard for LSOG retention

PATHWAY	INDICATORS	PROPERLY FUNCTIONING	AT RISK	NOT PROPERLY FUNCTIONING
	Riparian Reserves	the riparian reserve system provides adequate shade, large woody debris recruitment, and habitat protection and connectivity in all subwatersheds, and buffers or includes known refugia for sensitive aquatic species (>80% intact), and/or for grazing impacts: percent similarity of riparian vegetation to the potential natural community/composition >50%[12]	moderate loss of connectivity or function (shade, LWD recruitment, etc.) of riparian reserve system, or incomplete protection of habitats and refugia for sensitive aquatic species (70-80% intact), and/or for grazing impacts: percent similarity of riparian vegetation to the potential natural community/composition 25-50% or better[12]	riparian reserve system is fragmented, poorly connected, or provides inadequate protection of habitats and refugia for sensitive aquatic species (<70% intact), and/or for grazing impacts: percent similarity of riparian vegetation to the potential natural community/composition <25%[12]

1 Bjornn, T.C. and D.W. Reiser, 1991. Habitat Requirements of Salmonids in Streams. American Fisheries Society Special Publication 19:83-138. Meehan, W.R., ed.

2 Biological Opinion on Land and Resource Management Plans for the: Boise, Challis, Nez Perce, Payette, Salmon, Sawtooth, Umatilla, and Wallowa-Whitman National Forests. March 1, 1995.

3 Washington Timber/Fish Wildlife Cooperative Monitoring Evaluation and Research Committee, 1993. Watershed Analysis Manual (Version 2.0). Washington Department of Natural Resources.

4 Biological Opinion on Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH). National Marine Fisheries Service, Northwest Region, January 23, 1995.

5 A Federal Agency Guide for Pilot Watershed Analysis (Version 1.2), 1994.

6 USDA Forest Service, 1994. Section 7 Fish Habitat Monitoring Protocol for the Upper Columbia River Basin.

7 Frissell, C.A., Liss, W.J., and David Bayles, 1993. An Integrated Biophysical Strategy for Ecological Restoration of Large Watersheds. Proceedings from the Symposium on Changing Roles in Water Resources Management and Policy, June 27-30, 1993 (American Water Resources Association), p. 449-456.

8 Wemple, B.C., 1994. Hydrologic Integration of Forest Roads with Stream Networks in Two Basins, Western Cascades, Oregon. M.S. Thesis, Geosciences Department, Oregon State University.

9 e.g., see Elk River Watershed Analysis Report, 1995. Siskiyou National Forest, Oregon.

10 Northwest Forest Plan, 1994. Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. USDA Forest Service and USDI Bureau of Land Management.

11 USDA Forest Service, 1993. Determining the Risk of Cumulative Watershed Effects Resulting from Multiple Activities.

12 Winward, A.H., 1989 Ecological Status of Vegetation as a base for Multiple Product Management. Abstracts 42nd annual meeting, Society for Range Management, Billings MT, Denver CO: Society For Range Management: p277.

Appendix G

Marbled Murrelet Habitat Protection Plan

Marbled Murrelet Habitat Protection Plan

Henry M. Jackson Hydroelectric Project

(FERC Project No. 2157)

Public Utility District No. 1 of Snohomish County

Everett, Washington

May 2009

MARBLED MURRELET
HABITAT PROTECTION PLAN

For the

HENRY M. JACKSON HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION
PROJECT NUMBER 2157

Submitted by:

PUBLIC UTILITY DISTRICT NO. 1
OF
SNOHOMISH COUNTY

Everett, Washington

May 2009

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The Marbled Murrelet Habitat Protection Plan (MMHPP) describes the specific measures Public Utility District No. 1 of Snohomish County (District) will implement to avoid or minimize the Project-related impacts to marbled murrelets and their habitat. The MMHPP will be in effect for the term of the new license.

Recent surveys by the District and others have documented the presence of marbled murrelets (a federally-listed threatened species) in the Sultan Basin, and have resulted in the designation of forest in and near the Jackson Hydroelectric Project (Project) boundary as "occupied" by nesting marbled murrelets.

Three general types of Project-related activities have the potential to impact nesting marbled murrelets and/or their habitat: 1) the pruning, topping and felling of road-side danger trees; 2) overstory thinning and creation of snags, decaying live trees, coarse woody debris and forest canopy gaps during implementation of the Jackson Project Terrestrial Resource Management Plan (TRMP); and 3) the creation of new recreation trails and associated facilities as required under the new Federal Energy Regulatory Commission (FERC) license.

The goal of the Marbled Murrelet Habitat Protection Plan (MMHPP) is to avoid or minimize potential impacts to nesting marbled murrelets and suitable marbled murrelet nesting habitat during routine road maintenance on and near Project lands, during implementation of the TRMP, and during the creation, use and maintenance of new recreation trails and associated facilities. While conducting these activities, the District will identify potential marbled murrelet nest trees and protect them from modification or felling. Nearby live conifers that are large enough to provide lateral cover to potential nest trees will also be protected where feasible. To help ensure effective implementation of the MMHPP, the District will also maintain current maps of suitable and occupied marbled murrelet nesting habitat on Project lands.

1.1 Project Lands

The Project area consists of approximately 2,548 acres of upland, wetland and natural lake along with 1,908 acres of reservoir, all in the Sultan River Basin of Snohomish County, Washington (Figure 1-1). The TRMP divides the Project lands into four management tracts: Lost Lake, Project Facility Lands, Spada Lake, and Williamson Creek (see TRMP for detailed

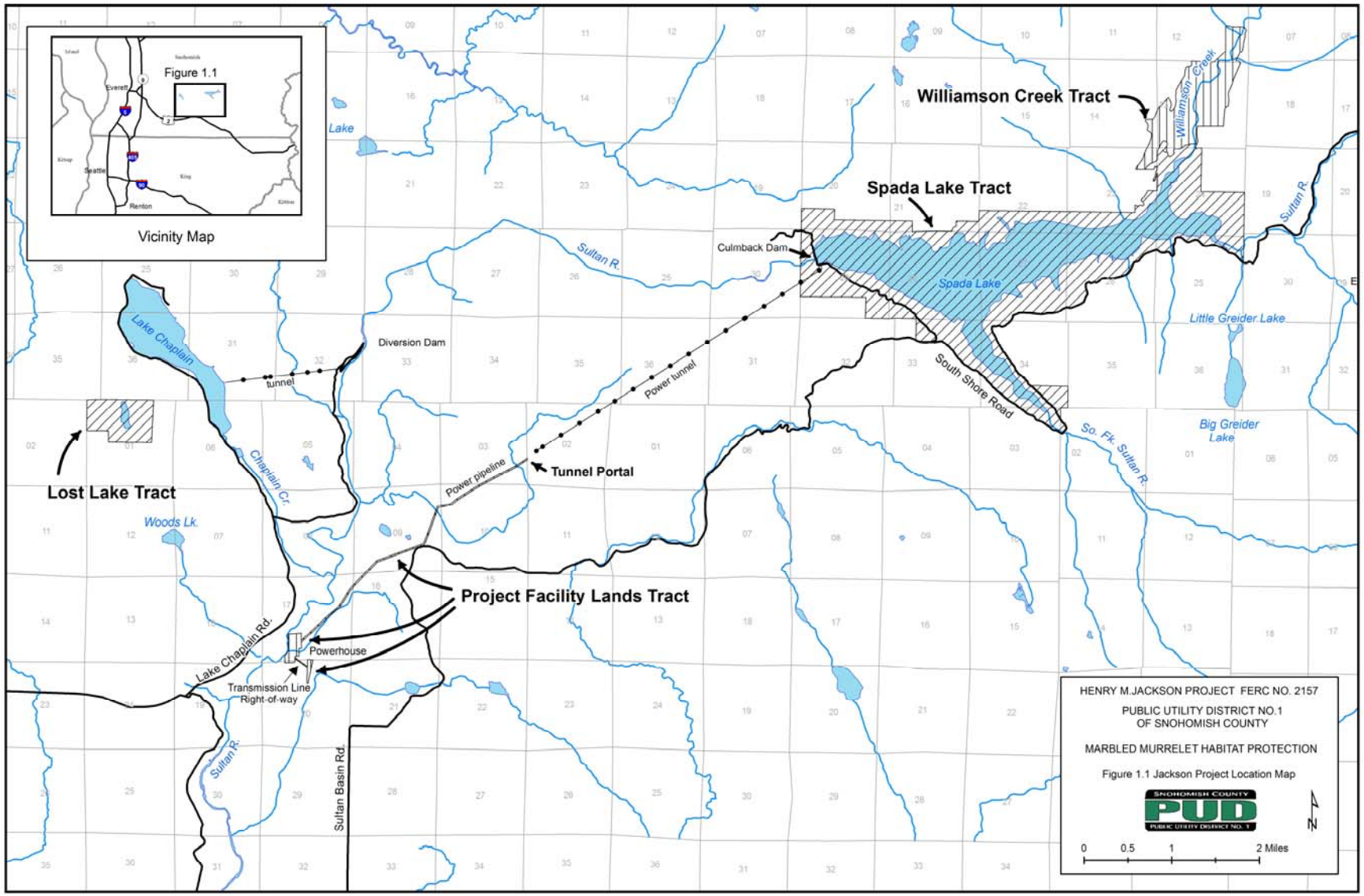


Figure 1.1
Vicinity Map
Everett
Seattle
Renton
Williamson Creek Tract
Williamson Creek
Spada Lake Tract
Culmback Dam
Spada Lake
Sultan R.
Little Greider Lake
Big Greider Lake
South Shore Road
So. Fk. Sultan R.
Lake Chaplain
Diversion Dam
tunnel
Power tunnel
Tunnel Portal
Power pipeline
Lost Lake Tract
Woods Lk.
Chaplain Cr.
Project Facility Lands Tract
Powerhouse
Transmission Line
Right-of-way
Lake Chaplain Rd.
Sultan Basin Rd.
HENRY M.JACKSON PROJECT FERC NO. 2157
PUBLIC UTILITY DISTRICT NO.1
OF SNOHOMISH COUNTY
MARBLED MURRELET HABITAT PROTECTION
Figure 1.1 Jackson Project Location Map
SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
0 0.5 1 2 Miles
N

descriptions of all tracts). This MMHPP will be applicable to suitable marbled murrelet habitat (current and future) on all TRMP lands. As of 2009, suitable and occupied marbled murrelet habitat are only present in the Spada Lake and Williamson Creek tracts, so the MMHPP will only be implemented in those areas at the time of issuance of the new license. If suitable marbled murrelet habitat develops and/or marbled murrelets are detected in other tracts over the term of the license, the MMHPP will be implemented there as well.

1.2 Regulatory Restrictions on Marbled Murrelet Habitat

The Federal Endangered Species Act (ESA) lists the marbled murrelet as a threatened species and restricts take throughout its range. The U.S. Fish and Wildlife Service (USFWS) provides informal guidance on steps that can be taken to avoid take of marbled murrelets, and consults formally with other Federal agencies that have identified the potential for their actions to affect the species. The issuance of a hydropower license by the FERC is a Federal action that is subject to compliance with the ESA. The FERC has designated the District as the Commission's non-federal representative for purposes of conducting informal consultation under Section 7 of the ESA. This MMHPP has been prepared to support that consultation.

Take of marbled murrelets on non-federal forestlands in Washington is largely avoided through implementation of the Washington Forest Practices Rules (FPR; Washington Administrative Code 222), which have been promulgated by the Washington Forest Practices Board under the authority of the Forest Practices Act (Revised Code of Washington 76.09). Specific provisions in the current (2009) FPR define suitable and occupied marbled murrelet habitat in Washington, and specify protocols for identifying habitat and surveying for the presence of marbled murrelets. Those definitions and protocols are used in this MMHPP as well.

The FPR classify timber harvesting and other forest management activities with the potential to cause take as Class IV – Special forest practices, and provide detailed guidelines for determining whether a forest practice is a Class IV – Special with regard to marbled murrelets. Most forest landowners design their activities to avoid designation as Class IV – Special, thereby eliminating the potential for take. That is the approach taken in this MMHPP as well. The measures described in Section 2.2 have been designed to avoid impacts to marbled murrelets wherever feasible, and to minimize impacts where avoidance may not be feasible (e.g., emergency road maintenance).

This MMHPP has been prepared to be consistent with the FPR. In implementing the MMHPP, the District will continue to comply with the FPR, including acquisition of the appropriate Forest Practices Approvals where needed.

2.0 HABITAT PROTECTION

2.1 Background

2.1.1 Current (2008) Distribution of Occupied and Suitable Habitat

Old-growth and mature conifer forest in the Spada Lake Tract was assessed as suitable marbled murrelet habitat according to the FPR definition (WAC-222-12-090) in 2007. The suitable habitat was surveyed for marbled murrelets as four survey areas (Culmback West, Culmback East, Olney Pass and South Fork Spada Inlet) in 2007 and 2008 according to Pacific Seabird Group protocol (Evans et al. 2003) (Figure 2-1). Occupancy was confirmed in the Culmback West survey area, and presence was confirmed in the other three (Biota Pacific 2008). Since Culmback West, Culmback East and Olney Pass survey areas are contiguous, all are considered occupied. While no occupancy detections were made at South Fork Spada Inlet in 2007 or 2008, the survey area is contiguous with occupancy detections on State lands from the 1990s (Northwest ¼ of Section 2, Township 28 North, Range 9 East), and is considered occupied as well.

Stands of contiguous mature and old-growth forest in Williamson Creek were also assessed as suitable. They were surveyed as two survey areas (Williamson Creek North and Williamson Creek South) (Figure 2-2) (Biota Pacific 2008). Occupancy was confirmed in the Williamson Creek North survey area in 2007. While no occupancy or presence detections were made at Williamson Creek South in 2007, the survey area is contiguous with Williamson Creek North, and is considered occupied as well.

2.1.2 Potential Future Habitat Conditions

The Project lands contain stands of second-growth forest that are not currently classified as marbled murrelet habitat. Many of these stands are being managed for late-seral forest under the TRMP, and could develop conditions that would trigger a reclassification as suitable marbled murrelet habitat under the FPR definition (WAC 222-16-010). These lands should be reassessed when habitat maps are updated each decade (see Section 2.2.1). Spada Lake, Williamson Creek, and Lost Lake tracts are the most likely locations for reclassified habitat, as the majority of the Project Facility Lands Tract is being managed for early seral forest and non-forest habitats.

Figure 2-1 Marbled murrelet survey areas in the Spada Lake Tract.

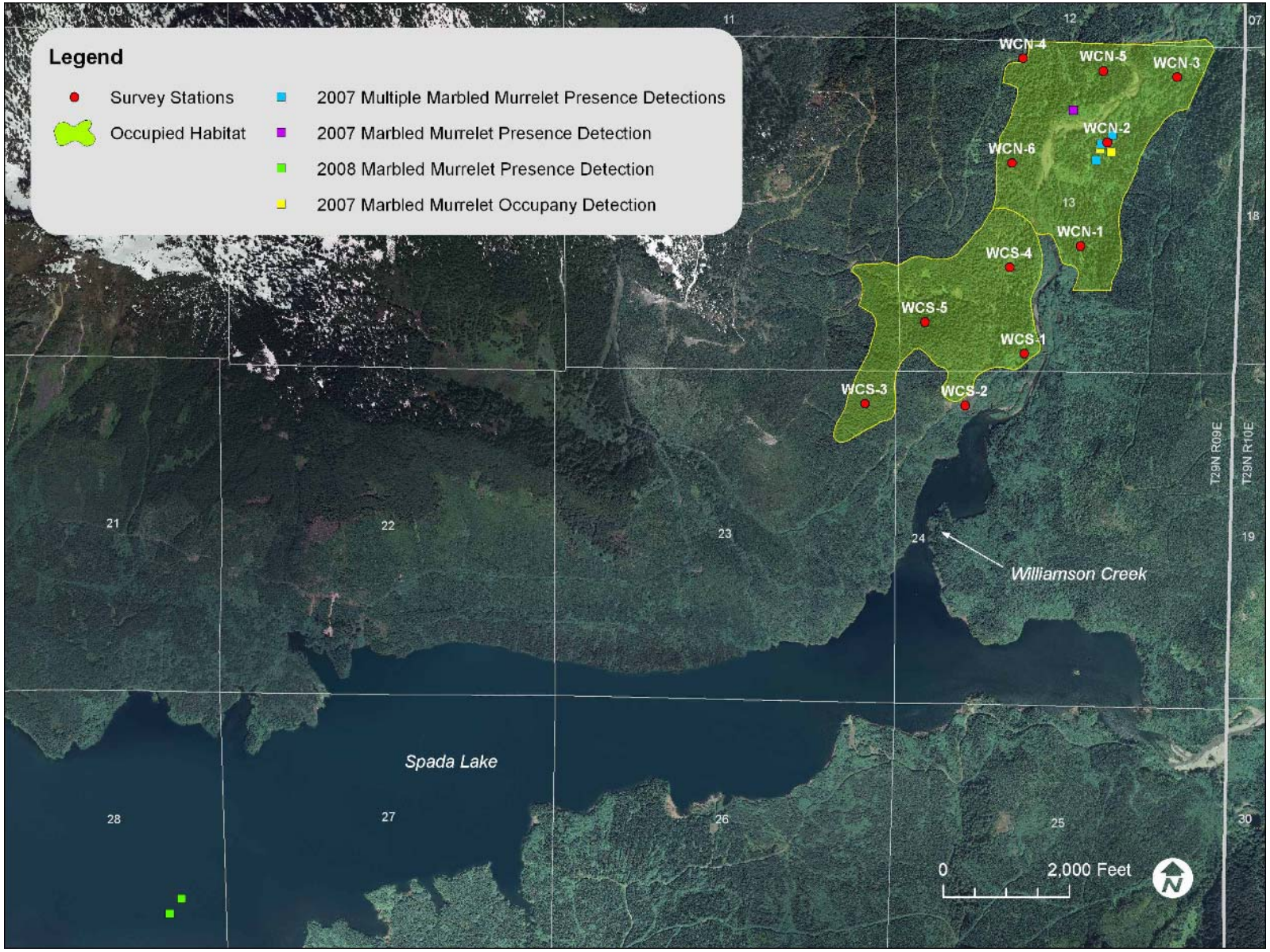


Figure 2-2 Marbled murrelet survey areas in the Williamson Creek Tract

2.1.3 TRMP Prescriptions for Occupied and Buffer Habitat

All occupied marbled murrelet habitat within the Project boundary is in mature and old-growth stands designated for passive management under the TRMP. These stands will be preserved as old-growth forest with minimal intervention. There will be no timber harvesting, snag creation, coarse woody debris, or gap creation within occupied stands.

Second-growth conifer and mosaic (mixed) forest stands adjacent to occupied habitat will also be managed for late-seral conditions, but they will require varying levels of active manipulation until they reach a stand age of 100 years. Overstory thinning, snag creation, coarse woody debris creation and gap creation may all occur as needed in second-growth stands. Active management in second-growth stands that are also serving as buffers to occupied marbled murrelet habitat (within 300 feet of occupied habitat) will be conducted in a manner consistent with the FPR to minimize impacts to occupied habitat.

2.2 Impact Avoidance and Minimization Measures

2.2.1 Updating of Habitat Information

The District will prepare and maintain maps of the Project lands and adjacent areas showing suitable marbled murrelet habitat, occupied marbled murrelet habitat, and other forest within 300 feet of suitable and occupied marbled murrelet habitat. For mapping purposes, suitable and occupied marbled murrelet habitats will be defined according to the FPR. At intervals of 10 years or less, the District will update the maps to reflect current habitat conditions. The District may conduct surveys for nesting marbled murrelets in all suitable habitat that is not known to be occupied and has not been surveyed for 10 or more years. If the District chooses not to survey suitable habitat, such habitat will be considered occupied for purposes of this MMHPP. Hereafter in this MMHPP, all references to occupied habitat include suitable habitat that has not been surveyed for 10 or more years. Surveys will be conducted according to the current protocol of the Pacific Seabird Group, or another protocol endorsed by the USFWS and WDFW.

2.2.2 Roadside Danger Trees

Relevance to the Project

An estimated 3 miles of Project roads pass through occupied habitat, or through forest that is within 300 feet of occupied forest. This number of affected road miles could increase during the term of the new license as forests in and near the Project boundary mature and additional acres become suitable for marbled murrelet nesting, or if the District assumes management responsibility for additional miles of existing Washington Department of Natural Resources (WDNR) roads along the south shore of Spada Lake. Among the routine maintenance activities conducted by the District are the pruning, topping and felling of roadside danger trees (trees capable of falling onto and blocking the road and/or striking passing vehicles). Conducting these activities in forest that is occupied or could be occupied by marbled murrelets has the potential to directly or indirectly impact nesting success. The pruning, topping or felling of trees in which marbled murrelets are present during the nesting season could lead to the injury or death of young birds. Similar activities outside the nesting season could reduce the availability of suitable nest sites in successive seasons. The pruning, topping or felling of other dominant or codominant overstory trees in forest surrounding occupied nesting habitat could expose nest trees to increased wind damage and make individual nests more vulnerable to disturbance and predation.

Avoidance and Minimization Measures

Prior to the scheduled pruning, topping or felling of roadside danger trees in occupied marbled murrelet habitat, District biologists will evaluate each tree proposed for such activity. The District will not prune, top or fell roadside danger trees in occupied habitat that contain marbled murrelet nesting platforms (as defined in the FPR), unless the roadside danger tree poses an imminent threat to the operation of the Project or safe use of a Project road. A roadside danger tree will be considered an imminent threat if it is leaning toward a road at an angle of greater than 20 degrees from vertical, is upslope from a road and being undercut by erosion, or is otherwise in a condition that would lead a professional forester or other similarly qualified person to conclude it has a reasonable potential to fall on or across the road without warning.

The District will not prune, top or fell roadside danger trees in or within 300 feet of occupied habitat during the critical marbled murrelet nesting season (April 1 through August 31),

unless the roadside dangers tree poses an imminent threat to the operation of the Project or safe use of a Project road, as described in the previous paragraph. Outside the critical marbled murrelet nesting season and regardless of imminent threat to the operation of the Project or safe use of a Project road, the District may prune, top or fell roadside danger trees in or within 300 feet of occupied habitat that do not contain marbled murrelet nesting platforms. Any tree-felling in or within 300 feet of occupied habitat that takes place within the critical nesting season will not be performed during the daily peak activity period defined in the FPR (one hour before official sunrise to two hours after official sunrise, and one hour before official sunset to one hour after official sunset).

2.2.3 TRMP Implementation

Relevance to the Project

Second-growth forest on the Project lands will be enhanced for late-seral wildlife species by thinning the overstory and creating snags, decaying live trees, coarse woody debris and small openings (gaps) in the canopy. The TRMP sets a goal of creating three snags and decaying live trees per acre every 8 to 12 years. It also prescribes the felling of live trees to create coarse woody debris. Gaps will be created at the discretion of District biologists, and thinning will be done on a limited basis where it is economically and operationally feasible and likely to accelerate late-seral forest development. Once second-growth stands reach 100 years old, the District will conduct no more thinning and create no more snags, decaying live trees, coarse woody debris, or gaps.

All currently-identified stands of occupied habitat on the Project lands are more than 100 years old, so none of the TRMP activities will be conducted within currently-identified occupied habitat. Maps of suitable habitat on the Project lands will be updated every 10 years (see Section 2.2.1), and new suitable marbled murrelet habitat will be surveyed or treated as occupied. New suitable habitat could be less than 100 years old, however, so the potential for TRMP activities to occur in suitable or occupied habitat needs to be addressed. TRMP activities also could occur in second-growth forest adjacent to occupied habitat, where avoidance and minimization measures will need to be followed.

Avoidance and Minimization Measures

The following restrictions will apply during implementation of the TRMP:

a) No thinning, snag creation, decaying live tree creation, coarse woody debris creation or gap creation will occur within occupied marbled murrelet habitat.

b) Thinning, snag creation, decaying live tree creation, coarse woody debris creation and gap creation may occur within 300 feet of occupied marbled murrelet habitat, provided that:

   i) The activity must result in a residual stand density of at least 75 trees per acre greater than 6 inches diameter at breast height (DBH), of which at least 25 trees per acre are greater than 12 inches DBH and at least 5 trees per acre are greater than 20 inches DBH.

   ii) No live coniferous trees with marbled murrelet nesting platforms (as defined in the FPR), live coniferous trees with a DBH of 32 inches or greater, or other live dominant or codominant trees within 100 feet of either of these two types of trees, may be modified or felled, except that live western redcedar and Pacific silver fir of any size may be modified to create snags or decaying live trees at a density of up to one per 20 acres per decade.

   iii) No activity may be conducted during the critical marbled murrelet nesting season.

c) No thinning, snag creation, decaying live tree creation, coarse woody debris creation or gap creation will be conducted within 0.25 mile of occupied marbled murrelet habitat during the daily peak activity period (one hour before official sunrise to two hours after official sunrise, and one hour before official sunset to one hour after official sunset) in the critical marbled murrelet nesting season.

2.2.4 New Recreation Trails and Associated Facilities

Relevance to the Project

At the request of stakeholders, the District has included in the Jackson Project Recreation Resource Management Plan (RRMP) the creation of new trails and associated trailhead

facilities (picnic sites, restrooms and parking area) to improve public access to the Sultan River and to the north side of Spada Lake. A portion of the new trail to the Sultan River and the associated trailhead facilities could be in occupied marbled murrelet habitat, and might require the felling of large trees. Such felling could impact marbled murrelet habitat by eliminating existing nest trees, reducing the number of potential future nest trees, or making remaining trees more vulnerable to wind damage and predation. If the felling takes place within the marbled murrelet nesting season, it could disrupt actively nesting birds. Another potential impact could be increased human activity along the trail or at the trailhead/picnic area, which could disrupt actively nesting marbled murrelets or make them more vulnerable to predation.

Avoidance and Minimization Measures

The following conditions will apply to new recreation trails and associated facilities created on non-federal lands in or within 300 feet of occupied marbled murrelet habitat:

a) The District will lay out trails and associated facilities to minimize the total area of trail and/or facility within 100 feet of potential nest trees (coniferous trees with marbled murrelet nesting platforms), while giving due consideration to other potential environmental and safety considerations.

b) The District will not fell coniferous trees with marbled murrelet nesting platforms, or live dominant or codominant trees directly adjacent to coniferous trees with platforms, to create a new recreation trail or associated facilities, unless doing so is necessary to make the trail or associated facilities safe, keep the overall area of site disturbance to a reasonable level, and/or avoid impacting slope stability, surface erosion or water quality. If the District determines that the felling of such trees is necessary, the District will fell such trees outside the critical marbled murrelet nesting season (April 1 through August 31).

c) The District will provide wildlife-resistant containers for human refuse during trail and associated facility construction and use, and will empty as needed to prevent wildlife access to refuse. The District will post signs alerting users of the need to contain all refuse.

d) The District will not conduct the following activities within the specified threshold distances of occupied marbled murrelet habitat during the daily peak activity period

(one hour before official sunrise to two hours after official sunrise, and one hour before official sunset to one hour after official sunset) in the critical marbled murrelet nesting season.

Activity	Threshold Distance
Blast > 2 pounds	1.0 mile
Blast ≤ 2 pounds	120 yards
Impact pile driver, jackhammer, rock drill	60 yards
Helicopter, single-engine airplane	120 yards
Chainsaw	45 yards
Heavy equipment	35 yards

3.0 MONITORING AND REPORTING

The District will update maps of occupied and suitable habitat will be regularly updated, as described in 2.2.1 of this MMHPP. Survey results or important changes to suitable or occupied habitat will be communicated with FERC every 5 years.

4.0 IMPLEMENTATION SCHEDULE

The District will update maps of suitable and occupied habitat at intervals of 10 years or less, as described in Section 2.2.1 of this document. Minimization measures will be applied as needed, whenever danger trees are felled or TRMP activities are conducted within 300 feet of occupied habitat. The measures will also be applied if new recreation trails are created in or within 300 feet of occupied habitat.

5.0 REFERENCES

Biota Pacific Environmental Sciences. 2008. Jackson Hydroelectric Project (FERC Project No. 2157) Revised Study Plan 11: Marbled Murrelet Surveys Final Technical Report. Prepared for Public Utility District No. 1 of Snohomish County, Everett, WA.

Evans Mack, D., W.P. Ritchie, S.K. Nelson, E. Kuo-Harrison, P. Harrison, and T.E. Hamer. 2003. Methods for surveying Marbled Murrelets in forests: a revised protocol for land management and research. Pacific Seabird Group Technical Publication Number 2. Available from http://www.pacificseabirdgroup.org.

APPENDIX A

STAKEHOLDER CONSULTATION

Appendix A

STAKEHOLDER CONSULTATION

Record of Consultation

Relicensing stakeholders, including WDFW, USFWS, USFS, the Tribes and others, were consulted prior to the submittal of the Notice of Intent to relicense (NOI) and Pre-application Document (PAD), and again during the scoping and study proposal process. They were informed of study progress and received drafts and final versions of the terrestrial resources studies (See the Updated Study Report for more information). On 8 September 2008, a meeting was held for the Jackson Project Relicensing Terrestrial Resources Group (TRG) to review the terrestrial study reports and to discuss proposed Protection, Mitigation and Enhancement (PM&E) measures for terrestrial resources, including a proposed Marbled Murrelet Habitat Protection Plan (MMHPP). A PowerPoint presentation was given at the meeting and paper copies of the presentation and of draft PM&E measures were distributed to those in attendance. Digital copies were also emailed to all TRG members. Meeting minutes are included in Appendix B. Comments were received from the USFS and were incorporated into the Marbled Murrelet PM&E and the MMHPP.

The Preliminary License Proposal (PLP) that was filed with the FERC on 31 December 2008 included the proposed Marbled Murrelet PM&E measure and a discussion of marbled murrelets in the Project area. No comments were received regarding marbled murrelets.

A meeting for the TRG was held on 23 February 2009 to discuss terrestrial PM&E measures and plans in the PLP. Meeting minutes and comments are included in Appendix B.

The District has engaged in discussions with WDFW, USFS and USFWS representatives regarding the contents of the Marbled Murrelet PM&E and the MMHPP. The MMHPP was expanded from the PM&E measure to include measures suggested by the Stakeholders, put into a format consistent with the other terrestrial plans, and included in the FLA.

Table A-1. Stakeholder comments on the Marbled Murrelet PM&E and MMHPP, and District responses to comments.

STAKEHOLDER COMMENT	DISTRICT RESPONSE
US Forest Service, Don Gay via email dated September 19, 2008	
On the draft murrelet PME, in the summary, I would suggest that the measure be expanded to protect/conserve/minimize removal of not only nest trees, but those adjacent trees that provide cover to potential nest sites (at least for the trail portion that would occur on National Forest System lands). This is provided for in the second bullet under specifics of trails on page 12.	As suggested in the comment, the PM&E was revised to clarify the District's intent to protect/conserve/minimize the removal of adjacent trees that provide cover to potential marbled murrelet nest trees in occupied habitat on all Project lands. These revisions were carried forward into the MMHPP.
On the first bullet on that page, I'm not sure that the trail layout should consider all coniferous trees w/in 100' of potential nest platforms, just those that provide cover to the potential platform. There could be areas with lots of small (< 15') conifers that would have no influence on nesting suitability for murrelets. For the second bullet, I have the same comment (specify the types of conifers of concern).	The PM&E was revised to specify the protection of live dominant and codominant trees directly adjacent to coniferous trees with marbled murrelet nesting platforms, as these are the trees most likely to provide cover for marbled murrelet nests. Smaller trees would not need to be protected. These revisions were carried forward into the MMHPP.
Not having seen the trail proposal, I don't know if there is any plan/possibility of refuse cans at the parking area/trailhead, but if there is, the third bullet would apply to the trail to access the river. Thank you for considering these suggestions.	The PME and MMHPP state the District will provide wildlife-resistant containers for human refuse during trail and associated facility construction and use. As suggested in the comment, this would include parking areas and trailheads in the vicinity of occupied marbled murrelet habitat.
Tulalip Tribes, letter dated October 20, 2008	
The following recommendations are meant to serve as a starting point for the discussion and development of Protection, Mitigation and Enhancement measures (PMEs) designed to protect terrestrial resources. The PMEs include those for implementation of a Terrestrial Resource Management Plan (TRMP), formalization of a Noxious Weed Plan, and development of a Marbled Murrelet Habitat Protection Plan. These recommendations should be considered preliminary and will need to be refined further under the direction of the Terrestrial Resources Work Group (or its successor).	Comment noted.

STAKEHOLDER COMMENT	DISTRICT RESPONSE
The Tulalip Tribes appreciates the opportunity to provide Project input, and is generally satisfied with the information contained within the Terrestrial Resources PMEs. Recommendations that follow reflect our ideas to further promote the success of the Project.	Comment noted.
Abbreviated terms should be specified at first use for the following: Page 1 Paragraph 1: "WDFW" and "USFWS" Page 1 Paragraph 2: "FERC" Page 1 Paragraph 3: "PME". Additionally, on page 3 *Description of the Action*, TRMP and WHMP were specified previously in the document.	The District agrees with these suggested acronyms. All abbreviations and acronyms will be defined at their first use in the MMHPP.
Physical habitat alteration seems to be the prime Project-related impact. While physical habitat alteration is an important component to address, the overall habitat impacts that are listed initially should include noise and other permanent disturbances to nesting and fledging birds. More specifically, trails and associated facilities will create a permanent disturbance to nesting marbled murrelets thereby reducing the amount of available suitable habitat. Restricting public access during sensitive periods should be considered, and suitable or occupied habitat buffers should be employed.	While the scientific literature suggests marbled murrelets are not particularly sensitive to human presence in the vicinity of active nests, the MMHPP contains a number measures to avoid or minimize human disturbance. Most District activities with the potential to disturb nesting marbled murrelets (felling of roadside danger trees, forest habitat enhancement and recreation trail construction) are restricted near suitable and occupied habitat during the marbled murrelet nesting season (April 1 through August 31). Those activities that might need to occur near suitable or occupied habitat during the nesting season, such as the felling of danger trees, would be conducted outside the marbled murrelet daily peak activity periods at dawn and dusk to further reduce the potential for disturbance. Comparable restrictions on public recreation access would be impractical, however, because the marbled murrelet nesting season coincides with most of the summer recreation season.
The Marbled Murrelet Habitat Protection Plan (MMHPP) should also place a greater emphasis on minimizing impacts from predation such as nest predation by corvids. An increase in human use via recreational activities (i.e., trails) and routine maintenance, as well as a patchwork habitat due to habitat enhancement or maintenance will likely cause an increase in corvid species. Furthermore, the MMHPP should include limitations on the amount of alteration conducted as a result of enhancement/restoration activities within suitable or occupied marbled murrelet habitat to ensure	The MMHPP requires the placement of wildlife-resistant refuse containers at trailheads and picnic areas to minimize the attraction of ravens, crows and jays (potential corvid predators of marbled murrelets). The MMHPP also prohibits all wildlife habitat enhancement and restoration activities, including gap creation and snag creation, within occupied marbled murrelet habitat and suitable habitat that has not been surveyed for marbled murrelets. On the remaining Project lands, the Jackson

STAKEHOLDER COMMENT	DISTRICT RESPONSE
that habitat is not rendered unsuitable.	Project Terrestrial Resource Management Plan (TRMP) prohibits even-aged timber harvesting, and the associated potential for habitat fragmentation, except in site-specific locations where WDFW and USFWS determine it is needed for habitat enhancement. It is anticipated these measures will minimize the fragmentation and degradation of suitable and occupied marbled murrelet habitat, and the attraction of corvids.
Within the *New Recreation Trails and Associated Facilities* section, the first bullet should be clarified. It is unclear whether trails and associated facilities will be constructed within marbled murrelet habitat. The Tulalip Tribes strongly recommend that trails and associated facilities avoid occupied or suitable habitat, and recommend a larger buffer than 100 feet. In addition, the Tribes recommend changing the language in the second bullet: "permission is granted to remove suitable nesting trees if a slope is unstable or considered unsafe". We recommend that the same process of review utilized for Roadside Danger Trees be employed for removal of trees associated with trails and other facilities.	A small portion of the proposed Culmback Dam Trail would run through occupied marbled murrelet habitat, but construction and use of the trail would be expected to have negligible impacts on nesting marbled murrelets. The felling of potential nest trees and adjacent cover trees would be kept to a minimum, and all felling and construction activity would occur outside the marbled murrelet nesting season. Human activity on the trail is expected to be light, and human use of hiking trails is not considered to be particularly harmful to marbled murrelets.
While most data in Washington suggests that marbled murrelet fledging activities would have occurred prior to August 31, more conservative dates limiting activities between April 1 and September 15 will further minimize disturbance to fledglings.	As noted in the comment, most data for Washington suggest marbled murrelet fledging is completed by August 31. This is reflected in Washington Forest Practices Rules, which define the marbled murrelet critical nesting season as April 1 through August 31. Restrictions on Project-related activities in occupied habitat after August 31 would be overly conservative, particularly given the limited nature of the activities (felling of roadside danger trees and recreational trail construction). With a few exceptions, these activities would not involve the felling or modification of nest trees, potential nest trees or trees providing cover to nest trees, so they would have relatively little potential to impact nesting marbled murrelets at any time during the nesting season. Prohibiting them from occurring through September 15 would leave the District with little time to complete them before winter snow accumulations make doing so impossible.

STAKEHOLDER COMMENT	DISTRICT RESPONSE
The Tulalip Tribes understands that the District will consider all unsurveyed habitat as occupied; however, we recommend that surveys be conducted more frequently than every ten years to ensure that the most appropriate marbled murrelet management decisions will be employed for the purposes of the project.	Surveys are proposed at 10-year intervals to account for new suitable marbled murrelet habitat that grows during the term of the license. Occupied habitat will not be resurveyed; it will be considered occupied for the term of the license and protected accordingly. Given the slow rate at which new marbled murrelet habitat develops, and the all-inclusive approach the District takes to identifying suitable habitat, it is believed that a 10-year interval is frequent enough to identify and protect all occupied habitat on Project lands. When evaluating habitat for marbled murrelet surveys, the District intentionally applies a broad definition of suitability to include all areas that could develop potential nest structures in the near future. The majority of the lands that are not currently considered occupied are young second-growth forest that will not develop potential marbled murrelet nest structures for several decades. It is therefore highly unlikely that any of the unsurveyed forest will become suitable marbled murrelet habitat between survey years.

APPENDIX B

STAKEHOLDER MEETING SUMMARIES

Jackson Project Relicensing
Terrestrial Resources Group

Monday, September 8, 2008

Meeting Summary

Start Time: 9:05 a.m.	**End Time:** 12:10 p.m.
Subject: Terrestrial Resource Group Meeting Summary	

Attendees:

- American Whitewater – Tom O'Keefe
- Biota Pacific – Marty Vaughn
- City of Everett – Julie Sklare
- District – Karen Bedrossian, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler
- FERC – David Turner (via conference phone)
- Meridian Environmental Inc – Pam Klatt
- North Cascades Conservation Council et al. – Rick McGuire
- Smayda Environmental Associates, Inc.– Kathy Smayda
- US Forest Service – Don Gay, Ann Risvold
- WA Dept of Fish and Wildlife – Rich Johnson

DISCUSSION ITEMS

Introductions

The group introduced themselves and their organizations.

Study Results Presentation

Karen, Kathy and Marty presented study results information contained in the attached slides.

Special Status Plant Survey discussion included the following:
Four lichens considered rare by the US Forest Service were located during the survey. Three of the species were in locations on non-NFS lands that are not impacted by the project. The fourth species was found on both NFS and private lands and is fairly common in the Project vicinity, despite its rare status. No special management methods were recommended by the FS for this species.

Noxious Weed Survey discussion included the following:
Blackberry is considered an invasive species, but it is not included on Snohomish County's noxious weed list. It is very common throughout the county. The District has a District-wide Vegetation Management Plan that covers general weed management for all District properties, including Jackson.

Wetland Survey discussion included the following:
Rich noted that the wetland rating system is misleading to persons unfamiliar with it. The rating system can somewhat counter-intuitively assign high scores to wetlands in the poor condition The pristine wetlands in the project area ended up with low ratings because of their limited opportunities for improving water quality and reducing flooding and erosion. Karen noted that reading the descriptions of the wetlands provides a better understanding of the quality of the wetland rather than reviewing the rating alone, that the system provided a standardized method of describing the wetlands, that the habitat scores and descriptions are useful, and that this system is the accepted method at both the state and county level. She and Bernice Tannenbaum discussed this issue with the author of the rating system while taking his wetlands rating class. (Note: this issue is addressed on the first page of the Western Washington Wetland Rating System ([Ecology Publication # 04-06-025.]).

- **Action:** Karen – per Rich's request, provide a cross reference for SP10 Amphibian wetland numbers with those from the SP9 Wetland Survey, since the two studies numbered the wetlands differently.

- **Action:** Dawn – resend link to SP9 and SP10 draft report appendices on web site.

Amphibian Survey discussion included the following:
Slide 21 should state that three (not four) state monitor species are potentially present. A fourth species, Oregon spotted frog, is listed as State Endangered, but its presence in the area is very unlikely.

Bull frogs (an invasive species) were found at Lost Lake, Chaplain Marsh and off-channel habitats along the lower Sultan River. While they are common in lowlands throughout western Washington, they were not found in the upper Sultan Basin.

Rich noted that there may be opportunities for management in the fluctuation zone and river channel to provide better habitat for amphibians; management activities could include timing and amount of flows/drawdown. Although, he is not necessarily saying the District should do so based on other resource needs/benefits. Karen noted that in the report conclusion it states that increase in flows on the river could have a negative impact on amphibians, and that existing conditions at the reservoir indicate that the amphibians are using areas outside the drawdown, so impacts from stranding are minimal.

Marbled Murrelet Survey discussion included the following:
The District has been operating as if the Culmback Dam West and East are occupied habitat since presence was first detected in the 1990s. Rich expressed gratitude that the District was treating the extent of occupancy as the entire survey area, as per PSG protocols.

Spotted Owl Survey discussion included the following:
The definition used during the study for suitable habitat is pretty broad since spotted owls have been found in non-typical or marginal habitat. Incidental potential sightings of spotted owls were treated as a possible sighting during the study and additional stations were added in those areas.

Karen noted that "owl detection" on the maps does not refer to spotted owls but to other species.

Marty discussed the latest research on the interaction of spotted and barred owls. They are competitors for the same habitat/food sources; this competition displaces the spotted owl. There is also some evidence of predation; however, the two species are not natural predators. There is some potential for spotted owl habitat improvement over the long term in the region, particularly on public lands, but the prospects for recovery of the species are still not good because of the presence of the barred owl.

Proposed Protection, Mitigation and Enhancement (PM&E) Measures Presentation

Karen, Kathy and Marty presented proposed PM&E information contained in the attached slides.

Noxious Weed Management Plan discussion included the following:
The District proposes a plan for the management of the 7 noxious weed species for which control must be provided under State and County regulations. The plan calls for an annual report and meeting, and review for additions/deletions from the County's list. The State gives authority for noxious weed control to the County governments.

During the discussion several stakeholders questioned why all noxious weeds would not be managed under the proposed plan. Karen stated that the plan will focus on the noxious weeds that are required to be controlled by state and county regulation. The survey included other noxious weeds and invasive species not listed as noxious weeds. The weed management plan will include general measures to prevent the introduction and spread of weeds, which will be effective both on the target weed species and other invasive species. The plan will bring prevention and management into the planning stages of ground-disturbing activities. Marty noted that the number of weeds for management is a concern due to the cost; managing for all invasive species, including those that have become widespread like blackberry and reed canarygrass, could be cost prohibitive.

The FS noted that they have concerns about the potential spread of weed species onto NFS lands, including several species not included in the draft weed management plan. They indicated that they recognize the difficulty of managing for species that are very common and widespread, such as blackberry and reed canarygrass, but would like to have other, less widespread species considered for addition to the plan. Ann Risvold indicated she will provide a list of FS weed species of concern to Karen.

Ann asked if the District uses herbicides. Karen responded that herbicides are not allowed in the watersheds due to water quality concerns as the water is for municipal drinking water supply. The two areas where knotweed is located are outside the watersheds and herbicides have been used, in combination with cutting, to treat those locations.

David noted that there are two options for the plan: 1) have a separate weed management plan or 2) incorporate the plan into the Terrestrial Resource Management Plan.

- **Action: Ann** – forward list of USFS weeds of concern to Karen.

- **Action**: Kathy – finalize draft Noxious Weed Plan for stakeholder review ASAP so it can be included in the PLP.

Marbled Murrelet Protection Plan discussion included the following:
The District proposes a plan for the protection of marbled murrelet habitat as it relates to road maintenance. Additional activities to be included in the plan are snag management and trails development; Marty will update accordingly for stakeholder review and comment. The District currently ensures protection of marbled murrelet habitat through the Washington Forest Practices Rules. Marty explained the implications of continuing to work through the Forest Practices Rules versus a PME with an incidental take statement for murrelets. A PME and incidental take statement are recommended because they would consolidate and clarify all murrelet habitat protection for District activities (including recreation trail development), and give the District more operational flexibility than the Forest Practices Rules.

A danger tree is one that is defined as having the potential to fall over a road or other facility where it could cause damage, restrict access or cause bodily harm.

Terrestrial Resources Management Plan discussion included the following:
The District is proposing a TRMP to cover the lands the District owns, including 1,745 additional acres around Spada Lake not covered in the original HEP analysis and 139 acres near Williamson Creek not currently in the WHMP or original HEP analysis. The City's lands on the Lake Chaplain Tract, which are used primarily for filtration plant/water supply purposes, as well as timber management, would not be in the TRMP, but would be managed under the current WHMP as an off-license agreement through which the District would maintain oversight of wildlife management activities. The City of Everett will no longer be a co-licensee for the project, and the preference is to continue managing the tract according to the WHMP, but under a separate, off-license agreement. Karen noted that the City of Everett had a timber management plan for the land prior to the preparation of the WHMP and proposed to include the Chaplain Tract in the WHMP as a means to provide more mitigation, while still harvesting timber. By implementing the harvesting plan in the WHMP rather than implementing the existing more aggressive timber management plan for the tract, wildlife habitat was improved. The value to the WHMP was measured by the HEP analysis as the difference between the two plans. The intention of including the lands in the WHMP was not to optimize the wildlife values, but to improve them over the original timber harvesting plan.

Rick expressed concern that there are differing beliefs on the management goals for these lands, the WHMP was outdated when it was written, more lands should be acquired, and the WHMP should be totally re-evaluated. He and Rich both suggested the WHMP places too much emphasis on management for deer. Rich expressed that he had very little disagreement with our current management but that he would like to see a change in management to less even-age stand management and focus on SP6 changes. Karen understands that there are differing philosophies on the management goals; however, the District is managing according to the goals established by the stakeholders under the WHMP's development and the objectives established by the State's current management plan, which includes managing habitat for deer. The WHMP emphasizes habitat for old-growth wildlife species because this was clearly a priority when it was written in the late 1980's, but it also includes management for deer because "in-kind" habitat mitigation was requested by the wildlife agencies as well. Don Gay, USFS asked if WDFW had had a recent change in policy to de-emphasize management for deer. Karen noted that a detailed response to NCCC comments was provided in the ICP response filed with FERC and that FERC made a determination on requests for modifications to study plans.

Rich expressed concern about not having regulatory authority over the Lake Chaplain lands if they are not in the project boundary. Enforcement efforts would be the obligation of the State rather than FERC. He did support the efforts currently underway at the Spada Lake Tract to promote late successional habitat. The District stated that the side agreement could include some oversight provisions, and that the side agreement warrants further discussion.

David Turner stated that the licensee needs to demonstrate to FERC that the Lake Chaplain lands are no longer needed within the project boundary for their original purpose (wildlife mitigation) or for any new purpose, such as recreation.

Tom asked if any lands would be added to the TRMP to replace the Lake Chaplain tract. Karen explained how the 1,745 acres at Spada Lake were added after the HEP analysis was conducted and 139 acres at Williamson Creek would be added, and how the total mitigation value and acreage would be more than adequate under the current FERC view of continuing project impacts.

- **Action: Rich** – identify specific habitat enhancement activities in SP6 that WDFW (including game management) would like to see occur on the mitigation lands so the District can begin analysis cost/benefit for the license application.

- **Action: Jeff** – develop bullet points or whitepaper on TRMP as it relates to an off license agreement relating to Lake Chaplain so Rich has something to give to his AG's Office for their review and approval of direction and for review by the TRG.

- **Action**: **Dawn** – route ICP response and FERC's study plan determination to TRG.

Next Steps for Process

The District will consider and update the PM&E documents based on comments received today at the meeting; the updated PM&Es will be routed via email for TRG review and comment next week. The TRG will have a 2-week comment period. The District seeks TRG input so what is proposed in the Preliminary Licensing Proposal (PLP) is close to/if not the final. In order for input into the PLP, Karen needs to have a "final" proposal ready for analysis by November 1.

Members can contact Karen via email and phone to discuss the proposals. A meeting will be scheduled for October 1, 9:00-11:00 to continue discussion of PM&E issues that do not get resolved between this and the next meeting.

- **Action: Marty** – forward the updated Marbled Murrelet PME to Don Gay for review.

END MEETING

Jackson Project Relicensing
Terrestrial Resources Group

Monday, February 23, 2009

Meeting Summary

Start Time: 2:05 p.m.	**End Time:** 3:40 p.m.
Subject: Terrestrial Resource Group Meeting Summary	

Attendees:

- Biota Pacific – Marty Vaughn
- City of Everett (City) – Julie Sklare
- District – Karen Bedrossian, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler, Matt Love (outside counsel at VanNessFeldman)
- Snohomish County (SnoCo) – Carly Summers (via phone)
- Tulalip Tribes (Tribes) – Reid Allison
- US Forest Service (USFS) – Kristen Bonanno (via phone)
- WA Dept of Fish and Wildlife (WDFW) – Rich Johnson

DISCUSSION ITEMS

Introductions

The group introduced themselves and their organizations.

Status of Relicensing; Settlement Process and Protocols

The entire Terrestrial Resources Group (TRG) was invited to this meeting. Since the attendees were familiar with the status of relicensing and the settlement process, these topics were not heavily discussed. The Confidentiality Agreement and Ground Rules are ready for signature by the agencies with an expectation of a required sign-off by each party by the March 11 Aquatic Resources Settlement Group meeting.

Review of PM&Es in PLP

Karen reviewed the PM&Es and Management Plans (in PLP Appendices) for terrestrial resources including the 1) TRMP, 2) Noxious Weed Plan, and 3) Marbled Murrelet Habitat Protection Plan.

TRMP – see handout

- Williamson Creek – additional acres (not in current WHMP) contain second-growth and wetland and are contiguous with Williamson Creek. Rich stated that WDFW prefers active management to accelerate habitat growth/diversity to allow for a variety of species.
- Lost Lake – no commercial harvest has been done there by the District but it is economically feasible to do so.

Noxious Weed Plan – no comments

Marbled Murrelet Habitat Protection Plan – received comments from Don Gay (USFS) which were incorporated into the version filed in the PLP. Tim Romanski provided comments to Karen on PLP version stating that USFWS is not likely to allow "take" for marbled murrelets. Access trail in upper river gorge area in marbled murrelet habitat could pose a problem. Karen will further discuss with Tim.

Issues

WDFW would like to see in TRMP:

- bigger gaps (1/4 acre), not necessarily more gaps, to provide a variety of habitat and not monocultural habitat
- Snag creation in mature growth areas, including larger diameter snags but in balance with the needs of marbled murrelets
- Fewer roads the better - better for wildlife
- Annual review good, but due to staffing concerns not sure if they will actively participate. 10 years for plan review too long to be proactive. 3-5 years may be better for plan review.
- Flexibility in the plan. Provide management concepts but not as detailed prescriptions as in current WHMP.

Karen and Biota are currently working on a draft TRMP. The District will provide a copy of the working draft to Rich and Mark Hunter by 16 March to be reviewed/commented on before Rich's one-month vacation that begins on 25 March. The TRG review of the TRMP will occur following that review.

WDFW expressed a desire to ensure that the general public continues to have the ability to access Project lands during state-approved hunting seasons. The Tribe expressed a similar interest for their members; no other terrestrial resource issues were identified. WDFW also mentioned concern that the Lake Chaplain Tract is managed for deer; however, the public is not allowed in the area for hunting.

Lake Chaplain Tract (LCT)

The City would like to have a meeting with WDFW and the City forester to discuss the management of the LCT. Rich said that he is interested in the meeting and site visit in March up to the 20th.

A list of issues Rich noted for the LCT were:

- Current clear cuts – he believes there is a short term gain but it is lost within 15 years when it doesn't provide browse any more and stays unproductive until the next cut.
- Minimize the use of clear cuts in favor of thinning
- Minimize size of clear cuts
- Lengthen seral stage (increase length of rotation)
- Minimize number of roads
- Develop corridors between the different habitat types
- Land not open to public should be managed for old growth

Rich would prefer management that targets critters losing habitat rather than target for deer. Karen pointed out that the WHMP was designed specifically to avoid and reduce the unproductive stages of clear cuts and that the overall wildlife habitat management program for Jackson Project will provide well over 100% of mitigation for late seral species. Rich would like for the District and City to look at the overall landscape. Karen said that mitigation was designed to make up for losses resulting from the Project (project nexus).

LCT management plan would be an off-license agreement signed by the District, City of Everett, WDFW and possibly the Tribes. USFS and Snohomish County indicated they were unlikely to be a signing party but would like to see drafts of the TRMP and LCT management plan.

Assignments:

Karen, Rich and Julie will set up a meeting for Rich and anyone else he wants to attend from WDFW to talk to the City forester in March.

Karen will send Rich and Mark Hunter a working draft version of the TRMP by 16 March so that Rich can review it prior to being gone during the month of April when the other stakeholders will be reviewing the draft plan.

Dawn will provide Karen with Justin Casing and Carly Summers' email addresses and will send terrestrial related emails to both Justin and Carly as requested by Carly.

END MEETING

Appendix H

RecreationResource Management Plan

Recreation Resource Management Plan

Henry M. Jackson Hydroelectric Project
FERC No. P-2157

Public Utility District No. 1
of Snohomish County

May 2009

Table of Contents

List of Acronyms

City	City of Everett
District	Public Utility District No. 1 of Snohomish County
DNR	Washington State Department of Natural Resources
DOH	Washington State Department of Health
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FPS	Forest Practice Standards
HPMP	Historic Properties Management Plan
I&E	Interpretation and Education
NPS	National Park Service
NRCA	Natural Resources Conservation Area
O&M	Operation and Maintenance
ORV	Off-Road Vehicle
PM&E	Protection, mitigation and enhancement measure
RCO	Recreation and Conservation Office
RCW	Revised Code of Washington
RM	River Mile
RNA	Recreation Needs Analysis
RRG	Recreation Resources Group
RRMP	Recreation Resource Management Plan
TRMP	Terrestrial Resources Management Plan
USFS	U.S. Forest Service
WDFW	Washington State Department of Fish and Wildlife

Recreation Site Name Cross-Reference

Recreation Site Name under RRMP	**Recreation Site Name under 1991 Recreation Plan**	**Site Number under 1991 Recreation Plan**
Olney Pass	Olney Pass	1
South Fork	South Fork	2
South Shore	South Shore	3
Nighthawk	Nighthawk	4
Bear Creek	Bear Creek	5
Not proposed as a site under RRMP	Culmback Dam[1]	6
Not proposed as a "site" under RRMP – area for directional signage	Pilchuck Entry	7
North Shore	North Shore	8
New Recreation Site (unnamed to-date)	*not applicable*	*not applicable*

[1] Per FERC Order dated June 28, 2006, Culmback Dam Recreation Site (No. 6) was removed from the Recreation Plan.

1.0 INTRODUCTION

1.1 Background

The Public Utility District No. 1 of Snohomish County (District) will be the sole licensee for the Henry M. Jackson Hydroelectric Project (Project) under a new license term. The Project is located on the Sultan River in Snohomish County, Washington, near the city of Sultan. The 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. In 1984, the hydroelectric project was constructed. The Project includes a 262-foot high rock-fill dam (Culmback Dam); a 1,870-acre reservoir (Spada Lake or Spada Reservoir) operated for City of Everett's water supply, fisheries habitat enhancement, hydroelectric power, and incidental flood control; a Powerhouse and various other facilities; wildlife mitigation lands; and several developed and undeveloped recreation and river access sites. The original interim recreation plan was approved by the Federal Energy Regulatory Commission (FERC) in 1987; a revised recreation plan was approved in 1994 and amended in 2006 by FERC.

During the relicensing process, the District developed this Recreation Resource Management Plan (RRMP) based on results of the Recreation Needs Analysis (EDAW 2008), subsequent development of protection, mitigation, and enhancement (PM&E) measures, and in consultation with Project stakeholders and the Recreation Resource Group (RRG). The RRMP was prepared in consultation with the City of Everett, Washington (City); U.S. Forest Service (USFS), State of Washington Departments of Health (DOH), Natural Resources (DNR), Fish and Wildlife (WFDW); Recreation Conservation Office (RCO); National Park Service (NPS); and non-governmental organizations, among others. Comments received from the consulted parties are included in Appendix 1.

1.2 Purpose and Organization

This RRMP for the Project is submitted to the FERC to assist in their assessment of the District's proposed recreation resources PM&Es and to fulfill the future requirement to have and implement a recreation resources management plan to consistently implement recreation related PM&Es over the term of the new license. The Plan provides a description of each developed recreation site, including the types of amenities provided at each site, proposed recreational development, and conceptual drawings that show the location of each existing and proposed developed site. The RRMP also includes a description of public access to the Sultan River.

The RRMP details recreation-related PM&E measures and guides recreation management in the Project area through the term of the new FERC license. The RRMP organizes PM&E measures into four programs: (1) Recreation Sites and Use Areas Program, (2) Operations and Maintenance Program, (3) Recreation Monitoring and Reporting Program, and (4) Interpretation and Education Program. Each of these programs and their associated PM&E measures are detailed below. In addition to these proposed programs, the RRMP supports the City's water quality protection measures (e.g., no overnight use,

non-contact reservoir-based activities only, no combustion engines, etc.) and the District's and surrounding landowners' protection of the natural resources (e.g. minimizing litter and vandalism, maintaining natural setting and native plant vegetation, etc.).

The District developed these RRMP programs in consultation with the Recreation Resource Group (RRG) and believes that they meet the needs of the recreation community in balance with other resource and landowner objectives.

1.3 Issues and Circumstances

The RRMP was developed based on several factors driving the direction of recreation in the Sultan Basin:

- results of the Recreation Needs Analysis (RNA). Among other things, the RNA identified a need for additional trails, and determined that capacity at existing recreation sites would not be exceeded through the term of the new license, (EDAW 2008);
- consultation efforts with the RRG. This group identified, among other things, a need for additional trails in the Project area;
- costly requirements to upgrade roads to Forest Practice Standards (FPS) by 2015 (David Evans 2008). Multiple culverts would need to be upgraded in size to meet the FPS for a road system, if not abandoned and/or converted to trails;
- lands adjacent to District ownership at Spada Lake are in the DNR's Morning Star Natural Resources Conservation Area (over 26,000 acres). These lands surround to the north, east and south and are managed for habitat protection, to provide opportunities for environmental education, and to allow low impact public use.
- other existing recreational opportunities in the Project area;
- protection of water quality of Spada Lake Reservoir as it provides storage of approximately 80% of the drinking water for Snohomish County; and
- protection of natural resources in this remote area. District-owned lands are managed for wildlife habitat and other terrestrial resources under plans associated with the Project license. Many of the recreation sites lie in close proximity to the Morning Star Natural Resources Conservation Area, old-growth forests, and occupied or suitable habitat for the Endangered Species Act (ESA)-listed marbled murrelet.

2.0 ROLES, PLANNING and COORDINATION

2.1 Roles and Responsibilities

The District has the responsibility to implement the RRMP as required by a new license issued by FERC and accepted by the District. The District will be responsible for:

- providing the funding to carry out the capital improvements and annual maintenance as described herein;
- coordinating with surrounding landowners regarding land management in or near the Project boundary that may affect or be affected by the recreational opportunities provided;
- consulting with appropriate agencies, tribes and FERC as needed;
- monitoring recreational use, resource impacts, vandalism; and
- reporting to FERC per Form 80 requirements.

2.2 Resource Integration and Coordination

Due to the natural setting of the Project recreation facilities and access sites, other resources affect recreation resources and vice versa. The District will coordinate the actions of the RRMP with the actions of the various Project resource management plans including the Noxious Weed Management Plan, Marbled Murrelet Habitat Protection Plan, Terrestrial Resources Management Plan, and Historic Properties Management Plan. Resource specialists will be consulted prior to new construction, enhancements and/or major repairs to recreation facilities. Operational staff will be trained on the unique requirements of the RRMP.

The District is cognizant of the surrounding agency and landowner resource management objectives. Current landownership in the Sultan Basin is identified in Figure 1. District staff will coordinate with surrounding resource management agencies and landowners on a periodic basis to discuss upcoming implementation of recreation actions and other relevant issues.

2.3 Supporting Documents

The RRMP and its associated PM&E measures do not include proposed recreation flow and other enhancement measures for whitewater boaters, which will be described in a separate document. Additionally, the District proposes several “off-license” agreements and measures that while related to recreation in the Project area, are considered “multi-purpose” serving purposes beyond the Project. These off-license agreements and measures will be documented independently and are not for inclusion in the RRMP or new license.

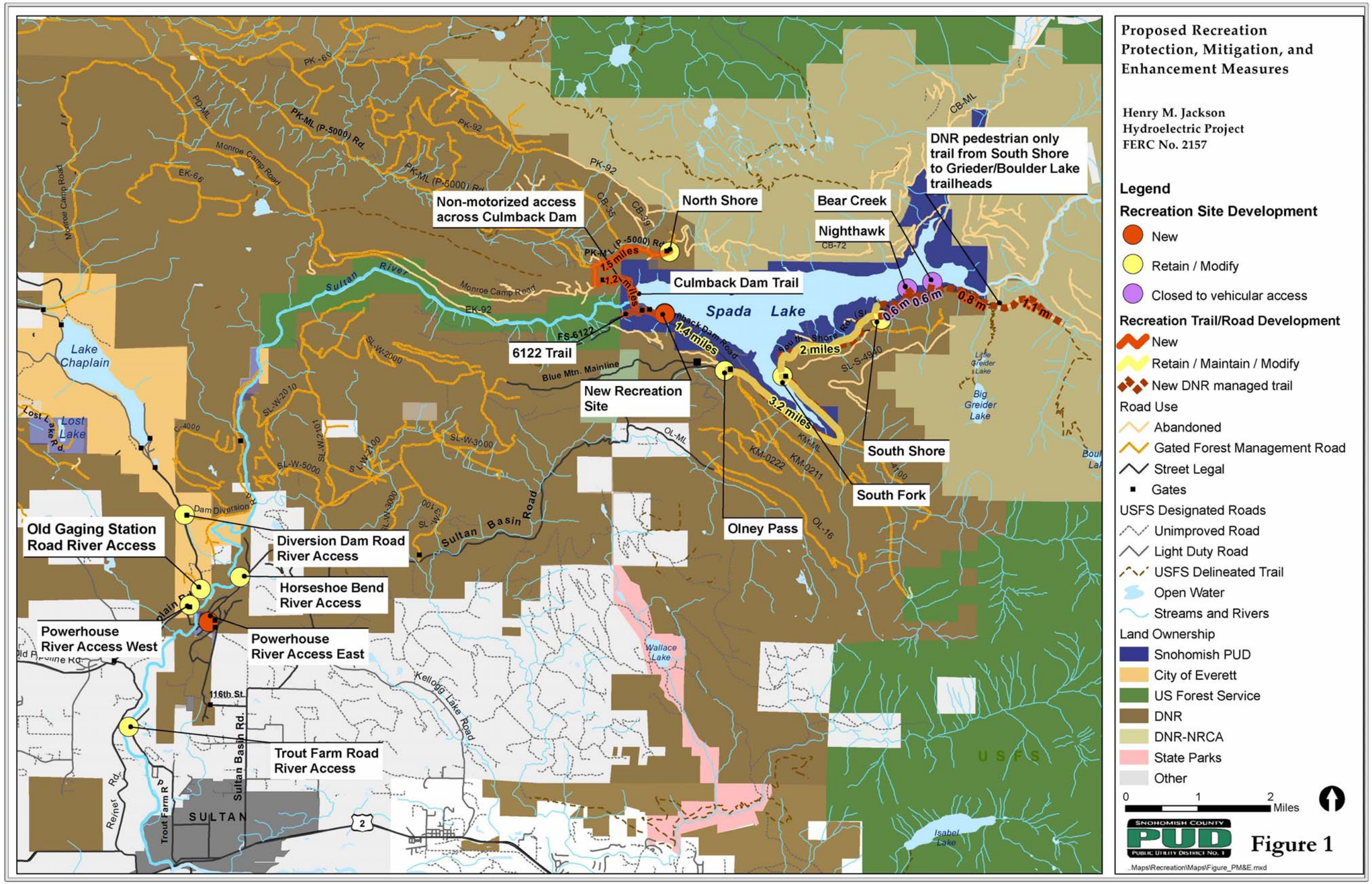

Non-motorized access across Culmback Dam
North Shore
Bear Creek
DNR pedestrian only trail from South Shore to Grieder/Boulder Lake trailheads
Nighthawk
Culmback Dam Trail
1.5 miles
1.2 miles
1.4 miles
2 miles
3.2 miles
0.6 m
0.6 m
0.8 m
1.1 m
6122 Trail
New Recreation Site
South Shore
South Fork
Olney Pass
Old Gaging Station Road River Access
Diversion Dam Road River Access
Horseshoe Bend River Access
Powerhouse River Access West
Powerhouse River Access East
Trout Farm Road River Access
Spada Lake
Sultan River
Lake Chaplain
Lost Lake
Wallace Lake
Little Greider Lake
Big Greider Lake
Isabel Lake
SULTAN
USFS
Monroe Camp Road
Sultan Basin Road
Kelloggs Lake Road
116th St.
Trout Farm Rd.
Reiner Rd.
Dam Diversion Rd.
Blue Mtn. Mainline
Proposed Recreation Protection, Mitigation, and Enhancement Measures
Henry M. Jackson Hydroelectric Project FERC No. 2157
Legend
Recreation Site Development
New
Retain / Modify
Closed to vehicular access
Recreation Trail/Road Development
New
Retain / Maintain / Modify
New DNR managed trail
Road Use
Abandoned
Gated Forest Management Road
Street Legal
Gates
USFS Designated Roads
Unimproved Road
Light Duty Road
USFS Delineated Trail
Open Water
Streams and Rivers
Land Ownership
Snohomish PUD
City of Everett
US Forest Service
DNR
DNR-NRCA
State Parks
Other
0 1 2 Miles
SNOHOMISH COUNTY PUD PUBLIC UTILITY DISTRICT NO. 1
..Maps\Recreation\Maps\Figure_PM&E.mxd

Figure 1

3.0 RECREATION SITES and USE AREAS PROGRAM

This section presents a brief overview of existing (as of 2009) and proposed Project-related recreation development and use areas. The intent is to describe the baseline recreation conditions and identify planned enhancements during the new license term. Conceptual site plans for existing and planned Project-related developed recreation sites are provided in Appendix 2.

The District owns approximately 4,500 acres of land adjacent to and including Spada Lake, Project facilities and Lost Lake. These lands are open to the public with the exception of Project operation facilities. These lands are managed to protect water quality, provide wildlife habitat and for public use.

The District provides several developed recreation sites (Olney Pass; South Fork; South Shore; Nighthawk; Bear Creek; and North Shore) and one site with directional signage only (Pilchuck Entry) adjacent to Spada Lake; and one undeveloped, low-impact site at Lost Lake. All sites are for day use only. The sites vary in their amenities; including parking lots, scenic overlooks, boat launching areas, trails, picnic areas, trash containers and vault toilets. No drinking water is provided at any of the sites. Sites have been enhanced by plantings of native vegetation to provide a natural setting. Several of the sites contain interpretive signs. Public access is provided to the Sultan River at several locations; amenities at these sites vary and include scenic views, trails, trash containers and a boat launch. Each site is described in more detail in Section 3.3.

3.1 Use Regulations

Many of the authorized uses and restrictions emphasize and prioritize the protection of Spada Lake Reservoir water quality which supplies approximately 80 percent of the water supply to Snohomish County. The Washington State Department of Health also supports the protection of the source water quality in Spada Lake. Therefore, Spada Lake is a non-contact (no bodily contact activities such as swimming, wading) reservoir. Only non-motorized and non-combustion engine watercraft may be used on the reservoir. Recreation sites and river access sites are for day use only.

Additional authorized uses and restrictions are periodically updated by various sources. These sources include the District's Board of Commissioners through resolutions, the District General Manager through directives, the Snohomish County Board of Commissioners through county ordinances, and the Everett City Council through city ordinances. Use regulations that outline approved uses of Project lands are posted to the District's website, on Project signage, and by other means as discussed in section 6.

The District assumes no responsibility for injuries, theft or vandalism occurring to the public or their property while using Spada Lake or adjacent lands.

The District will advise the public of use regulations. Major incidents are reported to the Snohomish County Sheriff's Department by the District or the City's watershed

patrolmen. District employees do not have policing power. The City's watershed patrol has policing power in matters of water quality and public use regulations.

3.2 Public Access

Visitors using District lands surrounding Spada Lake are required to register at the Olney Pass Recreation Site. Roads leading to Spada Lake are available for public use year-round but may be closed by Snohomish County during periods of heavy snowfall or when other safety issues arise. The public is allowed access from dawn to dusk, to Project lands throughout the year, with the exception of lands around facilities as detailed in the use regulations. Designated recreation sites will be maintained by the District from about April 15 to October 31 to coincide with the fishing season. Olney Pass will be open and maintained year-round.

Certain activities such as hunting and fishing are seasonal per WDFW regulations.

The District will allow pedestrian and/or bicycle access across Culmback Dam and pedestrian access across the Powerhouse bridge year-round during daylight hours.

The District may temporarily close Culmback Dam or the Powerhouse bridge to public access based on the National Threat Advisory. Public access may also be restricted if other security, weather or operational concerns are identified. Public access to lands adjacent to Spada Lake, and to Spada Lake itself, may be restricted due to fire hazard, public health and safety concerns, poor weather/road conditions, maintenance and repair, and/or security risk.

There are gates at the entrance to the South Shore Road and the Culmback Dam Road that are left open except when operational, security or safety reasons warrant closure. These roads are frequently closed to vehicular traffic in the winter due to snow related safety conditions. Gates at the entrance to Spada Lake recreation sites will remain open and unlocked from approximately April 15 through October 31, except during public access closures of the area or if significant vandalism of the sites occurs. The gate just off Culmback Dam Road at the entrance to the 6122 Road (to be converted to a trail) will be locked year-round; gate keys will be provided to the USFS and DNR for administrative access and other parties (e.g. mineral claimants) as requested for legitimate access. The Lake Chaplain Road gate is open from 6:00 a.m. to 6:00 p.m. year-round; access is controlled by City personnel for protection of the Lake Chaplain watershed and City property. The 116th Street gate and Powerhouse bridge gate (pedestrian only) will be kept open year-round to provide greater access to the Sultan River at the Powerhouse. Vehicles may park outside the gate just above the Powerhouse and walk the short distance to the Powerhouse bridge. The Trout Farm Road River Access gate will be left open during the fishing season. If vandalism becomes a problem at any of the recreation sites or use areas, or safety or operational issues warrant, access may be restricted via locked gates. Anyone wishing to gain access to a locked gate can contact the District.

3.3 Recreation Sites and Enhancements

Recreation sites and opportunities can be divided into three categories: 1) those surrounding Spada Lake; 2) those along the Sultan River; and 3) at Lost Lake. Existing conditions and proposed enhancements are described below and depicted in Figure 1 and Appendix 2.

3.3.1 Spada Lake

Olney Pass Recreation Site

Vehicular access to the Olney Pass Recreation Site is via the Sultan Basin Road. Olney Pass is the first site encountered as visitors enter the basin from the south side of the Spada Lake Reservoir. Visitors could park at Olney Pass for an approximately 1.4-mile-long one-way hike or bike ride west to the New Recreation Site and could continue on to the North Shore Recreation Site. Another option would be to head east for an approximately 3.2 –mile-long one-way hike or bike ride to the South Fork Recreation Site and they could continue another 2.0 miles to the South Shore Recreation site. From the South Shore Recreation Site they could continue hiking east to additional District or DNR recreation sites. The District leases the Olney Pass Recreation Site lands from DNR and will continue to do so under the new license term provided that reasonable terms for access rights can be obtained.

Amenities:

- Registration station and signage
- parking spaces (6)
- vault toilets
- trash receptacles

Planned enhancements: The District will maintain Olney Pass Recreation Site as currently configured. Aging signage will be replaced and toilets will be upgraded for barrier-free access.

South Fork Recreation Site

Vehicular access to the South Fork site is via the South Shore Road; it is approximately 3.2 miles east from Olney Pass. Barrier-free facilities are available (parking, paths, picnic tables, and vault toilets).

Amenities:

- car-top boat launch
- parking spaces (over 20)
- internal access trail
- picnic areas
- vault toilets
- trash receptacles

Planned enhancements: The District will improve the existing boat ramp at the South Fork Recreation Site to accommodate trailered-boat launching and improved access to Spada Lake during the fishing season (typically mid-April through the end of October). Additional parking will be constructed to accommodate vehicles with boat trailers; the District may reduce parking for vehicles without trailers (currently under-utilized) to accommodate these new facilities.

South Shore Recreation Site

Vehicular access to the South Shore Recreation Site is via the South Shore Road; it is approximately 5.2 miles east of the Olney Pass Recreation Site. Barrier-free facilities are available (parking, paths, and vault toilets).

Amenities:

- gravel boat launch
- parking for boat/trailer combinations (6) and vehicles (over 20)
- vault toilets
- picnic areas
- trash receptacles

Planned enhancements: The District will maintain South Shore Recreation Site. Picnic tables will be added and aging signage will be replaced. The District will improve the boat ramp and parking to accommodate an increase of visitor use of this site.

Nighthawk Recreation Site

Access to the Nighthawk Recreation Site is via the South Shore Road; it is approximately 5.8 miles east of Olney Pass.

Amenities:

- internal access trail
- toilets
- trash receptacles
- picnic areas

Planned enhancements: Nighthawk Recreation Site access will be via pedestrian access per the DNR's road abandonment strategy along South Shore Road. The District will relocate and/or remove facilities away from the reservoir shoreline to reduce potential water quality impacts. In consultation with the City and other recreation agencies, the District will remove the lower vault toilets and may remove the upper vault toilets and replace them with another accepted form of sanitation facility. The concrete boat ramp will be removed. Fire pits, firewood shelters, and shelters over picnic tables will be removed to minimize the potential for forest fires and to maintain the site for day use only. Four to five picnic tables will remain at this site. The District will revegetate areas where facilities are removed.

Bear Creek Recreation Site

Access to the Bear Creek Recreation Site is via the South Shore Road; it is approximately 6.4 miles east of Olney Pass. The Bear Creek site offers two scenic overlooks.

Amenities:

- internal access trail
- trash receptacles
- picnic area
- toilets

Planned enhancements: Bear Creek Recreation Site access will be via pedestrian access per the DNR's road abandonment strategy along the South Shore Road. In consultation with the City and other recreation agencies, the District may remove the vault toilets and replace it with another accepted form of sanitation facility. Improvements at this site will be construction of new guardrails, adding picnic tables, benches and signage.

North Shore Recreation Site

Access to the North Shore Recreation Site is available via hiking and/or bicycle along the Pilchuck Mainline (to the west). Non-motorized access across Culmback Dam will allow access from the south. The District leases this recreation site's lands from DNR and will continue to do so under the new license term provided that reasonable terms for access rights can be obtained. The site offers two scenic overlooks.

Amenities:

- internal access trail
- picnic areas
- vault toilets
- trash receptacles

Planned enhancements: The District will maintain North Shore Recreation Site as currently configured and replace aging signage and railing.

Pilchuck Entry

Access to the North Shore Recreation Site passes by the Pilchuck Entry. The Pilchuck Entry site provides no amenities and only contains directional signage. This area will be a part of the Identification & Enhancement program for providing directional signage rather than be considered a recreation site under this RRMP.

Planned enhancements: Replace aging signage.

Culmback Dam Access Enhancement

The District will reopen Culmback Dam to pedestrian/bicycle access during daylight hours for access to the north side of Spada Lake. The District may temporarily close the Culmback Dam road to non-motorized public access based on the status and level of the

National Threat Advisory. Public access may also be restricted if other security, operational or weather related concerns are identified.

New Recreation Site Development

The District will develop a new recreation site along Culmback Dam Road near the intersection with the 6122 Road. This new recreation site will provide parking (approximately 6 parking spaces), picnic tables (approximately 2 to 4), and a trailhead for non-motorized access to the North Shore Recreation Site and the new Culmback Dam Trail. Additional overflow parking will be available just east of the site. The new recreation site and the Culmback Dam area will provide a location for shuttle use (e.g., boater drop-off, turn around, etc.) and interpretive signs. The heated toilets near this Site at Culmback Dam will be upgraded for barrier-free access.

6122 Road Conversion to Trail

The District will formally abandon the portion of the 6122 Road that is located on District land (approximately 0.5 miles) and will convert it to a trail for hiking and access to National Forest System land. This trail will accommodate off-road vehicle (ORV) use for non-Project miners and administration/maintenance.

Culmback Dam Trail Development

The District will provide and maintain pedestrian-only access trail to the Sultan River from Culmback Dam along the alignment of the auxiliary release line or another location on District property near the dam; the District will install and maintain hand railing and enhanced footing on this trail. The trail will be accessible during daylight hours and will be sited to minimize natural resource impacts. The new trail will provide access for whitewater boaters and operational staff to the upper Sultan River.

3.3.2 Lost Lake

Access to Lost Lake is via hiking only. This area is primarily a wildlife management area and managed under the District's Terrestrial Resource Management Plan.
The Lost Lake area contains sensitive habitat; therefore, this is a low-impact only recreation use area. Fishing is allowed at the platform or from carry-in inflatable boats.

Amenities:

- floating fishing platform

Planned Enhancements: The District will maintain this low-impact recreation use area in its current configuration.

3.3.3 Sultan River

Trout Farm Road River Access Site

This site is located off the Trout Farm Road, north of the city of Sultan, on the east side of the Sultan River (river left) at RM 2.5. This site is the furthest downstream Project-provided river access site.

Amenities:

- parking area
- boat launch
- picnic area
- trash receptacle

Planned enhancements: The District will enhance this lower river access site by better defining the parking area and expanding parking for trailered-boat parking, removing boulders that inhibit boat launching, reconfiguring the driveway and boat launch entrance, installing wildlife plantings, conducting noxious weed management, and improved signage.

Powerhouse West River Access Area

This site is located on the Lake Chaplain pipeline right-of-way, on the west side of the Sultan River (river right) at RM 4.3. This area is accessed using the Lake Chaplain Road which is gated open from 6:00 a.m. to 6:00 p.m. year round. A parking area for approximately 20 vehicles is provided adjacent to the Lake Chaplain Road. The road/trail down to the river is gated and public access is hike-in only for approximately ½ mile.

Planned enhancements: The District will maintain access to this site in its current configuration.

Powerhouse East River Access Area

This site is located off 116th Street, on the east side of the Sultan River (river left) at RM 4.3. The road extends north of 116th Street and winds down to the Powerhouse and the Powerhouse bridge. The 116th Street gate is kept open to provide vehicular access to the Horseshoe Bend River Access Area and to this site. Vehicles may park outside the gate just above the Powerhouse and walk the short distance to the Powerhouse bridge.

Planned enhancement: The Powerhouse bridge gate will be modified to allow for pedestrian access to the river year-round. The 116th Street gate will continue to be kept open year-round unless operations or safety issues warrant closure.

Old Gaging Station Road River Access Area

This site is located at the Old Gaging Station Road on the west side of the Sultan River (river right) at RM 4.8. The road down to the river is gated and provides an approximately 1-mile hike to the river. This area is accessed using the Lake Chaplain Road which is gated open from 6:00 a.m. to 6:00 p.m. year round. Parking is provided at the Powerhouse West River Access Site (about 0.1 miles away) or along the Lake Chaplain Road.

Planned enhancements: The District will maintain access to this site in its current configuration.

Horseshoe Bend River Access Area

This site is located near the Horseshoe Bend Placer Claim on the east side of the Sultan River (river left) at RM 6.8 and accessed via the 116th Street. Parking is available along the pipeline right-of-way and a number of user defined trails can be used to access the river near the Horseshoe Bend. The 116th Street gate is kept open to provide vehicular access to this site.

Planned enhancements: The District will maintain access to this site in its current configuration and will continue to keep the 116th Street gate open year-round unless operations or safety issues warrant closure.

Diversion Dam River Access Area

This site is located on the west side of the Sultan River (river right) via the Lake Chaplain Road and Diversion Dam Road. Access in this area is between RM 6.5 through RM 9.7 (at the terminus of the Diversion Dam Road). Access at the Diversion Dam Road is hike-in only. Parking is available at the gate adjacent to the Lake Chaplain Road for approximately 10 vehicles. The Lake Chaplain Road is gated open from 6:00 a.m. to 6:00 p.m. year round.

Planned enhancements: The District will maintain access to this site in its current configuration.

4.0 OPERATIONS & MAINTENANCE PROGRAM

This program describes the District's Operation and Maintenance (O&M) responsibilities at Project recreation sites and use areas. The District will provide routine maintenance at its developed recreation sites at Spada Lake (Olney Pass, South Fork, South Shore, Nighthawk, Bear Creek, North Shore, and the proposed new recreation site; informal recreation area at Lost Lake; Trout Farm Road; and other defined river access sites.

4.1 Rounds

Rounds will be performed as needed (typically weekly) to inspect Project recreation sites; document maintenance needs; document evidence of vandalism, infractions of regulations, or natural resource damage; collect visitor registration cards; and remove garbage.

4.2 Signage

Vandalized signs will be repaired and/or replaced as needed. The District will evaluate signage effectiveness in conjunction with new interpretation and education (I&E) signage and kiosks.

4.3 Boat Launches

Boat launches will be kept free of debris. Maintenance which can be performed without closure of the boat launches will be performed as soon as practicable. Major maintenance will be performed prior to the opening of each recreation site each year to the extent possible. Boat launches may be blocked when recreation sites are closed to deter ORV use in the drawdown zone or other activities that could potentially affect water quality.

4.4 Trails

Trails will be routinely cleared of litter and fallen trees and maintained for proper drainage to reduce erosion problems. Maintenance which can be performed without closure of the trails will be performed as soon as practicable. Unsafe and fallen vegetation will be removed at the earliest available time each year. Trails within hazard areas will be closed to the public until they are repaired.

4.5 Recreation Site Entrance Roads

District -owned access roads at recreation sites will be maintained from about April 15 through October 31 each year. Access roads, ditches, and culverts will be kept free of debris. Maintenance which can be performed without closure of roads will be performed as soon as practicable. Major maintenance will be performed prior to the opening of each recreation site each year to the extent possible. However, shutdowns may occasionally occur during the recreation season for major maintenance or repairs as needed or for safety reasons.

4.6 Picnic Areas

Picnic areas will be kept free of debris. Tables and benches will be repaired as soon as practicable.

4.7 Parking Lots

Parking lots will be kept free of litter and fallen trees. Abandoned or disabled cars will be subject to towing. Maintenance which can be performed without closure of parking lots will be performed as soon as practicable. Major maintenance will be performed prior to the opening of each recreation site each year or during periods of low recreation use, to the extent possible.

4.8 Trash Receptacles

Trash receptacles will be bear-proof and emptied as needed. All recreation areas will be kept free of debris that could spill from the trash receptacles. Minor maintenance will be performed as time permits. Major maintenance will be performed prior to the opening of the recreation sites each year to the extent possible.

At recreation sites where no trash receptacles are provided, the District will encourage a pack-in/pack-out approach to keeping sites clean.

4.9 Toilets

Vault toilets or other sanitation facilities will be pumped or emptied as needed, but at least once per year. Supplies will be replenished and the toilets will be cleaned on a regular basis. Maintenance will be performed as soon as practicable. Major maintenance and a visual inspection of the vault liner will be performed prior to opening of the recreation sites each year.

During any planned high-use events (such as derbies, electric boat races), the District will supplement the existing facilities with additional portable toilets to accommodate the increase in visitors.

4.10 Vegetation

Unsafe and/or fallen vegetation at the recreation sites will be removed as soon as practicable. Vegetation in the landscaped areas at each recreation site will be maintained by the District's staff or its contractors. Damaged or dead vegetation in the landscaped areas will be replaced as soon as practicable. New landscape vegetation that is proposed will be coordinated for consistency with the Terrestrial Resource Management Plan. The Noxious Weed Plan will be implemented as needed.

4.11 Enforcement

The District will adequately advise the public of all use regulations and will provide enforcement. Major incidents will be reported to the Snohomish County Sheriff's Office by District staff or City Watershed Patrolmen. District employees do not have policing power. The City watershed patrol has policing power in matters of water quality and public use regulations.

The District currently has an agreement with the Snohomish County Sheriff's Office for patrol of the Jackson Project area and anticipates maintaining a similar agreement throughout the license term.

5.0 RECREATION MONITORING & REPORTING PROGRAM

This program describes how recreation use levels and potential impacts are monitored over the term of the new FERC license.

5.1 User Counts

Public use of the area will be documented by means of visitor registration, patrol reports and staff observations. Visitor registration data from the Olney Pass and Powerhouse West kiosks will be tallied on an annual basis; use levels along the Sultan River and Lost Lake will be periodically monitored to coincide with FERC Form 80 requirements. This information will be used in evaluation of existing use, sites, funding, budgeting estimates and projection of future needs.

5.2 Resource Impacts

The District will periodically monitor potential impacts from recreation use during its rounds described in section 4.1. Monitoring for potential recreation impacts will be focused primarily in dispersed/lightly developed areas, as they tend to be more susceptible to impacts, and may be coordinated with terrestrial and/or aquatic resource monitoring programs.

5.3 Reporting, Plan Review and Updates

The District will report recreation use levels on the FERC's Form 80 every six years and offer to hold a recreation group meeting to discuss use levels, resource impacts, demand, etc. If after two cycles (12 years) or more of collecting and analyzing FERC Form 80 data, significant changes to Project recreational use levels are identified, the RRMP may be modified to address future needs. The District, in consultation with appropriate agencies/tribes/stakeholders, will periodically review and revise elements of the RRMP, if needed. Significant change would include exceeding Project recreation facility capacity as defined by FERC Form 80 updates.

6.0 INTERPRETATION & EDUCATION PROGRAM (I&E)

This program describes potential signage and themes/topics that may be interpreted in the Project area during the new license term. Locations for I&E displays, kiosks, and/or signage are depicted in Appendix B.

6.1 Signage

Informational & Directional

Informational signage will be included at each of the developed recreation sites identifying the use regulations pertinent to that site, and identifying information in conformance with 18 CFR Part 8. A map of the Project's area may be provided at each of the recreation sites and trailheads around Spada Reservoir. Signage will be kept to a minimum to not disrupt the visual aesthetics of the area.

A visitor's bulletin board will be provided at Olney Pass. Recreation information will be posted on the board, and may include the following items: District regulation signs, map of Project recreation sites and nearby recreation destinations, Project brochure, site or road closure information, WDFW hunting and fishing regulations, and maintenance work currently being performed.

Directional signage will be included at the Pilchuck Entryway identifying a route to the North Shore Recreation Site and to the route across Culmback Dam.

Educational

Educational signage depicting the natural resources of the area and/or Project benefits will be provided at several recreation sites. Topics may include wildlife, wetlands, fish, hydroelectric power generation, drinking water supply, or other similar themes.

6.2 Kiosks

The District will maintain registration kiosks at Olney Pass and the Powerhouse West kiosk site. Kiosks will contain registration forms, recreation facility information, and use regulations.

6.3 Website

The District will maintain a website (or similar technology) that will identify the Project recreation sites, location, and open/closed status, among other informational items. The District will also post on the website the elevation of the reservoir pool level, river flow and rain gage data; along with information regarding whitewater boating opportunities.

6.4 Brochures

The District will periodically update educational brochures of the Project recreational sites and facilities and will provide these brochures to interested parties (Chamber of Commerce, businesses) as requested. Topics for educational brochures will be similar to those identified in section 6.1. Brochures will also be posted on the District's website.

7.0 IMPLEMENTATION SCHEDULE

From the issuance of the license by FERC, the District will:

- Update its website as stated in Section 6.3 within 1 year;
- Begin implementation of its I&E program within 2 years;
- Install new gate at Powerhouse bridge within 2 years;
- Install enhanced security measures at Culmback Dam and allow non-motorized access within 2 years;
- Construct the Culmback Dam Trail as stated in Section 3.3 within 2 years;
- Construct the new recreation site and 6122 Road Trail as stated in Section 3.3 within 3 years; and
- Modify recreation sites as stated in Section 3.3 within 4 years.

8.0 REFERENCES

David Evans and Associates. 2008. Rough Order Magnitude Cost Estimates for Road Maintenance and Abandonment Plans. Prepared for Snohomish County PUD.

EDAW. 2008. Recreation Needs Analysis (RSP13) Final Technical Report. Prepared for Snohomish County PUD.

Snohomish County PUD. 1991. Final Recreation Plan.

Snohomish County PUD. 2008. Preliminary Licensing Proposal.

Appendix A: Record of Consultation

Overview

The District has actively engaged with recreation stakeholders throughout the relicensing process – from study plan development, study result reporting, PM&E development, and RRMP review and comment – through meetings, workshops, telephone and email communications, and written comment periods. A list of consultation on the development of this RRMP and supporting meeting summary documents are included below. Responses to stakeholders' comments to the draft RRMP are also provided in this appendix. Further descriptions of recreation stakeholder consultation on the RNA can be found in the RNA and consultation on the study plan development can be found in FERC filings.

Date	**Type**	**Description**
5/6/2009	Written Comments	Written comments regarding draft RRMP
4/15/2009	Meeting	Review questions/comments on draft RRMP
3/31/2009	Written Comments	Written comments regarding PLP
2/5/2009	Meeting	Discuss recreation PM&Es identified in PLP
9/25/2008	Meeting	Discuss study results with recreation stakeholders and proposed PM&Es

Response to Comments

Number	***Comment***	***District Response***
Andy Bridge via email dated May 4, 2009		
AB-1	As noted previously in the Recreation Needs Analysis there is a strong need for additional trails in the Spada basin. This is challenging due to the planned shortening of the South Shore Road which means much longer hikes for the existing Greider and Boulder lake trails as well as the DNR's desire to form the Morning Star NRCA which precludes additional hiking trails. The PUD along with the City of Everett has a strong concern to protect the drinking water quality. These three issues all point to further enhancing and directing recreational use downstream of Culmback Dam. This is out of the NRCA and has no effect on drinking water quality.	Additional trails are being provided in the basin by the partial conversion of the South Shore Road and District's portion of the 6122 Road to trial. Additionally, the District has proposed to allow pedestrian access across Culmback Dam to access the North Shore Recreation Site. Collectively, these measures will create an approximate additional 7 miles for hiking. Hiking is a low impact recreation activity and allowed under the Morning Star NRCA. When compared to vehicular access, hiking to the recreation sites will have fewer impacts on the water quality for water supply and aquatic resources.
AB-2	The District has proposed a Culmback Dam Trail to the base of the dam. Quite honestly with the exception of a handful of occasional whitewater kayakers this trail is useless for recreation. It is very dangerous to venture into the gorge due to the many cliffs, rapids, etc and is simply not appropriate for most hikers. This trail would not allow easy access to any old growth forest. It would also encourage vandalism on the dam and/or increase liability issues for the District. If the District is interested in enhancing recreation downstream of Culmback Dam I would encourage working with the USFS on how best to	Comment noted. The District has reviewed several options for trails to the upper Sultan River, in terms of potential options and impacts to operations, terrestrial, cultural and other resources. Additionally, the District considered the topography and geology of the area - the upper river gorge is highly unstable and flashy with many landslides occurring. The Culmback Dam trail creates the least impact (none) to old growth forests and surrounding ESA-listed marbled murrelet occupied habitat on USFS lands downstream of Culmback Dam. Based on our analysis, the Culmback Dam trail provides the best option for accessing

Number	***Comment***	***District Response***
	provide trail access and to which areas.	the upper river. The utility of the Culmback Dam trail (for recreation and operational access) will be reevaluated after the 3-year trial period for whitewater boating.
AB-3	I would like to see the District create a joint plan with the USFS for the 6122 road/trail conversion.	The District and USFS have discussed coordinating efforts for the 6122 Road to trail conversion.
AB-4	The proposed 6 parking spaces at the new 6122 Recreation Site seems low to me. I realize that site is topographically challenging to work with. I still feel that more parking is needed somehow.	The six parking spots are an estimate at this point; more or fewer parking spaces may become realized after the site is thoroughly evaluated and construction plans developed. Additional parking will be available just east of the site and along the widened portion of the Culmback Dam Road. Collectively, there is parking for over 20 vehicles at or near the new recreation site.
AB-5	The RNA Study identified Trout Farm Road Site has nearing overcapacity at times. The District owns 5 acres at this site and should add additional parking spaces to a specified number. The RRMP does not give a number of parking spaces.	The RNA (page 90) indicates that the Trout Farm Site is approaching capacity due to the types of uses it receives (vandalism, dumping, partying, soil compaction) not the amount of use. (Facility capacity for parking is at 13% (RNA page 82) and for visitors is at 4% (RNA page 83).) To address the ecological/social capacity concern, per the RRMP, the site is being enhanced by the reconfiguration of the boat ramp and parking area and revegetation efforts. These enhancements will increase the visibility to the lower portion of the site near the river; thus, reducing vandalism and ecological impacts to the site. The site will be monitored for use and reported on the FERC Form 80. Any capacity concerns will be addressed in conjunction with the consultation process identified in the RRMP.

Number	***Comment***	***District Response***
AB-6	A well planned trail route from a new year round Rec. Site will create new opportunities for almost year round hiking when many other higher elevations trails are blocked by snow. This would be a very valuable addition to the hiking trails in the area.	The District has met and consulted with the Recreation Resource Group (RRG) on many occasions addressing Project-related recreation concerns and enhancements; the proposed plan has been vetted with the RRG and addresses Project-related recreation needs.
Patti Leppert, FERC via email dated May 6, 2009		
FERC-1	(in Section 3.0, Recreation Sites and Use Areas Program) clearly list the seven existing project recreation sites: Olney Pass; South Fork; South Shore; Nighthawk; Bear Creek; North Shore; and Culmback Dam access, instead of stating "The District provides several developed recreation sites adjacent to Spada Lake"….	Modified based on suggestion.
FERC-2	When I mentioned seven existing project recreation sites, I included Culmback Dam because the District's amended Recreation Plan, filed December 15, 2005, lists the recreation facilities at Culmback Dam as Recreation Site 6. However, the draft Recreation Resource Management Plan (RRMP) at Section 4.0., page 8, lists six existing recreation sites, and the proposed new site. A final RRMP for the Jackson Project should be very clear with the total number and the names of the existing project recreation sites.	The Culmback Dam recreation site (Site No. 6) was removed from the recreation plan and access restricted across Culmback Dam by FERC Order Modifying and Amending Recreation Plan dated June 28, 2006 due to its close proximately to the dam and associated facilities and to protect the security of the facilities. Thus, Site 6 is not a Project facility under the current license. The RRMP reflects the current and proposed recreation sites (which does not include the Culmback Dam recreation site No. 6).
FERC-3	The Preliminary Licensing Proposal (PLP) and the amended Recreation Plan identify a recreation site by a name and number (*i.e.*, Olney Pass Recreation Site (Site 1)); however, the draft RRMP identifies the recreation site	The District prefers to refer to the recreation sites by one name only under the new RRMP reducing confusion about name versus number; thus, selected to refer to the recreation sites via name only. A Recreation Site Name Cross-

Number	***Comment***	***District Response***
	by name only (*i.e.*, Olney Pass Recreation Site). Because this difference could lead to confusion I suggest a consistency in identifying the project recreation sites.	Reference table has been added prior to Section 1.0 of the RRMP to identify the recreation site name with the number used in the past.
FERC-4	The amended Recreation Plan identifies Recreation Site 7 (Pilchuck Entry), but I do not find this site in the draft RRMP.	Under the 1991 Recreation Plan, the Pilchuck Entryway Site No. 7 is identified as a "recreation site"; however, it does not provide any amenities beyond directional signage. For the RRMP, this "site" is being included as a point for directional signage under the I&E program and will not be referred to as a recreation site to avoid confusion with the other recreation sites that actually do include amenities.
FERC-5	With regard to the North Shore Recreation Site (page 4) and the Culmback Dam Access Enhancement (page 5), I suggest inserting the sentence, "Visitors could park at Olney Pass (for an approximately 4.0-mile-long one-way hike or bike ride) or at the proposed new day use site (for a 2.7-mile one-way trip)" - - taken from the PLP, page 227, North Shore Recreation Site (Site 8) and North Shore Access Trail - - wherever you find it appropriate. The sentence is a nice lead-in to the proposed new recreation site.	Modified based on suggestion.
FERC-6	With regard to Culmback Dam Trail Development (page 5), I have a concern with the wording "…down the face of Culmback Dam". Is there another way to characterize it? I did not find this measure in the PLP.	Modified the language. This measure was not proposed in the PLP but is included in the FLA to provide access to the upper Sultan River for recreational and administrative purposes.
FERC-7	For those recreation sites discussed under Lost Lake (Section 3.3.2) and Sultan River (Section 3.3.3) please be	With the exception of the Trout Farm Road River Access site, all other sites (Lost Lake and river access sites) are

Number	***Comment***	***District Response***
	clear whether the recreation site is a project recreation facility and whether the recreation site is located within or outside the current Jackson Project boundary. This clarity also should be reflected in Section 4.0 (Operations & Maintenance Program).	informal/undeveloped access sites. They are Project sites but not part of the current Project boundary. Please see Exhibit G, submitted with the FLA, for detail on the new Project boundary.
FERC-8	With regard to Section 8.0, I was not sure whether you want to list the various plans that you identify in Section 2.2. I'll defer to you.	The management plans have not yet been approved by the FERC and may periodically be updated through the term of the new license. For these reasons the District is opting not to cite them specifically to avoid confusion regarding the appropriate version that should be consulted.
Eric Ozog, USFS via emailed memo dated May 6, 2009		
USFS-1	**Figure 1** • the proposed vehicle gate on Road 6122 (on PUD land at the Culmback Road junction) should be shown.	Added to figure as suggested.
USFS-2	**Section 3.2 Public Access** • It is our understanding that a proposed vehicle gate across Road 6122 at the Culmback Road junction would be installed and maintained by the PUD. We proposed that the PUD manage access through the gate, and distribute keys to other landowners (USFS, DNR), whitewater boaters, and the mineral claimants, if desired for ORV access. The general public would be allowed to walk or ride a bicycle beyond the gate on the converted road, and the gate should be signed to inform the public of this	Added wording to address the 6122 road gate access.

Number	***Comment***	***District Response***
	recreation opportunity.	
USFS-3	• It is our understanding that the existing toilet near Culmback Dam will be utilized for this site and it is about 1/8 mile from the proposed parking lot. There is also a need to ensure that the toilet provided meets Americans with Disabilities Act (ADA) standards including the access route to the toilet, and that the access route is adequately signed. During scheduled whitewater release events additional toilets (i.e. sani-kans) would be needed. Trash receptacles need to be provided, and these should be "bear-proof" to keep bears and other animals, like crows out of the trash, which is of particular concern at this site due to the documented presence of marble murrelet nearby.	The RRMP has been updated to state that the toilet will be barrier-free, the trash facilities will be "bear-proof", and additional toilet facilities will be brought in during planned high-use events. Resource impacts (including to the marbled murrelet habitat) will be monitored and considered during future review of Project-related recreation use.
USFS-4	**Section 3.3.3 Recreation Sites and Enhancements, Sultan River** This would be a more appropriate section to include the proposals for the Culmback Dam trail, and 6122 Road to trail conversion.	These recreation site descriptions were left under the Spada Lake section due to their close proximity to Spada Lake and since they serve multiple purposed beyond access to the Sultan River.
USFS-5	**Section 4: Operations and Maintenance Program** • **Section 4.1 Rounds:** There may need to increase frequency if trash cans fill up more than weekly. Most of our recreation sites (i.e. picnic areas) have at least 2 visits per week.	Comment noted. Frequency will depend on site use which depends on the time of year; rounds will be conducted on a weekly basis or more/less frequently during high/low periods of use.

Number	***Comment***	***District Response***
USFS-6	• **Section 4.8 Trash Receptacles:** Can these all be "bear-proof"?	Updated RRMP as suggested.
USFS-7	**Section 5: Recreation Monitoring and Reporting Program** We agree that a monitoring report interval of every six years, with updates to the RRMP every 12 years for significant changes in Project use levels, would be acceptable. However, provisions should also be built into the License to allow changing recreation facilities or activities to accommodate changed use levels. .	Comment noted.
USFS-8	**Section 6: Interpretation & Education (I&E):** • **Section 6.1 Signage**: Signage should display the Sultan River Canyon Trail and the Sultan River showing river access points downstream at the map at Olney Pass and also on a map at the 6122 junction trailhead. River ratings for the Sultan River should also be displayed at river access points, so users know the difficulty of the particular river reaches that they will be boating.	The District will engage with the USFS in the development of the I&E plan consulting on the various sign locations and verbiage. The RRMP is left at a high-level as the signage needs may change over the course of the license and allows flexibility in sign placement and content.
USFS-9	• **Section 6.3 Website**: The website also needs to include notification of scheduled whitewater releases and river rating information.	Modified RRMP to provide information on whitewater boating opportunities.

Jackson Project Relicensing
Recreation Resources Group

April 15, 2009

Meeting Summary

Start Time: 10:00 a.m. **End Time:** 10:21 a.m.
Purpose of Meeting: Discuss comments/questions regarding draft Recreation Resource Management Plan (RRMP)
Conference Call Attendees:

- **Boeing Recreation:** Michael Dunican
- **City of Everett:** Julie Sklare
- **District:** Karen Bedrossian, Keith Binkley, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler
- **EDAW:** Sergio Capozzi
- **NPS:** Susan Rosebrough
- **USFS:** Eric Ozog
- **WDFW:** Mark Hunter

DISCUSSION ITEMS

The draft RRMP was sent to stakeholders for a 30-day review with comments due to the District by May 6. The RRMP will be an appendix in the FLA, so comments should be sent in as soon as possible in order to be considered, given the due date for the FLA is May 30. This conference call was scheduled to help facilitate a quick review of the plan and answer any questions and/or consider comments. The RRMP was developed based on the Recreation Visitors Survey, the Recreation Needs Analysis, stakeholder input and after review of other project recreation plans. The recreation plans from other projects varied considerably in content and detail. The District's approach is to keep the RRMP concise for ease of use by staff and to allow for flexibility over the term of the license. The RRMP does not include measures specifically for whitewater boating because whitewater boating will have its own 3-year trial plan. Off-license agreement measures are not included in the plan since they are off-license and FERC does not want them in the plans.

Comments from the agencies included:
NPS:

- Expressed concern that the whitewater flows and off-license agreement trail on NFS lands is not included in the RRMP.
    - The Districted responded that Whitewater will have its own plan since it is on a 3-year trial basis. FERC does not want off-license measures in the plans. That is

why the trail and other off-license measures are not in the RRMP. The RRMP includes only the measures for FERC approval and oversight.

- Expressed a desire to integrate this plan with the other plans (whitewater) and off-license agreements.
    - The District stated it will reference the other plans and agreements in the RRMP but will not specify those specific measures as stated above.
    - The NPS supported this approach.

USFS:

- Would like a report every 5 years on use levels to determine if existing facilities are meeting demands.
    - The District will file the FERC Form 80 every 6 years and offer a meeting, every 6 years to coincide with the FERC Form 80 requirement, to discuss project-related use and demand in the area.
    - The USFS supported this approach.
- Will there be a restroom at the new recreation site?
    - The District responded no; there is a restroom at Olney Pass and a heated restroom at Culmback Dam (less than 1/8 mile away). Additionally, the new site is near occupied marbled murrelet habitat so the District wants to keep the disturbance to a minimum. The District will make the restroom facilities at Olney and Culmback Dam "barrier-free"/ADA compliant.
    - The District will supplement the area with portable restrooms as needed when there is a planned high-use event such as tours or whitewater flow releases.
    - The USFS supported this approach.
- Will the trash cans be bear-proof?
    - The District responded yes; this recreation site is in a location that will allow for frequent patrol of garbage and because of its proximity to marbled murrelet habitat, it will follow the Marbled Murrelet Habitat Protection Plan regarding garbage disposal and monitoring.
    - The USFS supported this approach.
- Will the District be posting maps at trailheads? Posting river access points and river ratings?
    - The District responded that yes, the District will post signs at the District's recreation sites and also post the information to the District's web site.
    - The USFS supported this approach.
- Web posting of dates of releases, segment ratings? The District should personally notify mineral claimants along the Sultan River of scheduled flow releases.
    - The District responded that yes, this information will be posted to the District's web site and the District will notify the mineral claimants along the Sultan River of scheduled flow releases.
    - The USFS supported this approach.

No other stakeholders had comments.

From: Presler, Dawn
Sent: Monday, April 13, 2009 9:34 AM
To: 'Wert, Mike A'; 'Alison Hitchcock (alison.hitchcock@dnr.wa.gov)'; 'Andy Bridge, AW'; 'Bob Heirman (heirman@comcast.net)'; 'Candace Johnson (candace.johnson@dnr.wa.gov)'; 'Charles Everett'; 'Cindy Spiry (cindy@snoqualmienation.com)'; 'Cleve Steward (cleve.steward@amec.com)'; 'Connie Dunn (connie.dunn@ci.sultan.wa.us)'; 'Daryl Williams (dwilliams@tulaliptribes-nsn.gov)'; 'David Brookings (david.brookings@co.snohomish.wa.us)'; 'Don Gay (dgay@fs.fed.us)'; 'Dustin Hinson (dustin.hinson@amec.com)'; 'Eric Ozog (eozog@fs.fed.us)'; 'Everett Mountaineers (chair@everettmountaineers.org)'; 'Ian Kanair Esq (ian@snoqualmienation.com)'; 'IMBA (arttuftee@gmail.com)'; 'James A. Miller, WPMA'; 'Jane Shattuck (jandeslaptop@verizon.net)'; 'Jay Guthrie (jay.guthrie@dnr.wa.gov)'; 'JIM CAHILL (jim.cahill@dnr.wa.gov)'; 'Jim Eychaner (jime@rco.wa.gov)'; 'Joe Sambataro'; 'John Drabek (jdra461@ecy.wa.gov)'; 'John McClellan (jmcclellan@ci.everett.wa.us)'; 'Jolyn Leslie (jolyn.leslie@DOH.wa.gov)'; 'Julie Sklare'; 'Justin VanderPol, Backcountry Bicycles Trails Club (justin@bbtc.org)'; 'Karen Suyama (Karen.suyama@snoqualmienation.com)'; 'Laurie Bergvall (laurie.bergvall@dnr.wa.gov)'; 'Marc Krandel, SnoCoParks&Rec'; 'Mark Hanna (climbsrox@comcast.net)'; 'Merlin Halverson (m.halverson@snofire5.org)'; 'Michael Dunican, BEEPS'; 'Monika Kannadagali (mkan461@ecy.wa.gov)'; 'Pam Klatt'; 'Patti Leppert (Patricia.Leppert@ferc.gov)'; 'Peter McBride'; 'Ralph Dahlquist (rasudahlquist@juno.com)'; 'Rich Johnson (johnsrj@dfw.wa.gov)'; 'Stan Kurowski (stan.kurowski@dnr.wa.gov)'; 'Steve Mullen (Steve@Snoqualmienation.com)'; 'Susan Rosebrough (Susan_Rosebrough@nps.gov)'; 'Tim Romanski (Tim_Romanski@fws.gov)'; 'Tom Davis'; 'Washinton Trails Association (jonathan@wta.org)'; 'slinkydrake73@gmail.com'; 'Teigen, Tom'; 'csummers@snoco.org'; 'jkasting@co.snohomish.wa.us'; 'Thomas O'Keefe'; 'Kristen T Bonanno'; 'bbusse@fs.fed.us'
Cc: Bedrossian, Karen; Moore, Kim; 'pklatt@meridianenv.com'; 'Matthew Love'; Kallstrom, Jeffrey; 'Sergio Capozzi'
Subject: RE: Jackson Project (FERC No. 2157) - draft Recreation Resource Mgmt Plan

Dear Receration Group:
Attached is the updated figure for the RRMP. If you haven't done so already and you plan on attending the conference call this Wednesday at 10:00 to to review any questions or discuss any suggestions you have regarding the draft RRMP, please **RSVP for this conference call by today COB** and I will send you the phone number. Thanks!

Dawn

> -----Original Message-----
> **From:** Presler, Dawn
> **Sent:** Monday, April 06, 2009 11:32 AM
> **To:** 'Wert, Mike A'; 'Alison Hitchcock (alison.hitchcock@dnr.wa.gov)'; 'Andy Bridge, AW'; 'Bob Heirman (heirman@comcast.net)'; 'Candace Johnson (candace.johnson@dnr.wa.gov)'; 'Charles Everett'; 'Cindy Spiry (cindy@snoqualmienation.com)'; 'Cleve Steward (cleve.steward@amec.com)'; 'Connie Dunn (connie.dunn@ci.sultan.wa.us)'; 'Daryl Williams (dwilliams@tulaliptribes-nsn.gov)'; 'David Brookings (david.brookings@co.snohomish.wa.us)'; 'Don Gay (dgay@fs.fed.us)'; 'Dustin Hinson (dustin.hinson@amec.com)'; 'Eric Ozog (eozog@fs.fed.us)'; 'Everett Mountaineers (chair@everettmountaineers.org)'; 'Ian Kanair Esq (ian@snoqualmienation.com)'; 'IMBA (arttuftee@gmail.com)'; 'James A. Miller, WPMA'; 'Jane Shattuck (jandeslaptop@verizon.

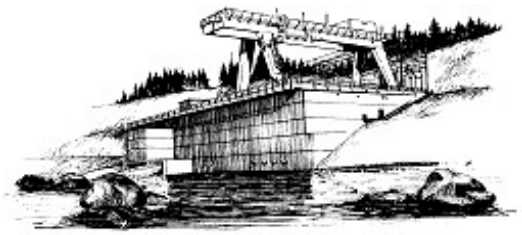
net)'; 'Jay Guthrie (jay.guthrie@dnr.wa.gov)'; 'JIM CAHILL (jim.cahill@dnr.wa.gov)'; 'Jim Eychaner (jime@rco.wa.gov)'; 'Joe Sambataro'; 'John Drabek (jdra461@ecy.wa.gov)'; 'John McClellan (jmcclellan@ci.everett.wa.us)'; 'Jolyn Leslie (jolyn.leslie@DOH.wa.gov)'; 'Julie Sklare'; 'Justin VanderPol, Backcountry Bicycles Trails Club (justin@bbtc.org)'; 'Karen Suyama (Karen.suyama@snoqualmienation.com)'; 'Laurie Bergvall (laurie.bergvall@dnr.wa.gov)'; 'Marc Krandel, SnoCoParks&Rec'; 'Mark Hanna (climbsrox@comcast.net)'; 'Merlin Halverson (m.halverson@snofire5.org)'; 'Michael Dunican, BEEPS'; 'Monika Kannadagali (mkan461@ecy.wa.gov)'; 'Pam Klatt'; 'Patti Leppert (Patricia.Leppert@ferc.gov)'; 'Peter McBride'; 'Ralph Dahlquist (rasudahlquist@juno.com)'; 'Rich Johnson (johnsrj@dfw.wa.gov)'; 'Sarah Daniels (sarah.daniels@edaw.com)'; 'Sergio Capozzi'; 'Stan Kurowski (stan.kurowski@dnr.wa.gov)'; 'Steve Mullen (Steve@Snoqualmienation.com)'; 'Susan Rosebrough (Susan_Rosebrough@nps.gov)'; 'Tim Romanski (Tim_Romanski@fws.gov)'; 'Tom Davis'; 'Washinton Trails Association (jonathan@wta.org)'; 'slinkydrake73@gmail.com'; 'Teigen, Tom'; 'csummers@snoco.org'; jkasting@co.snohomish.wa.us; Thomas O'Keefe; Kristen T Bonanno; bbusse@fs.fed.us
Cc: Bedrossian, Karen; Moore, Kim; pklatt@meridianenv.com; 'Matthew Love'; Kallstrom, Jeffrey
Subject: Jackson Project (FERC No. 2157) - draft Recreation Resource Mgmt Plan

Dear Recreation Group:

Attached is the draft Recreation Resource Management Plan (RRMP) for the Jackson Hydro Project based on the protection, mitigation and enhancement measures previously presented to the Recreation Group. Please take the next 30-days to review and provide written comments back to the District by May 6. Please email your comments to me at DJPresler@snopud.com .

A conference call for the Recreation Group is scheduled for Wednesday April 15 at 10:00 to review any questions or discuss any suggestions you have regarding the draft RRMP. Please **RSVP for this conference call by Monday COB** and I will send you the phone number. Thanks!

Sincerely,
Dawn Presler
Relicensing Specialist
Jackson Hydroelectric Project (P-2157)
Snohomish County PUD
Phone: 425-783-1709
Fax: 425-267-6369



Jackson Project Relicensing
Recreation Resources Group

Thursday, February 5, 2009

Meeting Summary

Start Time: 3:30 p.m. **End Time:** 5:30 p.m.
Purpose of Meeting: Update stakeholders on the status of relicensing, discuss the settlement process and protocols, review and discuss PM&Es presented in the PLP and identify outstanding issues.
Attendees:

- **American Whitewater:** Tom O'Keefe
- **Boeing Recreation:** Michael Dunican
- **City of Everett:** Julie Sklare
- **EDAW:** Sergio Capozzi (via phone)
- **NPS:** Susan Rosebrough (via phone)
- **PUD:** Karen Bedrossian, Keith Binkley, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler, Matt Love (outside counsel)
- **RCO:** Jim Eychaner
- **USFS:** Tom Davis
- **WDNR:** Stan Kurowski

DISCUSSION ITEMS

Status of Relicensing

The District filed its Preliminary License Proposal (PLP) with FERC December 31, 2008. The PLP includes protection, mitigation and enhancement measures (PM&Es) proposed by the District. Comments on the PLP are due 31 March 2009. The District will be filing its Final License Application (FLA) by 30 May 2009. Since the time between the comment due date and when the FLA is filed is so short the District is actively working toward getting PM&Es and Plans in place now.

Settlement Process

The District reviewed the settlement process.

PM&Es in the PLP

PM&Es are based on results of stakeholder meetings and input, DNR's plan to close South Shore Road from Olney Pass, and requirement to upgrade roads to State Forest Practice Standards. The requirements for the upgrade of the 6122 road on the District owned portion were described. Karen reviewed each PM&E in the PLP.

Deborah Knight stated that the City of Sultan has a grant for video surveillance and would be open to discussing the possibility of setting up video surveillance at the Trout Farm Road recreation site to help reduce vandalism. It is unknown if the Trout Farm Road recreation site is situated in the Sultan's Urban Growth Area.

Tom O'Keefe noted surprise by the District's proposal for a trail on its own land citing a lack of boating data for segment 1 (Culmback Dam to 6122 River Access Trail put-in) and prior discussions regarding the trail being on USFS lands. He noted safety concerns with that segment, that it might be beyond the scope of most boaters, and the demand and interest is at Segment 2 and lower. Tom Davis also noted safety concerns regarding segment 1 and that an improved/engineered (which he called a "system") trail is being requested during the 3-year trial period due to the erosion concerns and a preference for the trail and trailhead to be on USFS lands. Susan Roseborough seconded these concerns.

The District noted that the Study Plan 14 technical report identifies that segment 1 would not dictate the flow ranges for the rest of the segments, boaters have accessed the river for segment 1 down the face of the dam in the past, multiple alternative locations are available for the various ranges of expertise (at Diversion Dam, at Powerhouse, at Trout Farm Road), and the District is providing a range of enhancements (shuttles, new recreation site, leaving gate open, pedestrian access across Powerhouse bridge) beyond flow releases. Jim Eychaner pointed out that the trail being at Culmback Dam provides for a broader range of enthusiasts; those not willing to go down segment 1 can use another trail or put-in spot. Matt Love noted that the project nexus is being met by the proposed PM&E identified in the PLP (trail on District property); an off-license agreement, if any, for a trail on USFS lands would be above and beyond what is needed.

Tom O'Keefe requested a site visit to specifically look at the existing 6122 River Access Trail (user defined route), the route proposed by Tom Davis and the route proposed by the District. He requested a maps and matrix to show length of the routes. He is concerned that it will be a long hike for a long run. District noted that the proposed New Recreation Site off of the Culmback Dam road provides for the trailhead to both the North Shore and South Shore access trails. Due to weather/snow considerations, getting out on the potential trails may not be possible before the summer. Therefore, the group can review topo maps, aerial photos, etc. to review the trail locations. A field trip will be planned once conditions allow, though it will likely be after the license application is filed. Kim noted that the trail location is a known issue and the District is willing to continue to meet with the USFS if the USFS can address some of the District's concerns.

Michael Dunican stated that his organization would prefer the boater access trail to be downstream of the existing 6122 River Access Trail. The miners prefer that the District not abandon the 6122 road on their property. They would like at least ORV access. Stan Kurowski pointed out the rules for Forest Practice abandonment/upgrades. He also noted that the USFS' obligation for mining access can serve as further access for the whitewater boaters. Tom Davis stated that the USFS mining engineer stated that the abandonment of the District's portion of the 6122 road and conversion into a trail is not unreasonable access. There was a discussion about the difference between the miner's trail and the type of trail that Tom Davis said the Forest

Service wants for the kayakers. The miner's trail is a "social" trail not officially maintained by the Forest Service and the responsibility of the user. The Forest Service wants a "system" trail for the kayakers and wants the PUD to build and maintain it.

There was discussion about general safety in the canyon area. Michael Dunican referred to the Sultan River canyon as the "Canyon of Death" relative to the remoteness and difficulty of access if rescue becomes necessary. Tom O'Keefe stated that the dangers of the Sultan River Canyon are not that different form other rivers they run and that whitewater boaters acknowledge the inherent danger of the sport and therefore come prepared with safety kits, ropes, trust in other boaters, etc. Matt Love noted that this was an issue of concern rather than and outstanding license issue. Michael Dunican and Tom O'Keefe agreed.

Deborah Knight asked about advertising conducted for the recreation sites. The District responded that it has a web site that details the recreation facilities and provides brochures to various entities (including the Sultan Chamber of Commerce). Deborah is looking at ways to attract visitors to the area and advertising could be a possible partnership.

There was discussion about reporting over the term of the license. The District is required to report usage and costs every 6 years on a Form 80 to FERC. Depending on the results of usage, recreation facilities/enhancements can change over the term of the license to better suit the recreation needs.

Jim Eychaner stated he felt the technical studies/reports were done professionally. He noted a concern for a lack of toilet facilities at sites 4 and 5 and believed it would pose a larger water quality issue than if facilities were provided. He stated that he was not sure if he would participate in the settlement negotiations but that he would be would be keeping informed to make sure the recreational issues were addressed. He thinks the options are reasonable and he did not note any outstanding issues in addition to the ones mentioned during the meeting.

What Comes Next
Recreation Resource Management Plan – planning on providing a draft for stakeholder review by mid-March.

Action Items:

- District (Karen will take the lead) – create a matrix for the three Sultan River Canyon Trail options that describes the trail length, costs of trail construction or improvement and maintenance, and management considerations. Provide a map showing the location of the existing and potential trails.

- Dawn – Add Susan Roseborough to the Aquatics Settlement Subgroup list – whitewater flows.

- Julie – review sanitation options (concern regarding no toilet facilities proposed at Nighthawk and Bear Creek Recreation Sites -DNR, RCO).

- District/USFS meeting –USFS/District continue meeting to resolve legal issues and parameters for issues, then will confer with AW and mining interests.

- Tom Davis (post meeting request by Dawn) – email her trail standards and resource damage photos/map/data for the 6122 trail

- Dawn- Schedule another RRG meeting when progress has been made on trail for group discussion

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From: Presler, Dawn
Sent: Monday, February 02, 2009 2:41 PM
To: 'jmiller@ci.everett.wa.us'; 'Wert, Mike A'; 'Alison Hitchcock (alison.hitchcock@dnr.wa.gov)'; 'Andy Bridge, AW'; 'Bob Heirman (heirman@comcast.net)'; 'Candace Johnson (candace.johnson@dnr.wa.gov)'; 'Charles Everett'; 'Cindy Spiry (cindy@snoqualmienation.com)'; 'Cleve Steward (cleve.steward@amec.com)'; 'Connie Dunn (connie.dunn@ci.sultan.wa.us)'; 'Daryl Williams (dwilliams@tulaliptribes-nsn.gov)'; 'David Brookings (david.brookings@co.snohomish.wa.us)'; 'Don Gay (dgay@fs.fed.us)'; 'Dustin Hinson (dustin.hinson@amec.com)'; 'Eric Ozog (eozog@fs.fed.us)'; 'Everett Mountaineers (chair@everettmountaineers.org)'; 'Ian Kanair Esq (ian@snoqualmienation.com)'; 'IMBA (arttuftee@gmail.com)'; 'James A. Miller, WPMA'; 'Jane Shattuck (jandeslaptop@verizon.net)'; 'Jay Guthrie (jay.guthrie@dnr.wa.gov)'; 'JIM CAHILL (jim.cahill@dnr.wa.gov)'; 'Jim Eychaner (jime@rco.wa.gov)'; 'Joe Sambataro'; 'John McClellan (jmcclellan@ci.everett.wa.us)'; 'Jolyn Leslie (jolyn.leslie@DOH.wa.gov)'; 'Julie Sklare'; 'Justin VanderPol, Backcountry Bicycles Trails Club (justin@bbtc.org)'; 'Karen Suyama (Karen.suyama@snoqualmienation.com)'; 'Laurie Bergvall (laurie.bergvall@dnr.wa.gov)'; 'Marc Krandel, SnoCoParks&Rec'; 'Mark Hanna (climbsrox@comcast.net)'; 'Merlin Halverson (m.halverson@snofire5.org)'; 'Michael Dunican, BEEPS'; 'Michael Linde (michael_linde@nps.gov)'; 'Monika Kannadagali (mkan461@ecy.wa.gov)'; 'Pam Klatt'; 'Peter McBride'; 'Ralph Dahlquist (rasudahlquist@juno.com)'; 'Rich Johnson (johnsrj@dfw.wa.gov)'; 'Sergio Capozzi'; 'Stan Kurowski (stan.kurowski@dnr.wa.gov)'; 'Steve Mullen (Steve@Snoqualmienation.com)'; 'Susan Rosebrough (Susan_Rosebrough@nps.gov)'; 'Tim Romanski (Tim_Romanski@fws.gov)'; 'Tom Davis'; 'Washinton Trails Association (jonathan@wta.org)'; 'Hunter, Mark (DFW)'; 'Deborah Knight'; 'okeefe@amwhitewater.org'; 'robert.easton@ferc.gov'; 'Mariel.Combs@sol.doi.gov'; 'Kristen T Bonanno'; 'Chris Fontecchio'; 'billf@atg.wa.gov'; 'brianf@atg.wa.gov'
Cc: Bedrossian, Karen
Subject: RE: Jackson Project (FERC No. 2157) - Recreation Group meeting

Attached is the agenda for the Recreation Resources Group meeting taking place this Thursday Feb 5 starting at 3:30 sharp. If you haven't RSVP to me yet, please do so. Thanks.

Dawn

-----Original Message-----
From: Presler, Dawn
Sent: Tuesday, January 27, 2009 9:32 AM
To: 'jmiller@ci.everett.wa.us'; 'Wert, Mike A'; 'Alison Hitchcock (alison.hitchcock@dnr.wa.gov)'; 'Andy Bridge, AW'; 'Bob Heirman (heirman@comcast.net)'; 'Candace Johnson (candace.johnson@dnr.wa.gov)'; 'Charles Everett'; 'Chuck Cox, WPMA'; 'Cindy Spiry (cindy@snoqualmienation.com)'; 'Cleve Steward (cleve.steward@amec.com)'; 'Connie Dunn (connie.dunn@ci.sultan.wa.us)'; 'Daryl Williams (dwilliams@tulaliptribes-nsn.gov)'; 'David Brookings (david.brookings@co.snohomish.wa.us)'; 'Don Gay (dgay@fs.fed.us)'; 'Dustin Hinson (dustin.hinson@amec.com)'; 'Eric Ozog (eozog@fs.fed.us)'; 'Everett Mountaineers (chair@everettmountaineers.org)'; 'Ian Kanair Esq (ian@snoqualmienation.com)'; 'IMBA (arttuftee@gmail.com)'; 'James A. Miller, WPMA'; 'Jane Shattuck (jandeslaptop@verizon.net)'; 'Jay Guthrie (jay.guthrie@dnr.wa.gov)'; 'JIM CAHILL (jim.cahill@dnr.wa.gov)'; 'Jim Eychaner (jime@rco.wa.gov)'; 'Joe Sambataro'; 'John McClellan (jmcclellan@ci.everett.wa.us)'; 'Jolyn

Leslie (jolyn.leslie@DOH.wa.gov)'; 'Julie Sklare'; 'Justin VanderPol, Backcountry Bicycles Trails Club (justin@bbtc.org)'; 'Karen Suyama (Karen.suyama@snoqualmienation.com)'; 'Laurie Bergvall (laurie.bergvall@dnr.wa.gov)'; 'Marc Krandel, SnoCoParks&Rec'; 'Mark Hanna (climbsrox@comcast.net)'; 'Merlin Halverson (m.halverson@snofire5.org)'; 'Michael Dunican, BEEPS'; 'Michael Linde (michael_linde@nps.gov)'; 'Monika Kannadagali (mkan461@ecy.wa.gov)'; 'Pam Klatt'; 'Patti Leppert (Patricia.Leppert@ferc.gov)'; 'Peter McBride'; 'Ralph Dahlquist (rasudahlquist@juno.com)'; 'Rich Johnson (johnsrj@dfw.wa.gov)'; 'Sarah Daniels (sarah.daniels@edaw.com)'; 'Sergio Capozzi'; 'Stan Kurowski (stan.kurowski@dnr.wa.gov)'; 'Steve Mullen (Steve@Snoqualmienation.com)'; 'Susan Rosebrough (Susan_Rosebrough@nps.gov)'; 'Tim Romanski (Tim_Romanski@fws.gov)'; 'Tom Davis'; 'Washinton Trails Association (jonathan@wta.org)'; 'Hunter, Mark (DFW)'; 'Deborah Knight'; 'okeefe@amwhitewater.org'; 'robert.easton@ferc.gov'
Cc: Bedrossian, Karen
Subject: RE: Jackson Project (FERC No. 2157) - Recreation Group meeting

The meeting will be at the PUD's building located at 2320 California Street, Everett.

-----Original Message-----
From: Presler, Dawn
Sent: Tuesday, January 27, 2009 9:20 AM
To: 'jmiller@ci.everett.wa.us'; 'Wert, Mike A'; 'Alison Hitchcock (alison.hitchcock@dnr.wa.gov)'; 'Andy Bridge, AW'; 'Bob Heirman (heirman@comcast.net)'; 'Candace Johnson (candace.johnson@dnr.wa.gov)'; 'Charles Everett'; 'Chuck Cox, WPMA'; 'Cindy Spiry (cindy@snoqualmienation.com)'; 'Cleve Steward (cleve.steward@amec.com)'; 'Connie Dunn (connie.dunn@ci.sultan.wa.us)'; 'Daryl Williams (dwilliams@tulaliptribes-nsn.gov)'; 'David Brookings (david.brookings@co.snohomish.wa.us)'; 'Don Gay (dgay@fs.fed.us)'; 'Dustin Hinson (dustin.hinson@amec.com)'; 'Eric Ozog (eozog@fs.fed.us)'; 'Everett Mountaineers (chair@everettmountaineers.org)'; 'Ian Kanair Esq (ian@snoqualmienation.com)'; 'IMBA (arttuftee@gmail.com)'; 'James A. Miller, WPMA'; 'Jane Shattuck (jandeslaptop@verizon.net)'; 'Jay Guthrie (jay.guthrie@dnr.wa.gov)'; 'JIM CAHILL (jim.cahill@dnr.wa.gov)'; 'Jim Eychaner (jime@rco.wa.gov)'; 'Joe Sambataro'; 'John McClellan (jmcclellan@ci.everett.wa.us)'; 'Jolyn Leslie (jolyn.leslie@DOH.wa.gov)'; 'Julie Sklare'; 'Justin VanderPol, Backcountry Bicycles Trails Club (justin@bbtc.org)'; 'Karen Suyama (Karen.suyama@snoqualmienation.com)'; 'Laurie Bergvall (laurie.bergvall@dnr.wa.gov)'; 'Marc Krandel, SnoCoParks&Rec'; 'Mark Hanna (climbsrox@comcast.net)'; 'Merlin Halverson (m.halverson@snofire5.org)'; 'Michael Dunican, BEEPS'; 'Michael Linde (michael_linde@nps.gov)'; 'Monika Kannadagali (mkan461@ecy.wa.gov)'; 'Pam Klatt'; 'Patti Leppert (Patricia.Leppert@ferc.gov)'; 'Peter McBride'; 'Ralph Dahlquist (rasudahlquist@juno.com)'; 'Rich Johnson (johnsrj@dfw.wa.gov)'; 'Sarah Daniels (sarah.daniels@edaw.com)'; 'Sergio Capozzi'; 'Stan Kurowski (stan.kurowski@dnr.wa.gov)'; 'Steve Mullen (Steve@Snoqualmienation.com)'; 'Susan Rosebrough (Susan_Rosebrough@nps.gov)'; 'Tim Romanski (Tim_Romanski@fws.gov)'; 'Tom Davis'; 'Washinton Trails Association (jonathan@wta.org)'; 'Hunter, Mark (DFW)'; 'Deborah Knight'; 'okeefe@amwhitewater.org'; 'robert.easton@ferc.gov'
Cc: Bedrossian, Karen
Subject: RE: Jackson Project (FERC No. 2157) - Recreation Group meeting

Dear Recreation Resources Group:

On **Thursday February 5, 2009, from 3:30-5:30**, the relicensing team will be holding a meeting to review and discuss the recreation protection, mitigation and enhancement measures (PM&Es) presented in the Preliminary Licensing Proposal (PLP) and as previously discussed the Recreation Group in September 2008. We will also provide an update on the next relicensing steps. The PLP was filed with FERC on 12/31/08 and is located at: http://www.snopud.com/Content/External/Documents/relicensing/Relicense/PLP123108.pdf . Please review the PLP prior to attending the meeting to refamiliarize yourself with the PM&Es. Please RSVP to me **by Monday February 2** if you plan on attending this meeting.

Sincerely,

Dawn Presler
Relicensing Specialist
Jackson Hydroelectric Project (P-2157)
Snohomish County PUD
Phone: 425-783-1709
Fax: 425-267-6369

(Paper copy sent to William Raether and David Dorough)

Message

From: Presler, Dawn
Sent: Friday, January 02, 2009 11:50 AM
To: 'advocacy@bbtc.org'; 'ahook@tulaliptribes-nsn.gov'; 'alison.hitchcock@dnr.wa.gov'; 'andy.bridge@wernerpaddles.com'; 'Andy.Haas@co.snohomish.wa.us'; 'arisvold@fs.fed.us'; 'arttuftee@gmail.com'; 'asavery@tulaliptribes-nsn.gov'; 'athomsonbulldis@enviroissues.com'; 'auminer@earthlink.net'; 'bbusse@fs.fed.us'; 'beechhab@dfw.wa.gov'; 'bfeilberg@ci.monroe.wa.us'; 'bill.wallace@dnr.wa.gov'; 'billf@atg.wa.gov'; 'blakeskittens@hotmail.com'; 'blambert@co.snohomish.wa.us'; 'brca461@ecy.wa.gov'; 'Brian.davis@dnr.wa.gov'; 'brian.f.zderic@boeing.com'; 'brianf@atg.wa.gov'; 'bswift@americanrivers.org'; 'candace.johnson@dnr.wa.gov'; 'Carolyn.J.Fitzgerald@usace.army.mil'; 'chair@everettmountaineers.org'; 'chris.nelson@co.snohomish.wa.us'; 'christopherfuller@gmail.com'; 'cindy@snoqualmienation.com'; 'cleve.steward@amec.com'; 'climbsrox@comcast.net'; 'cmay461@ecy.wa.gov'; 'connie.dunn@ci.sultan.wa.us'; 'cyd.donk@ci.sultan.wa.us'; 'dadams@enviroissues.com'; 'dan.chaplik@sultan.k12.wa.us'; 'David.Brookings@co.snohomish.wa.us'; 'david.turner@ferc.gov'; 'david_jh_wilson@hotmail.com'; 'ddav461@ecy.wa.gov'; 'deborah.knight@ci.sultan.wa.us'; 'dgay@fs.fed.us'; 'dgrover@fs.fed.us'; 'donna.murphy@ci.sultan.wa.us'; 'dreiser@r2usa.com'; 'dustin.hinson@amec.com'; 'Dwilliams@tulaliptribes-nsn.gov'; 'ebessette@650dialup.com'; 'ed@osgood.org'; 'eozog@fs.fed.us'; 'frank.winchell@ferc.gov'; 'goldnpoint@comcast.net'; 'GSHE461@ecy.wa.gov'; 'heirman@comcast.net'; 'ian@snoqualmienation.com'; 'jandeslaptop@verizon.net'; 'jay.guthrie@dnr.wa.gov'; 'jennie@nwwhitewater.org'; 'jhollenbeck@fs.fed.us'; 'jim.cahill@dnr.wa.gov'; 'jime@rco.wa.gov'; 'jjones@bellingram.com'; 'joes@cascadeland.org'; 'johnsrj@dfw.wa.gov'; 'Jolyn.Leslie@DOH.WA.gov'; 'jonathan@wta.org'; 'jpac461@ecy.wa.gov'; 'jsklare@ci.everett.wa.us'; 'karen1@snoqualmienation.com'; 'kent@premier1.net'; 'Kevin@amwhitewater.org'; 'kirsplat@hotmail.com'; 'kmiller@tu.org'; 'krandel@co.snohomish.wa.us'; 'kreardon@ci.everett.wa.us'; 'kristi.favard@bullivant.com'; 'laurie.bergvall@dnr.wa.gov'; 'lclaughton@yahoo.com'; 'lee.stilson@dnr.wa.gov'; 'Lynda.Ransley@co.snohomish.wa.us'; 'm.halverson@snofire5.org'; 'm.morisset@msaj.com'; 'mal@vnf.com'; 'mark.soine@co.snohomish.wa.us'; 'mas@vnf.com'; 'matt.cutlip@ferc.gov'; 'matt@mattperkinslaw.com'; 'matt@snoqualmienation.com'; 'mbeilharz@fs.fed.us'; 'MBoston@tulaliptribes-nsn.gov'; 'mcarter@ci.everett.wa.us'; 'michael.g.dunican@boeing.com'; 'michael_linde@nps.gov'; 'mkan461@ecy.wa.gov'; 'nshore@nwlink.com'; 'okeefe@amwhitewater.org'; 'patricia.leppert@ferc.gov'; 'Peter.McBride@dnr.wa.gov'; 'Rallison@tulaliptribes-nsn.gov'; 'rasudahlquist@juno.com'; 'rckmcguire@gmail.com'; 'rich@hydroreform.org'; 'rick.cisar@ci.sultan.wa.us'; 'rmace@fs.fed.us'; 'Rob.Whitlam@dahp.wa.gov'; 'rpmmax@juno.com'; 's.haensly@msaj.com'; 'shanecrobinson@gmail.com'; 'slinkydrake73@gmail.com'; 'sonny.gohrman@co.snohomish.wa.us'; 'stan.kurowski@dnr.wa.gov'; 'steve@snoqualmienation.com'; 'steven.j.exe@boeing.com'; 'steven.m.fransen@noaa.gov'; 'subr461@ecy.wa.gov'; 'Susan_Rosebrough@nps.gov'; 'sybillef@microsoft.com'; 'tdavis@fs.fed.us'; 'tim@seattleraftandkayak.com'; 'Tim_Romanski@fws.gov'; 'Tom.Eksten@snoco.org'; 'tthetford@ci.everett.wa.us'; 'tugstours@comcast.net'; 'voice4wild@aol.com'; 'WaldARW@dfw.wa.gov'; 'wdortch@fs.fed.us'; 'wildfish@washingtontrout.org'; 'Schick, Lawrence J NWS'; 'Fitzgerald, Carolyn J NWS'; 'Engel, John'; 'jmiller@ci.everett.wa.us'
Cc: Moore, Kim; Meaker, Bruce; Bedrossian, Karen; Binkley, Keith; 'Pamela Klatt'; Kallstrom, Jeffrey; 'Dudley Reiser'; 'Martin E. Vaughn'; 'Sergio Capozzi'; 'Charles Everett'; 'Forrest.Olson@ch2m.com'
Subject: Jackson Project (FERC No. 2157) - Prelim License Proposal

Dear Relicensing Stakeholders:

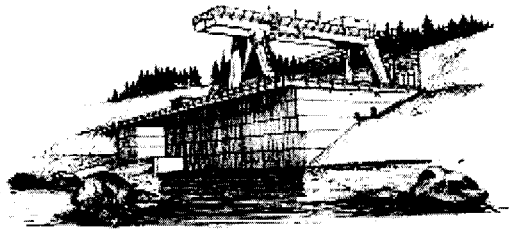
The Jackson Project Relicensing Team is pleased to announce that the Preliminary License Proposal (PLP) for the Jackson Hydroelectric Project was filed with FERC and is now posted to the relicensing web site for your review at: http://www.snopud.com/Content/External/Documents/relicensing/Relicense/PLP123108.pdf (or go to www.snopud.com, select Water Resources, then Relicensing, Relicensing-Documents, PLP).

Per the process plan and schedule and 18 CFR 5.16 regs, comments, if any, on the PLP must be filed with FERC by 3/31/09. If you have questions on the PLP or the relicensing process, please feel free to contact me. *Also, contact me if you want to be removed from the relicensing contact list.*

Wishing you a happy and healthy 2009!

Sincerely,

Dawn Presler
Relicensing Specialist
Jackson Hydroelectric Project (P-2157)
Snohomish County PUD
Phone: 425-783-1709
Fax: 425-267-6369



Jackson Project Relicensing
Recreation Resources Group Meeting
Study Results and PM&E Discussions

Thursday, September 25, 2008
9:00 – 12:00

Attendee Sign-In Sheet

Name/Organization:	Email:
Susan Rosebrough /NPS	SUSAN_ROSEBROUGH@NPS.GOV
Julie Sklare / COE	JSklare@ci.everett.wa.us
Sergio Capozzi (EDAW)	Sergio.capozzi@edaw.com
Chuck Everett (EDAW)	charles ~~chuck~~.everett@edaw.com
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Chris Mayo	CMay461@ecy.wa.gov
Rich Johnson	johnsrj@dfw.wa.gov
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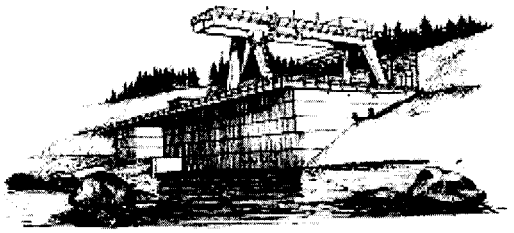
Alison Hitchcock	alison.hitchcock@wa.dnr.gov
STAN KACZOWSKI	STAN.KACZOWSKI@WA.DNR.GOV
Eric Ozog	eozog@fs.fed.us
TOM O'KEEFE	okeefe@amwhitewater.org
Randy Bridge	randy.bridge@weyerhaeuser.com
Bruce Meaker (PUD)	bfmeaker@snopud.com



Jackson Project Relicensing
Recreation Resources Group Meeting
Study Results and PM&E Discussions

Thursday, September 25, 2008
9:00 – 12:00

Attendee Sign-In Sheet

Name/Organization:	Email:
GLENN RUDOLPH	grudolph@drizzle.com
CATHERINE COOK	ccook@drizzle.com
Tom Davis	tdavis@fs.fed.us
Dawn Presler	DJPresler@snopud.com
Danny Miles	dwmiles@snopud.com

RECREATION RESOURCE GROUP
MEETING SUMMARY
9/25/08

Attendees:

- See attached sign-in sheet
- FERC – Patti Leppert and David Turner via conference phone

Discussion Items:

Karen B. opened the meeting by introducing herself, followed by introductions of all meeting attendees.

Important dates are quickly coming up: (1) the Recreation Needs Analysis (RSP 13) is out for review now and stakeholder comments are due to the District on October 3; (2) draft PM&Es are to be done for insert into the PLP by November 1; and (3) the PLP is due out by Dec. 31.

Sergio C., Karen B., and Keith B. presented a PowerPoint presentation with a summary of the draft Recreation Needs Analysis (RSP 13) report and draft Flow Recreation Study (RSP 14) report, as well as the District's preliminary proposed protection, mitigation, and enhancement (PM&E) measures for recreation and recreation-related flows. The PowerPoint presentation is available on the District web site. Meeting participants had comments/questions on the following PowerPoint slides regarding the summary results of RSP 13 and 14:

Slide 11

Jim E. asked what the theoretical maximum recreation days (RD) were at the Project. Sergio indicated that anticipated growth is expected to be up to 18,800 RD, which is below the theoretical maximum capacity. The 11,000 to 18,800 RD estimate is based on the existing recreation sites at the Project. To date, no future use scenarios have been run based on potential recreational enhancements.

Slide 14

Stan K. stated the DNR's plan was to convert South Shore Road from a vehicular road to a non-motorized trail.

Slide 20

Tom O. stated slide 20 is not consistent with RSP14. After presentation, Sergio confirmed that there was a typo in Slide 20, which incorrectly identified the difficult of Segment 2 as Class III+ to V (correct difficulty is Class III – IV).

Slide 25

Keith noted running all river segments in a watercraft can be tiring and some paddlers will desire to run selected segments only. There are varying preferences for segments 2 and 3 as a result.

Jim E. questioned the preference of segments based on the type/skill level of paddlers. After the meeting, Bo Shelby and Doug Whittaker of Confluence Research and Consulting (CRC) indicated that there is no clear pattern among skill levels between those who preferred acceptable flows in both segments (2 and 3) versus optimal flows in Segment 3 (there were roughly similar numbers of Class 5 boaters responding each way). In addition, the flow recreation survey also asked boaters to self-classify their skill levels, and some of the demonstrably more accomplished boaters happen to be more humble than some others, which further complicates such an analysis. The more likely variable is whether or not a boater was interested in a long trip or had a tolerance for the more arduous put-in option (both segments), which is not really skill dependent.

Slide 27
Sergio clarified that no mining occurs in Segment 1. Also, he clarified that public access is not prohibited along any of the river segments, except near the hydro facilities (e.g., Culmback Dam, Diversion Dam, etc.). There are no formalized trails along the river.

Slide 31
Andy B. noted that the road to the Diversion Dam is foot access only and a longer walk than other river access points. Eric O. clarified the need for a river access trail along the FR 6122 route.

Patty L. (FERC) thanked Sergio and EDAW/CRC for the quality of the relicensing-related recreation products.

Karen provided an overview of the District's preliminary proposed recreation-related PM&E measures as a hand-out and walked through the measures. Keith B. provided an overview of recreation flow-related PM&E measures. Meeting participants had the following comments/questions on the preliminary proposed PM&E measures:

Karen discussed DNR's reasons for the proposed abandonment of the South Shore Road near Spada Lake and that the District has been working with DNR and USFS to help craft proposed PM&Es that make sense for all.

DNR has no current plans for the P-5000 road. Karen stated that the District has no plans for this road either, but that the road from Culmback Dam to the North Shore Recreation Site would be kept open for administrative purposes only (it would not be abandoned and converted to a trail).

Andy asked about the DNR's proposed plan for abandonment of the South Shore Road. Stan K. indicated that abandonment of the existing road was due to the cost of upgrading the road to required Forest Practice Standards, ongoing problems with the road, and DNR has no timber harvests planned in the area to

offset road costs. DNR land east of the South Fork is proposed for Natural Resource Conservation Area (NRCA) designation.

Tom D. had concerns about potential whitewater releases in the river below the dam and the potential for upwards of 100 paddlers with approximately 40 cars using the river at one time. Tom thinks that a larger trailhead/recreation day use site may be appropriate, located about 1 mile further down FR 6122. He felt that the existing cleared area along FR 6122 on NFSL is probably the best site for a new paddler event parking area (compared to the District's proposed site closer to the dam that is smaller). Tom did acknowledge that using a potential shuttle service would be another alternative (instead of a single, larger event parking area).

A proposed trailhead at FR 6122 could be accomplished via an off-license agreement between the District and USFS, given the multi-use nature of the proposed trail enhancement project. Tom O. mentioned other FERC relicensing proceedings where multi-use actions were included in the FERC license.

Dave T. (FERC) indicated that FERC does often require that recreation facilities be included within a project license, such as a whitewater boating access site where whitewater recreation flows are mandated. There needs to be a clear project nexus. FERC does not like to see one-time funding actions included in a license, only actions with longer term commitments and ongoing actions. One-time funding actions are generally considered to be an off-license action. If the proposed trail enhancement project were considered to be multiple use, then FERC would want to consider what percent of the proposed trailhead and trail are considered multi-use in making a decision (off-license or in-license).

Kim stated that a multi-use facility was a hypothetical at this point. The proposed trailhead near the intersection of FR 6122 and Culmback Dam Road would present a good hiking opportunity for the public.

Concern about abandoning FR 6122 Road (FR 6122 on District-owned land) would be raised by mineral claimants. Eric O. mentioned having similar issues on other projects regarding compliance with the 1872 mining law. Mineral claimants may object to the closure of FR 6122 and its conversion to a new trail beyond the new trailhead.

Rich J. brought up concerns about hiking on the proposed trail during the winter when daylight hours are fewer.

Karen asked Jim E. about road/trail issues and resistance to converting roads to trails.

Andy B. felt that the District's proposals for the South Shore Road were reasonable. Andy asked about overnight parking and overnight camping along

the South Shore Road. The District intends to work closely with the City of Everett and the DNR on the proposals along South Shore Road, but overnight camping will continue to be prohibited due to water quality protection in the watershed. Overnight parking is being discussed and would occur at a new trailhead.

Susan R. asked about District security at the dam and the proposed pedestrian access route across the dam. Kim indicated that the District thinks it can be done safely and has consulted with FERC staff. However, it is a FERC decision. Cameras may be added.

There was a question regarding the prohibition of boat landings along the north shore of Spada Lake. The City of Everett has concerns about activities along this portion of the reservoir shoreline that may impact water quality. Susan R. asked why there was not a trail along the north shore of Spada Lake. Stan K. stated that there are no prohibitions regarding walking/hiking along the north shore road, but there are no plans for a formalized trail. Stan also indicated that State Trust Lands are generally open to recreational use, but recreation is encouraged only on developed trails or at specific facilities within NRCAs. Stan explained that within a NRCA, the first priority is environmental protection and that recreation is subordinate, not a priority. Furthermore, there are already other access trails to the north of Spada Lake on DNR lands. There is no DNR requirement to provide trail access everywhere.

Eric O. asked that the project NEPA compliance analysis, even if programmatic, be included as part of relicensing. Dave T. indicated that it can probably be factored into the project NEPA compliance analysis, but could still be separate from the license and addressed in a cumulative affects analysis. Eric said the USFS may prefer to have the proposed trailhead and trail within the new FERC license. Patty said that the District as licensee wants it off-license and that will be considered by FERC. Tom O. wanted the project NEPA compliance analysis to include trail information. Patti L. would want to work with the USFS to use the FERC NEPA analysis for their project at same time.

Dave T. indicated that many of the District's preliminary proposed PM&Es address DNR's abandonment plans for the South Shore Road. The upcoming project Preliminary Licensing Proposal (PLP) should address keeping all existing recreation sites, as well as eliminating some as proposed by the District. Jim E. mentioned reasons for eliminating under utilized recreation sties: environmental issues, wetlands, and trails. Rich stated that these south shore recreational sites might be better served by trails instead of roadways.

Jim E. and Sergio C. mentioned that sightseers are important to consider as well; however, many of their experiences often start when they get out of their car.

The District proposed a trial whitewater boating program for the Sultan River below Culmback Dam (segments 2-5). For initiating whitewater boating programs at FERC licensed projects, Tom O. indicated that 3 years is a standard trial period length. Jim E. stated that there should be criteria developed to judge the success or failure of the trial period before a program is launched. Examples include use levels during events, safety, environmental impacts, and access logistics. Tom O. indicated this has been done on other FERC projects. Tom O. wants more structure to the whitewater boating flow proposal and recommends follow-up meetings with the District to flush out the proposed 3-year trial period.

Andy brought up that the 900 acre-feet proposed by the District is a total volume of water over 3 years. Tom O. indicated that the offer is fairly lean, but on other hand, he understands the constrained economics of the project and the cost of lost generation. Tom asked FERC staff how decisions are typically made regarding whitewater boating flow releases at FERC projects. Dave T. stated that FERC will balance the cost of lost generation and the recreational benefit (such as number of paddlers expected during an event). Project economics is a concern. Dave T. stated that economics associated with lost generation are based on average power prices for the current year. Patty L. reminded meeting participants that Section 4.3.1 of RSP 14 provides information regarding anticipated District costs ($15,000-$75,000 per release). She also inquired if we should look at other flow volumes. Andy indicated that 900 acre-feet would likely only provide optimal flows for 2 years, not 3 years. Bruce M. indicated that during extreme drought years, flows may be excluded.

Rich wanted to ensure that any proposed whitewater flows are balanced with potential fishery and/or flushing flows. There is a need to integrate both flow proposals where possible. Susan R. and then the group discussed the potential for an integrated PM&E meeting (potentially after the upcoming USR meeting on Oct. 27). Dave T. reminded the group that the purpose of the USR meeting is to agree that the studies were done per the approved RSP and that there are no additional modifications required. However, other meetings could occur before or after the USR meeting.

Dave T. provided additional information on estimating the cost of lost generation. A FERC engineer will assist on cost calculations and will likely pick an average cost for alternative energy, such as the Mid-C's.

Tom O. commented that he wants to see real time stage (elevation) data from Spada Lake posted on the web for boaters and others to view.

Tom O. stated that the District has done a great job on the study.

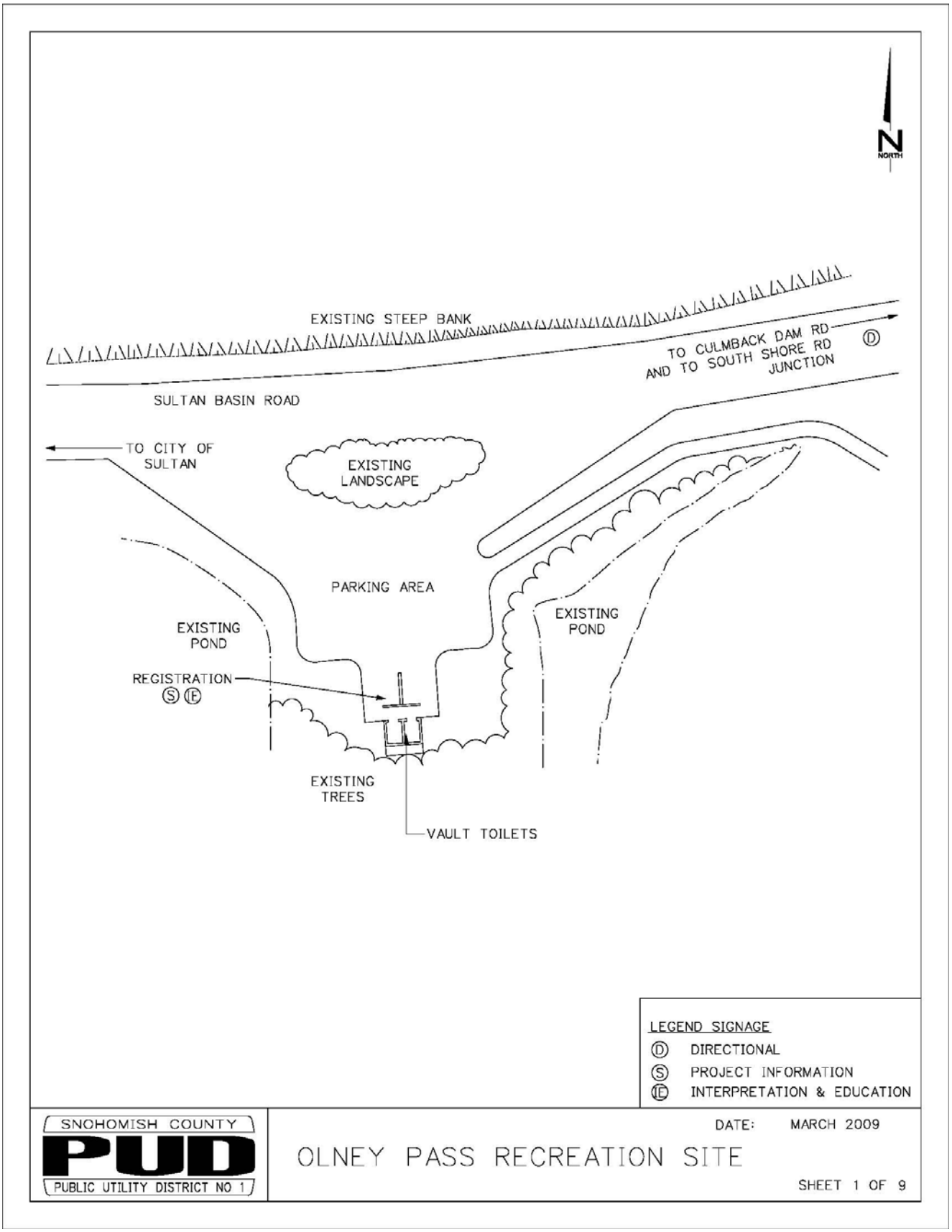
Stan K. said that the DNR considered mountain biking access along the South Shore Road (after abandonment) when it was looking at placing the trailhead at Olney Pass. There are environmental concerns such as bikers leaving the

designated trail and creating impacts such as erosion. If the trailhead is at the South Shore Recreation Site, which is much closer to the Greider trailhead, then DNR would convert the road beyond that location to a pedestrian trail. DNR would not build the trail to accommodate bicycles.

Karen indicated that the preliminary proposed recreation and flow PM&Es will be emailed/sent out for further review by stakeholders in a few days, with a follow-on 2 week review period. At the same time, the District will be engaging in additional discussions with DNR and USFS staff.

Karen indicated that the new proposed recreation site/trailhead accessing the enhanced trail along FR 6122 needs a name. Stakeholders were encouraged to submit their ideas for a name.

Appendix B: Conceptual Site Plan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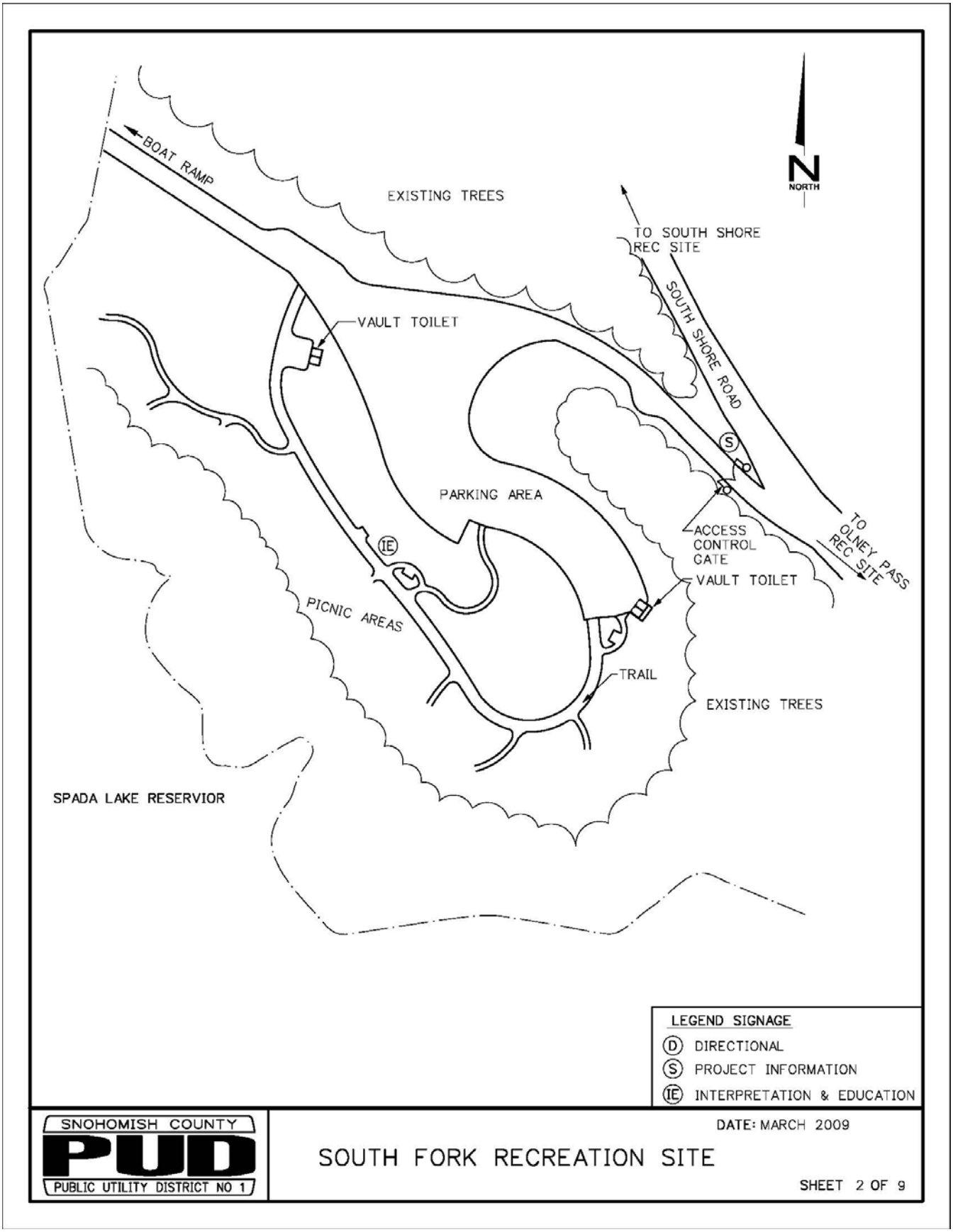
VAULT TOILETS
LEGEND SIGNAGE
Ⓓ DIRECTIONAL
Ⓢ PROJECT INFORMATION
Ⓘ INTERPRETATION & EDUCATION
SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO 1
DATE: MARCH 2009
OLNEY PASS RECREATION SITE
SHEET 1 OF 9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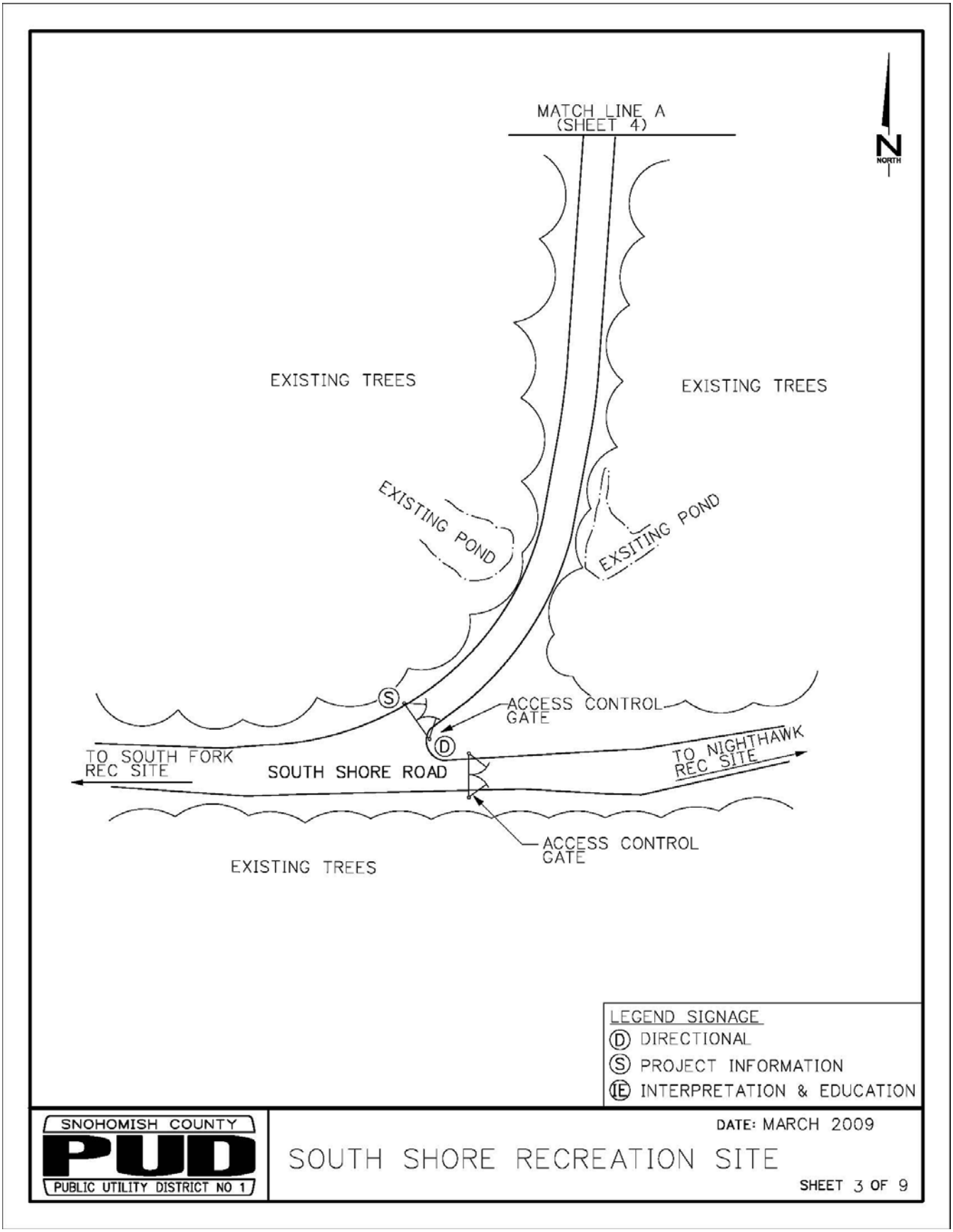
SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO 1
DATE: MARCH 2009
SOUTH FORK RECREATION SITE
SHEET 2 OF 9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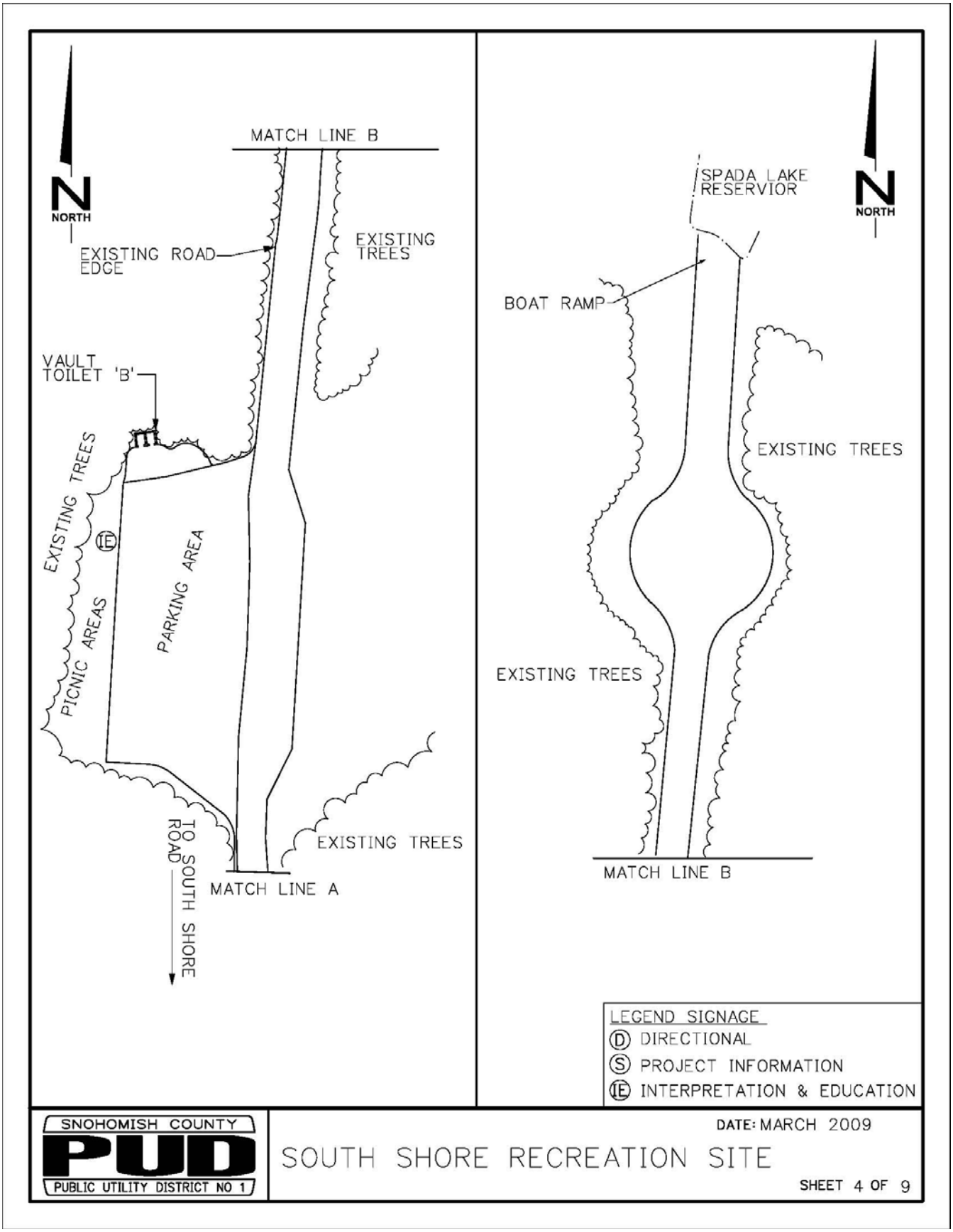
PUBLIC UTILITY DISTRICT NO 1
DATE: MARCH 2009
SOUTH SHORE RECREATION SITE
SHEET 3 OF 9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DATE: MARCH 2009
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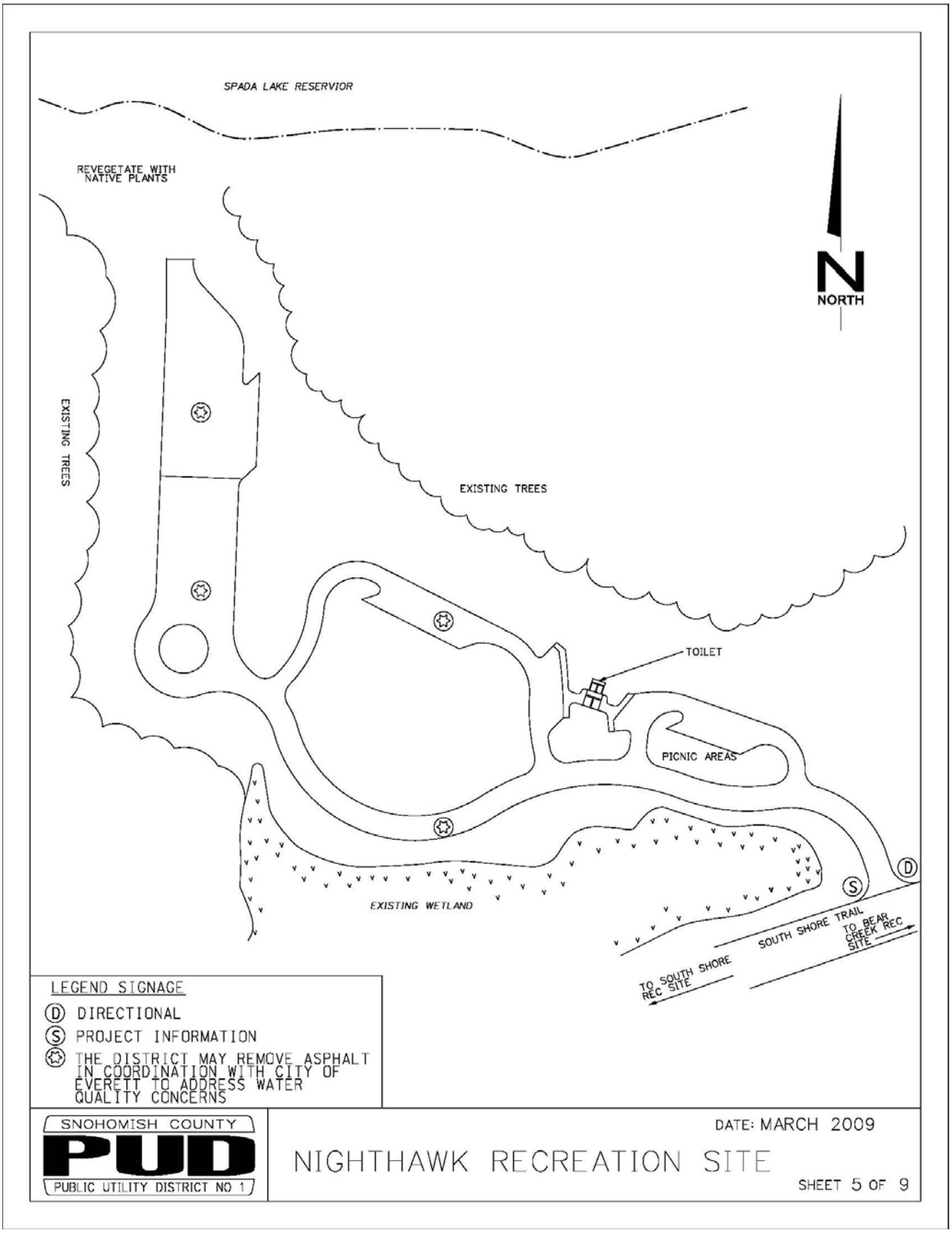
SHEET 4 OF 9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LEGEND SIGNAGE
D DIRECTIONAL
S PROJECT INFORMATION
THE DISTRICT MAY REMOVE ASPHALT IN COORDINATION WITH CITY OF EVERETT TO ADDRESS WATER QUALITY CONCERNS
SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO 1
DATE: MARCH 2009
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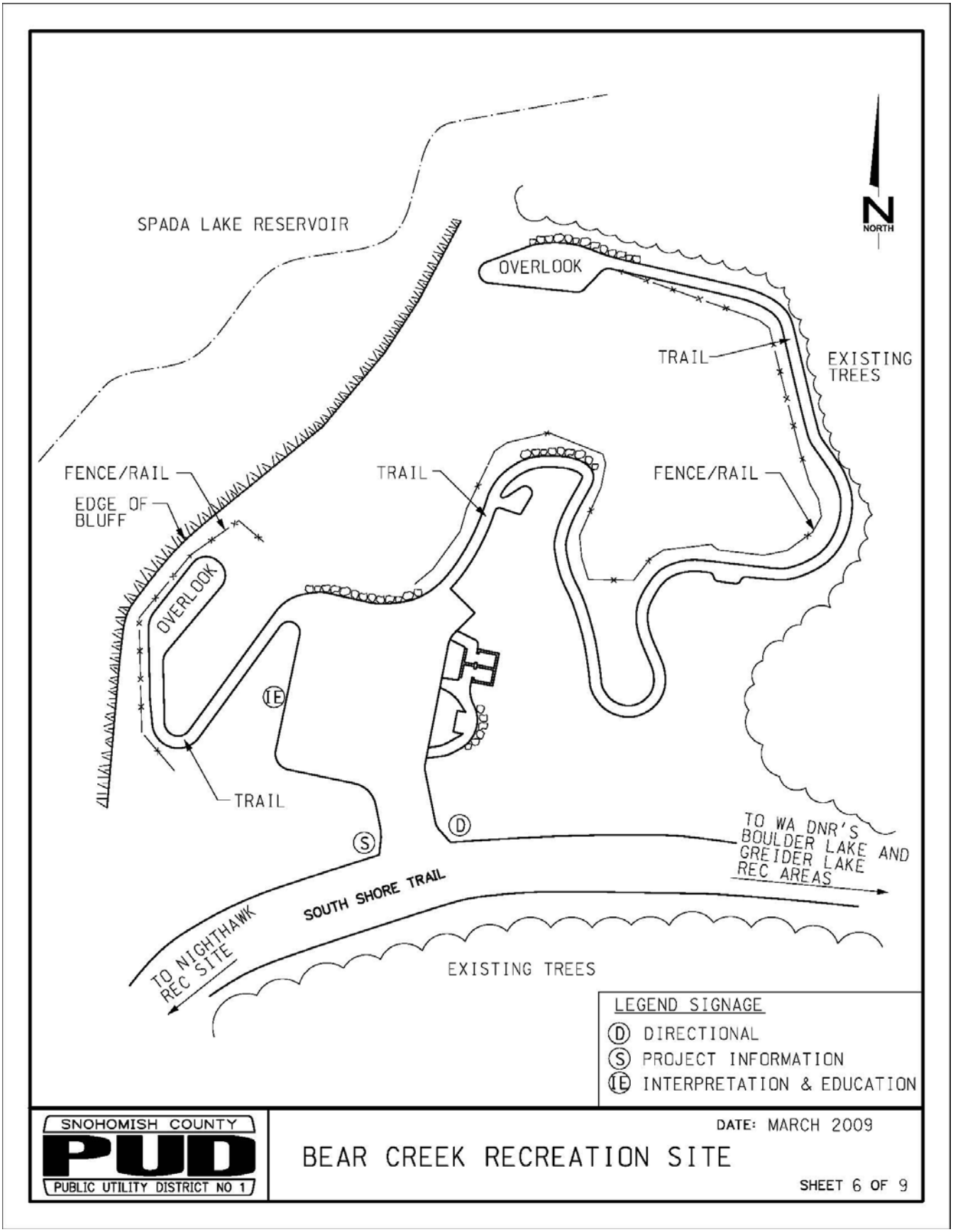
SHEET 5 OF 9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DATE: MARCH 2009
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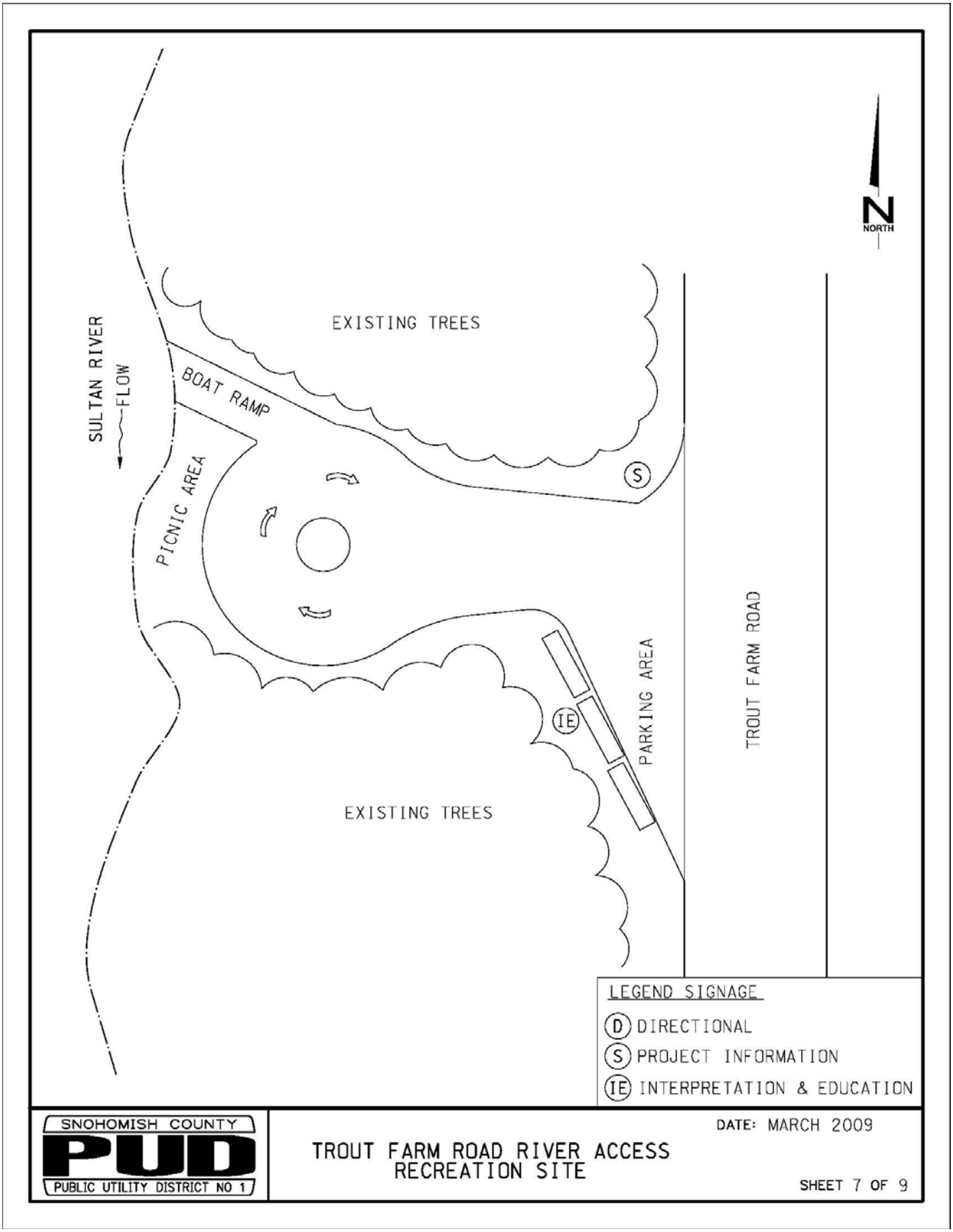
SHEET 6 OF 9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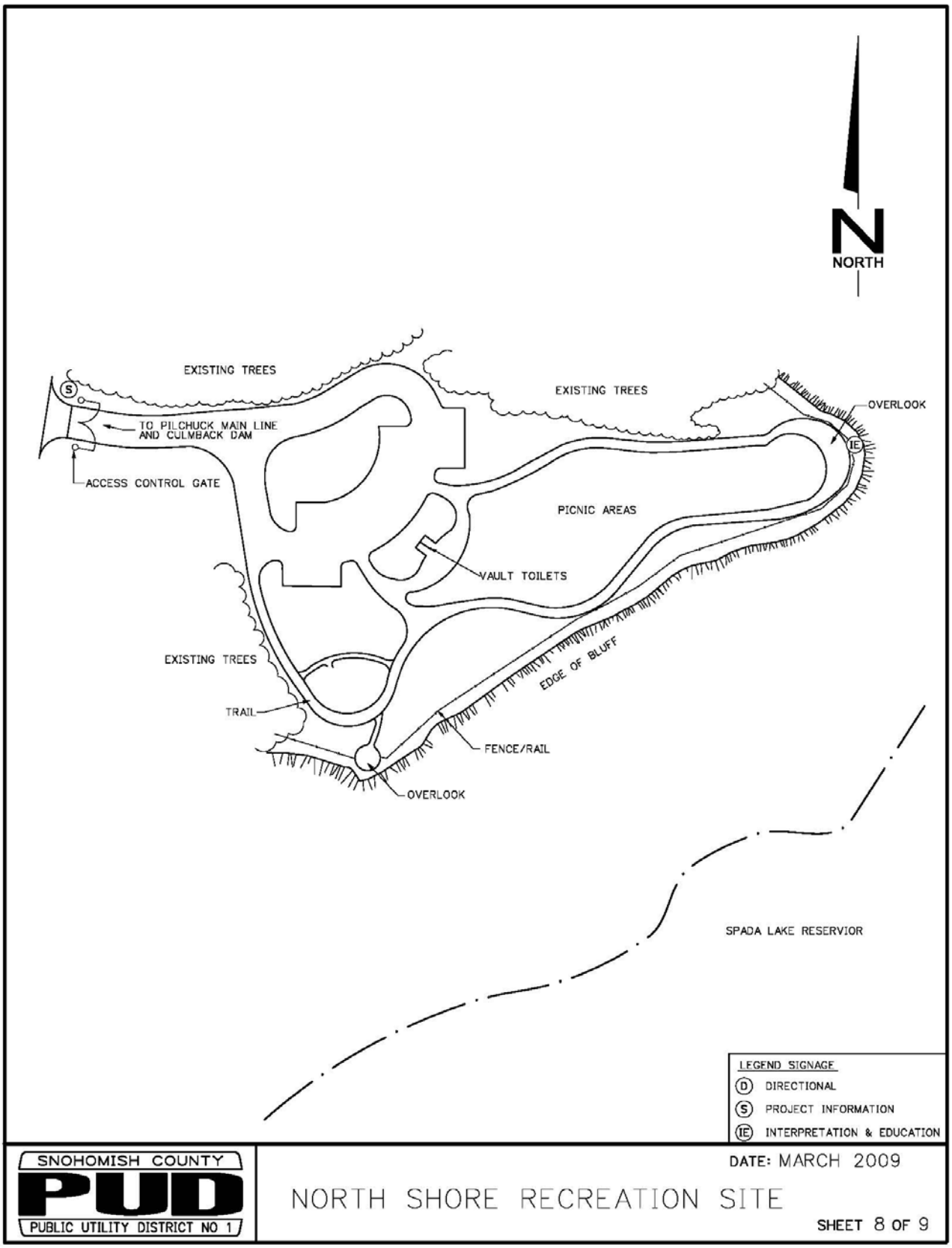
PUD
PUBLIC UTILITY DISTRICT NO 1
DATE: MARCH 2009
TROUT FARM ROAD RIVER ACCESS
RECREATION SITE
SHEET 7 OF 9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PUBLIC UTILITY DISTRICT NO 1
DATE: MARCH 2009
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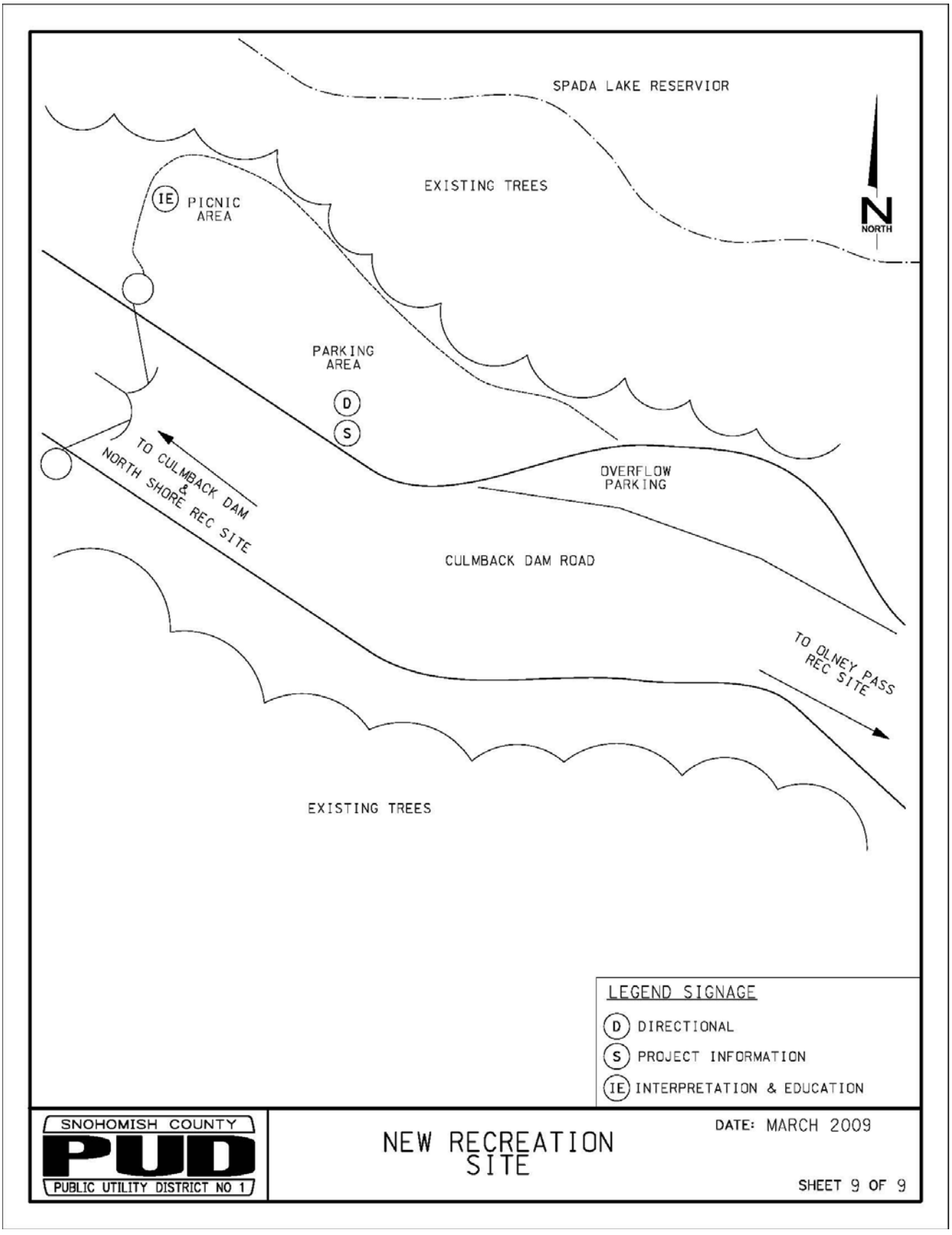
SHEET 8 OF 9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CULMBACK DAM ROAD
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S PROJECT INFORMATION
IE INTERPRETATION & EDUCATION
SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO 1
NEW RECREATION SITE
DATE: MARCH 2009
SHEET 9 OF 9

Appendix I

Historic Properties Management Plan

Henry M. Jackson Hydroelectric Project
(FERC No. 2157)
Historic Properties Management Plan

Submitted to

Snohomish County Public Utility District No. 1
2320 California Street
P.O. Box 1107
Everett, Washington 98206-1107

Submitted by

Steven K. Dampf and Brent A. Hicks
Seattle, Washington

September 2008
Updated May 2009

Table of Contents

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1.0 Introduction

The Public Utility District No. 1 of Snohomish County (District) is seeking from the Federal Energy Regulatory Commission (FERC) a new license for the existing 111.8-megawatt (MW) Henry M. Jackson Hydroelectric Project (FERC No. 2157) (Project); the current license expires May 31, 2011. The Project, located on the Sultan River in Snohomish County, Washington, consists of a dam and impoundment (Spada Lake Reservoir), a powerhouse, and associated equipment and facilities. FERC's actions in relicensing of the Project constitute a federal undertaking subject to the National Historical Preservation Act (NHPA) and its implementing regulations. Typically, FERC completes its NHPA requirements by entering into a Programmatic Agreement (PA) or Memorandum of Agreement (PA/MOA) with the licensee and other stakeholders that is attached to the license. The PA/MOA stipulates how effects to cultural resources will be considered and appropriately managed, the details of which are usually included in a Historic Properties Management Plan (HPMP).

Staff from FERC and the Advisory Council on Historic Preservation (ACHP) developed guidelines to assist hydropower project licensees in preparing HPMPs (FERC and ACHP 2002). Consistent with Section 106 of the NHPA, the guidelines focus on management of historic properties, which are cultural resources that are listed in or eligible for listing in the National Register of Historic Places (National Register). The guidelines call for an HPMP to:

- Identify the nature and significance of historic properties that may be affected by day-to-day project maintenance and operation, proposed improvements to project facilities, and public access;
- Identify goals for preservation of historic properties;
- Establish guidelines for routine maintenance and operations;
- Provide procedures for integrated resource management during project planning activities – including consistency with other management programs;
- Establish mechanisms for consultation with regulatory agencies, Indian tribes, historic preservation experts and the interested public;
- Coordinate with some other Project plans; and
- Be written in plain English with a minimum of historic preservation jargon.

The District retained Historical Research Associates, Inc. (HRA), for preparation of this HPMP to provide a strategy for managing the historic properties under the District's stewardship. This HPMP briefly reviews the research that HRA undertook to identify and evaluate Project cultural resources, potential effects of relicensing on identified eligible historic properties, and measures that will be taken to manage such properties during the new license period. The District previously filed the HPMP with FERC in 2008; this version updates the HPMP to be consistent with the Final License Application removing the Diversion Dam as a Project facility under the new license. This update does not modify the determinations or effects analysis.

The District is committed to exercising good stewardship over the Project's historic properties by following applicable federal and state laws and regulations in consultation with oversight agencies and affected Native American tribes, consistent with their responsibilities to their customers and to the natural and social resources they manage.

1.1 Legal Authority and Purpose

Section 106 of the National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. § 470f), as amended, requires federal agencies to take into account the effects of their decisions on historic resources. To meet its obligations under the NHPA, FERC requires its license applicants to complete cultural resources investigations as part of the suite of environmental and resource studies undertaken in the licensing process. In most cases, FERC – in exercising its public interest/comprehensive planning authorities under the Federal Power Act – requires licensees to develop a plan to identify (if necessary) and manage the historic properties affected by their projects. This HPMP is designed to assist the District in managing historic properties identified within the Area of Potential Effects (APE) for the Project. The HPMP is intended to be a flexible document that will assess and manage the effects of Project operations throughout the term of the new license.

1.2 Coordination with Interested Parties

The District convened a Cultural Resource Group (CRG) during the relicensing consultation process for the Project in 2006. Participants in the CRG include representatives of the U.S. Forest Service Mount Baker-Snoqualmie National Forest (MBSNF), Washington Department of Natural Resources (DNR), Tulalip Tribes, Snoqualmie Tribe, Stillaguamish Tribe, Certified Local Governments (City of Everett and Snohomish County), FERC and Washington State Department of Archaeology and Historic Preservation (DAHP). Several meetings and field visits to the Project area with these tribal and agency representatives took place during the cultural resource work for relicensing the Project.

The CRG reviewed and commented on Revised Study Plan 15: Historic Properties Study (RSP 15) and the draft Inventory Report, with specific discussion topics including past research for the Project area, survey methods, project schedule, the MBSNF special use permit for archaeological fieldwork, and the confidential nature of traditional cultural property (TCP) and archaeological site information. CRG members visited the project area at the conclusion of archaeological fieldwork in September 2007 to discuss the methods and results of the inventory work. The CRG was also given an opportunity to comment on the HPMP.

1.3 Arrangement of the Plan and Disclaimer

Following this introductory section, Section 2.0 summarizes the applicable cultural resource regulatory context, including the laws, regulations, and executive orders that provide for the management of historic properties. Section 3.0 briefly describes the Project, including its geographic location, facilities, and the APE for historic properties. Information on cultural resource studies, providing lists of the cultural resources and identifying which are historic properties is included in Section 4.0. Section 5.0 discusses the Project's potential effects on the

historic properties, while Section 6.0 sets out the general management measures for these resources. More general archaeological measures and site-specific measures for archaeological sites are found in Section 7.0, while Section 8.0 provides measures for the operation and maintenance of the hydroelectric facilities that are eligible for the NRHP. Section 9.0 discusses HPMP implementation, and Section 10.0 contains a list of the references cited.

Six appendices contain a List of Acronyms (Appendix A), maps of the Project Boundary/Area of Potential Effects, Sensitivity Criteria, and recorded cultural resources (Appendix B), an Inadvertent Discovery Plan for human remains and archaeological deposits (Appendix C), FERC's notice designating the District as the non-federal representative (Appendix D), DAHP's letter concurring with eligibility recommendations (Appendix E), and the District's letter identifying TCP identification opportunities (Appendix F).

2.0 Applicable Cultural Resource Laws, Regulations and Executive Orders

The following sections discuss the Project's regulatory context, including applicable federal and state cultural resource laws, regulations, and executive orders that exist at the time of this HPMP's development.

2.1 Federal Laws and Regulations

Several Federal historic preservation and environmental laws, and their implementing regulations interact with FERC's project licensing authority, including: NHPA and regulations developed by the Advisory Council on Historic Preservation (ACHP), 36 C.F.R. Part 800; the National Environmental Policy Act of 1969; the American Indian Religious Freedom Act of 1978 (AIRFA); the Archaeological Resources Protection Act of 1979 (ARPA); and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). The application of each of these differs depending largely on land ownership within the Project area.

The National Historic Preservation Act of 1966, as Amended (16 U.S.C. § 470 et seq.) establishes the statutory responsibilities of federal agencies to manage the cultural resources under their jurisdiction and authorizes the Secretary of the Interior to maintain a NRHP. Section 106 of the Act requires federal agencies to take into account the effect of their proposed undertakings on properties listed in, or eligible for listing in, the NRHP. "The Protection of Historic and Cultural Properties" (36 C.F.R. Part 800, as revised) implements Section 106 by stating the requirements for inventorying cultural resources, determining which are eligible for listing in the NRHP, evaluating project effects on the properties, and resolving adverse effects, as implemented in consultation with oversight agencies, Indian tribes, and other interested parties.

The NHPA and ACHP define historic properties as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register..." (16 U.S.C. § 470w(5); 36 C.F.R. § 800.16(*l*)(1)). The term includes artifacts, records, and remains that are related to and located in such properties. It also includes properties of traditional religious and cultural importance (traditional cultural properties) that are eligible for inclusion in the NRHP. The NRHP is the federal list of historic, archaeological and other cultural resources that are significant in American history, prehistory, architecture, archaeology, engineering, and culture and includes districts, sites, buildings, structures, objects, and landscapes.

The National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.) established a decision making process that provides for the systematic consideration of alternatives and examination of the direct, indirect, and cumulative environmental impacts associated with implementation of a proposed action. Under NEPA, federal agencies must take into account impacts to historical resources, or those resources that are eligible for the NRHP, before a project is approved under the NEPA. The NEPA process provides an avenue to facilitate compliance with other statutory and regulatory requirements (e.g., Section 106

reviews) but compliance with NEPA does not satisfy these other applicable requirements or vice-versa.

The American Indian Religious Freedom Act of 1978 (42 U.S.C. § 1996) protects and preserves the right for American Indians, Eskimos, Aleuts, and Native Hawaiians to exercise their traditional religion and allows them to possess and use sacred objects, and to access traditional sites for religious purposes.

The Archaeological Resources Protection Act of 1979 (ARPA) (16 U.S.C. §§ 470aa-mm) protects archaeological resources on federal and tribal land by prohibiting the removal of archaeological artifacts without a permit from the land managing agency. Violation of the Act can result in civil and criminal penalties. Federal agencies can issue permits under ARPA for archaeological investigations on lands under their jurisdiction. This law applies to land within the MBSNF.

The Archaeological Data Preservation Act (ADPA) or Archaeological and Historic Preservation Act (AHPA) (16 U.S.C. §§ 469-469-c). This Act requires agencies to report their potential impacts on archaeological, historical, and scientific data, and to recover such data in various ways.

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. § 3001 et seq.) establishes regulations regarding the treatment of any Native American graves, human remains, and/or funerary objects, sacred objects, or objects of cultural patrimony on federal and tribal lands. Knowingly disturbing or removing gravesite remains or these objects is a felony under federal law and can result in criminal prosecution. This law applies to land within the MBSNF.

Executive Order (EO) 13007 requires that federal agencies try to minimize damage to Native American sacred sites on federal land, and try to avoid blocking access to such sites by traditional religious practitioners.

2.2 Washington State Laws and Regulations

Several Washington State laws provide protection to archaeological sites on both public and private lands. Specific statutes relevant to this HPMP include the following:

The Archaeological Sites and Resources Act (RCW 27.53) provides for the conservation, preservation, and protection of the state's archaeological resources. It combines certain elements of the NHPA and ARPA, but also provides specific penalties for the disturbance or destruction of archaeological materials on both public and private lands. The Department of Archaeology and Historic Preservation (DAHP) is the agency designated to carry out the functions of this law. DAHP also administers the Washington Heritage Register, a Washington-specific list of properties, similar to the NRHP, that help sustain the social, cultural and economic well being of communities. Violation of this law is a Class C felony.

The Indian Graves and Records Act (RCW 27.44) makes knowingly destroying American Indian graves and pictographs or petroglyphs a class C felony. This law provides that inadvertent disturbance of native Indian graves requires re-interment under supervision of

the appropriate Indian tribe. Also, the sale of any native Indian artifacts or any human remains that are known to have been taken from an Indian cairn or grave also is prohibited. *House Bill 2624* was recently approved and incorporated into RCW 27.44 by the Washington State Legislature (June 12, 2008) and contains several amendments and additions to existing laws concerning human remains. These changes include notifications to coroner and local law enforcement; appointment of a state physical anthropologist to investigate, preserve, and, when necessary, remove and reinter discoveries of nonforensic skeletal human remains; revision of definitions relating to cultural resources; and requiring the DAHP to develop and maintain a centralized database and geographic information system of all known cemeteries and known sites of burials of human remains in Washington state; among others.

The Public Lands Act (RCW 79.01) addresses several activities on public lands. It is a criminal act to take or remove any valuable materials from public lands. The DAHP has determined that archaeological objects are valuable materials under the provisions of this act and that anyone removing such objects from public lands faces penalties, including imprisonment.

The Abandoned and Historic Cemeteries and Historic Graves Act (RCW 68.60) protects historic graves and cemeteries from unlawful destruction, mutilation, injury, or removal. Deliberate desecration of any historic grave, grave marker, tomb, monument, or cemetery is a Class C felony.

2.3 Federal and State Agencies and Indian Tribes

The United States has a trust responsibility to Native American tribes as dependent sovereign nations. This unique relationship is derived from the history of the country's relationship with tribes and is represented in the Constitution of the United States, treaties, executive orders, court decisions, and laws and regulations. FERC, as the federal agency with primary oversight for the Henry M. Jackson Hydroelectric Project, is the responsible party for representing this relationship. FERC maintains its own cultural resources staff and consults with the Advisory Council on Historic Preservation on issues affecting cultural resources.

FERC designated the District as its non-federal representative for carrying out consultation under NHPA Section 106 in the relicensing of the Project (see Appendix E). The District invited government, tribal and private entities with interests in cultural resources in the Project area to participate in work groups during the relicensing process for the Project. The CRG invitees included: the U.S. Forest Service Mount Baker-Snoqualmie National Forest (MBSNF), Washington Department of Natural Resources (DNR), Tulalip Tribes, Snoqualmie Tribe, Stillaguamish Tribe, Certified Local Governments (City of Everett and Snohomish County), FERC and Washington State Department of Archaeology and Historic Preservation (DAHP).

As described in Section 1.2, a Cultural Resource Group was formed, which included entities with appropriate government or professional credentials to review Section 106 compliance, to provide input into the development of the study plan, to review study findings, to review and comment on the draft technical report of Revised Study Plan 15, and to address information regarding cultural resources that is restricted from the general public (e.g., site locations).

3.0 Project Description

The Project, located on the Sultan River in Snohomish County, Washington, currently consists of a dam and impoundment (Spada Lake), a smaller diversion dam, a powerhouse, and associated equipment and facilities (Appendix C). Under the new license, the Diversion Dam will not be a Project facility, although it will remain in the Project's APE due to its proximity to the Sultan River. The District is not proposing to add capacity or make any major modifications to the Project under the new license. The current license expires May 31, 2011. The following sections provide summary information on the Project's geographic location, facilities, and Area of Potential Effects for historic properties.

In 1930, the City of Everett constructed, at River Mile (RM) 9.7, the Diversion Dam that exists today. This dam was used to divert water from the Sultan River, through a pipeline and tunnel, west to Lake Chaplain for municipal water supply storage. The District and City filed a joint application with the Federal Power Commission (now FERC) in 1960 to develop what was then known as the Sultan River Project; a license was issued in 1961 for construction of the Project in two phases (Snohomish County PUD and City of Everett 2005). In 1965, Stage I of Culmback Dam was built at RM 16.5 for additional storage of municipal water supply. The traditional operation of the Diversion Dam and tunnel to Lake Chaplain were essentially unchanged. With completion of the Stage II hydroelectric Project facilities in 1984 (which included a raised Culmback Dam, a power tunnel and pipeline, a powerhouse, and a Lake Chaplain pipeline from the powerhouse to Lake Chaplain), the Project was renamed after the late Senator Henry M. Jackson. Stage II changed the function of the Diversion Dam considerably. Prior to the completion of Stage II, water flowed west from the Diversion Dam through the tunnel to Lake Chaplain; post-Stage II, water now flows east through the tunnel between Lake Chaplain and the Diversion Dam. Some of the water diverted from Spada Lake at Culmback Dam is returned to the Sultan River at the Diversion Dam to provide minimum instream flows below that point for fishery protection and enhancement. Under the new FERC license for the Project, the water will be returned to a new discharge structure adjacent to the Diversion Dam. The District will be the sole licensee.

3.1 Geographic Location

The Project is located on the Sultan River within the western foothills of the central Cascade Range, approximately 39 kilometers [km] (24 miles [mi]) east of Everett, Washington. From its headwaters near Vesper Peak, the Sultan River flows west for approximately 31 km (19 mi), then south-southwest for 18 km (11 mi) to its confluence with the Skykomish River at the city of Sultan. The basin is bounded on the east by the Cascade Mountains, on the north and south by lateral ridges extending westward from the Cascade crest, and on the west by the Puget Sound lowlands. Elevations in the basin range from the 2,017-m (6,617-ft) summit of Del Campo Peak to 40 m (130 ft) at the confluence of the Sultan and Skykomish rivers. Major tributaries to the Sultan River above Culmback Dam include the South Fork Sultan River, North Fork Sultan River, Elk Creek, and Williamson Creek. Downstream of Culmback Dam, major tributaries include Marsh Creek, Chaplain Creek, Woods Creek (drains Woods Lake), Ames Creek, and Winters Creek.

The District owns approximately 4,300 acres of wildlife habitat management lands (WHMP), mostly surrounding Spada Lake. Approximately 2,300 acres lie within the current FERC Project boundary. Other land managers and owners include the City of Everett, DNR, MBSNF, and other private parties. The Pre-Application Document (PAD) describes the terrestrial environment of the area as:

The Project area lies within the Western Hemlock Zone and Pacific Silver Fir Zone of the Northern Cascades Physiographic Province (Franklin and Dyrness 1973). The dominant native vegetation is similar in both zones and consists of dense forests of western hemlock, Douglas-fir and western red cedar (and Pacific silver fir at higher elevations). Scattered throughout the coniferous forests are individual and small stands of red alder, bigleaf maple and black cottonwood. Hardwoods are found primarily on wet and/or recently disturbed soils. The primary difference between the zones is elevation, which results in greater annual precipitation and more persistent snowpack in the higher Pacific Silver Fir Zone.

Most development is limited to the lower portion of the Sultan River basin, below the powerhouse. Most of the basin below Big Four Creek (RM 11.2, or approximately 1.5 miles above the Diversion Dam) was harvested in the 1920s (FERC 1981) and some stands have been harvested again more recently. Areas above Big Four Creek have been harvested since the 1960s and are in various successional stand conditions. Some old growth forest remains on steep slopes along the Sultan River between Culmback Dam and the Diversion Dam, and within the Jackson Project wildlife habitat management areas. The DNR's Upper Sultan Basin Natural Resource Conservation Area (NRCA) also contains some old growth forest.

Vegetation cover types within the Project area include coniferous forest, mixed deciduous/coniferous forest, deciduous forest, riparian forest, mixed shrub/brush, grass/meadow, and wetlands. [PAD page 5-113] (see Appendix C for cover type maps).

The District's approach to habitat management is consistent with objectives of protecting and enhancing plants of tribal concern. The WHMP calls for preserving old growth conifer stands, promoting old growth characteristics in adjacent younger stands, and retaining mixed and deciduous forest. In planning stand management activities, the District aims to optimize conditions to support native understory shrubs, forbs and grasses. The District establishes buffers around streams, lakes and wetlands to protect riparian and wetland plant communities [PAD page 5-124].

3.2 Project Facilities

The hydroelectric development consists of:

- An 1,870-acre reservoir at maximum operating pool elevation of 1,450 feet above mean sea level (msl);
- A 262-foot-high, 640-foot-long earth and rock-filled dam;
- A concrete morning glory spillway with an inside diameter of 38 feet, a 94-foot-diameter ogee crest, vertical shaft, and horizontal tunnel section;

- A powerhouse containing two 47.5 megawatt (MW) Pelton turbines and two 8.4 MW Francis turbines;
- A 72-inch-diameter buried pipeline running from the powerhouse to the Portal 2 structure on the shore of Lake Chaplain;
- A control structure (Portal 2) at the terminus of the Lake Chaplain pipeline;
- A 1.5-mile-long, concrete-lined diversion tunnel and 72-inch-diameter, 2,000-foot-long concrete cylinder pipeline connecting Portal 2 to the Sultan River;
- Mechanical, electrical, and computer control equipment; and
- Other associated facilities.

Figure 3-1. Project location.

3.3 Area of Potential Effects

A project's Area of Potential Effects (APE) is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist (36 C.F.R. § 800.16[d]). For the purposes of the new license for the Project, the APE is defined as the:

(a) Lands enclosed by the Project boundary; and

(b) Lands or properties outside the Project boundary where Project operation, recreational development, or other Project-related development or use may cause changes in the character or use of historic properties, if any historic properties exist.

The APE that was used during the relicensing efforts is in Appendix C, sheets 1-4.

4.0 Identification of Historic Properties

The District and its contractors have undertaken several tasks to inventory cultural resources and determine which are eligible for listing in the National Register. These tasks include consultation and meetings of the CRG, and resource inventory studies in the APE for prehistoric and historic-period archaeological sites, as well as for historical buildings and structures. The following sections summarize this work and the results.

4.1 Resource Inventory Studies

A number of previous cultural resource studies and informal consultations have been conducted on lands within or near the Project in conjunction with the construction of the original Culmback Dam, amendment of the license to add the current Project facilities, subsequent land exchange actions, and resource management activities associated with the Project. Kidd's (1963) survey report discusses the methods and results of archaeological work undertaken in the Spada Lake reservoir area during land clearing prior to construction of Stage I of Culmback Dam and filling of the reservoir. Kidd and his assistants conducted reconnaissance surveys throughout the reservoir area along with a virtually comprehensive survey of the pre-inundation riverbank (see Section 5.9.4 of the PAD). The survey identified two possible stone artifacts and the remains of a cabin, probably associated with prospecting, on the south bank of the river opposite and somewhat east of the dam's construction camp.

The 1979 study by Thompson and Lindeman was conducted in conjunction with Stage II construction at the Project which included raising Spada Lake 27 m (90 ft), digging a power tunnel from Culmback Dam to a point about 3 km (2 mi) southwest of the summit of Blue Mountain, and burying a pipeline from this point to a powerhouse located on the river west of Haywire Ridge. The study included a literature review, field survey, and interviews (see Section 5.9.4 of the PAD). Thompson and Lindeman (1979) identified only one possible prehistoric artifact—a stone flake found along the lower part of the power pipeline route. Fieldwork at a prehistoric lithic site previously identified in state records (45SN39) located downstream of the powerhouse found no artifacts at the location. The survey identified a number of locations where remains of historic period use were found, although most were too sparse and deteriorated to be considered significant. Four properties were thought not to be eligible for the NRHP; nevertheless, the researchers recommended that Project construction avoid these sites because formal evaluation had not occurred. They included a cabin near the powerhouse, a sluice-water ditch and cabin foundations on the fish water return pipeline route, and a railroad grade near part of the power pipeline route. Two additional properties were identified in this survey and thought to be eligible for the NRHP: the Horseshoe Bend Placer Claim and the Sultan North Fork Truss Bridge ("Sultan River Truss Bridge" as identified on the NRHP nomination form). Snohomish County later listed the Horseshoe Bend Placer Claim in the NRHP. The Sultan River Truss Bridge was demolished by DNR in the early 1990s.

Table 4-1. Cultural Resource Studies in the APE and General Vicinity.

Author(s)	Date	Report Title	Cultural Resources Identified
Kidd	1963	*Sultan Basin Archaeological Project—Final Report on Survey Conducted in 1962-1963*	Cabin remains
Thompson and Lindeman	1979	*Cultural Resource Assessment of the Sultan River Hydroelectric Project*	Possible lithic material, cabin, sluice-water ditch, cabin foundations, railroad grade; 45SN125; 45SN126
FERC	1981	*Final Environmental Impact Statement, Sultan River Project No. 2157*	None
Hicks and Stump	1989	*An Archaeological Reconnaissance of the Proposed Sultan Basin Land Exchange*	MB325, MB326, FS2191, bridge, mine shaft, cedar stumps with springboard notches
USFS	1990	*Determination of Significance and Effect* (Report No. CRR05-89-050, 1371-F-FS-MBS-10)	MB325, MB326, FS2191
Miss and Campbell	1991	*Prehistoric Cultural Resources of Snohomish County, Washington*	Prehistoric archaeological sites (none in general vicinity)
District	2000a	*Lost Lake Tract Resource Management Plan*	None
	2000b	*Spada Lake Tract Resource Management Plan*	None
	2001a	*Project Facility Lands Tract Resource Management Plan*	None
	2001b	*Williamson Creek Property Resource Management Plan*	None

Additional survey work was conducted in 1989 (Hicks and Stump 1989) for the Sultan Basin Land Exchange between the United States Forest Service (USFS) and the District. The field survey focused on high probability landforms, such as ridgelines and promontories, low gradient slopes near water sources, known or observed subsurface exposures, and meadows or other treeless areas. Representative surveys were carried out in areas of lower probability, such as high gradient slopes and disturbed areas. No prehistoric remains that would be affected by the Project were identified during the field survey. Some historical remains (puncheon roads) were found during this survey and are described below in Section 4.2. Additional historical remains of interest located during the survey include a log bridge across the Sultan River gorge, an exploratory mine shaft, and several cedar stumps with springboard notches. All historical remains found were believed to be not eligible for inclusion in the NRHP.

A 1991 study prepared for the Washington State Office of Archaeology and Historic Preservation (OAHP), now the Department of Archaeology and Historic Preservation (DAHP), was designed to locate 98 prehistoric sites in Snohomish County that were recorded prior to 1983 and to update the inventory form for the sites. The researchers were unable to locate two-thirds of the sites. They attributed this result to changed vegetation, incomplete location information, and disturbance due to construction and development (Miss and Campbell 1991).

When management plans were prepared for the Wildlife Habitat Management Plan (WHMP) lands, no additional survey work was conducted, but state records were reviewed in 1991 and 1996. In 1991, contact with the OAHP was made to determine if any cultural resources had been

identified within the boundaries of the Jackson Project lands, the Williamson Creek Property and the Lost Lake Tract. OAHP representatives reported that no resources had been identified. Similarly, contacts in 1996 regarding the Spada Lake Tract reported that no resources have been identified. Contacts with the Tulalip Tribes were also made in 1991 and 1995, with the report that the Tribes were not aware of or concerned about any cultural resources in the basin. The reports do not identify further contacts subsequent to 1996 (District 2000a, 2000b, 2001a, 2001b).

4.2 Historic Properties Study and National Register Eligibility

As part of the FERC relicensing process, a Historic Properties Study was conducted by HRA for the District to identify cultural resources that qualify as historic properties under NHPA and that should be considered for management in the new FERC license, as needed. To qualify for listing in the National Register, which includes resources significant at the national, regional, and local levels, resources need to be 50 years old or older (unless they are of exceptional importance, as determined by the Keeper of the Register), and possess historic significance and integrity. National Register regulations and guidelines refer to qualifying resources as historic properties, regardless of their nature or age. The criteria for evaluating the eligibility of resources for listing in the National Register (36 C.F.R. § 60.4) define significance and integrity as follows:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. That are associated with the lives of persons significant in our past; or
>
> C. That embody the distinctive characteristics of type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. That have yielded, or may be likely to yield, information important in prehistory or history.

In *How to Apply the National Register Criteria for Evaluation* (Bulletin 15), the National Park Service (NPS) states that "to retain historic integrity, a property will always possess several, and usually most, of the [seven] aspects [recognized by the National Register]" (Andrus 2002). The most important aspects of integrity depend on the criteria under which the property is potentially eligible. Resources eligible under Criteria A and B for instance, should retain "physical features that make up its character during the period of its association with event, historical pattern, or person(s)" (Andrus 2002). This translates to integrity of design, workmanship, materials, and feeling. Properties eligible under Criterion D should retain

integrity of location, design, and materials to ensure that important information can be gleaned from extant remains.

For archaeological sites, National Register eligibility typically is associated with contributions to knowledge of the prehistory or history of an area or region based on the kinds of archaeological materials present in the site (Criterion D). Some archaeological site locations also may be eligible based on their association with events that have made a significant contribution to the broad patterns of our history (Criterion A) or are associated with the lives of persons significant in a community's past events (Criterion B). Eligibility under all criteria assumes the locations retain integrity and that measures to protect or otherwise treat the site would successfully conserve the features that make the site eligible.

In addition to these criteria, historic properties can possess other cultural values. Amendments to NHPA in 1992 specify that properties of traditional religious and cultural importance to a Native American tribe may be determined eligible for inclusion in the National Register because of their "association with cultural practices or beliefs of a living community that are (a) rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998). Therefore, a property may also be significant if it has traditional or ethnographic importance because of its ties to the cultural past of Native Americans.

HRA's inventory included archival research, followed by development of a map showing areas within the Project APE that have a high, medium, and low probability for containing prehistoric and historic-period archaeological resources, consideration of any potential traditional cultural properties, and field survey. In consultation with tribes and other stakeholders, researchers determined which resources possess integrity and meet the criteria for eligibility for listing in the National Register.

HRA tested the expectations derived from the probability criteria and map during archaeological field survey in spring and fall 2007. No prehistoric archaeological resources were identified during this survey. The topographical and environmental setting of the Sultan River basin and results of the field survey indicate that the Project area has a low probability for containing prehistoric cultural remains. The basin is a drowned river valley with little potential for extensive travel routes; extant prehistoric archaeological resources, if any, would likely be submerged under the reservoir or on ridgelines at the edge of the valley outside the Project APE.

4.2.1 Resources Inventoried

Table 4-2 lists the sites and structures reported or encountered during the 2007 survey, within the Project's APE. The table summarizes its status for listing in the NRHP. Ten historic-period archaeological resources and one historic-period structure associated with resource extraction activities were identified and/or relocated in the APE, reflecting the Sultan River valley's history of mining and logging, and development of hydropower and as a resource for Snohomish County’s municipal water supply. No prehistoric archaeological resources were observed.

Table 4-2. Cultural Resources in the Henry M. Jackson Hydroelectric Project APE.

Site Number	Name	NHRP Significance	Date of Determination Status
45SN125	Horseshoe Bend Placer Claim	Listed	5/7/1981
45SN430	Old Sultan River Dam and Pipeline	Determined not Eligible	6/27/2008
45SN431	Sultan Steam Donkey Platform	Determined not Eligible	6/27/2008
45SN432	Startup Gaging Station No. 12137500	Determined not Eligible	6/27/2008
45SN433	Stringer Bridge	Determined not Eligible	6/27/2008
45SN434	Sultan CCC Puncheon Road	Determined not Eligible	6/27/2008
45SN435	South Fork Trail	Determined not Eligible	6/27/2008
45SN436	Olney Creek Trail	Determined not Eligible	6/27/2008
45SN437	Williamson Creek Road	Determined not Eligible	6/27/2008
45SN438	South Shore Culvert/Trestle	Determined not Eligible	6/27/2008
1325-1	Sultan River Diversion Dam and Associated Structures	Eligible (Criterion A)	6/27/2008
MB325	Sultan Basin Logging Road Grade and Attendant Structures	Determined not Eligible	5/10/1990
MB326	Olney Pass Puncheon Road	Determined not Eligible	5/10/1990
FS2191	North Fork Sultan River Puncheon Road and Possible Diversion Dike	Determined not Eligible	5/10/1990

4.2.2 Historic Period Archaeological Sites

Nine of the ten historic-period sites, 45SN430, 45SN431, 45SN432, 45SN433, 45SN434, 45SN435, 45SN436, 45SN437, and 45SN438 were recommended not eligible for listing in the National Register due to lack of integrity and/or research potential. One of the existing sites, the Horseshoe Bend Placer Claim (45SN125), has previously been determined eligible for the National Register. In a letter dated June 27, 2008, the State of Washington Department of Archaeology and Historic Preservation concurred with the recommendation that the nine historic-period sites were not eligible (see Appendix F).

Horseshoe Bend Placer Claim (45SN125)

The Horseshoe Bend Placer Claim (45SN125), a historic mining property dating to the 1880s, consists of a tunnel, ditch, and associated features cut through the bedrock of the Horseshoe Bend of the Sultan River. Site 45SN125 was originally identified in 1979 as part of a cultural resource assessment conducted in conjunction with Jackson Hydroelectric Project improvements (Thompson and Lindeman 1979). In 2007, HRA walked along the exposed banks and observed no artifacts on the ground surface. The opening to the tunnel, on the north side of the bend, is completely obstructed by fallen trees and heavy understory. Water inundation

prevented a measurement of the entire tunnel length for the 2007 site revisit, but archaeologists were able to access the south portion of the tunnel, from the south portal to the open shaft at the approximate center of the tunnel.

Site 45SN125 is located partially inside the APE. The site has been previously determined eligible for listing in the NRHP because it has yielded and has the potential to yield information regarding Snohomish County mining history (Lambert 1979). The 2007 survey failed to identify several features originally recorded in 1979 because of dense vegetation and no previously unrecorded associated cultural materials were observed. Despite the absence of mining debris, the site still conveys significance as being the only readily identifiable placer mining site on record in Snohomish County, as well as representing a highly original application of engineering towards existing terrain.

4.2.3 Historical Buildings and Structures

One group of associated historic-period structures was identified during the 2007 surveys. The Sultan River Diversion Dam and Associated Structures (Field Number 1325-1) was recommended eligible for listing in the NRHP under Criterion A for its historical association with the water supply for the City of Everett and with the broader theme of urban development in Snohomish County. In a letter dated June 27, 2008, the State of Washington Department of Archaeology and Historic Preservation concurred with the recommendation that the nine historic-period structures (1325-1) are eligible for listing on NRHP (see Appendix F).

Sultan River Diversion Dam and Associated Structures (1325-1)

Most of the Project's buildings and structures date to 1984. The City of Everett's 1930 Diversion Dam, tunnel, and portal structure (1325-1) are located within the APE and function as part of the Jackson Project under the current license. Under the new license, the Diversion Dam will not be a Project facility. The Diversion Dam spillway is an ogee section, meaning that a portion of its arch is convex and a portion is concave. The river is prone to floods that carry gravel and rocks, which eventually covered the prior dam constructed on the Sultan River all the way to the spillway level. A large sluiceway prevents gravel from accumulating behind this dam; when an operator opens it under flood conditions the force of the water will carry accumulated gravel or rocks away. Workers have removed the windows and covered a portion of the cladding of the building housing the meters and controls for the dam. They updated controls and built a structure above the sluiceway to protect some of the controls from the weather.

A 2,184-m- (7,164-ft-) long diversion tunnel connects Sultan River to Lake Chaplain. When constructed, concrete lined several hundred feet at either end of the tunnel but the remainder was bare rock. The portals at either end of the tunnel allow workers to access the tunnel (Figure 4-3).

The 1930 Diversion Dam, tunnel, and portal structure (1325-1) are located within the APE and, with minor alterations, continue to function in the same manner as they did when constructed. The portal and tunnel have undergone minor alterations since construction, all of which were necessary maintenance, but this property retains many of the aspects of integrity described in Bulletin 15 (e.g., setting, workmanship, location, and association). The property retains integrity of setting through the character of the place in which it has played its historic role, as well as its relationship to the surrounding features and open space (the surrounding area remains relatively undisturbed). The workmanship of the structures, and the system as a whole,

reveals an application of both technological practices and aesthetic principles. The property's location has not changed since the original date of construction and it is complemented by its setting. This also contributes to the property's association with the provision of water to the City of Everett.

HRA recommended that 1325-1 is eligible for listing in the NRHP and WHR under Criterion A for its association "with events that have made a significant contribution to the broad patterns of our history" (the structures have been integral parts of the system that supplied water to Everett from 1930 to present and contributed to the development of that City, which is the cornerstone of development in Snohomish County). As noted above, the structures retain several aspects of integrity that convey this significance. It is not known to be associated with significant persons (Criterion B) and is not known to be the work of a master craftsman or architect (Criterion C).

4.2.4 Traditional Cultural Properties

Tribes involved in the Project's relicensing efforts were given opportunities to discuss traditional cultural properties (TCPs) that are in the Project's APE (Appendix G). The tribes did not disclose any information regarding TCPs during the conduct of RSP 15.

5.0 Effects to Historic Properties

Analysis of effects only is required for National Register eligible properties identified within the Project APE. Effects commonly identified in reservoir settings include erosion, recreation activities, unauthorized artifact collection and vandalism, and potential ground-disturbing activities associated with Project activities such as resource protection and enhancement measures. However, only those effects attributable to the presence, operation, and maintenance of the Project are considered adverse effects that are to be considered in future management efforts.

Identified Project adverse effects on the two National Register-eligible historic sites include recreation activities that increase visitation and can inadvertently damage cultural resources, unauthorized artifact collection and vandalism, and ground-disturbing activities associated with Project maintenance and natural resource protection and enhancement activities. While other effects on archaeological sites were observed, such as trash dumping, these effects are not connected to Project activities and would occur if the Project were not present. Effects on buildings and structures can include changes to character-defining features. Table 5-1 shows the Project effects for recorded sites.

Table 5-1. Summary of Project Effects on Identified Historic Properties.

Site No.	NRHP Status	Recreation	Unauthorized Artifact Collection
45SN125 (Horseshoe Bend Placer Claim)	Listed	x	x
1325-1 (Diversion Dam & Associated Structures)	Eligible	x	

5.1 Effects to Historic Period Archaeological Sites

Effects to 45SN125 (Horseshoe Bend Placer Claim) are limited to recreation activities that may occur at the site. Recreation activities in the vicinity of 45SN125 include hiking, kayaking, and fishing. Increasing visitation can inadvertently damage sites by cutting undeveloped access trails through archaeological sites, increasing deterioration of sites, climbing on structures, using structures for recreational activity support (e.g., tying climbing ropes, soil disturbance at kayak entry and takeout locations), dumping garbage, as well as contributing to unauthorized artifact collection.

5.2 Project Effects on Historic Buildings and Structures

The Sultan River Diversion Dam and Associated Structures (1325-1) is the only historic resource determined to be National Register-eligible (see Appendix F). The Diversion Dam and its associated facilities are operating as intended and Culmback Dam only controls water at volumes well below that which would have negative impacts on the Diversion Dam. Any water volumes high enough to damage or otherwise adversely affect the Diversion Dam could not be a result of the District's operation of the Project. No other activities associated with the current operations of Culmback Dam, the hydroelectric facilities, or the Diversion Dam itself are having identified effects to the Diversion Dam. Therefore, Project operations are not having adverse effects on the Diversion Dam. Future operation and maintenance of the Project should be monitored under this Plan to not undermine the qualities of the property that lend it National Register-eligibility. This is addressed below in Section 8.0.

6.0 General Management Measures

General measures for management of historic properties during the period of the new license include establishing management goals, principles, and standards; appointing an Historic Preservation Coordinator; managing cultural resources data confidentially; conducting consultation and meetings with agencies and Tribes; instructing and training District staff on appropriate treatment and stewardship of historic properties; coordinating with other plans to manage Project lands and resources; providing for future inadvertent discoveries, the curation of artifacts, and ownership and disposition of any human remains that may be encountered; and preparing reports of activities conducted under this HPMP. These measures are discussed in the following sections.

6.1 Management Goals, Principles, and Standards

The District will responsibly manage National Register-listed and eligible properties affected by the Project to the extent feasible within the requirements of continuing Project operations and the need to balance stewardship of other sensitive resources in an integrated fashion. Effective management of historic properties is founded on the goals, principles, and standards discussed below, and conducted through management measures during the term of the license.

6.1.1 Goals

The District's goals for managing National Register properties include the following:

- Ensure continued safe and normal operation of the Project while maintaining, to the extent practicable, the integrity of historic properties within the Project APE.
- Avoid, minimize, or mitigate Project-related adverse effects on historic properties within the Project APE.
- Maintain confidentiality of the location of sensitive historic properties, especially archaeological sites and traditional cultural properties.
- Ensure consistency with federal, state, and local regulations and local resource management plans.
- Maintain coordination and compatibility of historic property management with other resource goals such as water use and quality, aquatic and terrestrial resources, recreation, aesthetics, and land management, as well as Project maintenance and operations.
- Provide good stewardship of historic properties by monitoring vulnerable historic properties within the Project APE.
- Provide cost-effective measures for any management of historic properties within the Project APE that balance with management of other Project resources.

6.1.2 Principles and Standards for Archaeological Properties

The District's principles for managing NRHP-eligible archaeological properties are:

- Maintain the confidentiality of information on the nature and location of archaeological sites.
- Treat undetermined sites as if they are National Register-eligible until they receive evaluation and SHPO concurrence.
- Strive to avoid adverse effects on archaeological sites resulting from Project activities.
- Protect sites using an acceptable and feasible treatment method.
- Consider data recovery if avoidance and protection are not feasible.
- Work to safeguard archaeological sites from vandalism and other visitor effects.

The District will consult and coordinate with the MBSNF, the City, the affected tribes, and the DAHP, as well as take into consideration the *Secretary of the Interior's Standards and Guidelines for Archaeological Documentation* (http://www.cr.nps.gov/local-law/arch_stnds_7.htm , May 13, 2008) when Project activities may impact these properties.

New archaeological resources may be identified during the term of the FERC license. Some archaeological sites within the Project boundary may remain unevaluated while the HPMP is being implemented and they will be treated as National Register-eligible until they receive evaluation. In addition, sites where no Project effects are identified or effects can be avoided, and no land disturbance is proposed may remain unevaluated until such time as any District ground disturbing activities are proposed in the vicinity. As discussed in Section 7.1 below, the District will work to conduct an archaeological survey of areas not previously examined within the APE if ground disturbing activities are proposed. If sites are identified, they will be avoided if feasible, or the District will arrange for them to be evaluated and effects analysis conducted.

6.1.3 Principles and Standards for Historic Buildings and Structures

The Diversion Dam and Associated Structures (1325-1) is the only National Register-eligible historic structure currently recorded in the APE. The District will monitor the National Register-eligible buildings and structures to promote the longevity of these properties. Each resource requires special consideration with regard to maintenance, use, and its ultimate disposition, depending on the resource's character-defining features. A preservation objective is to retain the character-defining features, which include the engineering design of the Sultan River Diversion Dam.

Several treatments are suitable for preservation of historic buildings and structures. As stated in *The Secretary of Interior's Standards for the Treatment of Historic Properties*, they include:

- Preservation, which is the application of measures to keep the existing form, integrity, and material of the historic resources. Stabilization and ongoing maintenance contribute to preservation.

- Rehabilitation, which is making a property useful in a contemporary and efficient way while preserving features that contribute to its cultural character.
- Restoration, which is accurately recovering the form and details of a property and its setting as it appeared at a particular period of time by removing later work or replacing missing earlier work.

If Project impacts are identified, the District will apply the standards listed below in a reasonable manner, taking into consideration economic and technical feasibility, the Project's FERC license conditions, impacts to other resource areas and the overall Project goals. The standards recognize that change is inherent in maintaining and upgrading engineering facilities. The District will apply the standards to maintain historic integrity without losing the flexibility to upgrade equipment or compromising safety and security as required by the FERC, laws, or technological advances.

- An historic resource will be used for its original purpose in its original location, taking into consideration its function and character-defining features.
- The historic character of a resource will be retained and preserved by reasonable means and methods. The removal of historic materials or alteration of features and spaces that characterize a resource will be avoided whenever feasible.
- Each historic resource will be recognized as a physical record of its time, place, and use.
- Deteriorated architectural features will be repaired rather than replaced whenever reasonable. When replacement is necessary, the new material will match the historic material in design, color, scale, and texture whenever feasible. Replacement of key features will be documented by physical or pictorial evidence.
- Replacement of outmoded or deteriorated engineering equipment will avoid unnecessary alteration or removal of character-defining features.
- Appropriate techniques will be used in the surface cleaning and maintenance of structures to avoid damage.
- Whenever feasible, new additions, exterior alterations, and related new construction will be visually distinct from historic resources while remaining compatible in size, scale, and material with the features that characterize the historic resource.
- Project actions will reasonably attempt to maintain and preserve the overall integrity of historic features.

6.2 Historic Preservation Coordinator

The District's Historic Preservation Coordinator (HPC) is the Cultural Resources Coordinator or another person designated by the District. The HPC has oversight responsibility for historic properties and cultural resources related to the Project, with duties that include the following.

- Implementation of the HPMP;

- Compilation, organization, maintenance, and protection of the confidentiality, as needed, of information on the Project's historic properties. This includes, but is not limited to, inventory forms and maps, cultural resource inventory reports and maps, archaeological sensitivity maps, and any of the District's cultural resource and geographic information system (GIS) databases;
- Coordination of review of potential effects of Project operation, maintenance, and construction activities on historic properties and maintenance of records that document review and decision-making;
- Preparation and administration of training materials and reports;
- Coordination of and participation in consultation and meetings with the DAHP, MBSNF, the City, and the affected tribes; and
- Provision for curation of any artifacts and documentation that may be collected.

The HPC need not be a cultural resource professional but will attend basic and periodic training, in federal and state cultural resource workshops, that addresses issues related to the Project's regulatory compliance, including such topics as:

- The Section 106 compliance process
- Anti-vandalism procedures
- The 40-hour cultural resources training offered by the State Department of Archaeology and Historic Preservation or the U.S. Forest Service
- Application of the Secretary of Interior's Standards for Rehabilitation
- Government-to-government relations and consultation with Native American tribes.

The HPC will seek information on the application of new and updated technologies in historic property management. The District will support the HPC in attending relevant cultural resource management conferences. The HPC will periodically attend seminars, workshops, conferences, and other education opportunities to maintain current knowledge and understanding of cultural resource management regulations and procedures. These programs may include lectures and conferences regarding cultural resource management sponsored by the DAHP, the Northwest Hydroelectric Association, National Hydropower Association, Edison Electric Institute, and the Utility Roundtable on Cultural Resources, among others.

The HPC will work cooperatively with the cultural resources staff of the City as well as qualified archaeologists and historians for consultation and assistance whenever necessary. The District will notify CRG members of the name of the designated HPC once the new license is in effect and at the time when a new HPC is designated.

6.3 Data Management and Confidentiality

Information on archaeological sites is exempt from public disclosure (NHPA). The District protects information on archaeological sites from public disclosure but will share it with the

DAHP, MBSNF, the City, and the affected tribes. The District respects the tribes' concern for the confidentiality of information about traditional cultural properties and to the extent allowable under applicable law will not disclose publicly any information it may come to possess, although this information will be shared, if necessary, with the DAHP and FERC. Location information will be available only at a general level for management use in avoiding impacts. To the extent allowable under applicable law, the District also will not disclose to the public any information related to Native American burials or remains, should such information come to the District's attention.

The HPC will be responsible for maintaining the confidentiality of cultural resource information that the District possesses for the Project and will address the status of confidentiality in the Project's annual report on cultural resources.

6.4 Consultation and Meetings

The District will implement the HPMP measures to manage the Project's historic properties in consultation with the MBSNF, the City, and DAHP, as appropriate, according to landownership within the Project boundary. The District will consult with the parties regarding archaeological review of Project activities on their lands, and with the SHPO regarding review of Project activities that would affect historic buildings and structures.

As needed, the District will contact representatives of the landowners, tribes and DAHP for meetings to discuss the status of historic properties management at the Project, plans for site management activities, potential future modification of management measures and this HPMP. The District will provide information on the dates of planned archaeological surveys at the Project so that the landowner, tribe and DAHP representatives may participate in or observe the work as desired. Upcoming ground disturbing activities for maintenance, operations or Project improvements will be discussed, and the MBSNF, City and/or DNR consulted as needed for activities on their lands. The District will make any decisions to change specific aspects of the management program such as historic property inspections, data recovery, treatment plans, and evaluation priorities in consultation with the landowner and DAHP. The District will also consult with the FERC, as needed. Documentation of such changes will be provided to each signer of the Programmatic Agreement.

In conjunction with the issuance of the Annual Status Report (as described in section 6.8), the District will offer an annual meeting with interested parties at a mutually acceptable time and location to discuss the contents of the report.

6.5 Coordination with Other Plans to Manage Project Lands and Resources

Pursuant to its new FERC license for the Project, the District could be required to develop and implement various plans to manage the Project's resources. The District will adhere to the principles described in this HPMP in administering the other resource management plans for the Project so that their activities avoid, where possible, recorded historic properties, any future finds of archaeological sites where eligibility has not yet been determined, and uninventoried portions of the APE. If there is potential for adverse effects on uninventoried lands within the Project

APE, including potential historic properties, the District would conduct cultural resources inventories and submit reports on the methods and results to the City and DAHP for review and concurrence, as discussed in Section 7.3 below.

6.6 Personnel Training

To ensure that HPMP measures are properly implemented, the District will provide training for the District's Project staff members, including the HPC (as discussed in Section 6.2), Project managers making capital decisions about Project activities, construction supervisors and inspectors, biologists and supervisors of field staff, as applicable.

Affected staff members will receive training about HPMP measures including procedures for the inadvertent discovery of archaeological or human remains and measures for addressing urgent conditions that could affect historic properties, compliance with applicable regulations, and the concerns associated with cultural resources and human remains. In particular, the District will require that Project personnel who supervise, inspect, or independently perform ground-disturbing activities that may impact historic properties be informed about identifying, protecting, and preserving historic properties. The HPC will arrange for construction-associated supervisors to receive a brief orientation on cultural resource sensitivity for the work site. The orientation will include information on the types, nature, and importance of historic properties that could be encountered, the concerns of the tribes and cultural resource professionals about these properties, the damage that can occur from construction activities ad unauthorized artifact collection, and the procedures of the District's Inadvertent Discovery Plan.

The District will arrange for training of its on-site staff members involved in Project operations, ground disturbance, building repair and modification, and recreation and wildlife management. Information will include the:

- Types, nature, and importance of cultural resources
- Concerns of the tribes
- Damage that can occur from unauthorized collecting, digging, and construction
- Characteristics of undesirable behavior
- Locations where undesirable behavior takes place and where unauthorized individuals are not to be present or to linger
- What to do upon noticing undesirable behavior
- Whom and how to call for help
- What to do if an on-site staff member finds an artifact or site, or someone reports one to staff

The trainings will be of varying lengths depending on the subject matter and take place every two years or when new staff are added to the Project.

6.7 Curation and Disposition of Artifacts and Human Remains

The District will curate artifact collections and documentation resulting from any archaeological fieldwork conducted under the HPMP at an existing qualified facility, on an interim or long-term basis. The District recognizes Washington state law requiring that artifacts from sites in the state be curated at a repository within the state. The interim facility for collections from Washington State is likely to be the Burke Museum in Seattle, although the District's decision will be influenced by the facility's availability and costs. The District will consult with the landowner and DAHP as needed, in making the decision about a curatorial facility.

The District will see that artifact collections and documentation are suitably prepared for curation, with reference to guidelines for 36 C.F.R. Part 79 (Curation of Federally Owned and Administered Archaeological Collections). Copies of paper and digital documentation will be of archival quality to provide for stability during curation.

The District will follow NAGPRA provisions for any burial-associated prehistoric artifacts and collections discovered on federal lands that are affected by the Project. Decisions about the disposition of human remains will be made in consultation with the affected tribes, following NAGPRA provisions for federal lands and state law and DAHP guidance for District and other private lands.

6.8 Reporting

The HPC will prepare a brief Annual Report on historic properties management, and provide it to the City, MBSNF, affected tribes, and DAHP. The Annual Report will include information summarizing activities that potentially impacted historic properties, and management measures exercised over the past year with particular focus on elements of this HPMP. The Annual Report will also outline planned activities for the upcoming period. Procedures for completing the summary are as follows:

1. Summarize the ground-disturbing activities reviewed by the HPC that were considered exempt from case-by-case review.
2. Summarize the undertakings that required consultation, and the results of that consultation.
3. List any specific resource or action of special concern to the City, MBSNF, or DAHP.
4. Report any inadvertent discoveries and any actions taken by the District as a result.
5. Summarize consultation that has occurred or is ongoing.
6. Outline planned activities for the coming year and indicate whether any will require consultation with the landowner and DAHP.
7. Summarize the activities and results of any other HPMP measures, such as personnel training and site monitoring.

8. Report on the security of confidential historic property information that is held by the District.

9. Include any recommendations regarding amendments to the HPMP.

The District will file the first annual report the first year after the District accepts the new license.

7.0 Archaeological Measures

7.1 Strategies for Additional Survey

All lands within the FERC Project Boundary of high and medium probability were surveyed for archaeological and historic resources during the relicensing process (see Appendix C). Low probability lands within the FERC Project Boundary are defined as steep-sloped areas (greater than or equal to 35 percent slope) that have no associations with any high or medium probability criteria; these areas are unlikely to contain any historic properties and are unlikely to be a location for ground-disturbing activities under the new license. (See RSP15 and the Technical Reports for further information.) Additional surveys may be conducted if ground-disturbing activities by the District are proposed in areas meeting high and medium probability criteria, not surveyed during this relicensing process.(see Appendix C), and not an exempt activity (see Table 7-1). The District will consult with the landowner and DAHP to determine if further survey work is warranted.

7.1.1 ARPA Permits

Archaeological Resource Protection Act (ARPA) permits are required for archaeological survey and excavation fieldwork on federal land, including the MBSNF, unless the work is being conducted by the agency itself. The District will apply for ARPA permits for any work that is proposed on MBSNF land.

7.2 Approach to Archaeological Site Evaluation and Management

One archaeological site, the Horseshoe Bend Placer Claim (45SN125), in the Project APE has been identified as eligible with concurrence obtained from the SHPO and is listed on both the NRHP and WHR. This site, and any others identified over the period of the new license, will be evaluated and managed consistent with this section. As stated in the principles and standards for archaeological properties (Section 6.1.2 above), the District will treat potentially National Register-eligible sites as eligible until they are evaluated. Priority will be given to defining and implementing procedures for protecting and, as necessary, mitigating adverse effects by the Project on known archaeological resources listed in or eligible for listing in the National Register, followed by defining measures to evaluate and assess the potential adverse effects of any archaeological sites that have not been evaluated for National Register eligibility as described in Sections 4.2 and 5.0, respectively.

Archaeological site evaluation typically involves subsurface testing to collect information on the horizontal and vertical extent of a site, its contents and what they may offer to a better understanding of the prehistory or history of the region (Criterion D), and to verify that the site is intact (at least enough to retain the important information it has to offer). Observations made at many sites during surveys or subsequent inspections may provide information adequate for making an assumption of eligibility, describing adverse effects, and making recommendations of appropriate management measures. In these cases, archaeological testing probably would only confirm survey observations.

Determinations of appropriate management measures for National Register-eligible archaeological sites will be made on a case-by-case basis to address the particular adverse effects identified. Common methods of treating impacts to archaeological sites include protection and data recovery; the consulting participants also may choose to allow a site to continue to erode. Protection is the preferred method of site management as it emphasizes conservation of the resource in place.

There are various ways to use management methods and some involve the installation of combinations of materials. However, certain factors may prevent installation of protective measures as a long-term solution including poor access or unsuitable soils and/or site topography. In addition, consideration of the results of a cost-benefit analysis of all of the treatment measures available for a given site is necessary.

Data recovery involves archaeological excavation of endangered significant cultural materials with the intent to collect a representative sample. The recovered sample and the methods to be used in its collection are detailed in a site specific Research Design focused on retrieval of information in relation to the deposits that were identified during evaluation as important (Criterion D).

The following management measures will be implemented for Site 45SN125: the District will review information resulting from monitoring of Site 45SN125 and will relate information about the site's condition in the Annual Report. If the monitoring results show that the Project is having an adverse effect on the site, the District will work with the City and DAHP to develop measures to resolve the effect.

7.3 Review Procedures for New Ground-Disturbing Activities

While Project facilities are already in place, future improvements or additions to the facilities (e.g., recreational developments) may have consequences for archaeological sites. Such actions can disturb and break artifacts and destroy the stratigraphic integrity of cultural deposits. Some types of activities might result in the inadvertent removal or burial of archaeological materials. Project work such as habitat management could inadvertently damage archaeological sites by disturbing the integrity of their cultural deposits. Improvements at developed recreation sites also can affect archaeological sites.

In general, the HPC will coordinate with Project staff to compile a list of development activities involving ground disturbance and not on the exempt list (Table 7-1) that are expected to take place during the upcoming year. The HPC will provide a copy of the information, along with a map and description of any cultural resource review planned, to the landowner, tribes and DAHP for any Project activities proposed. The District will consult directly with any party that expresses concerns about any adverse effects to historic properties by any of the development activities and if any additional archaeological work, such as further survey, treatment planning, or construction monitoring, is needed.

7.3.1 Exemptions from Archaeological Review

Certain Project activities and locations are exempt from archaeological review because they would have little or no potential to affect historic properties. Exempt activities include those that

would not disturb National Register-eligible archaeological sites because the activities occur within previously surveyed areas and outside the boundaries of known archaeological sites. Many are routine construction or maintenance activities within previously disturbed footprints and involve no new soil disturbance that would not affect archaeological sites. The HPC will review exempt activities on non-District lands with the landowners' cultural resource specialists. After the HPC reviews, approves, and documents the review, Project operators may proceed with the activities listed below. Documentation will be retained according to the District's records retention policy and made available to the cultural resource representatives, upon request. The HPC will summarize this information in the Annual Reports. Table 7-1 shows the exemptions from archaeological review.

Table 7-1. Exemptions from Archaeological Review

Exclusion	Description	Conditions
Roads, Trails, and Fences	Routine road and trail maintenance	Only on previously improved roads and rights-of-way
	Road closures to redirect use to existing roads and trails	If no new ground disturbance
	Routine recreational, safety, or information signs or markers, gates, and portable sanitation devices	If installed within or along existing roadways or developed areas at least 50 feet away from recorded archaeological sites
	Fence installation and replacement	If using the same post holes and/or maintenance that excludes new ground disturbance or on areas previously surveyed
	Culvert and drainage maintenance, cleaning or replacement	If no new ground disturbance
	Routine gabion wall and slope stability maintenance	If no new ground disturbance
Transmission Lines	Maintain right-of-way through tree/brush cutting and application of herbicides	If no new ground disturbance
	Pole replacement	If construction equipment is confined to dry ground; Only in areas previously surveyed and at least 50 feet away from recorded archaeological sites
	Upgrading or adding new lines to existing poles/towers	If no new ground disturbance
Underground Utilities	Repair or replacement of underground utility lines or cables	If disturbance is confined to limits of existing trench
	Repair or replacement of septic systems, storm drainage, or fuel storage	If no new ground disturbance
Reservoir Work	Removal of large woody debris	If no new ground disturbance or in areas previously surveyed
	Removal of aquatic plants	
	Dewatering for O&M activities	

Exclusion	Description	Conditions
Environmental Restoration and Enhancement	Watershed restoration activities such as planting, seeding, mulching, course/large woody debris and boulder placement, and gravel augmentation	If no new ground disturbance or in areas previously surveyed
	Removal of logs or debris using hand labor, or mechanical devices	If no new ground disturbance or in areas previously surveyed
	Placement of environmental monitoring equipment (e.g., stream gages, cathodic protection devices or radio transmitters)	If no new ground disturbance or in areas previously surveyed
	Removal of noxious weeds	
	Snag creation and thinning	If visual observation does not reveal culturally modified trees
	Application of biosolids and herbicides	
Safety	Removal of hazardous trees	
	Installation of devices to protect human or animal life (e.g., raptor electrocution prevention devices or log boom installation), and the integrity of the project works under emergency situations	
	Removal of brush and woody debris for maintenance and fire suppression	If in areas previously surveyed and at least 50 feet away from archaeological sites
Miscellaneous		
Removal or Construction of Structures and Materials	Including site reclamation and penstock monitoring activities	If in areas previously surveyed, at least 50 feet away from archaeological sites, or if no expansion of previous ground disturbance or footprint, and if structure is not 50 years or older.
Land and Resource Studies	Inventory, data, and information (sample) collection for land use, land cover, resource evaluation, fish migration, geophysical surveys, etc.	
Resource Management Actions		If in areas previously surveyed; or if no expansion of previous ground disturbance, horizontally or vertically; or if within the bed of the Sultan River or side channels to enhance aquatic habitat

7.3.2 Process for Non-Exempt Activities

For individual non-exempt ground-disturbing activities, a specific APE will be delineated for the proposed activity, such that an assessment can be made regarding potential impacts of the proposed activity to archaeological sites. The District will work with a consulting archaeologist, as needed, to implement the following steps. The District will consult with the appropriate landowner to identify, evaluate and protect archaeological resources:

- The HPC will review the Project's archaeological GIS database during the planning stages of any proposed activities to determine if the affected area includes previously identified archaeological sites and to determine the area's potential for unrecorded sites. If the area has not been surveyed and/or appears to be sensitive for containing unrecorded sites, the HPC will work with the activity's proponent to determine whether a location can be selected that is less likely to affect archaeological sites. The HPC also will review specific activities to assure that archaeological sites are taken into consideration and that potential activity effects are determined.

- Once the specific APE is defined, any documentation of prior significant ground disturbance will be assessed to determine whether undisturbed areas may be present. If significant disturbance can be documented for the APE, then an inventory survey will not be warranted. The District will place a memo in its files concerning the archaeological review of the development and will include a summary of such reviews in its Annual Report.

- If significant disturbance cannot be documented and a previous inventory survey has not been completed for the specific APE, then the District will arrange for an inventory survey to identify any sites that may be present. The District will place in its files a report on the methods and results of the inventory survey.

- If a site is identified and it can be avoided by establishing a sufficient buffer (in consultation with the landowner and DAHP), it will be necessary to implement protective measures to prevent inadvertent short and long-term impacts.

- If new sites are identified within the specific APE and a sufficient buffer cannot be established to avoid the site (based on consultation with the appropriate parties), then a site evaluation is warranted. The evaluation will provide the site boundaries and information necessary to determine if the site(s) is/are eligible for listing in the National Register.

- If consultation with the affected parties determines the site not to be eligible, no further measures will be needed, and the proposal may proceed.

- If consultation with the affected parties determines that the site is eligible for listing in the National Register, and it can be avoided based on the established site boundary, it may be necessary to implement protective measures to prevent inadvertent short- and long-term impacts.

- If consultation with the affected parties determines that the site is eligible for listing in the National Register and avoidance is not feasible, the District will consult with a

professional archaeologist to provide a data recovery plan that will be implemented to mitigate the adverse effect on the eligible site. The data recovery plan will be developed in consultation with, and reviewed by, the affected parties prior to implementation.

- In the event that the potential archaeological resources cannot be addressed prior to construction efforts, the District will submit to the affected parties a detailed monitoring plan designed by an archaeologist that details the anticipated resources, the level of effort expected for data recovery (if a site is present), the time allotted to the archaeological effort and the District's responsibility in the monitoring effort.

7.4 Monitoring Archaeological Sites

Monitoring concerns in the Project area include vandalism and construction/development. Monitoring of Horseshoe Bend Placer Claim (45SN125) and any additional sites discovered over the course of the license will allow ongoing assessment of the kinds and severity of impacts and the pace of degradation, as well as observation and documentation of the kinds of cultural materials that are being exposed. In addition, monitoring can reveal when an emergency management situation has arisen and immediate action is needed. Each of these informs the prioritization for actions:

1. How soon an evaluated site needs to have management measures implemented, or
2. How soon an unevaluated but likely National Register-eligible site needs to be evaluated to determine appropriate management measures, or
3. How soon a site needs to be evaluated to determine if it is National Register-eligible and should be managed.

Site 45SN125 will be monitored annually by the HPC, Project staff with cultural resources training, or a professional archaeologist. Monitoring will consist of a short site visit, and is not intended to include data gathering beyond site condition, impacts, threats of impact, and recommendations for site management due to Project impacts. If there have been any changes to the site since the last visit, an update to the site form will be prepared by a professional archaeologist and submitted to DAHP and landowners. All observations shall be recorded and provided to the HPC.

Monitoring intensity refers to how often sites are visited to update condition observations, record the types and rates of impacts, and inform recommendations for the prioritization of actions at the site. This information can then be used to make timely management decisions. Should any other archaeological sites be identified, the HPC will consult with the landowner, as applicable, and DAHP regarding an appropriate schedule for monitoring. Monitoring of sites that have not been evaluated for National Register eligibility shall include recordation of current condition, threats and impacts, but also will involve adding new, missing, or out-of-date data to the existing site record and maps. This type of monitoring will assist in providing data that will be used not only for site protection, but site assessment as well.

7.5 Looting and Vandalism

Looting and vandalism are common challenges in cultural resource management. Looting is the illegal, unscientific removal of archaeological resources; vandalism is the intentional or unintentional defacement of a resource. Visitors may deliberately or unintentionally disturb sites and collect artifacts without knowledge of how their actions affect the resource or the legal consequences. These actions cause a loss of the historic value of the resource and also may cause a cultural loss to the affected tribes.

The District will take the following steps to prevent looting and vandalism, and will cooperate with the City and MBSNF in their anti-vandalism programs.

- Confidentiality – Information about the location and contents of Project area archaeological resources will be kept confidential in accordance with applicable law and established professional standards.
- Restricted Access – The District will seek to restrict access to known archaeological resources when the land is within the District's control and the action is compatible with other resource objectives. Access restrictions may be implemented in conjunction with the City, MBSNF, and other amenable landowners.
- Site Monitoring – The District will periodically monitor critical sites within the FERC Project boundary to assess and document site condition as described in Section 7.4. Protection measures will be considered on an as needed based on these observations.
- Education – The District will educate its staff about the legal implications of vandalism, how to recognize its occurrence (being present in archaeologically sensitive areas for no apparent reason, walking patterns and bending to examine or collect materials from the surface, digging, or vandalism), and correct procedures to follow upon its discovery (see Section 6.7 above). Appropriate protocols for the discovery of vandalism of human remains are discussed in the Inadvertent Discovery Plan (Section 7.6 and Appendix D).
- Coordination with Law Enforcement –As noted in Section 6.2 above, the HPC will receive some basic training about ARPA violations that could occur on federal land within the APE. When District employees observe potentially illegal activities, the employee will, assuming his/her personal safety is not at risk, note information about artifact collecting activities and immediately call the HPC. The HPC will then call the applicable law enforcement officers.

7.6 Procedures for Inadvertent Discoveries of Archaeological Materials and Human Remains

Over the new license period, unexpected discoveries of prehistoric and historic period archaeological materials and human remains could occur during Project-related activities or operations. The remains could be uncovered by erosion, recreation activities, vandalism, or found during the course of ground-disturbing activities for the Project. The District has developed an Inadvertent Discovery Plan (IDP) that provides the procedures to be followed for the identification and treatment of archaeological materials and human remains (Appendix D)

discovered during Project-related activities or operations. The IDP specifies consultation with the DAHP, City, and tribes, and with the MBSNF if the find occurs on Forest Service land located within the APE.

The IDP is intended to:

- Comply with applicable Federal and State laws and regulations, particularly 36 C.F.R. § 800.13 of the regulations that implement Section 106 of NHPA and Section 3(d) of the Native American Graves Protection and Repatriation Act for finds on the MBSNF;
- Establish procedures the District will follow to deal with inadvertent discoveries; and
- Provide direction and guidance to District personnel and/or contractors about the protocol to be followed should an unexpected discovery occur.

7.7 Actions in Response to Urgent Conditions

The District would have to respond urgently when life, safety, property, or continued operations are at risk by an unpredictable action, such as fire, flood, extreme weather conditions, or facility malfunctions. During such urgent conditions, Project staff will likely not be able to follow some or all of the HPMP management protocols. However, staff can endeavor to minimize disturbance and damage to known historic properties.

Upon resolution of the urgent condition, managers or other emergency coordinators must report all locations and actions taken to the HPC. The HPC will follow up with whatever inspection and/or specialists are needed to assess the extent of damage to the historic property or the eligibility of a resource inadvertently discovered during the urgent condition. Consultation with the City, MBSNF, DAHP, FERC, or others may be necessary. Future steps may include implementation of measures that would protect the resource from impacts in the future or data recovery. The HPC is responsible for ensuring that regulatory requirements regarding historic properties are met (36 C.F.R. § 800.12). The HPC will ensure that relevant Project operating and management plans reference the role of historic properties management.

8.0 Operation and Maintenance of the Historic Properties

The following sections discuss treatment definitions, rehabilitation standards, anticipated effects, preservation standards and mitigation measures, review procedures, maintenance guidelines, and periodic review of historic buildings and structures that are within the Project APE. This includes the City of Everett's National Register-eligible 1930 diversion dam, tunnel, and portal structure (1325-1), hereafter referred to collectively as the Diversion Dam.

8.1 Anticipated Effects

The City of Everett's 1930 Diversion Dam (1325-1), with minor alterations, continue to function in the same manner as they did when constructed. The portal and tunnel have undergone minor alterations since construction, all of which were necessary maintenance, but this property retains many of the aspects of integrity described in National Register Bulletin 15 (e.g., setting, workmanship, location, and association). Association and function link the individual elements of this historic property, which together convey a sense of time and place in history. The continuity of these buildings and structures is crucial to the integrity of the historic resource. Removal or irreversible alteration of individual elements could result in a loss of integrity as well as a loss of the sense of place and time.

Incremental changes to historic properties have occurred in the past and can reasonably be expected to continue. Over the life of the FERC license, portions of the historic resource are likely to undergo routine maintenance, repairs and upgrades. Developments may be proposed through the relicensing process or under the license that may affect the integrity of the resource.

Elimination or alteration of character-defining features may result in an adverse effect, diminishing the integrity of the property's location, design, setting, materials, workmanship, feeling or association. The National Historic Preservation Act defines "adverse effect" in terms of direct and indirect actions that alter the characteristic of a historic property that qualify it for inclusion in the National Register of Historic Places (36 C.F.R. Part 800). Direct effects occur at the same time and place as the action that causes them; indirect effects occur later or at a different location from the action.

Examples of direct effects include the following:

- **Alterations to Buildings and Structures** – modifications of, or additions to, buildings, structures or sites as a result of use, modernization, operational requirements or technological advances. Includes replacement of features with unlike materials.
- **Isolation from, or Alteration of, the Property's Surrounding Environment** – changes and additions to, or subtractions from, the physical setting of the buildings.
- **Introduction of Elements out of Character with the Property or its Setting** – changes to characteristic features of the larger area that have the potential to affect the setting of the property.
- **Neglect** – resulting in deterioration or destruction.

- **Demolition** – resulting in alteration of a historic property.
- **Removal of Property from its Historic Location** – resulting in changes to the feeling or association of a historic property.
- **Ongoing Project Operation and Maintenance** – road building, road grading and maintenance, ditch clearing, vegetation clearing, snag clearing and any maintenance involving heavy equipment.

Examples of indirect effects include the following:

- **Introduction of Visual Elements out of Character with the Property or Its Setting** – resulting in changes to the feeling or association of a historic property.
- **Introduction of Audible Elements out of Character with the Property or its Setting** – resulting in changes to the feeling or association of a historic property.

8.2 Treatment Definitions

To retain the integrity of a historic property, management measures are taken with consideration of a resource's character-defining features to identify the appropriate treatment. The Secretary of the Interior's *Standards for the Treatment of Historic Properties*, commonly referred to as the Secretary's Standards, outline four treatment approaches for historic properties: preservation, rehabilitation, restoration and reconstruction. The first two approaches are discussed below in relation to the Diversion Dam; the third (restoration) and fourth (reconstruction) are not relevant to the Project.

8.2.1 Preservation Standards

Preservation focuses on the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time. Preservation maintains the existing integrity and character of a historic property by arresting or retarding deterioration caused by natural forces and normal use. It includes both maintenance and stabilization. Maintenance is a systematic activity that mitigates wear and deterioration by protecting the condition of a property. Stabilization entails reestablishing the stability of an unsafe, damaged or deteriorating property while maintaining its existing character. Preservation does not include extensive replacement and new construction; however, the limited and sensitive upgrading of mechanical, electrical and plumbing systems, and other code-required work needed to make properties functional is appropriate within a preservation project.

Preservation is typically the preferred approach to the management of historic properties. The Secretary of the Interior's *Standards for Historic Preservation Projects* (Federal Register, Vol. 48. No. 190, Part IV) outlines preservation standards and procedures. These standards are based on the philosophy that actions requiring the least degree of intervention are preferable. The primary principle upon which the Preservation Standards are based is the desire to maintain and repair historic materials and to retain a property's form as it has evolved over time. The standards recognize that change is integral to the continued operation of the Project and are designed to accommodate change.

Facilities like the Diversion Dam and their associated structures and buildings are routinely expanded and adapted to meet changing technologies and needs. Some replacement in kind or new construction is acceptable to ensure the efficient and continuous operation as long as the character of the historic project is preserved. Additional changes to the property, such as removal of contributing elements; the addition of nonhistoric materials or irreversible structural additions on auxiliary resources; or construction of modern resources within the historic property boundary (including within the visual effect area) may adversely affect the integrity of the resource.

If Project impacts are identified, the District will apply the Preservation Standards in a reasonable manner, taking into consideration economic and technical feasibility as well as requirements for overall management of the Project and its other resources. Application of the Preservation Standards will ensure retention of the character-defining features of the historic properties, while permitting the flexibility required to up-grade facilities and equipment for efficient and economical operation. The standards will guide future actions by the District as long as it owns and operates the Project, including the future inventory of the hydroelectric facilities and any management measures that result in response to identification of adverse effects to National Register-eligible resources. If adverse effects on the Diversion Dam or any other historic resources cannot be avoided, mitigation options will be considered in consultation with the landowner and DAHP.

8.2.2 Rehabilitation Standards

Rehabilitation is the act or process of making possible an efficient compatible use for a property through a program of repair, alteration, and addition that preserves those portions or features that convey the property's historical, cultural, or architectural values. Rehabilitation may involve major repairs or additions. This technique is applicable, for example, if continued efficient operation necessitates changes to the Sultan River diversion dam.

As noted above, "preservation" constitutes the philosophical approach guiding the management of historic properties. The Rehabilitation Standards that govern preservation efforts are outlined below. These standards are adapted from the Secretary's Standards (Federal Register, Vol. 48. No. 190, Part IV). The standards recognize that change is inherent in an operating utility. The District will apply the standards in a reasonable manner, taking into consideration economic and technical feasibility as well as the requirements for overall management of the Project. Through application of these standards, if Project impacts are identified, the District will seek to maintain the integrity of National Register-eligible resources while not impeding the safe and efficient use of the facilities by the City of Everett for which they were developed.

- **Retain Appropriate Use** – To the extent reasonably practicable, a property will be used for its historic purpose or placed in a new use that requires minimal change to the defining characteristics of the property, its site and its environment.
- **Retain Historic Character** – To the extent reasonably practicable, the historic character of a property will be retained and preserved. The District will seek to avoid or minimize removal of historic materials or alteration of features and spaces that characterize a property.

- **Maintain Appropriate Era** – To the extent reasonably practicable, each property will be recognized as a product of its time, place and use. The District will seek to avoid or minimize changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings.
- **Retain Historic Changes** – Most properties change over time; to the extent reasonably practicable, the District will seek to retain and preserve changes that have acquired historic significance in their own right.
- **Retain Distinctive Features** – To the extent reasonably practicable, the District will seek to preserve distinctive features, finishes and construction techniques or examples of craftsmanship that characterize a property.
- **Repair Historic Features** – To the extent reasonably practicable, the District will seek to repair, rather than replace, deteriorated historic features. Where the extent of deterioration requires replacement of a distinctive feature, the District will exert reasonable efforts to match the new feature to the old in design, color, texture and other visible qualities and, where possible, materials. To the extent reasonably practicable, the District's efforts to replace missing features will be substantiated by documentary, physical or pictorial evidence.
- **Use Appropriate Cleaning Methods** – To the extent reasonably practicable, the District will not use chemical or physical treatments, such as sandblasting, that cause damage to historic materials. The District will seek to use the gentlest means practicable when surface cleaning buildings and structures, if appropriate.
- **Alterations To Be Compatible** – To the extent reasonably practicable, new additions, exterior alterations or related new construction will not destroy historic materials that characterize the property. The District will seek to differentiate new work from the old and will use reasonable efforts to make the new work compatible with the massing, size and scale of the historic architectural features to protect the historic integrity of the property and its environment.
- **Design Removable Alterations** – To the extent reasonably practicable, new additions and adjacent or related new construction will be undertaken in a manner so that if removed in the future, the essential form and integrity of the historic property and its environment will remain unimpaired.

8.3 Review Procedures for Historic Properties

The following sections briefly discuss three levels of review that the District will apply, if Project impacts are identified, to limit Project activities that could adversely affect the Diversion Dam and other National Register-eligible historic resources.

8.3.1 Level 1 Review: for Maintenance and Repair-In-Kind

- Project planners will consult the Maintenance Guidelines (Section 8.4)

- Project staff will apply the Maintenance Guidelines
- Project staff will keep maintenance and repair records for historic buildings and structures

8.3.2 Level 2 Review: for Alterations

- **Annual Review** – The HPC will discuss proposed actions with the Project Manager for any alterations and will apply the Preservation Standards
- The HPC will obtain necessary technical advice from a historic preservation specialist, if necessary, and convey to the Project Manager and relevant staff
- The HPC will include a description of the alterations and how the Preservation Standards will be/have been applied in the Annual Report

8.3.3 Level 3: for Demolition, Relocation, or Reconstruction

- **Proposed Actions** – The HPC will conduct work with Project Managers to identify actions calling for demolition, relocation, or reconstruction
- The HPC will consult with the City and DAHP to identify effects and measures to avoid, reduce, or mitigate adverse effects

8.4 Maintenance Guidelines

Management reviews, new developments and maintenance activities focus on retaining aspects of integrity, such as location and setting that characterize the resource. Maintenance and repair measures focus on retention and protection of specific materials (concrete, steel gates) and elements.

Within one year after FERC approves the HPMP, the District will collaborate with the City and DAHP to prepare a Historic Resource Maintenance Guidelines to provide City staff with guidance on appropriate methods of protecting, cleaning and repairing the National Register-eligible Diversion Dam. The City-owned Diversion Dam is used for water supply operations and managed by the City; coordination of responsibilities for historic properties management between the City and the District will be addressed. The Historic Resource Maintenance Guidelines will detail how the Diversion Dam will be monitored and treated, if Project impacts are identified, over the life of the license. The guidelines are designed to be part of a systematic plan for the safeguarding and protection of the Diversion Dam, and are intended to assist in the inspection, repairs, and ongoing maintenance of these structures. The purpose is to assure continuity of treatments over time and with changing personnel. The District's HPC will work with the City, Project planners and staff to implement the Maintenance Guidelines, while members of staff will be assigned responsibility for carrying them out.

9.0 Plan Implementation

Implementation of the HPMP involves several administrative procedures. The following sections briefly discuss the procedures and schedule for implementing the HPMP including its review and amendment, and the resolution of disputes.

9.1 Procedures

The District anticipates FERC staff will prepare and execute a Programmatic Agreement (PA) providing for the filing of this HPMP. The PA is likely to provide for HPMP review and dispute resolution as well as other standard provisions commonly found in PAs for FERC hydroelectric projects.

9.2 Schedule

The District will implement the HPMP following FERC approval. Table 9-1 summarizes the schedule for implementing the management measures. All of the deadlines are measured from the date that FERC approves the HPMP.

Table 9-1. Schedule for Implementing Management Measures

Measure	Frequency	Deadline
Conduct Project staff training	Every two years	First Quarter
Monitor recorded archaeological sites	45SN125 annually by HPC; if changes observed a professional archaeologist will update site form and route to parties. Other sites as determined.	In tandem with other Project activities or when site(s) is exposed
Conduct additional archaeological survey of APE	As needed for planned Project activities	
Review/revise measures in the HPMP	Every 5 years at minimum	
Consultation Meetings	As needed	
Annual Report	Yearly	March 1

9.3 Plan Review and Revisions

At 5-year intervals after adoption of the HPMP and acceptance of a new license, the District will review the document to see if revisions may be warranted. The District will notify the CRG in writing that a review is to be conducted. The review should be sensitive to any changes in regulations and applicable technologies, and any inventory results or potential changes to National Register status of a property.

Any of the interested parties, including the District, may suggest a revision to the HPMP by providing the information in writing to the other parties. The District will provide for a meeting for the parties to discuss the suggested revisions and reach agreement. The District will then

make the agreed-upon revisions to the HPMP and circulate the relevant pages to the parties for review and concurrence. This may be done as part of the Annual Report. If the parties reach agreement on the proposed changes, the District will submit the proposed changes to FERC for approval. If the parties cannot reach agreement on a suggested revision, the sponsoring party may submit the matter to dispute resolution under the procedures of Section 9.4.

9.4 Dispute Resolution

As the party responsible for implementing the HPMP, the District will attempt to resolve informally any objections raised by a cultural resource representative or the ACHP. The District will first seek resolution through discussion with the party raising the objection; if that discussion does not resolve the party's objection, the District will bring the objection to DAHP and cultural resource representatives to seek resolution typically within 30 days, unless circumstances warrant faster resolution. If this group is unable to resolve the party's objection, the objection will be subject to the process for dispute resolution provision of the Programmatic Agreement.

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1991 *Prehistoric Cultural Resources of Snohomish County, Washington*. Prepared by Northwest Archaeological Associates, Inc. for the Washington State Office of Archaeology and Historic Preservation, Olympia.

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1998 *Guidelines for Evaluating and Documenting Traditional Cultural Properties.* National Register Bulletin 38. United States Department of the Interior, National Park Service, Washington, D.C. Update available at http://www.nps.gov/history/nr/publications/bulletins/nrb38/.

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Appendix A

List of Acronyms

List of Acronyms

ACHP - Advisory Council on Historic Preservation

ADPA - The Archaeological Data Preservation Act

AHPA - Archaeological and Historic Preservation Act

AIRFA - American Indian Religious Freedom Act of 1978

APE - Area of Potential Effects: the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist.

ARPA - Archaeological Resources Protection Act of 1979

City – City of Everett, Washington

C.F.R. Code of Federal Regulations

CRG - Cultural Resource Group

DAHP - Washington State Department of Archaeology and Historic Preservation

District – Public Utility District No. 1 of Snohomish County

EO - Executive Order

FCR – Fire Cracked Rock

FERC - Federal Energy Regulatory Commission

GIS – Geographic Information System

HPC - The District's Historic Preservation Coordinator

HPMP - Historic Properties Management Plan (this document)

HRA - Historical Research Associates, Inc.

IDP - Inadvertent Discovery Plan

MBSNF Mount Baker-Snoqualmie National Forest

MOA - Memorandum of Agreement

MSL – Mean Sea Level

MW - Megawatt

NAGPRA - Native American Graves Protection and Repatriation Act of 1990

NEPA - National Environmental Policy Act

NHPA - National Historic Preservation Act

NPS – National Park Service

NR – National Register

NRHP - National Register of Historic Places (36 C.F.R. § 800.16(1))

PA – Programmatic Agreement

PAD – Pre-Application Document

Project - The Henry M. Jackson Hydroelectric Project, FERC No. 2157

PUD - Public Utility District No. 1 of Snohomish County

RM – River Mile

SHPO - State Historic Preservation Officer

TCP - Traditional Cultural Property

USFS - United States Forest Service

WDNR – Washington State Department of Natural Resources

WHMP Wildlife Habitat Management Plan

WHR Washington Heritage Register

HRA
HISTORICAL RESEARCH ASSOCIATES, INC.

Appendix B

Project Boundary/APE Maps

Due to the sensitive nature of cultural resources/historic properties, the Appendix B maps have not been included in this filing. Please refer to the maps provided in the FERC filing 20081006-5105 on October 6, 2008.

Appendix C

Inadvertent Discovery Plan

Inadvertent Discovery Plan for
Archaeological Materials and Human Remains
Public Utility District No. 1 of Snohomish County
Henry M. Jackson Hydroelectric Project, FERC No. 2157
Snohomish County, Washington

The Public Utility District No. 1 of Snohomish County (District) shall appoint one or more onsite representatives (may be a District employee or contractor familiar with the IDP) to carry out the obligations of this Plan and to be present or immediately available whenever the District plans any work which is anticipated to include disturbance of soils. If any member of the operations staff or contractor believes that he or she has made a discovery of archaeological materials or human remains, that person will notify the District's onsite representative. The onsite representative will direct that work be stopped in and adjacent to the discovery. The area of work stoppage will be large enough for the onsite representative to provide for the security, protection and integrity of the immediate discovery. There are many types of archaeological resources. An archaeological resource could be prehistoric or historic-period and may consist of, but not be limited to, the following:

- An area of charcoal or charcoal-stained soil in association with historic-period or prehistoric remains such as stone tools or chips
- An arrowhead, stone tool, or stone chips
- An historic bottle, old glass fragments, square nails, "hole in top" lead-soldered cans, etc.
- A cluster of bones or burned rocks in association with stone tools or chips
- A cluster of tin cans or bottles, logging, mining, or agricultural equipment older than 50 years
- Culturally modified tree

The District onsite representative will contact the District's Historic Preservation Coordinator (HPC). The HPC will then consult with a professional archaeologist to determine whether the discovery may be an archaeological resource. The District onsite representative will take reasonable steps to protect the discovery site. The District will notify the Mt. Baker-Snoqualmie National Forest (MBSNF) and the affected tribes of the discovery within 24 hours if it is on USFS managed land. For discoveries on non-federal land, the District will promptly notify all appropriate parties, including any potentially affected Indian tribes. Vehicles, equipment and individuals who are not authorized by the onsite representative or the MBSNF (on USFS managed land) will not be permitted to traverse, alter, or destroy the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed or the discovery has been adequately protected as determined by the HPC and professional archaeologist.

The District will determine whether it is necessary to continue the ground-disturbing work that led to the discovery. If it is necessary, the following steps apply:

1. The HPC will arrange for the discovery to be evaluated by an archeologist. The archeologist will recommend whether the discovery is potentially eligible for listing in the National Register of Historic Places (NRHP). If the resource is not eligible, this judgment will be documented and distributed to the consulting parties.
2. The District will work with the MBSNF representatives for discoveries on MBSNF land and with the landowner for discoveries on state or private land. The interested parties will also include the State Historic Preservation Officer (SHPO), the affected Indian tribes (unless the discovery is clearly non-Indian) and the FERC. The affected Indian tribes are the Tulalip Tribes, the Stillaguamish Tribe, and the Snoqualmie Indian Tribe.
3. The HPC and the archaeologist will contact the appropriate parties (see below) as soon as practicable to consult regarding the eligibility of the discovery for the NRHP. If the consulting parties determine that the discovery is an eligible resource, they will consult with appropriate parties for treatment. Treatment measures may include mapping, photography, limited probing and sample collection, or other activity.
4. The District will arrange for the archaeologist to implement the appropriate treatment measure(s) and provide draft and final reports on their methods and results to the consulting parties. Any investigation of the discovery will follow the procedures recommended by the archeologist for mitigation and/or management. If it is not necessary to continue the ground-disturbing activities that led to the discovery, the District will consult to stabilize and protect the property.

If it is not necessary to continue the ground-disturbing activity that led to the discovery, the District will consult to stabilize and protect the discovered remains. If the discovery is a National Register-eligible prehistoric or historic-period archaeological resource, it will be included in the Historic Properties Management Plan for the Project.

Treatment of Human Remains

District personnel will take reasonable steps to ensure that any human remains that are discovered are treated with dignity and respect and in accordance with applicable law. The Indian tribes to be contacted by District personnel for potential Indian remains are the Tulalip Tribes, the Stillaguamish Tribe, and the Snoqualmie Tribe (see below).

If any District employee or contractor believes that he or she has made an unanticipated discovery of human skeletal remains and/or associated or unassociated funerary objects, sacred objects, or items of cultural patrimony, that person will notify the District's onsite representative. The onsite representative will stop work in and adjacent to the discovery and keep the remains covered. The area of work stoppage will be large enough for the onsite representative to provide for the security, protection and integrity of the remains. Vehicles, equipment and individuals not authorized by the onsite representative or the MBSNF (on USFS managed land) will not be permitted to traverse, alter, or destroy the discovery site.

The onsite representative will call the Snohomish County Sheriff's Office and the HPC via phone or radio on a secure channel (i.e., unavailable to the media or general public). The Sheriff's office and County Medical Examiner's office may, of course, examine the discovery and determine whether the human remains will be treated as a crime scene. The District's onsite representative will remind the Sheriff's office that:

- the find may be a prehistoric or historic burial;
- the affected Indian tribes are very concerned about Indian burials and the find must be treated confidentially so that it is not subject to vandalism; and
- the tribes will be notified and asked if they want to have a representative present.

If the site is on USFS land, the HPC will immediately telephone, with written confirmation by certified mail, to the Federal Agency Official, the Skykomish Ranger District Ranger. The District will also contact the MBSNF Heritage Manager and Law Enforcement Officer. If the remains are found to be human or funerary objects, sacred objects, or items of cultural patrimony are found, the District will cooperate with the MBSNF, as appropriate based on the amount and potential likelihood of Project impacts upon the resources, in fulfilling MBSNF's responsibilities under NAGPRA and implementing regulations (43 C.F.R. Part 10).

If the remains are determined to be American Indian and they lie within MBSNF land, MBSNF will notify the District, the affected Indian tribes and the SHPO as listed below. The District will notify FERC. The District has been informed that the MBSNF will be the lead agency, working with the other parties to determine what treatment is appropriate for the remains. Under Sec. 3(d) of NAGPRA, activities may resume 30 days after certification in writing by the MBSNF that it has received the District's notification.

If the find lies on non-Forest Service land and is determined not to be a crime scene, the HPC will use reasonable efforts to contact the interested Indian tribes and secure the services of an archaeological resource consultant qualified to identify human remains to assist the District in further activities with respect to the discovery. If the remains are determined to be Indian and they lie within state or private land, the District will notify the SHPO, the affected Indian tribes, the landowner (if other than the District) and FERC. The SHPO will be the lead agency, consulting with the other parties to determine what treatment is appropriate for the remains. (At a meeting on 4/2/07, the Tulalip Tribes stated they desire to have aboriginal human remains left onsite and protected if any are discovered.)

If disinterment of aboriginal human remains becomes necessary, the consulting parties, as listed above, will jointly determine the final custodian of the human remains. The final disposition of the human remains on MBSNF land will be conducted in accordance with NAGPRA. The parties will make a good faith effort to accommodate the concerns and requests of the Indian tribes. The District will work with the affected Indian tribe(s) and pay the costs of reburial if disinterment and reburial is necessary.

If the remains are determined to be non-Indian, the District will treat (or if the landowner is not the District or the MBSNF, encourage the landowner to treat) the remains in accordance with applicable laws and regulations.

Contact List for Inadvertent Discovery Plan

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Snoqualmie, WA 98065
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Ian@snoqualmienation.com

Stillaguamish Tribe

Victoria Yeager, Stillaguamish Cultural Committee Member
PO Box 277
Arlington, WA 98223-0277
(360) 652-7362

City of Everett

Dave Koenig, Certified Local Government Representative
3002 Wetmore Street
Everett, WA 98201
(425) 257-8736
DKoenig@ci.everett.wa.us

Tom Thetford, Utilities Director and Jackson Project Contact
3200 Cedar St.
Everett, WA 98201
(425) 257-8824
TThetford@ci.everett.wa.us

Snohomish County

Brent Lambert, Certified Local Government Representative
2731 Wetmore Street, Suite 402
Everett, WA 98201
(425) 388-3263
BLambert@co.snohomish.wa.us

Snohomish County Medical Examiner

Norman Thiersch, M.D.
Snohomish County Chief Medical Examiner
9509 29th Avenue West, M/S 203
Everett, WA 98204
(425) 438-6200

Snohomish County Sheriff's Office

Snohomish County Sheriff's Office
3000 Rockefeller, M/S 606
Everett, WA 98201
(425) 388-3393
*Sheriff's personnel should not use unsecured radio channels to discuss potential finds of human remains.

Appendix D

Designation Letter

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

EVERETT

Providers of quality water, power and service at a competitive price that customers value.

September 1, 2005

Ms. Magalie R. Salas, Secretary
Federal Energy Regulatory Commission
888 First Street N.E.
Washington, D.C. 20426

Re: Jackson Hydroelectric Project, FERC No.2157, Snohomish County, Washington
Request for Designation as Commission's Non-Federal Representative

Dear Secretary Salas:

Public Utility District No.1 of Snohomish County, Washington (the "District") and the City of Everett (the "City") are co-licensees of the Jackson Hydroelectric Project, FERC No.2157 (the "Project"). The current Project license expires on May 31, 2011, and the District and City intend to file their NOI and PAD to commence an "Integrated Licensing Process" with regard to the Project prior to the end of 2005.

The District and City hereby request that they be designated as the Commission's non-Federal representative for purposes of consultation under section 7 of the Endangered Species Act and the joint agency regulations thereunder at 50 C.F.R. Part 402, section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and the implementing regulations at 50 C.F.R. section 600.920, following filing of their NOI and PAD.

The District and City further request authorization to initiate consultation under section 106 of the National Historic Preservation Act and the implementing regulations at 36 C.F.R. section 800.2(c)(4) as the Commission's non-Federal representative upon commencement of formal Project relicensing activities.

Thank you for consideration of this request. Please contact the undersigned with any questions.

Sincerely,

Glen Mixdorf
Assistant General Counsel
Relicensing Team Lead

Tom Thetford
Utilities Director
Relicensing Team Co-Lead

cc: David Turner, FERC
Linda Lehman, FERC

SNOHOMISH PUD 2320 California St. Everett, WA 98201 (425) 783-1000 Fax (425) 783-8238
CITY OF EVERETT 3200 Cedar St. Everett, WA 98201 (425) 257-8800 Fax (425) 257-8882

20060130-3022 Issued by FERC OSEC 01/30/2006 in Docket#: P-2157-167

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Snohomish County Public Utility District No. 1 and City of Everett	Project No. 2157-167

NOTICE OF INTENT TO FILE LICENSE APPLICATION, FILING OF PRE-APPLICATION DOCUMENT, COMMENCEMENT OF LICENSING PROCEEDING, SCOPING MEETINGS, SOLICITATION OF COMMENTS ON THE PAD AND SCOPING DOCUMENT, AND IDENTIFICATION OF ISSUES AND ASSOCIATED STUDY REQUESTS

(January 30, 2006)

a. Type of Filing: Notice of Intent to File License Application for a New License and Pre-Application Document; Commencing Licensing Proceeding.

b. Project No.: 2157-167

c. Dated Filed: December 1, 2005

d. Submitted By: Snohomish County Public Utility District (PUD) No. 1 and City of Everett (co-licensees)

e. Name of Project: Henry M. Jackson Hydroelectric Project

f. Location: The Henry M. Jackson Hydroelectric Project is located on the Sultan River in Snohomish County, Washington. The project occupies lands of the Mt. Baker-Snoqualmie National Forest.

g. Filed Pursuant to: 18 CFR Part 5 of the Commission's Regulations

h. Potential Applicant Contact: Glen Mixdorf, Relicensing Team Lead, Snohomish County PUD No. 1, 2320 California St, Everett, WA, 98201, (425) 783-8607 or via e-mail at grmixdorf@snopud.com.

i. FERC Contact: Linda Lehman Stewart (202) 502-6680 or via e-mail at linda.stewart@ferc.gov.

j. The Snohomish County PUD No. 1 and City of Everett filed a Pre-Application Document (PAD), including a proposed process plan and schedule, with the Commission pursuant to 18 CFR 5.6 of the Commission's regulations.

k. With this notice, we are initiating informal consultation with: (a) the U.S. Fish and Wildlife Service and NOAA Fisheries under section 7 of the Endangered Species Act and the joint agency regulations at 50 C.F.R., Part 402; (b) NOAA Fisheries under section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations at 50 C.F.R. § 600.920; and (c) the State Historic Preservation Officer, as required by Section 106, National Historical Preservation Act, and the implementing regulations of the Advisory Council on Historic Preservation at 36 C.F.R. § 800.2.

l. With this notice, we are designating the Snohomish County PUD No. 1 and City of Everett as the Commission's non-federal representative for carrying out informal consultation, pursuant to section 7 of the Endangered Species Act, section 305 of the Magnuson-Stevens Fishery Conservation and Management Act, and section 106 of the National Historic Preservation Act.

m. Copies of the PAD and Scoping Document 1 (SD1) are available for review at the Commission in the Public Reference Room or may be viewed on the Commission's website (http://www.ferc.gov), using the "eLibrary" link. Enter the docket number, excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support at FERCONlineSupport@ferc.gov or toll free at 1-866-208-3676, of for TTY, (202) 502-8659. A copy is also available for inspection and reproduction at the address in paragraph h.

Register online at http://ferc.gov/esubscribenow.htm to be notified via e-mail of new filing and issuances related to this or other pending projects. For assistance, contact FERC Online Support.

n. With this notice, we are soliciting comments on the PAD and SD1 as well as study requests. All comments on the PAD and SD1, and study requests should be sent to the address above in paragraph h. In addition, all comments on the PAD and SD1, study requests, requests for cooperating agency status, and all communications to Commission staff related to the merits of the potential application (original and eight copies) must be filed with the Commission at the following address: Magalie R. Salas, Secretary, Federal Energy Regulatory Commission, 888 First Street, N.E., Washington, D.C. 20426. All filings with the Commission must include on the first page, the project name (Henry M. Jackson Hydroelectric Project) and number (P-2157-167), and bear the appropriate descriptive heading "Comments on Pre-Application Document," "Study Requests," "Comments on Scoping Document 1," "Request for Cooperating Agency Status," or "Communications to and from Commission Staff." Any individual or entity interested in submitting study requests, commenting on the PAD or SD1, and any agency requesting cooperating status must do so by **March 31, 2006**.

Comments on the PAD and SD1, study requests, requests for cooperating agency status, and other permissible forms of communications with the Commission may be filed electronically via the Internet in lieu of paper. The Commission strongly encourages electronic filings. See 18 CFR 385.2001(a)(1)(iii) and the instructions on the Commission's website (http://www.ferc.gov) under the "e-filing" link.

o. At this time, Commission staff intends to prepare an Environmental Assessment (EA) for the project, in accordance with the National Environmental Policy Act (NEPA).

Scoping Meetings

We will hold two scoping meetings at the times and places noted below. The daytime meeting will focus on resource agency, Indian tribes, and non-governmental organization concerns, while the evening meeting is primarily for receiving input from the public. We invite all interested individuals, organizations, and agencies to attend one or both of the meetings, and to assist staff in identifying particular study needs, as well as the scope of environmental issues to be addressed in the environmental document. The times and locations of these meetings are as follows:

Evening Scoping Meeting

Date and Time: Monday, February 27, 2006, 7:00 PM (PST)

Location: PUD Electric Building Headquarters
2320 California Street
Everett, Washington

Directions: Arriving from Interstate 5, southbound:
Take Exit 194, follow City Center signs onto Everett Avenue, westbound (right). Turn left at Virginia Avenue. Turn right at California Street.

Arriving from Interstate 5, northbound:
Take Exit 193, turn left onto Pacific Avenue. Turn right at Cedar, and then left onto Hewitt Avenue. Turn right at Virginia Avenue.

For additional information:

Please contact Ms. Dawn Presler, Relicensing Information Coordinator, Snohomish County PUD No. 1, (425) 783-1709 or DJPresler@SNOPUD.com

Daytime Scoping Meeting

Date and Time: Tuesday, February 28, 2006, 10:00 AM (PST)

Location: Washington State Department of Ecology
Headquarters/Southwest Regional Office
300 Desmond Drive
Lacey, Washington

Directions: Arriving from Interstate 5, southbound:
Take Martin Way Exit 109, turn left onto Martin Way. At the third traffic light turn right onto Desmond Drive. Head uphill and at the intersection turn left and proceed along the front of the Headquarters building. Proceed past a stop sign at the main entrance and find the visitors parking lot on the left.

Arriving from Interstate 5, northbound:
Take Martin Way Exit 109, turn right onto Martin Way. At the second traffic light turn right onto Desmond Drive. Head uphill and at the intersection turn left and proceed along the front of the Headquarters building. Proceed past a stop sign at the main entrance and find the visitors parking lot on the left.

Please note that parking is limited and carpools are encouraged. If the visitors parking lots are full, retrace your route to Desmond Drive and take a left at the stop sign onto Desmond Drive. Continue around and park at the U.S. Fish and Wildlife Service building (510 Desmond Drive) and walk across the field to the Washington State Department of Ecology building.

Please check in at the front desk upon arriving at the Washington State Department of Ecology office building.

SD1, which outlines the subject areas to be addressed in the environmental document, has been mailed to the individuals and entities on the Commission's mailing list. Copies of SD1 will be available at the scoping meetings, or may be viewed on the web at http://www.ferc.gov, using the "eLibrary" link. Follow the directions for accessing information in paragraph m. Depending on the extent of comments received, a Scoping Document 2 (SD2) may or may not be issued.

Site Visit

A site visit is typically held in conjunction with the scoping meeting. However, anticipating that access to some project facilities would be limited by winter weather, the co-licensees hosted a project site visit on October 17, 2005. The site visit was noticed by the Commission on September 20, 2005 and attended by Commission staff on October 17, 2005. For these reasons, the Commission will not host its own site visit in conjunction with its NEPA scoping meeting.

Scoping Meeting Objectives

At the scoping meetings, staff will: (1) present the proposed list of issues to be addressed in the EA; (2) review and discuss existing conditions and resource agency management objectives; (3) review and discuss existing information and identify preliminary information and study needs; (4) review and discuss the process plan and schedule for pre-filing activity that incorporates the time frames provided for in Part 5 of the Commission's regulations and, to the extent possible, maximizes coordination of federal, state, and tribal permitting and certification processes; and (5) discuss requests by any federal or state agency or Indian tribe acting as a cooperating agency for development of an environmental document.

Meeting participants should come prepared to discuss their issues and/or concerns. Please review the Pre-Application Document in preparation for the scoping meetings. Directions on how to obtain a copy of the PAD and SD1 are included in paragraph m of this document.

Scoping Meeting Procedures

The scoping meetings will be recorded by a stenographer and will become part of the formal Commission record on the project.

Magalie R. Salas
Secretary

Appendix E

Washington Department of Archaeology and Historic Preservation Eligibility Concurrence Letter Dated June 27, 2008

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

June 27, 2008

Mr. Frank Wintchell
FERC
888 First Street NE
Washington DC 20426

In future correspondence please refer to:
Log: 121205-02-FERC
Property: Henry M. Jackson Hydro Electric Project 2157
Re: Determined Eligible

Dear Mr. Wintchell:

Recently, the Department of Archaeology and Historic Preservation was contacted by the Snohomish County Public Utility District (PUD) concerning the above referenced project. Dr. Rob Whitlam and I have reviewed the materials provided to our office and we concur with the professional opinion of the PUD's professional consultants that the Sultan River Diversion Dam & Associated Structures are eligible to the National Register of Historic Places. We also concur that the nine archaeological sites within the APE are not eligible.

I look forward to further consultation regarding FERC's determination of effect on Sultan River Diversion Dam & Associated Structures and the Horseshoe Bend Placer Claim (45SN125) previously listed on the National Register of Historic Places.

I would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available. These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800.

Thank you for the opportunity to review and comment. If you have any questions, please contact me.

Sincerely,

Russell Holter
Project Compliance Reviewer
russell.holter@dahp.wa.gov
Cc: Rob Whitlam (DAHP); Dawn Presler (PUD)

Appendix F

TCP Identification Letter

Jackson Project Relicensing

Date: April 17, 2007

To: Cultural Resources Group

From: Jackson Project Relicensing Team

Re: Jackson Project (FERC No. 2157) – SP15 and TCP Identification

---

At the April 2, 2007, Cultural Resources Group (CRG) meeting, State Archaeologist Dr. Robert Whitlam asked where Traditional Cultural Properties (TCPs) fit into the schedule developed for Study Plan 15: Historic Properties Study (SP15). Brent Hicks of HRA volunteered to provide a scope of work template for TCP, however in reviewing the provisions in SP15 (which was reviewed and approved by the CRG and FERC), we realized that it contains several opportunities for the tribes to identify potential TCPs. This memo summarizes the opportunities currently identified in SP15 to identify potential TCPs in the Jackson Project APE and suggests additional opportunities if desired by the tribes.

SP15 includes:

1) **Consultation** (SP Sections 15.3, 15.4.3, 15.7, 15.7.1, 15.7.2, 15.7.4 and 15.7.9) – Consultation will include the Tulalip Tribes, Snoqualmie Tribe and Stillaguamish Tribe to address any potential concerns about the study plan approach and traditional cultural properties within the APE.
2) **Information Sharing** (SP Section 15.7.2 and 15.9) – In conjunction with consultation, the co-licensees will provide the tribes with an opportunity to share any information on TCP that they may have. Co-licensees are aware tribes may be reluctant to disclose information and will work with tribes to attempt to reach an appropriate accommodation. Likewise, the co-licensees will share information with the tribes.
3) **Site Visits** (SP Section 15.7) – Consultation will include one or more field visits to the Project, and to cultural resource sites as desired by the tribes.
4) **Archival Research** (SP Sections 15.7.1.1 and 15.7.2) – Research will seek published and unpublished written, map and photographic sources, including the US Forest Services' TCP information.

5) **Archaeological Survey** (SP Section 15.7, 15.7.1.3) – An Archaeological Survey will be conducted to identify cultural resources that may qualify as historic properties. Tribes will be notified of the survey schedule and invited to participate in the work.
6) **Report Review** (SP Section 15.7.4 and 15.9) – Members of the CRG will be provided an opportunity to review and comment on the reports, eligibility forms and HPMP developed under SP15.

At the 4/2/07 meeting and previous meetings, tribal members expressed cultural interest in natural resources, especially certain plants. The co-licensees are conducting two studies on plants - SP 7: Special Status Plants Survey and SP8: Noxious Weeds Survey. Data and reports from these studies will be provided to the tribes. The PUD's terrestrial biologist, Karen Bedrossian, will be available to discuss the results of these studies and/or aspects of current wildlife habitat management for the Project area.

Suggested Additional Opportunities for TCP Identification (if desired by the tribes):

As provided in SP15 (Section 15.7.2), if tribal representatives believe the above actions are inadequate to identify potential TCPs, for each tribe the co-licensees propose to:

1) hold a meeting with tribal elders, members and/or staff to discuss TCPs in the Project area;
2) provide a tour of the Project area for tribal elders, members and/or staff, including potential TCP locations, as desired; and
3) transcribe any information shared at the meeting and/or tour regarding TCPs and submit the transcript to the tribe for its records. Only general, non-site specific information will be presented in the final Historic Properties Technical Report and HPMP, unless other arrangements are desired by the tribes. The co-licensees will use their utmost care in preserving the confidentiality of sensitive information shared at the meetings and tours.

If either tribe's representatives believe these suggested additional opportunities are warranted and desired, they should notify Dawn Presler by May 15, 2007, to begin coordinating and scheduling desired activities. Dawn Presler can be reached at 425-783-1709 or DJPresler@snopud.com .

Thank you for your continued participation in SP15 and Jackson relicensing.

Appendix G

Responses to Draft HPMP Comments

STAKEHOLDER COMMENT	LICENSEE RESPONSE
WA Department of Archaeology and Historic Preservation, letter dated August 18, 2008	
Page 6, 3rd Paragraph. House Bill 2624 is now incorporated into the relevant sections of RCW 27.44 and the substantive sections in this paragraph should be discussed on page 5 under RCW 27.44.	Updated as suggested.
Please identify the participating Federal Agencies and tribes in Section 2.3, page 6.	Updated as suggested.
Please confirm with a date on the determination of eligibility status of all resources identified in Table 4-2.	Updated as suggested.
Section 6.2 needs to have the District notify the parties to the HPMP the name of the designated individual as soon as the HPMP and License is implemented.	Updated as suggested.
Section 6.4 needs to assure that meetings will be held at least annually at a mutually acceptable time and locale.	Updated to offer meeting opportunity in conjunction with Annual Report issuance.
Section 6.2 should also state that an annual report of cultural resource activities shall be provided to the consulting parties.	Addressed in section 6.8 Reporting.
Section 6.4 also needs to state that revisions to the HPMP will be considered at least every 5 years to reflect changes in policy,	Updated to allow for consideration of revisions on 5-year interval.

STAKEHOLDER COMMENT	LICENSEE RESPONSE
resources, and management.	
Section 7.3 needs to articulate how the District will comply with Section 106 and 36CFR800 including the definition of the APE, timeline for consultations, determination of effect and proposed treatment.	Addressed in section 7.3.2.
Page 29, item 4 should state removal or construction of structures or materials is not exempt.	Per conversation between Rob Whitlam and Brent Hicks, updated to include “existing footprint” in exempt list.
Section 7.4 Monitoring of archaeological resources must be done by a professional archaeologist with an updated site form and report provided to the consulting parties.	Per conversation with Rob Whitlam, HPC can do annual monitoring but if changes are noted, the District will hire a professional archaeologist to update the site form.
Please address the Cumulative Effects in Section 8.1 and provide examples in paragraph 3, page 34.	Will be addressed in FERC’s NEPA document supporting the relicensing process.
Please include DAHP in the development of the Maintenance Guidelines identified in Section 8.4	Updated as suggested.
Please revise Section 8.5 for a 5 year interval and include all the consulting parties in the revision.	Updated as suggested.

STAKEHOLDER COMMENT	LICENSEE RESPONSE
Section 9.3 and 8.5 can be consolidated into one Section.	Updated as suggested.
Please provide timelines for dispute resolution and have the District notify the other parties of the dispute.	Updated as suggested.
Frank Winchell and Patti Leppert, FERC, Handwritten comments September 3, 2008	
Fix acronyms in text and appendix list.	Updated as suggested.
Remove appendix B regulations because 2-1 summarizes these regs.	Updated as suggested.

Appendix J

District Response to PLP Comments

FERC – dated March 27, 2009		
Comment Number	**Comment**	**District Response**
FERC-1	*Cumulative Effects Analysis* The Commission's Scoping Document 2 (SD2) issued on May 2, 2006, identified water quantity and quality, fisheries, and old-growth forest as resources that may be cumulatively affected by the proposed continued operation and maintenance of Public Utility District No. 1 of Snohomish County's (District) Henry M. Jackson Hydroelectric Project (Jackson Project). The Preliminary Licensing Proposal (PLP) does not fully address cumulative effects on water quantity, water quality, fisheries, or old-growth forest. The PLP provides some cumulative effects analysis for project effects on water quantity, but the analysis appears to assume that the City of Everett's water consumption would remain static at 84 million gallons per day for the term of the license. This assumption appears to conflict with other sections of the PLP that state that water supply consumption would increase over time. According to the Council on Environmental Quality's (CEQ) regulations for implementing NEPA (50 C.F.R. 1508.7), a cumulative effect is the effect on the environment that results from the incremental effect of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities. Please revise your cumulative effects analysis to address the resources and geographic and temporal scope identified in the SD2. For further guidance on preparing cumulative effects analyses you may want to review the Commission's guidelines for preparing environmental documents, which can be found on the Commission's webpage at: http://www.ferc.gov/industries/hydropower/gen-info/guidelines/eaguide.pdf.	In the FLA, we revised the cumulative effects analysis addressing water quantity and quality, and included effects associated with projected changes in the City's water demand (Section E.6.2.4). We also added cumulative effects analyses for fisheries (Section E.6.3.4), and old growth (Section E.6.4.4). In addition, we identified listed fish species and marbled murrelets as resources that could be cumulatively affected, and address them in Section E.6.6.4.

FERC – dated March 27, 2009		
Comment Number	**Comment**	**District Response**
FERC-2	*Essential Fish Habitat* Section 305(b)(2) of the Magnuson-Stevens Act provides that federal agencies must consult with the Secretary of Commerce on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect essential fish habitat (EFH). Based on the fish species identified as occurring in the project area, it appears as though the project may affect designated EFH for coho, Chinook, and pink salmon. Therefore, in your analysis of project effects on aquatic resources, please describe any EFH that may be affected by the project, and, for each species and life stage for which EFH was designated, please provide a description of abundance, distribution, available habitat, and habitat use by these species. Your analysis should conclude with a determination of effect for how the Proposed Action will affect EFH for each applicable species and life stage.	In Section E.6.3, the FLA includes a detailed description of Chinook, coho, and pink salmon EFH affected by the Jackson Project; a description of the abundance, distribution, available habitat, and habitat use by these species; and the effects of the Project's recommended PM&Es on EFH. We have included a final determination of effects on EFH for each species in Section E.6.6.6.
FERC-3	Final License Application Exhibits The PLP describes proposed changes to the project boundary. We want to remind you to show the existing and proposed project boundary modifications on your exhibit G drawings in your final license application, along with existing and modified acreages and land ownership. Also be sure to identify all section 24 lands in exhibit G of your final license application and provide the boundary data in a geo-referenced electronic format – such as ArcView shape files, GeoMedia files, MapInfo files, or similar format.	Exhibit G has been updated with the requested information, and corresponding acreages have been added to each Exhibit E resource section, where applicable.
FERC-4	Specific Comments 5.2.1.1.2, Water Resources Existing Conditions (page 37) In section 5.2.1.1.2, Sultan River Flows, you state that the withdrawal of water from the Sultan River basin by the City of Everett, while affecting Sultan River instream flows, is not part of the hydroelectric project and is not further discussed. However, in various other sections of the PLP you contend that other proposed Protection, Mitigation, and Enhancement (PM&E) measures (e.g., minimum instream flows, etc.) are predicated on	A more detailed discussion of the City of Everett water demands and impacts to the Project is provided in Appendix A. The City demands are discussed in the Supplement to the Operating Plan. Portions of that discussion were also imported into Section E.6.2.4.1.

FERC – dated March 27, 2009		
Comment Number	**Comment**	**District Response**
	protecting the City of Everett's water supply. Therefore, so that we may conduct the required analysis and balancing of competing interests of Sultan River water resources, please provide a detailed discussion of the City of Everett's water supply program. The discussion should include an analysis of existing and anticipated future water supply demand for a period of up to 50 years, and an evaluation of the ability of the project as proposed by the District (e.g., District proposed instream flow releases, process flows, etc.), or recommended by other stakeholders (e.g., reasonably foreseeable stakeholder recommendations for instream flows, process flows, etc.), to meet the current and future anticipated water supply demand.	
FERC-5	5.2.3.1.2, Water Quantity Effects (page 60) In your analysis of the effects of the PME measure "Protect Everett Water Supply and District Power Supply Dependability" on water quantity in section 5.2.3.1.2, you state that the District's proposed instream flow regime would provide a benefit to aquatic resources while negatively affecting the dependability of the City of Everett's "water supply safe yield" (safe yield). In your analysis, however, you provide no specific information on the definition of, or rationale for, choosing the safe yield, nor do you provide any explanation of how your proposed safe yield translates to a minimum target reservoir elevation of 1,410 feet mean sea level (msl). Therefore, in your final license application, please provide (1) a discussion of the definition of the safe yield; (2) an analysis of why your proposed safe yield would require the implementation of a minimum target reservoir elevation (trigger) of 1,410 feet msl; and (3) a justification for why instream flow releases would default to the existing instream flow schedule when the reservoir elevation falls to 1,410 feet msl. Additionally, if there are other reasonably foreseeable recommendations from stakeholders for varying reservoir elevation triggers to protect the safe yield, please provide an analysis of those recommended triggers, including benefits and costs, as appropriate, and an explanation of why your proposed 1,410 feet msl trigger would be in the public interest.	The statement about the proposed instream flow negatively affecting the City of Everett water supply was made to establish the case for the conservation trigger to be imposed when Spada Lake dropped below 1,410 feet msl. This concept and the effects of the proposed PM&Es are analyzed in Section E.6.2.4.1.

FERC – dated March 27, 2009		
Comment Number	**Comment**	**District Response**
FERC-6	5.2.3.1.2, Water Quantity Effects (pages 60, 61); 5.3.3.1.2 Protect Everett Water Supply and District Power Supply Dependability (page 127) In your analysis of the effects of implementing a 1,410-foot msl reservoir elevation trigger to protect the safe yield, you state that modeling shows that lowered instream flows would occur in some years in October under existing and future water supply demands (e.g., year 2035 and year 2060+). However, you provide no discussion of the anticipated frequency of lowered flows during all other months of the year. Therefore, please provide additional analysis on the effects of a 1,410-foot msl reservoir elevation trigger on instream flow releases during the other months of the year, as appropriate. The analysis should include an explanation of the anticipated frequency of flow reductions under future demand scenarios within the anticipated new license period of 30 to 50 years.	The requested discussion is included in the FLA in Section E.6.2.4.1.
FERC-7	5.2.3.3.1, Prepare Water Quality Protection Plan and Implement Compliance Monitoring (page 76) As noted in section 5.2.3.3.1 of the PLP, project operations have the potential to affect the water quality of the Sultan River. In addition, comments from stakeholders throughout the pre-filing consultation process have indicated a strong desire in enhancing aquatic habitat in the project bypassed reach by implementing measures to seasonally increase water temperatures to improve habitat suitability for salmonids. Available information suggests that modifying the baseline water quality conditions in the upper bypassed reach could potentially adversely affect downstream water quality. The PLP states that you propose to address water quality concerns by preparing a Water Quality Protection Plan, implementing water quality compliance monitoring, and preparing and implementing a Bypassed Reach Water Temperature Management Plan, in consultation with the Washington Department of Ecology, during the term of the new license.	The Water Quality Study was completed in March, 2009. Due to time constraints, it was not feasible to develop a comprehensive Water Quality Monitoring Plan (WQM) in time for submittal with the District's FLA. The District is submitting a PM&E with the FLA (see Appendix B) that requires the District to prepare a WQM and file it with the FERC after review and comment from the Aquatic Resources Committee (ARC). The District has attempted to prepare as many complete plans as possible for submittal with the FLA.

FERC – dated March 27, 2009		
Comment Number	**Comment**	**District Response**
	We will need to assess all proposed water quality measures, including benefits and costs, as part of our environmental analysis. Therefore, please describe these proposed measures in detail in a comprehensive Water Quality Monitoring Plan and file it with your final license application. We envision that the plan, at a minimum, will include the following: • a thorough description of water quality monitoring locations, sampling frequency, and a schedule for monitoring the project's effects on water quality in the Sultan River downstream of Culmback dam; and • a description of specific measures you intend to implement to improve water quality conditions and/or habitat suitability in the project bypassed reach and downstream, including anticipated costs. If during preparation of the Water Quality Monitoring Plan you determine that the anticipated costs to prepare and implement the plan differ from those preliminary costs included in section 5.10 of the PLP, please update the cost estimates accordingly and include them in your final license application.	
FERC-8	5.3.2.1.2, Habitat Availability (pages 105-110) The PLP provides a lengthy comparison of the changes in aquatic habitat availability that occurred between Stage 1 and Stage 2 operations. This information is useful from a cumulative effects analysis in that it describes aquatic habitat changes that occurred under the previous license term; however, the existing environment at the time of licensing is the Commission's baseline for evaluating the effects of your Proposed Action. By including this discussion under the project effects analysis you may confuse a reader that is attempting to discern the effects of the relicensing action that is under consideration at this time. Your comparison of the effects of Stage 1 and Stage 2 operations on aquatic habitat (IFIM analysis) would be more useful for the Commission's NEPA analysis if it were synthesized in an abbreviated, qualitative discussion and presented in the aquatic resources affected environment section and/or incorporated into the fisheries resources cumulative effects analysis.	We understand the existing environment at the time of licensing is the Commission's baseline for evaluation Project effects. As such, this section has been revised in the FLA to describe only the effects of the existing (Stage II) flow regime on aquatic resources. Comparisons with the Stage I flows are not included in the analysis.

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FERC-9	5.3.2.4.3, Fish Entrainment (page 118) The PLP provides a relatively brief discussion of the consultation and study record regarding the potential for fish entrainment into project facilities from Spada Lake, and concludes with the statement that "…the risk of trout becoming entrained into the powerhouse intake appears to be low." As it currently reads, your analysis provides very little information from the project record to support your findings. This section should be expanded to incorporate the analysis from the fish entrainment study report to support your conclusions (e.g., the engineering features of the project, the biology of Spada Lake trout, and project operations that contribute to your conclusions). We are not suggesting that the entire report be included, but a sufficient summary of the data should be provided to allow the analysis to stand on its own, with the reader being referred to the study for additional details.	Section E.6.3.2.2.3 of the FLA includes a more detailed description of the study's consultation record and an expanded analysis of the entrainment study results.
FERC-10	*5.3.3.1.2, Modify Minimum Instream Flow Schedule* (page 126); *5.3.3.1.5*, Ensure *Connectivity with Existing Side Channels* (page 133) The analysis of your proposed changes to instream flow releases and side channel connectivity briefly mentions that "side channel habitat provides important rearing and to a lesser extent spawning habitat for several species of salmonids." Further, in both sections of the PLP noted above, you state that "the ongoing juvenile fish occurrence study substantiates the importance of these areas." However, the PLP does not include any specific description or quantification of the existing fish use of surveyed side channel habitats as presented in the juvenile fish occurrence study report. Incorporating a summary of the study data and results into your analysis would help the reader understand the importance of this habitat type and the costs of your proposed connectivity enhancement measures. Your final license application should also include a schedule for implementing your proposal to reconnect the three side channels in the lower Sultan River.	Section E.6.3.1.2.8 provides additional information about the final results of the District's Juvenile Fish Abundance, Life History and Distribution Study (RSP 5). Section E.6.3.3.7 discusses the proposed Side Channel Enhancement Plan, and includes a schedule for completion.

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FERC-11	*5.3.3.1.2, Modify Minimum Instream Flow Schedule* (page 127) In the PLP, you propose to continue to cooperate with the U.S. Geological Survey (USGS) to provide real-time instream flow compliance monitoring at the diversion dam (USGS gaging station no. 12137800) and the powerhouse (USGS gaging station no. 12138160). As noted in the Commission's Policy Statement on Hydropower Licensing Settlements, the Commission has no jurisdiction over any party to an agreement other than the licensee. Therefore, while the licensee and a third party may agree to cooperatively undertake a certain task, and perhaps be paid by the licensee to do so, the Commission cannot enforce such an agreement against a non-licensee. We, therefore, suggest that your proposal be confined to actions that you need to be responsible for to ensure compliance with the license.	Section E.6.3.3.2 clarifies the District's commitment to ensuring that an accurate record of instream flows is available to assess compliance.
FERC-12	*5.3.3.1.4, Provide Process Level Flows* (page 129) Comments from stakeholders on the updated study report and PM&E discussions indicate a strong desire at providing process level flow releases greater than your proposed 4,200-cfs flow. Throughout the fall 2008 relicensing meetings, the District indicated that there is not an operational mode that allows for a flow release greater than your proposed approximately 4,200-cfs process level flow in a "controlled manner", and that the project would be unable to accommodate a higher process level flow release without holding the reservoir elevation at a level high enough to promote an uncontrolled spill event. The District indicated that maintaining the reservoir at an elevation suitable to promote uncontrolled spill could potentially cause flooding and property damage downstream. Regardless of the District's assertions, based on comments received to date, we anticipate that stakeholders may provide recommendations for process level flow releases greater than your proposed 4,200-cfs flow. Therefore, so that we may conduct the required analysis of all potential proposals and recommendations for process level flows, your final license application should include a detailed analysis of	This detailed analysis is included in Section E.6.3.3.3 of the FLA.

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	the anticipated effects, including benefits and costs, on project economics, aquatic resources, physical habitat, and human property from releasing a higher process level flow in an uncontrolled manner through the morning glory spillway; and the benefits and costs on these resources of modifying the existing project facilities (explain what would need to be done) to provide a process level flow greater than 4,200 cfs in a controlled manner.	
FERC-13	*5.3.3.1.6, Create New Habitat* (page 133) You propose to create two new side channel features in the lower Sultan River. Specific information on the scope of your proposed measure is lacking. Stream channel dynamics have the potential to alter side channel function and connectivity over time, and it is unclear whether you are proposing to ensure connectivity of the new side channel features throughout the term of a new license and how. We will need to assess the specific details of your proposed measure, including benefits and costs, as part of our environmental analysis. Therefore, please develop a Side Channel Creation Plan and file it with your final license application. We envision that the plan, at a minimum, will include the following: □□the specific locations and characteristics (width, length, acreage, land ownership, etc.), of your proposed side channel creation sites; □□your specific responsibilities for construction and maintenance of the side channel creation sites, including performance criteria, as applicable; and • an implementation schedule. If during preparation of the Side Channel Creation Plan you determine that the anticipated costs to prepare and implement the plan differ from those preliminary costs included in section 5.10 of the PLP, please update the cost estimates accordingly and include them in your final license application. Note, for all proposed measures, please be sure to provide both the capital cost and any operation and maintenance cost associated with the proposed measure.	Section E.6.3.3.7 of the FLA provides additional detail about the proposed Side Channel Enhancement Plan, and clarifies that the District proposes to maintain side channel connectivity through the new license period. The side channels would be designed to be self-maintaining, as much as possible, but the District will evaluate options for long-term maintenance and implement them, as needed. The District will modify the Exhibit G drawings once all lands or easements for all required projects have been obtained.

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FERC-14	*5.3.3.1.7, Enhance In-Channel Habitat with LWD* (page 134) You propose to enhance large wood accumulations at five locations in the lower Sultan River. Stream processes and high flow events have the potential to degrade or destroy established large wood accumulations over time. Specific information on the scope of your proposed measure is lacking. Further, it is unclear whether you are also proposing to maintain these established large wood sites throughout the license term. We will need to assess the scope of your proposed measure, including benefits and costs, as part of our environment analysis. Therefore, please develop a Large Woody Debris Enhancement Plan and file it with your final license application. We envision that the plan, at a minimum, will include the following: • the specific locations and characteristics (size of feature, size and quantity of wood, acreage of feature, land ownership at site, etc.), of the five LWD enhancement projects; • your specific responsibilities for construction and maintenance of the five sites; and • an implementation schedule. If during preparation of the Large Woody Debris Enhancement Plan you determine that the anticipated costs (capital and operation and maintenance) to prepare and implement the plan differ from those preliminary costs included in section 5.10 of the PLP, please update the cost estimates accordingly and include them in your final license application.	Section E.6.3.3.6 of the FLA describes the District's proposal to design and implement a Large Woody Debris Plan, and analyzes the effects of this PM&E. The District proposes to file the plan for Commission approval within 1 year of license issuance.
FERC-15	*5.3.3.1.8, Prepare LWD Management Plan* (page 135) You also propose to formalize an existing voluntary measure to address storage and placement of any large woody debris captured at Culmback Dam. Specific information on the scope of your proposed measure is lacking. We will need this information to conduct the required analysis of the benefits and costs of developing and implementing the large woody debris management program. Therefore, please develop a Large Woody	Given the ILP schedule, the District has attempted to prepare as many complete plans as possible for submittal with the FLA. Section E.6.3.3.6 of the FLA describes the District's proposal to design and implement a Large Woody Debris Plan, and analyzes the effects of this PM&E. The District proposes to file the plan for Commission approval within 1 year of

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	Debris Management Plan and file it with your final license application. We envision the plan, at a minimum, will include the following: • the specific location(s) where you intend to stockpile large woody debris at the project; • your specific responsibilities for implementing the program; and • an implementation schedule. If during preparation of the Large Woody Debris Management Plan you determine that the anticipated costs (capital and operation and maintenance) to prepare and implement the plan differ from those preliminary costs included in section 5.10 of the PLP, please update the cost estimates accordingly and include them in your final license application.	license issuance.
FERC-16	*5.4.3.2.2, Terrestrial Resources Management Plan* (page 167) You state that you will prepare and implement a Terrestrial Resources Management Plan for the continued management of all District-owned wildlife habitat lands. We will need to assess the benefits and costs of the specific measures you propose to include in your Terrestrial Resources Management Plan. Therefore, please develop the plan and schedule and file it with your final license application. If during preparation of the Terrestrial Resources Management Plan you determine that the anticipated costs (capital and operation and maintenance) to prepare and implement the plan differ from those preliminary costs included in section 5.10 of the PLP, please update the cost estimates accordingly and include them in your final license application.	The Terrestrial Resources Management Plan (TRMP) is included in the FLA as Appendix E. Costs are addressed in Section E.7 and E.8 of the FLA.
FERC-17	*5.6, Rare, Threatened and Endangered Species* (page 187) Your analysis of the project's effects on threatened and endangered species should be revised. The format for analyzing the project's effects on listed species should follow section 3.3.4 of *Attachment A—Specific Guidance for Resource Sections*, in the Commission's guidelines for	The FLA includes a new Rare, Threatened and Endangered Species section (see Section E.6.6) addressing the effects of both the Project's ongoing operations and the District's proposed PM&Es on listed species. The format of this analysis will be consistent

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	preparing environmental documents, which can be found on the Commission's webpage at: http://www.ferc.gov/industries/hydropower/geninfo/guidelines/eaguide.pdf. In general, this section of the document should be organized into two sections: (1) affected environment; and (2) environmental effects. The affected environment section should include a discussion of each listed species' status and biology. The environmental effects section should include a discussion of how the Proposed Action—including ongoing effects and any proposed PME measures—would affect each species, and conclude with a determination of effect for each species. As the PLP is currently written, it appears as though no determinations of effect were made for the aquatic species, and the PLP refers the reader back to the resource sections for an analysis of effects to listed aquatic fish. However, the aquatic resource sections do not break down the project's effects on each listed fish species, but rather, discuss aquatic habitat effects as a whole. Since there are three listed fish species known to occur in the Sultan River in project-affected waters, there should at the very least be a summary in section 5.6 of the effects of your Proposed Action—including ongoing effects and PME measures—on each of these listed fish species, and conclude with a determination of effect for each listed fish species. Finally, the threatened and endangered species effects analysis is divided into a discussion of project effects (section 5.6.2) and PME measures (section 5.6.3). However, the discussion of the PME measures also identifies potential effects associated with continued project operations. Since the PME measures are part of your Proposed Action, it would improve readability and minimize confusion if these sections were combined, with the ultimate finding of effect presented at the conclusion of the effects analysis for each species.	with the guidance provided by the Commission.
FERC-18	*5.7.1.1, Developed Recreation Facilities* (page 210) Table 5.7-1 should also show the estimated acres of each recreation site that the District proposes to bring into the project boundary (Olney Pass, South Fork, South Shore, Nighthawk, Bear Creek, and North Shore).	Estimated acreage of the recreation sites adjacent to Spada Lake is included in the FLA.

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FERC-19	*5.7.3.2.1, Changes in the Project Boundary* (page 237) The District proposes to make the Olney Pass and North Shore recreation sites part of the project and bring them into the project boundary "assuming a satisfactory agreement can be reached with the [Washington] DNR". You should include a firm proposal regarding these sites in your license application.	The District will continue to lease these sites should the Washington Department of Natural Resources (DNR) be willing to lease sites or it will purchase them if allowed by DNR. The District is in active discussions with DNR to determine which alternative is best.
FERC-20	*5.7.1.2.1, Project Area Ownership and Management* (page 213); *5.7.3.2.1, Changes in the Project Boundary* (page 237) The discussions on both the current and modified Jackson Project boundary should clarify the acres of land, as explained below. 1. On page 213 and page 237, the District states the project boundary around Spada Lake follows the contour elevation of 1,460 feet and totals approximately 1,939 acres. The District also states, on page 237, that it owns 1,978 acres of land surrounding Spada Lake. Please clarify the total acres of land and associated ownership within the current and proposed Jackson Project boundary. 2. On page 237, Section 5.7.3.2 (Land Use), the District proposes to add four of the Wildlife Habitat Management Plan tracts (Lost Lake, Project Facility Lands, Spada Lake, and Williamson Creek) to the project boundary, incorporating 2,285 acres. However, on page 154, Section 5.4.1.2.2 (Wildlife Habitat Management Plan), the total acreage of the four tracts in Table 5.4-5, when added, is 2,624. Please correct this discrepancy. Please confirm that the acreages in Table 5.4-5 do not include the Lake Chaplin tract. 3. In the Land Use Section, the District should create a table that clearly identifies the name and acres of the parcels of land, including roads, to be added to or removed from the current Jackson Project boundary.	Exhibit G identifies the acreages requested. All land owned by the District around Spada Lake is not part of the current Project boundary. Acreages presented in the FLA have been revised with most recent information. 1. On page 237 it is repeated that the "existing Project boundary around Spada Lake follows the 1,460-foot contour and totals 1,939 acres, including the reservoir area." 2. The acres on page 237 refer to land surrounding Spada Lake to be managed under the new TRMP. The acres on page 154 refer to the existing WHMP. Table 5.4-5 does include the Lake Chaplain Tract as indicated because the existing WHMP includes the Lake Chaplain Tract. Acreages throughout the document have been updated based on a new boundary survey that was completed in May, 2009. 3. These acreages are presented in tables E.6.7-3 and E.6.7-6 in Exhibit E of the FLA.
FERC-21	*5.9.1.1, Cultural Resources Regulatory Framework* (page 245) Please briefly elaborate on the consultation record the District had with the various cultural resource participants, including the formulation of a	The requested discussion is included in Section E.6.9.1.2 of the FLA.

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	cultural resources work group. At a minimum, the discussion should include: (1) who participated in the cultural resources work group; (2) how often the group met; and (3) agreements made between the group involving the establishment of the area of potential effects (APE) and associated studies in locating cultural resources.	
FERC-22	*5.9.1.2, Area of Potential Effects* (page 246) The PLP provides a general description of the APE, but there is no detail on the specific lands and facilites of the project that were included in the APE. Please provide this information in your final license application.	The requested discussion is included in Section E.6.9.1.3 of the FLA.
FERC-23	*5.9.1.4, Cultural Resource Surveys* (page 247) and *5.9.1.5, Recorded Cultural Resources and Historic Properties* (page 248) The PLP briefly mentions the previous cultural resources inventory assessments associated with the Project, but does not describe any of the most recent inventory work or their findings. Please provide more detail on the inventory work within the APE based on the 2008 Historic Properties Study Report.	The requested discussion is included in Section E.6.9.1.5 of the FLA.
FERC-24	*5.9.2.1, Historic Properties* (page 249) The PLP describes the cultural resources within the project APE that were considered historic properties, but fails to disclose the other cultural resources within the APE that were not considered historic properties. If not already done, please seek concurrence with the Washington SHPO on all National Register evaluations, if there are any remaining that have been rendered eligible or ineligible.	The requested discussion is included in Section E.6.9.1.6 of the FLA. The Washington SHPO concurred with the eligibility recommendations presented in the HPMP.
FERC-25	*5.9.3.2.1, Implement a Historic Properties Management Plan* (page 250) Please provide more detail in your proposed historic properties management plan about the general management measures that will be included in the plan (e.g., what will be done with inadvertent discoveries of cultural resources, human remain discovery protocols, emergency situations, etc.).	The requested discussion is included in Section E.6.9.3.1 of the FLA.

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FERC-26	*5.10, Estimated Costs of PM&E Measures* (page 251) Costs for various proposed environmental measures were included with the PLP. However, other pertinent cost and financing information needed for our economic analysis were not provided. While this information is not required in the PLP, it will be necessary for our analysis of your licensing proposal. Therefore, please ensure that all information required by section 4.51(e) of the Commission's regulations is included in your final license application. The column titled "Total Estimated Costs" in table 5.10 of the PLP is not needed for our economic analysis. Therefore, when filing your final license application, please only include the anticipated capital costs and average annual operations and maintenance costs for each of your proposed environmental measures. If the average annual costs vary from year-to-year, please provide a clear description of how the annual costs vary for each year, using footnotes to table 5.10, as appropriate. The following comments apply to specific measures included in table 5.10 of the PLP: 1. *Water Quantity PM&E measure 5.2.3.1.3, Control Maximum Flow during* *Salmon Spawning* – Are there any costs associated with this measure (e.g., energy generation or dependable capacity losses)? If so, please provide these costs in table 5.10 of your final license application. 2. *Process Flows* – You propose to release flows no more frequent than once every 4 years. Please clarify the $49,000 annual cost provided in Table 5.10. Is this the cost for each process flow release event (i.e., $49,000 every fourth year) or is this the average annualized cost for releasing a process level flow event every four years for the term of the license? 3. *Water Quantity PM&E measure 5.2.3.1.6, Control Flows during Winter Steelhead Fishing* – It is assumed that there are no costs for this measure because it is included as part of the current operating procedures.	1. There is no additional cost to the PUD for providing a maximum flow control, because it is part of the current license. 2. Process Flows are the annualized amount for the program proposed. 3. This measure has been removed from the FLA based on stakeholder input. 4. A single estimated cost will be provided in the FLA. 5. These have been combined into one PME measure in the FLA. 6. 6.. The costs of implementation for the Noxious Weed Plan are included in Table 5.10. Costs to prepare the plan are included as relicensing costs to-date. 7. Costs in Table 5.10 are for implementation only and do not include the cost of preparing the TRMP. 8. These measures are associated with the noxious weed plan and Table 5.10 in the FLA clarifies this. Costs are estimated to be higher during the first five years of implementation until existing weed infestations have been reduced.

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	However, if there are any cost changes for this measure associated with your proposed modifications to the operating regime, please include these costs in table 5.10 of your final license application. 4. *Water Quantity PM&E measure 5.2.3.1.8, Install and Operate Powerhouse Pelton Unit Flow Continuation System* – For our economic analysis we will need an estimated capital cost instead of a range of costs as provided in table 5.10 of the PLP. Please provide a single estimated cost in the final license application. 5. *Aquatic Resource PM&E measures 5.3.3.1.5 and 5.3.3.1.6, Ensure Connectivity with Existing Side Channels and Create New Habitat* – These two PM&E measures are separate actions that we will evaluate independently in our environmental and economic analysis. Therefore, the capital an operation and maintenance costs for each measure should be separated and presented as two separate line items in table 5.10. 6. *Vegetation PM&E measure 5.4.3.1.2, Noxious Weeds* – The plan has been prepared so the capital costs are assumed to be part of the relicensing costs to-date. However, the implementation (annual) costs should be included in table 5.10. 7. *Wildlife PM&E measure 5.4.3.2.2, Terrestrial Resources Management Plan* – Because we are requesting that a draft of this plan be filed with the final license application, the capital costs of preparing the plan should be included in your estimate of the relicensing costs to-date. 8. *Vegetation Management (years 1-5) and years (6-50)*. In table 5.10, you identify vegetation management in years 1-5 and years 6-50 as two items with different annual costs. Please explain what environmental measure these two costs are associated with (e.g., terrestrial resources management plan, noxious weed management plan, etc.).	
FERC-27	Please ensure that the PM&E measures listed under Recreation Resources match those discussed in the previous sections, as explained below. 1. Table 5.10 lists “New Recreation Site”, but the text on page 227, identifies “New Day Use Site and Trailhead”. Are these items the same? 2. Table 5.10 lists “North Shore Access Trail (new)”. Is this the trail	1. Yes. 2. The North Shore Access Trail refers to the road/trail that goes over Culmback Dam and

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	discussed on page 227, under North Shore Recreation Site (Site 8) and North Shore Access Trail, or is it in Appendix G (RSP 14 - Flow Recreation Analysis) under Enhanced Whitewater Flow Access and Notification? Please clarify. 3. According to the District, the project facilities occupy lands owned and managed by the District and the City of Everett. The project does not occupy federal lands. With that said, table 5.10 lists "6122 Road Abandonment", which is discussed on page 228 and page 240 (Forest Road 6122). The District notes an off-license agreement between the District and Forest Service may be negotiated prior to abandonment of the District's ownership portion (approximately 0.5 mile) of Forest Road 6122. If that is the case, this item and associated costs should be deleted from table 5.10 because it would not be a project cost. However, we recommend that you provide in a separate table a break down of the costs associated with the off-license agreement measures. 4. Table 5.10 lists "New Sultan River Canyon Trail (District Land)". This proposed measure is identified in Appendix G (RSP 13 - Recreation Needs Analysis) under Proposed Off-License Agreements and Measures. Therefore, as noted above, this item and associated costs should be deleted from table 5.10 because it would not be a project cost. Again, we recommend that you provide in a separate table a break down of the costs associated with the off-license agreement measures.	northward to the North Shore Recreation Site. 3. The conversion of the 6122 Road in District ownership (0.5 miles) to a trail is one of the proposed measures in the RRMP. Costs in Table 5.10 are for District ownership only. 4. The trail that leads to the Sultan River Canyon on District land has been renamed the Culmback Dam Trail to avoid confusion.

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WDOE-1	1) Section 5.2.2.2 Section 5.2.2.2 does not provide a detailed analysis of affect of project operations on all water quality parmneters identified for monitoring for Jackson project (except temperature). Since the two year monitoring period will end in March 2009, Ecology recommends including analysis of project operation on all other water quality parameters in your final license application.	The effects of Project operations on parameters that exceed the state criteria have been added to the FLA.
WDOE-2	2) Section 5.2.2.2.1 Discussion of project impact on water temperature is insufficient. There is a good discussion about how the dam features can or cannot control the water temperature in Reach-1, 2 and 3. Ecology recommends including discussion on how the project operations impact the water temperature in comparison to (a) Washington State water quality standards, and (b) natural temperature regime, in your final license application.	The water temperature analysis has been updated in the FLA.
WDOE-3	3) Section 5.2.2.2.1 and 5.2.3.3.3 Discussions with stakeholders during pre-filing consultation process have indicated an interest in increasing water temperature to improve habitat for salmonids. Available water temperature monitoring information and the discussion provided in Section 5.2.2.2.1 and 5.2.3.3.3 of PLP suggests that modifying the water quality conditions in the upper bypass reach could potentially adversely affect downstream water quality. Ecology recommends fmiher analysis ofthese discussions and including the approach finally adopted by SNOPUD in the final license application.	This will be addressed through the results of the Sultan Temperature (SNTEMP) modeling efforts. The flow volumes, flow schedules, and modifications presented in the FLA will increase temperatures during the period of reservoir stratification. The intent is to increase temperatures and stay within the bounds of the state water quality criteria.
WDOE-4	4) Section 5.2.3.3.3 Ecology agrees with SNOPUD proposal to develop water temperature management plan and applying all known and reasonable technologies (AKART) to address any chronic water temperature exceedences in Reach-3. Ecology recommends	Comment noted. This information has been presented in the FLA and upgrades of system infrastructure are proposed as a PM&E in the FLA.

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	including specific temperature management measures or any other project operational measures SNOPUD is proposing to implement to improve water quality and habitat suitability in the project bypass reach and downstream.	
WDOE-5	5) Section 5.2.3.1, Page 57 Ecology agrees with SNOPUD's proposal to modify Sultan River minimum flow schedule to benefit fish and other aquatic resources.	Comment noted.
WDOE-6	6) Section 5.2.1.2.2 PLP states that "During 2007 monitoring in the was not met in three cases:" • 1-day minimum DO values ranged from 8.1 to 9.4 during a 25-day period in June above the Diversion Dam (RM 9.8). • 1-day minimum DO values ranged from 8.7 to 9.4 mg/L during a 23-day period in June just above the Powerhouse (RM 4.9). • 1-day minimum DO values ranged from 9.1 to 9.4 mg/L during a 2I-day period in June and an 8-day period in September near the mouth (RM 0.2). Comment: Please confirm if it's three cases or four, as indicated in PLP.	The date was checked and is accurately presented in the FLA.
WDOE-7	7) Section 5.2.2.2 and Section 5.2.3.3.1 Section 5.2.2.2 of the PLP states that the project operations may affect water quality to some degree and Section 5.2.3.3.1 states that project operations can potentially affect Sultan river water quality. Comment: Avoid these couflicting statements and base your conclusions on the results obtained from water quality monitoring.	The water quality section of the FLA has been revised to incorporate the 2007-2008 water quality monitoring study results.
WDOE-8	We are planning to continue to work toward a settlement agreement with Snohomish County PUD and others to meet flow and habitat needs. We are still working on several areas: 1. Fish passage above Reach No. 2. 2. Reducing extremely cold temperatures in reach No. 1. We will want monitoring, baseline and evaluative studies.	Comment noted. The District has addressed many of these concerns as PM&E measures which are included in the FLA. We assume DOE refers to OR-3 in the Comment #2 instead of “Reach No. 1”, where unnaturally cold temperatures occur seasonally due to Project releases from the base of Culmback Dam.

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	3. Process flows to clean out sediment and debris, form channels and distribute gravel, adult fish attraction, and juvine fish egress. 4. Recreation flows. 5. Reach 3 minimum flows. 6. Mimum flows in other reaches. 7. Habitat improvements. 8. A report showing that the project is or isn't meeting water quality standards before project was built and after.	

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USFS-1	**1. The PLP does not justify a fifty year license.** The stated goal in the PLP is to obtain a new "50 year" license for the Project (PLP, p. 2). Although the Federal Energy Regulatory Commission (FERC) licenses for new Projects are for 50 years, during a relicensing, FERC licenses are generally accepted as being from thirty to fifty years with the longer term licenses being granted to projects that propose significant protection, mitigation and enhancement (PME) measures or upgrades and additions to project facilities. Currently the PLP does not justify a fifty year license for the Jackson Project. **Recommendation**: Unless the PUD proposes a more robust PME package or facility improvement, the USFS will not support a fifty year license.	A 50-year License Term is justified based upon the extensive environmental mitigative and enhancement measures. In general, when deciding on a term for a new license, the Commission continues to adhere to its policy first announced in its 1995 Mead Corp. order, which provides for: *30-year terms for those projects that propose little or no redevelopment, new construction, new capacity or environmental mitigative and enhancement measures; 40-year terms for those projects that propose moderate redevelopment, new construction, new capacity, or environmental mitigative and enhancement measures; and 50-year terms for those projects that propose extensive redevelopment, new construction, new capacity, or environmental mitigative and enhancement measures." 72 FERC ¶ 61,027, at 61,077 (1995). Recent orders confirm that the Commission, when deciding on a term for a new license, takes a case-by-case approach in determining whether the approved redevelopment, new construction, new capacity or environmental mitigative and enhancement measures qualify as "extensive" or "moderate" or "minor." In recent orders, the Commission, in applying this test, has continued to issue new licenses for terms of 50-years. In Entergy Ark., Inc., 101 FERC ¶ 62.201, at PP 63-65 (2002), for example, FERC issued a new 50-year license, finding that the "amount of proposed new investment in equipment rehabilitation and environmental measures at the project is extensive in nature," when the new license required the licensee to provide for continuous flow releases; implement whitewater boating releases; limit daily flow fluctuations; install plated trashracks; install minimum flow turbines;*

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		and add 188 acres of undeveloped land to the project boundary. See also Swift Creek Power Co., 81 FERC ¶ 61,347 (1997). As described in the FLA, the District's proposed PM&Es are extensive in nature. These measures, summarized in Section E.3.1.3 and discussed in detail, by resource, in Section E.6, are expected to provide substantial benefits at an estimated capital cost of $10,876,000 and an annual cost of approximately $574,000. Accordingly, a 50-year license is warranted.
USFS-2	**2. It is not clear how agreements between the PUD and City of Everett relate to this Project.** The PLP states that "By Agreement between the District and City in 2007, the District will be the sole licensee applicant for a new license" (PLP, p. 18). It is not clear to the USFS how other agreements with the City of Everett related to the Project, if any, are or are not continuing and how they impact the Project. For example, does the Agreement include any changes in responsibility for maintaining and operating structures related to the Project, such as the City of Everett's Diversion dam. What agreements exist concerning shared water rights? **Recommendation:** The PUD should explain in the Final License Application how agreements it has with the City of Everett related to the Project impact the continued operation and maintenance of the Project, if at all.	The primary documents governing the relationship between the City of Everett (the "City") and the District with respect to the Project are an agreement for multi-purpose development of the Sultan River dated July 21, 1960 (the "1960 Agreement"), and an amended agreement dated November 17, 1981 (the "1981 Amended Agreement"). These agreements state that the Project must meet the needs of the City's water system before meeting the District's needs for power generation. *See* 1960 Agreement, Art. II, Sec.2; 1981 Amended Agreement, Art. II, Sec. 2. As a result, the District is contractually bound, consistent with the 1960 Agreement and the 1981 Amended Agreement, to place the needs of the City's water supply ahead of the District's needs for power generation. The 1960 Agreement and 1981 Amended Agreement also recognize that certain City-owned facilities would be utilized as part of the Project. Thus, through these agreements the City granted the District a perpetual contract right to use those facilities for Project purposes. *See* 1960 Agreement, Art. II, Sec. 3; 1981 Amended Agreement, Art. II, Sec. 3. In 2007 and 2008, two additional agreements were entered into between the City and the District. The first is a supplemental agreement dated October 17, 2007 (the "2007 Supplemental

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		Agreement"), and the other is a second supplemental agreement dated March 21, 2008 (the "2008 Second Supplemental Agreement"). While the 2007 Supplemental Agreement reiterated the priority of the City's water supply system over the District's power generation needs as expressed in the earlier agreements, *see* 2007 Supplemental Agreement, Sec. A.4., the primary goal of the agreement was to make explicit that "the District currently has, through the provisions of the 1960 and 1981 Agreements, all authorizations from the City necessary to continue Project operations and carry out required FERC mitigation involving City lands, facilities and property." 2007 Supplemental Agreement, Sec. A.1. Because the District possessed sufficient authority from the City to carry out the terms of a FERC license, even if those terms involved City-owned facilities or land, the City and the District petitioned the Federal Energy Regulatory Commission to declare that the City need not be a co-licensee on the next license covering the Project. *See* Joint Petition for Declaratory Order, accession number 20071108-0124 (November 1, 2007). The Declaratory Order was issued on December 20, 2007, though the Federal Energy Regulatory Commission requested certain modifications to the agreements to ensure that the District has sufficient control of City-owned facilities. 121 FERC ¶ 61,269 (Dec. 20, 2007). These modifications are embodied in the 2008 Second Supplemental Agreement. The respective responsibilities of the City and the District for maintaining and operating Project facilities are described in the 1960 Agreement and the 1981 Amended Agreement. *See* 1960 Agreement, Art. IV, Sec. 1-3; 1981 Amended Agreement, Art. V, Sec. 1-2. These responsibilities cover all facilities used for Project purposes, including the City-owned Diversion Dam, should the Diversion Dam continue to be so used. The 2007 Supplemental Agreement is expressly supplemental to the earlier agreements, and the terms of the 2007 Supplemental Agreement do not amend

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		or change the respective responsibilities described in those agreements. *See* 2007 Supplemental Agreement, Section F.3.
USFS-3	**3. The PLP does not describe the Project boundary.** In the Pre Application Document (PAD), the last paragraph of the Project Background section (PAD Section 2.3) describes the Project boundary of the existing license. The PLP (page 18) has omitted any description of the boundary. A description of the existing and proposed boundary is important information to understand the proposed PME measures. PLP sections on recreation and terrestrial refer specifically to Project boundary. The USFS assumes that the PAD description of existing boundaries is still valid, but the Final License Application should include the PUD's proposal for boundary delineation. The current boundary as described in the PAD is the lands and waters within the **Project boundary** include Spada Lake and shorelands below elevation 1,460 feet, Culmback Dam, the power tunnel corridor (a corridor having a 60-foot radius around the center line of the power tunnel), the power pipeline corridor, the powerhouse, the Lake Chaplain pipeline corridor, the City of Everett's diversion tunnel and pipeline corridor, and the City of Everett's Diversion Dam. The Project boundary should also include the Sultan River bypass reach between Culmback dam and the Powerhouse, as it is a linear feature within which instream flow is measured at two points. **Recommendation:** The PLP should describe the Project boundary and include the Sultan River bypass reach.	The required level of description for the Project boundary is included in the FLA Exhibit G drawings. There is no reason or precedent for inclusion of any of the Sultan River reaches in the Project boundary.
USFS-4	**4. The description of the river channel below Culmback dam mischaracterizes the habitat potential of the Sultan River.** The description of the river channel below Culmback dam as "containing numerous rapids and cascades separated by short pool riffle stretches" mischaracterizes the habitat potential of the Sultan River (PLP, pp. 18-19). Study Plan 3 (Instream Flow Study Report, Figure 2-2, pp. 2-4), shows that cascades and rapids are actually the *least* abundant habitat	The qualitative description presented on pp. 18-19 in the PLP is from the Stream Catalog prepared by Williams et al. 1975. In that description, the term "numerous" should not be translated to refer to a percentage of a particular habitat type. The District concurs that quantitative information is preferred over qualitative information. The best available information for making

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	types in all three reaches downstream of Culmback dam – with both of these habitat types making up a total of less than 15-20% of the habitat in any reach. Pools and glides are the predominant habitat type displayed in Table 2-2 followed by low gradient riffles. **Recommendation:** The PLP should incorporate results of studies on habitat in the Sultan River so that the habitat potential in all reaches of the Sultan River is accurately described.	between-reach comparisons is contained in Revised Study Plan (RSP) 3 and the model results associated with that study. Information from this RSP has been included in the FLA.
USFS-5	**5. The PLP Project facilities section has dropped information that was included in the PAD on the size and capacity of the turbines.** PLP Section 4.3, which addresses Project facilities, has not provided information that was included in the PAD (Section 4.3.9) on the size and capacity of the turbines. This information is necessary to clearly understand the system. Specifically, the PAD said the two Francis turbines each had a maximum discharge capacity of 44 cfs, but that together they discharged up to 390 cfs to Lake Chaplain and the Diversion dam. The PLP states that [t]he two Francis units are sized to meet current water delivery requirements to Lake Chaplain and the minimum instream flow requirements between the City's Diversion Dam…. **Recommendation:** Please describe the hydraulic capacity of the turbines in the FLA.	The PAD accurately described the capacities of the Pelton and Francis units. Section 4.3.9.1 states that the **minimum** capacity of the Francis units is 44 cfs. A similar description has been added to the FLA.
USFS-6	**6. The PLP is unclear that instream flow requirements are for release amounts; and does not identify maximum hydraulic capacity of the system.** Please add the word "releases" after instream flow to indicate the requirements are for release amounts, not for instream amounts (PLP, p. 22). Also, by providing the hydraulic capacity of the Portal 2 gate, and of the tunnel from Lake Chaplain to the Diversion dam, the USFS can better understand the hydraulic limitations of this system. Specifically, identify what is the maximum flow that can be continuously routed from the powerhouse to Lake Chaplain, and from the lake back to the	The PLP is clear that the instream flows are the in-river targets (as measured at USGS gage locations) which the District is obligated to maintain per the instream flow requirements of the license. The only point where the term "releases" applies is at Culmback Dam where the minimum instream flow is the amount released. The FLA has been clarified where needed to address this comment.

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	Diversion dam. **Recommendation:** Please add the word "releases" after instream flow to indicate the requirements are for release amounts, not for instream amounts, provide the hydraulic capacity of the Portal 2 gate, and of the tunnel from Lake Chaplain to the Diversion dam, and identify what is the maximum flow that can be continuously routed from the powerhouse to Lake Chaplain, and from the lake back to the Diversion dam in the Final License Application.	
USFS-7	**7. It is not clear what the PUD's responsibility for maintaining and calibrating the weir on the City of Everett's Diversion dam is.** Currently, the instream flow returned to the river at the Diversion dam is measured at the weir (PLP, p. 23). The PLP does not clearly describe what the PUD's responsibility for maintaining and calibrating this weir on the City of Everett's Diversion Dam is. Section 3.3 describes this as the City of Everett's Diversion Dam. Does the PUD consider this dam, or the weir to be a project facility to be authorized by the next license? **Recommendation:** Please explain in the FLA what the PUD's responsibility for maintaining and calibrating this weir on the City of Everett's Diversion dam is. Other stream gages used for compliance monitoring need to be described as a project facility.	The PUD is responsible for the accuracy of the gaging equipment for all compliance requirements. Currently, the USGS by contract provides the calibration and record keeping for the Diversion Dam and Powerhouse gaging stations. These are the only two gages used for compliance and these instrumentation points are provided by and maintained by the USGS. The District commits to maintaining these two gages should the USGS notify the District that they will no longer maintain and operate them. The District does not consider the City's Diversion Dam or weir as a Project facility to be included in the next license, and is proposing to construct a new minimum flow discharge structure on District property adjacent to the Diversion Dam. The new structure would enhance the District's ability to control minimum flow releases.
USFS-8	**8. It is not clear what quantity of water can be diverted from the Diversion dam to Lake Chaplain.** The PLP does not provide information about what quantity of water can be diverted from the Diversion dam to Lake Chaplain when the City needs to meet water requirements or how often this diversion has occurred during Phase II (PLP, p. 23). This information is important in determining the Project impacts to the resources, and needed to understand the possible options for routing water when it is available during high-flow events. **Recommendation:** In the FLA please identify what quantity can be diverted from the Diversion dam to Lake Chaplain when the City needs	Hydraulic capacities of the Project facilities have been included in the FLA.

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	to meet water requirements, as well as how often has this occurred during Phase II.	
USFS-9	**9. The description of habitat potential in Reach 3 and its distinction from Reach 2 is inaccurate.** The PLP states that higher flows are provided to reaches below the Diversion dam and Powerhouse where river conditions offer more suitable habitat than is found upstream of the Diversion dam (PLP, p. 25). Although Reach 1 is lower gradient than the other reaches and probably represents the best spawning habitat in the system, the distinction between Reaches 2 and 3 is qualitative and arbitrary, considering habitat conditions in Reach 3 are totally controlled by Project operations. These operations limit flows to minimal levels and maintain water temperatures too low for native and non-native fishes to thrive. Except for the upper 0.3 mile, stream gradient and habitat types in Reach 3 are very comparable with those in Reach 2 (CH2M Hill, 2008). **Recommendation:** The PLP should either more accurately describe habitat conditions in all project affected reaches of the Sultan River or delete qualitative references.	The District concurs that quantitative information is preferred over qualitative information. The best available information for making between-reach comparisons is contained in Revised Study Plan (RSP) 3 and the model results associated with that study. Information from this RSP has been included in the FLA.
USFS-10	**10. The terms "instream flow" and "releases" are inconsistently used throughout the PLP.** The PLP states that "[r]emaining flows in the river are allowed to pass over the Diversion dam to provide required instream flows" (PLP, p. 25). Please use the terms "instream flows" and "releases" consistently and accurately throughout the document, with "instream" meaning the amount of flow measured instream, accounting for all sources. The section titled Project Flow Data uses "minimum flow" where it should read "minimum release." (PLP, p. 28). The PLP refers to "release points" then uses the terms "a minimum flow of 95 to 175 cfs " and "minimum flow requirements range from 165 to 200cfs" (PLP, p. 38). Both of these sentences should identify that these are minimum release amounts. On the next page, the PLP uses the terms Instream flow requirements, not "Release Requirement" (PLP, p. 39, Table 5.2-1). Table 5.2-6 identifies the current minimum flows as "releases." Please explain how current	The text of the PLP p.28 is accurate, if one understands that the minimum release only applies to Culmback Dam, because it is the only source of water for that point. That is the only part of the text that refers to releases. The Diversion Dam and the Powerhouse are "release points" where we supplement the instream flows coming into those points to achieve the instream flow requirements of the license. Table 5.2-1 is labeled correctly. Table 5.2-6 is mislabeled. This has been changed in the FLA.

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	flow requirement compliance measurements are made, relative to whether it is measured as "instream" or "release." **Recommendation:** Please consistently and appropriately refer to "instream flow" and "releases" and explain how current flow requirement compliance measurements are made, relative to whether it is measured as "instream" or "release."	
USFS-11	**11. Wording clarifications, Section 4.4.3 Project Flow Data.** The Agreement referenced in the second sentence of PLP, Page 28 should be identified with the beginning of the hydropower operations. Wording related to "minimum flow" should be changed to "minimum releases" if this is more accurate. **Recommendation:** The Agreement referenced in the second sentence should be identified with the beginning of the hydropower operations. Wording related to "minimum flow" should be changed to "minimum releases" if this is more accurate.	Yes, the Settlement Agreement was developed in anticipation of the beginning of hydropower operations in the early 1980s. See response to comment USFS-10.
USFS-12	**12. Accretion Flow Label clarification, Table 4.2.** The mean and median accretion flow column headings should be labeled "Inflow as measured at lower end of reach" if this is the case (PLP, p. 29, Table 4.2). **Recommendation:** The mean and median accretion flow column headings should be labeled "Inflow as measured at lower end of reach" if this is the case. The proposed operations and maintenance plan needs to include higher minimum flow releases in Reach 3, passage at the Diversion dam, and process flows released more frequently than once every 4 years (PLP, p.30).	The Districts agrees that "inflow as measured at the lower end of the reach" or "cumulative accretion" are better ways to describe the data contained in the table. We acknowledge that the USFS desires higher instream flow releases in Reach 3, passage at the Diversion Dam, and more frequent process flow releases. This is not the District's position.
USFS-13	**13. The PLP does not provide annual and monthly average and median inflow to Spada Lake or describe the City of Everett's water demand.** PLP Section 5.2.1.1 Water Quantity, should display annual and monthly average and median inflow to Spada Lake over the long-term and address the water demand by the City of Everett (PLP, p. 36). This information is needed to describe the "water budget" of the project,	Inflow data (along with many other parameters) was used to produce the 109 year model runs of various Project operational scenarios, which were then used to generate daily flows in the lower Sultan River (see Section E.6.2.4). Effects of City water demand are presented under Section E.6.2.4 (Cumulative Effects).

<table>
<tr><th colspan="3">US Forest Service – dated March 31, 2009</th></tr>
<tr><th>Comment Number</th><th>Comment</th><th>District Response</th></tr>
<tr><td></td><td>which provides context for other discussions of flows and water uses. Based on numbers in Study Plan 23 (IHA Report) and elsewhere, the current water quantity situation can be summarized as follows:

<table>
<tr><th></th><th>Acre Feet</th><th>Pct of inflow</th></tr>
<tr><td>Pre-Project Upstream end of Reach 3</td><td>525,755</td><td></td></tr>
<tr><td>Release 20 cfs below Culmback</td><td>14,500</td><td>2.8%</td></tr>
<tr><td>Spill</td><td>17,341</td><td>3.3%</td></tr>
<tr><td>Generation</td><td>493,914</td><td>93.9%</td></tr>
<tr><td>Municipal demand (withdrawn after being used for generation)</td><td>94,000</td><td>17.9%</td></tr>
</table>

This type of display would indicate that withdrawal for City water is a subset of the water used for power generation, and that it is 18% of the inflow on the average year. When the demand doubles, it will be 36% of inflow to Spada Lake. Current releases below Culmback dam are just 2.8% of the inflow. This analysis puts the magnitude of the releases below Culmback dam in context of the other uses. Releases at the Diversion dam could also be included in this list as a “post-generation” water use.

Recommendation: Display annual and monthly average and median inflow to Spada Lake over the long-term and address the water demand by the City of Everett.</td><td></td></tr>
<tr><td>USFS-14</td><td>14. Wording consistency regarding City of Everett water withdrawals.
The PLP states on Page 37 that
[t]he withdrawal of water from the Sultan River basin by the City of Everett, while affecting Sultan River flows, is not part of the hydroelectric project and is not further discussed.</td><td>The statement on page 37 is inaccurate and has been corrected in the FLA.</td></tr>
</table>

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	This statement is not consistent with the rest of the document. The interaction between hydropower operations and withdrawal of water by the City of Everett is discussed extensively in the Effects analysis and discussed explicitly in Section 5.3.3.1.2. **Recommendation:** Delete the statement that The withdrawal of water from the Sultan River basin by the City of Everett, while affecting Sultan River flows, is not part of the hydroelectric project and is not further discussed. In the alternative, make the above statement consistent with the other statements on this topic in the PLP.	
USFS-15	**15. Clarify flow regulation history.** The statement in the PLP that "Flow releases from Culmback dam to the Sultan River have been regulated since 1965 (prior to the hydroelectric project)" should be clarified. See Comment # 11 above. **Recommendation:** Clarify that flow releases from the Culmback dam to the Sultan River have only been regulated since the mid 1980s when diversion for hydropower generation began.	Flow releases have been regulated since 1965 with the completion of Stage I of Culmback Dam.
USFS-16	**16. The PLP does not propose PME measures to address the Project impacts to the riparian corridor and associated instream habitat in the Project's Bypass Reach.** The USFS manages the riparian corridor and associated instream habitat within Reach 3 of the Sultan River (bypass reach) between Culmback dam and the Diversion dam (PLP, p. 30). As described in the previous paragraph, this reach is heavily impacted by Project operations, however, no additional proposals to mitigate these impacts to public resources are proposed. **Recommendation:** The FLA should propose PME measures that address Project impacts to the riparian corridor and associated instream habitat in the Project's bypass reach.	A bypass reach should not be included within project boundaries unless the license requires ongoing programs in a bypassed reach such that continued Commission oversight over the reach is necessary to meet those requirements. *See* Duke Power, 100 FERC ¶ 61,294 at P 35 (2002). Instream flow requirements alone will not trigger a need to include a bypass reach within a project boundary. Except for the instream flow requirements, neither the existing license nor the PM&Es proposed within the FLA require the District to implement ongoing programs within the bypass reach. As such, the bypass reach should not be included within the Jackson Project boundary.

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USFS-17	**17. Project effects on water temperatures and resident fish in Reach 3.** The PLP states that the entire Sultan River is designated as "Core Summer Salmonid Habitat" (p.45) and that the river downstream of Culmback dam meets state criteria for water temperature (p.47). Although this latter statement may be technically accurate since the State of Washington standard was established as a "not to exceed" maximum standard, it is also misleading in terms of Project effects. Project operations have had a significant effect on the "Core Summer Salmonid Habitat" in much of the 6.8 miles of Reach 3 due to the cold water releases from Spada Lake. These hypolimetic releases are in the 4-6oC range (PLP, Figure 5.2.6) and have rendered the upper 4 miles of the reach virtually uninhabitable for resident trout, as shown by sampling completed for the Fish Passage Assessment (Phase 1) Report prepared for this Project relicensing proceeding (CH2MHill, 2008). **Recommendation:** The PLP should adequately describe the negative effect of current coldwater releases from Spada Lake on the aquatic biota in Reach 3, and propose a PME to improve habitat conditions in the reach that meet the intention of managing the entire Sultan River as "Core Summer Salmonid Habitat".	Section 5.3.3.1.13 *Bypass Reach Water Temperature Monitoring and Management Plan* of the PLP describes the measure to address the cold water issue in Reach 3. The FLA includes a PM&E to address temperature conditions in Reach 3.
USFS-18	**18. The Indicators of Hydraulic Alteration analysis section does not provide enough information about the actual changes in magnitude and average monthly annual flows.** The Indicators of Hydraulic Alteration (IHA) Analysis section needs more information on the actual changes in magnitude and average monthly and average annual flows, rather than narrative comparisons (PLP, p. 50-51). This information is necessary to understand the continuing effects of the project. Please provide these Phase I and Phase II averages in cubic feet per second. **Recommendation:** Please provide information about the actual changes in magnitude and average monthly and average annual flows and Phase I and Phase II averages should be provided in cubic feet per	The Final Technical Report of RSP 23 provides much greater detail on hydrology. The PLP provides a summary of the information but the District encourages the reader to refer directly to the study for additional information.

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	second.	
USFS-19	**19. It is unclear whether the flows described in Section 5.2.2.1.1 are minimum releases or not**. It is not clear whether the flows discussed in PLP Section 5.2.2.1.1 Flow Alternatives are referring to minimum flow releases or something else. **Recommendation:** Please clarify the wording to indicate these flows are measured as "minimum releases" if this is the case.	The flows referred to are actual flows; sometimes at minimum and sometimes higher because of accretion from groundwater and surface water sources.
USFS-20	**20. The PLE does not propose any PME measures to mitigate for Project flows in Reach 3.** Although the PUD identified at least five major Project impacts on flows in Reach 3 of the Sultan River in its IHA analysis (PLP, p. 51), no mitigation measures are proposed in this section of the PLP to address these effects on almost six miles of habitat. Specifically, the PLP stated that No changes are proposed for the bypass reach (OR-3) from RM 9.7 to 16.5; the year round release of 20 cfs from Culmback dam would remain unchanged from current conditions. Not only has habitat in the bypass reach been severely impacted by water withdrawals, cold water releases, and interruption of physical large woody debris (LWD) and sediment transport processes, but aquatic habitat has been fragmented and the native fish populations have been restricted in distribution and potential abundance by the presence of the barrier (Diversion dam) at the lower end of the reach. Other than the area inundated by Spada Lake, Reach 3 has been the reach most adversely impacted by Project facilities and operations. The complete absence of any "on-site" or "in-kind" mitigation measures proposed by the Licensee in this reach is questionable given the significance of the potential of the public resources within this reach of the river. As a result of these Project impacts, the USFS would like the PUD to propose a PME that optimizes temperature and flows for anadromous	The Diversion Dam is not a District facility and the District is not responsible for the anadromous fish passage blockage which has been in place for the past 100 years. There have been no proposals to increase instream flows in Reach 3. As stated above the FLA does include a PME to address temperature concerns within Reach 3.

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	species in Reach 3 with existing facilities, and leaves the option open for alteration of facilities in the future if determined to be needed based on biological monitoring results. **Recommendation:** Develop a PME measure that optimizes temperature and flows for anadromous species in Reach 3 with existing facilities and leaves the option open for alteration of facilities in the future if determined to be needed based on biological monitoring results.	
USFS-21	**21. It is not clear in the PLP what the "proposed increased minimum instream flows downstream of Culmback Dam" are.** The PLP (on p. 60) states that [p]roviding the proposed increased minimum instream flows downstream of Culmback Dam to benefit aquatic resources…would negatively affect the dependability of the City of Everett's water supply (safe yield) and the District's power generation capabilities. It is not clear what "the proposed increased minimum instream flows" refers to as the PUD has not proposed to increase flows below Culmback dam, and there is no reference in the PLP to proposals by other parties to do so. **Recommendation:** Clarify in the FLA what the "proposed increased minimum instream flow" amounts are and explain how these flows would "negatively affect the dependability of the City of Everett's water supply" and the "District's power generation capabilities."	The statement on p. 60 is incorrect. It should say "downstream of the Diversion Dam and Powerhouse" and this has been corrected in the FLA.
USFS-22	**22. The PLP discussion of habitat process flows requires more analysis.** The proposed PME for process flows only describes the effects of the PME for process flows in terms of increase from current condition, rather than as continuing effects of the Project (PLP, p.62). A description of the continuing effects would compare the proposed PME measure with the frequency of flows capable of inducing the same level of gravel movement as in Stage I, by each reach. The analysis of continuing effects also should discuss how the proposed PME measure would	The proposed measure allocates a water budget of 22,000 acre-feet for process-related flows. This volume of water would be released from the base of Culmback Dam. The budget allows for the water to be used in a variety of manners to achieve desired objectives. Sequencing the releases with rainfall events will allow for greater flow volumes, subject to limitations associated with downstream landowners. Other PM&E measures (LWD, side channels) when coupled with releases will provide means to do geomorphic work and address issues such as encroachment.

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	address the actual effects described – in this case the "encroachment". **Recommendation:** In the FLA, provide a description of continuing effects by comparing the proposed PME process flow with the frequency of flows capable of inducing the same level of gravel movement, before Stage II, by each reach. Also discuss how the proposed PME measure would address encroachment.	
USFS-23	**23. An increase in the volume of cold water released from Culmback dam will more significantly impact aquatic resources than minor exceedences of the upper standard temperature standard in the downstream end of the reach.** Even though the adverse effect of the current cold water releases on the trout population in the upper half of OR-3 has been well documented (CH2M Hill, 2008), the PUD proposes to increase the volume of cold water released from Culmback dam to avoid exceeding state water temperature standards in the lower part of the reach during infrequent hot dry periods during the summer (PLP, p. 76). Although the PUD is required to meet state water quality standards during the relicensing, any 401 certification process should recognize that the known effects of the existing cold releases from Culmback dam are of more significance to aquatic resources than modeled minor exceedences of the upper standard temperature standard in the downstream end of the reach. A new license should require the PUD to condition temperatures in Reach 3 by mixing water from the epilimnion in Culmback dam releases to improve distribution and production of salmonids in the 6 miles of habitat upstream of the Diversion dam. The mixed water would increase water temperatures during summer months, resulting in a more productive aquatic ecosystem. **Recommendation:** The FLA should include a PME measure that requires the PUD to condition temperatures in Reach 3 by mixing water from the epilimnion in Culmback dam releases to improve distribution and production of salmonids.	Section 5.3.3.1.13 *Bypass Reach Water Temperature Monitoring and Management Plan* of the PLP described the measure to address the cold water issue in Reach 3. As discussed previously, the District has included a PM&E to address temperature concerns within Reach 3. See Appendix B of the FLA.
USFS-24	**24. Section 5.3.1.1 inaccurately describes Reach 2 and 3 habitat.**	The District will review the text and make sure that it is consistent

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	In the second paragraph of Section 5.3.1.1 Sultan River Below Cumback Dam (p. 78), the description of the habitat in Reach 2 and 3 is misleading, as described in previous Comment #9. The description of habitat in Operation Reach 3 is more accurately described on page 78 of the PLP. **Recommendation:** Modify Section 5.3.1.1 to be consistent with the description of Reach 2 and 3 habitat on page 78 of the PLP.	in the FLA.
USFS-25	**25. Project facilities and operations have significant impacts the fish community and habitat potential in Reach 3.** The PLP (on p. 81) states, However, all salmonids share a need for the following habitat conditions: sufficient food supply; cool, high quality flowing water; high dissolved oxygen concentrations; and unimpeded migratory access to and from spawning and rearing areas (Spence et al. 1996). The Project currently impacts at least three of these habitat conditions: streamflow, water quality and migratory access to and from spawning and rearing areas. Although most of Reach 3 was originally within the range of anadromous fish prior to construction of the Diversion dam, the direct effect of Project facilities and operations (lack of passage facilities at the Diversion dam and the lack of flow in the reach) have resulted in significant impacts to the fish community and habitat potential in this reach. **Recommendation:** The FLA should include PME's to address impacts to aquatic habitat and native biota created by the lack of fish passage at the Diversion dam as well as water quality and quantity in Reach 3.	See response to comment USFS-20. The Diversion Dam was not constructed as part of the Jackson Project. The District is not responsible for these pre-Project impacts caused by the Diversion Dam.
USFS-26	**26. Chinook Salmon would greatly benefit from passage at the Diversion dam and increased flows in Reach 3.** Puget Sound Fall Chinook are listed as an Endangered Species Act (ESA) Threatened species. The Skykomish River population is listed as "depressed." During this relicensing there is the possibility of contributing to the recovery of this important stock by providing fish passage at the	See response to comments USFS-20 and USFS-25.

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	Diversion dam and restoring flows in Reach 3. Passage at the Diversion dam and restoration of more flow to Reach 3 would immediately provide an increase of six miles of mainstem riverine habitat for this species. There are probably few actions that could be taken within the range of this population that would have a more significant beneficial long-term effect. However, the PUD proposes to maintain the status quo and concentrate mitigation measures downstream of the Diversion dam. **Recommendation:** The PUD should propose in the FLA to undertake fish passage at the Diversion dam and increase flows in Reach 3 for Chinook and other anadromous species.	
USFS-27	**27. The PLP does not address impacts related to the lack of sediment transport in and through Reach 3.** The PLP on p. 102 states Although Spada Lake intercepts all gravel from the upper basin and the frequency and magnitude of high flow events in the Sultan River have been reduced as a result of Project operations, previous and ongoing monitoring activities have shown that gravel quantity and quality are being maintained in the river below the Diversion dam (Snohomish County PUD and the City of Everett 2005). These comments focus on the Project's lack of effects on the lower river but do not address impacts related to the lack of sediment transport into and through Reach 3. **Recommendation:** The FLA should describe the impacts related to the lack of sediment transport into and through Reach 3.	The Sultan River is unique in that there is an extremely large supply of gravel associated with Blue Mountain, which happens to be located downstream of Culmback Dam. Blue Mountain was characterized in great detail in the Washington Department of Natural Resources, Landslide Hazard Analysis. The transport of gravel and large wood down the Sultan River is dictated by flow and primarily achieved by spill events under the current operation. The release of process flows will aid in transporting these materials downstream.
USFS-28	**28. The IFIM Analysis does not acknowledge the habitat loss due to vegetation encroachment.** PLP Section 5.3.2.1.2 (Habitat Availability IFIM Analysis) analyzes the change in availability of fish habitat based on an IFIM study that looked at current channel conditions (PLP, p. 105). However, this analysis does not acknowledge the habitat loss due to vegetation encroachment, resulting in reduction of active channel width, which will continue to	This is more complicated than the application of a simple adjustment factor. The comparisons presented in the PLP were based on hydrology, Project operations, and assumed current channel conditions. To make detailed comparisons with Stage 1 would require physical survey information at channel cross sections, assumptions about the redistribution of depth and velocities across those cross sections, and re-modeling with fish

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	amount to over 30% of the pre-Stage II habitat. The numbers in this section should include an "adjustment factor" to expand the Stage I area numbers to represent the probable amount of habitat actually available in the original channel width. This information would allow more accurate representation of the continuing effects of the Project, and the relatively small changes to habitat that will result from the proposed PME measures in the currently encroached channel. **Recommendation:** In the FLA provide an "adjustment factor" to expand the Stage I area numbers to represent the probable amount of habitat actually available in the original channel width.	preference curve information. This would translate to a new additional study that may have marginal relevance since the existing condition is the baseline.
USFS-29	**29. The PLP description of the effects of the 20 cfs release in Reach 3 on fisheries habitat is misleading and inaccurate.** The description of the effects of the 20 cfs release in Reach 3 on fisheries habitat is misleading and inaccurate (PLP, p. 107). As written, this section only describes effects on current resident fish habitat, and does not address effects on anadromous fish species. Although currently blocked by a lack of passage at the Diversion dam, Chinook and coho salmon as well as steelhead trout historically accessed habitat in the Bypass Reach, and could do so again if passage were provided during the new license. The IFIM report (R2 Resources, 2008) evaluated the amount of habitat available at various flows for these species and found that 20 cfs provided the following amount of habitat for these species/lifestages: Chinook: Spawning – 9% Juvenile – 15.7% Adult – 45.7% Steelhead: Spawning – 7.9% Juvenile – 17.9% Adult – 83.2% Coho: Spawning – 19% Juvenile – 90.1% Although there is accretion in the reach, it occurs in fairly regular increments downstream from Culmback dam (USFS estimate of 15% of total accretion per mile downstream from Culmback). Thus, accretion flows in the upper portion of the reach are very limited. Accretion is also limited during summer months to very low levels even as far	Comment noted. The current and proposed measure addresses resident fish as there are no anadromous fish present in Reach 3. In the FLA, the District has proposed temperature conditioning of the 20 cfs. See response to comment USFS-30.

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	downstream as the Diversion dam. Thus, the releases (or lack thereof) from Culmback dam compose a significant portion of any instream flow within Reach 3 and, as can be observed, the flow releases proposed by the PUD to be continued during the new license provides only a very small amount of habitat for these historically present species. Even though the PUD has not proposed passage at the Diversion dam, this information should have been included in the PLP Project Effects section. In addition, the PUD's treatment of the effects of its proposed flow release on the resident fish that are still present in the reach is also misleading. Instead of describing the effect of its flow proposal on rainbow trout, the PUD compares the differences between Stage 1 and Stage 2 flows and then describes the amount of habitat available at flows that are 4 to 6 times its proposed releases. In fact, the R2 IFIM Report shows that 20 cfs only provides 19.5% of the potential spawning habitat and 26.8% of the potential juvenile habitat for rainbow trout in Reach 3. This is particularly true in the upper part (several miles) of the reach where accretion is limited and instream flow releases make up the majority of the flow. **Recommendation:** Include information on effects of the 20 cfs to resident and anadromous fish habitat in the Bypass Reach as described in the comment.	
USFS-30	**30. The temperature alternation discussion excludes Reach 3.** The temperature alteration discussion in PLP Section 5.3.2.1.3 focuses on Reaches 1 and 2, with no reference to Reach 3 (PLP, p. 111). The growth of individuals, and possibly the reproductive success of fish communities in this six mile reach will continue to be adversely affected by the low temperatures released from the low-water outlet of Culmback dam. This effect should be discussed fully in the FLA. **Recommendation:** The FLA should include a complete discussion about how low temperatures negatively impact fish communities in Reach 3.	The District has prepared a PM&E measure to address temperature conditions in the Reach 3. This measure will use existing Project plumbing, but will include the use of the auxiliary line release structure which has not previously been used. This auxiliary line, which has an intake at 1,408 feet above mean sea level (msl), can supplement the release structures currently used to increase water temperatures during the April to October timeframe when the reservoir is stratified. Temperature and aquatic resource monitoring is included in this measure. Existing data should provide a baseline for comparisons.
USFS-31	**31. The PLP does not recognize the significant benefit to ESA listed**	See responses to comments USFS-20 and USFS-25.

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	fish that passage at the Diversion dam would provide. Although the City of Everett may originally have constructed the Diversion dam, the dam is currently used as part of the Project works to return instream flows from the power diversion to the Sultan River in Reach 2 as stated in the PLP, page 22. The PLP does not identify the potential production increases in habitat for important ESA listed fish species that are present in Reach 3 if fish passage were provided. Almost 40% of the length of the Sultan River that could support anadromous fish is currently blocked by the lack of fish passage facilities at the Diversion dam. This dam is only 25 feet tall with no installed generation facilities. Providing volitional up and downstream fish passage at the site would be a straightforward process compared to many of the other hydro facilities where passage has been required under recent FERC licenses. For example, at Soda Springs dam (a 70 foot tall dam on the North Umpqua Project), and at Trail Bridge dam (a 100 foot dam on the Carmen Smith project- both are reregulation facilities in Oregon), volitional up and downstream passage was required even though the amount of upstream habitat was less than that present in Reach 3 in the Sultan drainage. The USFS is puzzled by the lack of a PUD passage proposal considering the presence of two listed anadromous fish species in the drainage, all the other efforts underway to recover salmon and steelhead in the Pacific Northwest in general, and for Puget Sound in particular. **Recommendation:** The FLA should include a proposal to provide fish passage at the Diversion dam at some appropriate point during the next license term.	
USFS-32	**32. The PLP fails to propose flow release increases in Reach 3.** In PLP Section 5.3.3.1.1 (Modify Minimum Instream Flow Schedule), this PME does not increase minimum instream flows in Reach 3, as noted in Comment #20 above (PLP, p. 123). As a result, habitat for resident fish would remain minimal in the reach, and there would be essentially no potential for reintroducing anadromous fish upstream of the Diversion dam during the new license term.	The FLA contains an analysis of a restructured flow release schedule that is anticipated to provide greater physical habitat and improved water temperatures at certain times of year.

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	Recommendation: The FLA should include a PME measure to increase flow releases in Reach 3 over the Project's next license term.	
USFS-33	**33. The PLP omits a description of the continuing effects on habitat from Stage I.** The analysis of effects of the PME measures on habitat should include reference to continuing effects from Stage I (PLP, p. 123). This analysis should include a description of the habitat available under the original channel width in Stage I in all reaches. As currently written, the amount of habitat resulting from the PME is compared with end-of-Stage II channel-width habitat availability. **Recommendation:** The FLA should describe the continuing effects on habitat from Stage I.	The appropriate baseline for the environmental review is the existing environment at the time of relicensing, which means present day condition, not pre-Project conditions (Conservation Law Foundation v. FERC, 216 F.3d 41, 46 (D.C. Cir. 2000), American Rivers v. FERC 201 F.3d 1186 (9th Cir. 1999).
USFS-34	**34. Modify Minimum Instream Flow Schedule** This PME does not include any modification to releases in Reach 3 (PLP, p. 124), but the Effects Analysis needs to disclose that continuing effects will occur to Reach 3 from the Project, as described in Table 5.3-2 on page 107. **Recommendation:** Include a narrative discussion of continuing effects of less rearing habitat due to ongoing diversions of water, because FERC will prepare an Environmental Assessment with this and other information provided in the PLP.	Effects of proposed operations on OR-3 water temperatures are presented in Section E.6.3.3.15 Habitat area would remain the same as existing conditions (see Section E.6.3.1.1
USFS-35	**35. The current LWD PME proposal fails to adequately mitigate for Project impacts to LWD in Reach 3.** The PLP acknowledges that Culmback dam has affected large wood debris (LWD) recruitment rates downstream; yet, the PUD only proposes to install five new debris jam complexes in the lower 2.7 miles of the river. This failure to propose more LWD ignores the effect of the dam on upstream habitat including Reach 3, which is managed by the USFS (PLP, p. 134). Although LWD densities reported in the PLP are currently adequate in this reach, the average size of the pieces is smaller than	The FLA includes wording in the LWD PM&E measure that gives the Aquatic Resource Committee discretion on the location where LWD structures will be installed. In addition as part of the FLA the District has increased the number of LWD installations from five to eight.

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	desirable, and there is no requirement for maintaining these densities during the new license term, even though Culmback dam will continue to affect the transport and deposition of wood in the reach. **Recommendation:** The FLA should include a PME measure that provides LWD in Reach 3 to mitigate for the continuing loss of habitat by reduced base flows and reduced process flows.	
USFS-36	**36. Maintaining the river temperature within Stage I range does not address the Project impacts to aquatic biota in Reach 3 caused by Project releases.** The PUD proposes to continue the current operations pattern in regards to maintaining water temperatures within state standards downstream of the Diversion dam (PLP, p. 141). This PME measure fails to address the impacts to aquatic biota in Reach 3 that are caused by the hypolimnetic releases from Spada Lake. **Recommendation:** The FLA should include a PME measure to condition its releases from Spada through use of the Auxilliary water line to moderate temperatures in Reach 3 to provide better habitat for resident fish and potentially reintroduced anadromous fish.	Section 5.3.3.1.13 (*Bypass Reach Water Temperature Monitoring and Management Plan*) of the PLP described the measure to address the cold water issue in Reach 3. The FLA includes a PM&E measure to condition the releases from Spada Lake reservoir through the use of the auxiliary line, as described in Appendix B.
USFS-37	**37. Both the trailhead proposed to be located near the intersection of Culmback Dam Road and USFS Road 6122 and an earlier USFS proposed trailhead proposal are acceptable to the USFS.** The new trailhead proposed to be located near the intersection of the Culmback Dam Road and USFS Road 6122 is acceptable since it would serve as a common trailhead for non-motorized access across Culmback dam to the north shore area and access trails to the Sultan River canyon (PLP, pp. 227-228). Locating the new trailhead near Culmback dam would be easier to monitor and patrol, and thus less prone to vandalism. This proposal is in contrast to an earlier USFS proposed trailhead site on National Forest System (NFS) lands, about 0.75 mile from the junction of USFS Road 6122 and Culmback Dam Road. This earlier USFS location	The District agrees with this statement and considered these factors when developing the Recreation PM&Es and the Recreation Resource Management Plan. Thank you for your comment.

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	at an old landing/cleared area on Road 6122 is somewhat isolated and would not be as easily monitored. Also, if USFS Road 6122 was converted to an off-road vehicle trail for kayak, mining claim, and pedestrian access for the general public, then over time this would offer a natural appearing trail opportunity versus an undesirable hike on a road. While some whitewater recreationists would prefer driving to the USFS-proposed trailhead (since it would reduce the time and effort required to access the river), the increase in hiking distance from approximately 1.1 miles to about 2 miles should be a reasonable distance for access, considering the other advantages stated above. However, the USFS would support whichever trailhead and trail location that would best serve the majority of recreation users. The PUD's stated parking of "6 vehicles" at its proposed trailhead on Culmback Dam Road should be evaluated further during the design process. This parking lot size seems adequate for general every day use for recreationists accessing the north shore or the proposed Sultan River Canyon Trail. However, the use of this trailhead during scheduled flow releases is expected to be much higher, thus traffic flow and parking accommodations need to be considered in order to reduce congestion. The Flow-Recreation Study Technical Report (May 2008, Section 4.4.1) estimated that the number of users during scheduled whitewater flow events would most likely be in the 80-120 boaters range, which equates to 30-40 vehicles, assuming three people per vehicle. As a result, the USFS suggests encouraging shuttles, that the trailhead design incorporate a turnaround for buses or vans with trailers full of kayaks, and identify overflow parking areas (such as Olney Pass). Although not specifically stated, it is assumed that trash receptacles (ideally bear proof) would be provided at the trailhead and maintained on a regular basis. This approach would reduce the chance of trash being strewn about and attracting crows and jays, which prey upon the marbled murrelet, a federally listed threatened species that is documented to	Comment noted. Additional overflow parking will be available just east of the new recreation site along the Culmback Dam road. The new site and the Culmback Dam area will provide a location for shuttle use (boater drop-off, turn around, etc.). Bear-proof trash receptacles will be provided at the new recreation site as described in the Recreation Resource Management Plan. The Marbled Murrelet Protection Plan provides for strict management of trash at this site.

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	occur in the area. **Recommendation:** The USFS supports whichever trailhead and trail location that best serves the majority of recreation users. However if the trailhead on Culmback Dam Road is chosen, the PUD should encourage using shuttles to the site, the trailhead design should incorporate a turnaround for buses or vans with trailers full of kayaks, and overflow parking areas (such as Olney Pass) should be identified. Trash receptacles (ideally bear proof) should be provided at the trailhead and maintained on a regular basis.	
USFS-38	**38. The existing informal access trail to the Sultan River should not be used for kayak access, even during the proposed 3-year trial period.** An existing informal access trail to the Sultan River, which is utilized by a mining claimant, was used during the whitewater study flow releases on October 19, 20 and 21, 2007. This trail use resulted in excessive resource damage (breakdown of trail tread and muddiness). Also, there is a hazardous 12-foot high drop-off to get to the river put-in. A ladder to access the river put-in is private property and public access is not authorized. Grades on this informal "trail" are too steep and do not meet USFS trail standards, in addition to potential conflict between user groups (mining claimants and whitewater boaters). Therefore, the existing trail should not be used for kayak access, even during the proposed 3-year trial period. **Recommendation:** A USFS Trails Specialist identified an alternate trail route on USFS land (PUD Trail Alternative #2), upstream from the existing route, that would reduce conflicts between the users, eliminate the hazardous drop-off at the river, and minimize the number of switchbacks required. This trail would best meet the needs of the primary user, whitewater boaters, since it would access a river segment rated at Class III to IV that is manageable for skilled boaters. This alternate trail would need to be built to USFS standards for pedestrian use as detailed in the USFS Trails Management Handbook (FSH	The District will provide a trail for whitewater boater access on District land at Culmback Dam (see RRMP). The District has no control over use of trails on National Forest System (NFS) lands. The District has requested, but not yet received, data regarding the level of resource damage on the existing trail on NFS lands. It is the District's understanding that two USFS personnel spent 1 day assessing and repairing trail "damage". No damage was noted by District staff the following summer. It should also be noted that the trail proposed by USFS is located in occupied marbled murrelet habitat.

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	2309.18).	
USFS-39	**39. The USFS has some concerns with the proposed Sultan River Canyon Trail and River Segment 1.** The proposed Sultan River Canyon Trail from the Culmback Dam Road down to the base of Culmback dam (PUD Trail Alternative #4) appears technically feasible according to PUD engineers (PLP, p. 229). It is unclear exactly where the trail would be routed, but consideration of a trail alignment that minimizes bottlenecks and allows for a staging area at the put in should be considered. The USFS has serious concerns about the boatability and the degree of difficulty of the river segment that would be accessed by this trail. The Flow-Recreation Study Technical Report identifies this segment as Segment 1 which runs from Culmback dam to the USFS Road 6122 put-in site. Segment 1 is described as Class IV to V, with the hardest rapid potentially a Class VI (Table 4.1, Flow-Recreation Study Technical Report). A Class V rapid is considered violent and complex, for experts only, and a Class VI rapid is considered unrunnable except by experts under the most favorable conditions. The Flow-recreation Study Technical Report only provides some limited information on Segment 1, and this segment was not boated during the study flow releases. However, Section 2.1.1 in the Technical Report states: "The reach may have been boated in the past but reports are uncertain," and "may have unboatable rapids that require portaging." Due to the steep, cliff lined gorge in this area it is uncertain if a portage is even possible and describes the largest cascade as containing "near-vertical falls that range from 8 to 15 feet (Ruggerone 2006, cited in Section 2.1.1 of the Technical Report). **Recommendation:** An "expert team" should assess Segment 1 (as described in Study Plan 14 Section 4.1.4) to determine whether this segment is boatable and/or if there are portages around any unboatable rapids, and the amount of flow required. If it is determined that Segment 1 is unboatable and a portage is not available to bypass this section,	The proposed trail will be routed down the face of Culmback Dam along the alignment of the auxiliary release line (pipe). At the base of the dam, there are options for staging along the "toe wall". The District agrees that an "expert team" should assess the hazards associated with boating Segment 1 and recommends that this be done early on during the 3-year trial study. Given the known risks and inherent hazards associated with this recreational activity, boaters need to be cognizant of the difficulty along the entire river and their own skill level.

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	then the USFS would question the need for this access trail.	
USFS-40	**40**. **The PUD should be responsible for constructing and maintaining the proposed Trail Alternative 2 on NFS lands, the road-to-ORV trail conversion of USFS Road 6122, and the proposed gate**. The USFS believes that the PUD be responsible for constructing and maintaining the proposed Trail Alternative 2 on NFS lands, the road-to-ORV trail conversion of USFS Road 6122 (0.75 mile), and the proposed gate, since the primary user would be whitewater boaters during scheduled flow releases (PLP, p. 230). The ORV and river access foot trails should be constructed and maintained to USFS standards, which the USFS will provide. Operation and maintenance would also include the PUD coordinating the management of whitewater flow events, and managing access through the gate. **Recommendation:** The FLA should clarify that the PUD is responsible for constructing and maintaining the proposed Trail Alternative 2 on NFS lands, the road-to-ORV trail conversion of USFS Road 6122, and the proposed gate.	The District will provide a trail for whitewater boater access on District land at Culmback Dam (see RRMP). The District will pay for conversion of the 6122 Road to an ORV-trail on District-owned land. The District will provide the gate and maintenance on District-owned land. The District is not responsible for mineral claimant and recreational use on NFS lands.
USFS-41	**41. The trial flow releases proposed to gauge whitewater demand are inadequate.** Under the current license, Stage II of the Project effectively eliminated whitewater kayaking in the Sultan River bypass reach. At this time, the bypass reach only becomes navigable to paddlers when extremely heavy precipitation provides enough flow from tributary streams, or when the PUD decides to release water, either due to a flood event or scheduled maintenance. The whitewater kayaking community estimates that this reach once provided an estimated 100 days of whitewater flows suitable for kayaking prior to Project Stage II. The PUD's proposed PME of "over a 3-year trial period, release a total of 900 acre-feet of water to provide whitewater boating flows in a schedule to be coordinated with the stakeholders" is inadequate. This equates to only two releases at 900 cfs each, over the 3 year trial period.	The District proposed a PM&E measure for whitewater boating that takes into account several factors: use levels, close proximity to other whitewater boating opportunities, cost of power replacement due to lost generation, opportunities to dovetail with other flow releases (such as process flows, maintenance flows) and naturally occurring events and spills, and other enhancements for the whitewater boating community (such as shuttles, posting of reservoir elevation on the District's web site, advanced notifications, additional access). The District understands that the FERC has issued requirements for higher number of days for other projects; however, these projects have different circumstances than the District, and a higher number of releases may have been warranted. The District proposed a PM&E based on the District's circumstances and believes it is in balance with the other opportunities and enhancements being provided for recreation and

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	Nine hundred cfs was identified as an optimal level of flow for kayak Segment 2 (from the 6122 Access Route Put-in to the Diversion Dam Take-out locations), as determined in the Flow-Recreation Study Technical Report. The PUD's PME seems inadequate to gauge what the true demand is for this unique whitewater resource. American Whitewater (AW) proposes four releases per year over a three year Trial Period, (two in the spring, two in the fall months) at an optimal flow of 1,000 cfs; a total of 12 releases. The National Park Service concurs with AW's proposal, and USFS agrees that this proposal would be reasonable, as explained below. A major factor in recreation use in the Cascades is the weather, especially considering the proposed whitewater flow season, as the weather is usually very rainy and cold during this time. By providing a range of release dates during different months, this reduces the statistical variability if the chosen day has very poor weather. By providing releases in the spring, this would provide a more reliable gauge of future use, since the weather is warmer and day length is longer. Study Plan 14 identified releases during warm weather as preferred. The trial period would also need to evaluate how these releases affect other resources such as fisheries, but it appears that with management of ramping rates, releases during the spring can be achieved with little effect to fisheries. Some of these releases may be able to dovetail on the downramping of process flow releases, such as for channel maintenance and enhancement. Also, additional release dates would tend to spread the use out and help alleviate crowding issues, which would likely occur if there was only one release per year. In the limited publicity whitewater trial events there were some "bottlenecks" with less than 50 participants. The Whitewater Flow Study estimates each "advertised" flow event would probably attract about 80 to 100 participants.	other resource areas, power generation and water supply. The 3-year trial will help determine if more or fewer days are warranted for the term of the license.

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	Four releases per year is a modest number compared with other FERC projects that schedule whitewater releases; many are in the range of 8 to 10 releases per year such as: 1. Tallulah North Georgia (P-2630), 10 days 2. Prospect 1,2,4 (P-2630), 8 days 3. Roanoake Rapids, NC and Gaston, VA (P-2009), 9 days 4. Kern River, CA, 39 days (with fewer releases during dry years). **Recommendation:** Given the examples of other FERC projects, the USFS considers four releases per year as described above as a starting point. Then, based upon preset criteria (such as amount of use during scheduled releases, capacity of facilities, safety concerns (i.e. Segment 1), and the quality of the recreational experience), long term whitewater flow releases could be determined, and adjusted accordingly due to other Project constraints.	
USFS-42	**42. The proposed whitewater boat trial flow releases would preclude placer operations on two days during the fall months.** The season of operation for mineral prospecting and placer mining on the Sultan River Segments 1 and 2 (between Culmback dam and the Diversion dam), according to Washington State regulations (Gold and Fish, 1999), is from July 1 to October 31 for Class I and II equipment. One claimant was granted a Hydraulic Project Approval (HPA) to extend his operating season for two additional months, from October 31 to December 31, 2009. Two whitewater flow releases of 900 to 1,000 cfs during the months of October and/or November (as proposed by AW) would preclude placer operations on two days. Any springtime whitewater flow releases (April and/or May) would not affect placer operators in the Bypass Reach, as Class I and II equipment is not authorized until July 1. **Recommendation:** The PUD should involve the claimants during the	The District will consider revising the PM&E measure to focus whitewater releases at times of the year when impacts to mining interests would be minimized. The District will notify claimants in advance of scheduled whitewater flow releases. Also, 2 potentially lost days of prospecting out of a season of 120+ days does not seem to constitute a significant impact.

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	relicensing environmental analysis process, and personally notify mineral claimants along the Sultan River, well in advance of any scheduled whitewater flow releases.	
USFS-43	**43. Enhanced Access and Notification (page 234)** The access trail on NFS lands to the Sultan River gorge would have to be constructed prior to the trial period, since utilizing the informal access "trail" off of USFS Road 6122 resulted in unacceptable resource damage, safety issues, and user conflict. By constructing the a new trail on NFS lands (Trail Alternative #2) to USFS standards, public safety would be maximized, and resource damage and user conflict issues would be minimized. Also, this trail would serve a majority of boaters who are capable of paddling Class III and IV water in River Segment 2; a lack of suitable access would no longer be a factor in determining demand during the 3 year trial period. The USFS recommends that information about the skill levels required and ratings of each whitewater segment be posted at the trailhead and on the PUD's website to ensure beginner kayakers don't attempt the Class V rapid (for example), and that a portage may be required. Rather than rely solely on a website medium, the USFS recommends the PUD personally notify mineral claimants along the Sultan River well in advance of scheduled flow releases (whitewater boating events, process	The District will provide a trail for whitewater boater access on District land at Culmback Dam (see RRMP). The District has requested, but not yet received data regarding the level of resource damage on the existing trail on NFS lands. The District understands that two USFS personnel spent 1 day assessing and repairing trail "damage". No damage was noted by District staff the following summer. It should also be noted that the trail proposed by USFS is located in occupied marbled murrelet habitat. The District will post information at District trailheads regarding whitewater boating. The District will post on its web site information regarding whitewater boating and flow releases (see RRMP). The District will notify mineral claimants along the Sultan River of scheduled flow releases.

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	flows, or other significant flow releases that would disrupt placer operations). Not all the claimants use internet access. This will ensure forewarning the claimants that they would not be able to operate on those days and that they would need to remove their equipment outside of the expected high water zone to prevent damage or loss. **Recommendation:** The PUD should construct the access trail on NFS lands to the Sultan River gorge prior to the trial period. In addition, information about the skill levels required and ratings of each whitewater segment should be posted at the trailhead and on the PUD's website. Also, the PUD should personally notify mineral claimants along the Sultan River well in advance of scheduled flow releases.	
USFS-44	**44. The USFS has several concerns with the PUD's proposed abandonment of USFS Road 6122.** The PUD has proposed a PME measure to decommission and convert the 0.5 mile segment of USFS Road 6122 across PUD land to a trail for the following reasons: (1) reduce its road maintenance costs, (2) the road is not needed to administer the Project, and (3) deep-fill culverts would need to be removed or replaced with a bridge to meet State Forest Practice Standards and reduce the risk of catastrophic failure (required by 2015) (PLP, p. 240). The PUD would prefer to remove the culverts and fill material to allow the drainage to flow naturally and reduce this risk. While the USFS recognizes the PUD's interests, there are access rights of mineral claimants currently operating on NFS lands that have to be considered. The USFS holds easements, or has granted easements with reserved rights, for several roads and road segments within the Sultan Basin. The USFS and the Washington State Department of Natural Resources (DNR) exchanged easement rights to various roads and road segments within the Sultan Basin from 1966 into the 1980s. Easement rights were also reserved by the USFS in the 1991 Spada Lake Land Exchange with PUD, which includes USFS Road 6122. Road 6122 was originally	The District does not concur that it should be responsible for the cost of the NEPA. The easement rights to the 6122 Road provide for reasonable access, not a vehicular road. The landslide and failing culverts along the 6122 Road are on NFS lands. In the District's view, protection of water quality and promotion of good stewardship could be achieved if the USFS either upgrades or abandons the road. The District-owned 0.5 miles is in relatively good shape and needs to be upgraded because of new culvert size standards by 2016 or abandoned. The District is simply proposing to convert the District-owned portion of the road to a trail and has agreed to construct the trail to provide ORV access to mineral claimants and for administrative purposes on the District-owned portion (see RRMP). The District has agreed to coordinate conversion of the road with USFS, but does not agree to pay for conversion on NFSL. Providing mineral claimants' access over NFSL is the responsibility of USFS and does not have a Project nexus. The District is providing a trail on District-owned land on Culmback Dam for whitewater boater access.

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	constructed by the USFS across NFS lands and DNR land for timber access and management. The road through NFS lands and DNR land to the west of PUD land has not been maintained for years, access is blocked by the large landslide in the SE1/4 of Section 30, and the road is badly damaged from washouts all the way to an old log stringer bridge site in Section 25. The USFS is not interested in maintaining USFS Road 6122 for motorized vehicle access at this time; if not for the mineral access, we would likely place the road in storage. There are no timber management activities planned at this time or in the future. Although timber management is technically allowed in this area according the Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan (as Amended), any proposed timber sale would be significantly constrained due to slide-prone soils, presence of old-growth marbled murrelet habitat, protecting water quality in the municipal watershed, and our aquatic conservation strategy and riparian reserve objectives. There are 17 unpatented placer claims on NFS lands in the Bypass Reach of the Sultan River (owned by four claimants), where panning, suction dredge and sluice box operations extract gold. Access to the Sultan gorge by the claimants (and general public) has become more limited over the years because of road closures by other land owners, lack of road maintenance, and flood damage, especially to the north side of the Sultan River from the Monroe Log Road. Access to the westernmost mining claims to the south side of the Sultan River is via DNR RoadSLW-2101, which is still drivable. Access to the easternmost claims on south side of the river is still possible from USFS Road 6122, although significant repairs would be needed. The two roads (SLW-2101 and USFS Road 6122) do not connect. As a result, the claimants have expressed their interest in keeping USFS Road 6122 open from the Culmback Dam road to access the easternmost claims. The USFS contacted the mineral claimants (letter of 10/31/08), which	

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	explained the PUD's proposal for decommissioning or converting USFS Road 6122 to a trail. We received detailed replies from claimants William Raether, the Washington Prospectors Mining Association, and the Boeing Employees Everett Prospecting Society, Inc. All three claimants stated their access has become severely restricted over the years, and therefore they do not want this road to be decommissioned; that the road be kept open to vehicle use and maintained. One claimant has disabilities, and he stated he would need full size vehicle access to get as close as possible to the trail leading to his claim. This claimant has offered to help maintain USFS Road 6122 with his road grader. Alternate proposals by the claimants include: 1. reconstruct the road to the log stringer bridge site for use by the claimants, public, and a kayak put-in; 2. reconstruct and maintain USFS Road 6122 as a road only as far as the landslide or proposed river access trailhead on NFS lands (responsibility of USFS and PUD), and construct/maintain an ORV trail from that point, and over the landslide on the existing road bed to the old log stringer bridge location (responsibility of the claimants); 3. construct a new, multiuser trail to the river. The claimants also support installing a gate, provided they are issued keys. Claimants have expressed concerns of dumping, indiscriminate shooting, and damage from off-road vehicles, which a gate would reduce. These concerns are shared by the USFS and PUD. As the USFS retained easement rights to Road 6122 across PUD land to access NFS lands, an environmental review process under NEPA, including full public participation, and concurrence from the USFS is required before USFS Road 6122 could be decommissioned and/or converted to a trail; as this proposal would be a significant change in public access. The PUD should be responsible for the cost of the NEPA environmental analysis as they are the proponent, and suggest this analysis be included in the Environmental Assessment for relicensing	

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	the Project. Mining is a legally recognized use of NFS lands under the federal mining laws. Claimants have a right of reasonable access across federal land to operate on their claims, as interpreted by U.S. courts. Regulations in Forest Service Manual 2811, Section 2813.14, state The right of reasonable access for purposes of prospecting, locating, and mining is provided by statute. Such access must be in accordance with the rules and regulations of the Forest Service. However, the rules and regulations may not be applied so as to prevent lawful mineral activities or to cause undue hardship on bona fide prospectors and miners. Reasonable access rights include the right to utilize USFS-owned roads and easements for roads granted to the USFS, subject to the road managers' terms and conditions of use to protect resources. In the case of USFS Road 6122, we believe the road managers of the 0.75 mile road segment in question are the underlying land owners (the PUD and USFS). While the USFS is obligated to provide reasonable access, it is not obligated to maintain (at public expense) a road or trail facility for the sole purpose of accessing mining claims or private inholdings. As the USFS does not need a full-service road for managing NFS lands in the Sultan gorge, the cost of road maintenance and construction mitigation measures to maintain reasonable access to the mining claims would normally be borne by the claimant(s), and authorized through a road maintenance agreement with the USFS and PUD. The USFS believes that to decommission or "abandon" USFS Road 6122 without providing an access alternative would deny the claimants access to their claims and cause undue hardship. However, as the PUD has offered to convert the road to a trail to provide access for whitewater boaters, the USFS would support this if the road was converted to an ORV trail standard and maintained so it can also be used by the mineral claimants with motorized off-highway vehicle equipment. It is our opinion	

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	that converting the road to a usable ORV trail would not deny the reasonable access rights of the claimants. Some claimants may disagree with this opinion, as their responses indicate above, and their concerns should be addressed through the environmental analysis process under NEPA. **Recommendation:** The FLA should include a PME measure to convert USFS Road 6122 to an ORV trail that is maintained by the PUD, for use by the whitewater kayakers, mining claimants, and administrators of the PUD and USFS. A 0.25 mile section of the road on USFS land would also need to be converted to the ORV trail and maintained by the PUD, as it leads to where the USFS-proposed river access trail would begin (Trail Alternative #2, beginning at the old landing). As part of converting the 0.75 mile section of Road 6122 to an ORV trail, the USFS agrees that general public access should be limited to pedestrian and bicycle use only, and controlled by a gate, to be installed and maintained by the PUD at the Culmback Road junction. The PUD should manage access through the gate, issuing keys as needed to whitewater boaters, mining claimants, and administrators, who would be allowed to use ORVs for transporting their gear and equipment from the PUD's proposed trailhead on Culmback Road. The ORV trail would need to meet USFS standards detailed in the USFS Trails Management Handbook (FSH 2309.18), and be of a sufficient width, with bridges or fords over stream crossings (where culverts are proposed to be removed by the PUD to meet State Forest Practice Standards), to be easily traversed by an ORV and trailer.	
USFS-45	**45. Knotweed is missing from the bullet list of sites and species to be treated.** Knotweed should be included in the bullet list of sites and species to be treated in Section 9.0, Implementation and Monitoring, as it is referred to in the rest of the noxious weed sections (PLP, p. 16).	The bulleted list of sites and species referred to in Section 9.0 addresses new weed sites that were discovered during the 2007 survey, but not treated that season. The knotweed site has been treated by the District, and therefore is discussed in the second paragraph of Section 9.0. This paragraph has been revised to specifically call out knotweed as one of the managed sites that will

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	Recommendation: Knotweed should be included in the bullet list of sites and species to be treated, as it is referred to in the rest of the noxious weed sections.	continue to be monitored and retreated as necessary.
USFS-46	**46. Management methods for invasive knotweeds should be more aggressive.** The Five-Year Management Objectives for invasive knotwee describe a reduced monitoring frequency after two consecutive monitoring events show no presence of knotweed (PLP, p. 35). It is not at all unusual for knotweed to appear dead for two or more years and then show up again. Knotweed is highly resistant to a quick eradication. **Recommendation:** The PUD should conduct annual monitoring for at least three years before reducing the monitoring frequency.	The knotweed management objectives have been revised to show at least 3 years of annual monitoring before reducing monitoring frequency.

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Tribe-1	B. General Comments The District's stated goal is to obtain a 50 year hydropower license for operation of the Jackson Project. PLP ¶ 1.2, at 2-3. Presently, we cannot support this goal. Our objections are twofold. First, issuance of a 50 year federal hydropower license to the District for operation of the Jackson Project without the Tribe's consent is contrary to FERC's continuing federal fiduciary obligation to the Tulalip Tribes. As an agency of the federal government, FERC is subject to the United States' fiduciary responsibilities towards Indian tribes. Covelo Indian Community v. FERC, 895 F.2d 581 (9th Cir.1990). The Commission has adopted these responsibilities by regulation. See 18 CFR 2.1c(b). The Tulalip Tribes has reserved, adjudicated treaty rights to take fish from usual and accustomed fishing places including the Sultan River. On October 16, 1981, the Commission issued an order amending the existing license, to authorize the elevation of Culmback Dam and the construction and installation of generating facilities. 17 FERC ¶61,056. In response, the Tulalip Tribes filed a motion for rehearing seeking measures to be included in the license to protect and enhance the fishery, out of concerns for adverse impacts to the Tribe's treaty fishing rights. In May 1982, the presiding judge certified a proposed order to the Commission to approve an uncontested offer of settlement ("Agreement") between the licensees and the Tulalip Tribes. The Commission found the settlement to be uncontested, fair, reasonable, and "in the public interest in carrying out the provisions of the Federal Power Act", and "approved and incorporated [the	A 50-year License Term is justified based upon the extensive environmental mitigative and enhancement measures. In general, when deciding on a term for a new license, the Commission continues to adhere to its policy first announced in its 1995 Mead Corp. order, which provides for: *30-year terms for those projects that propose little or no redevelopment, new construction, new capacity or environmental mitigative and enhancement measures; 40-year terms for those projects that propose moderate redevelopment, new construction, new capacity, or environmental mitigative and enhancement measures; and 50-year terms for those projects that propose extensive redevelopment, new construction, new capacity, or environmental mitigative and enhancement measures." 72 FERC ¶ 61,027, at 61,077 (1995). Recent orders confirm that the Commission, when deciding on a term for a new license, takes a case-by-case approach in determining whether the approved redevelopment, new construction, new capacity or environmental mitigative and enhancement measures qualify as "extensive" or "moderate" or "minor." In recent orders, the Commission, in applying this test, has continued to issue new licenses for terms of 50-years. In Entergy Ark., Inc., 101 FERC ¶ 62.201, at PP 63-65 (2002), for example, FERC issued a new 50-year license, finding that the "amount of proposed new investment in equipment rehabilitation and environmental measures at the*

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	settlement] as terms and conditions of the license for Project No. 2157." 22 FERC ¶ 61,140 at 4. The Commission then dismissed the Tribe's pending motions as moot, but only as to the issues resolved in the settlement. The dismissal order did not, however, "affect or pertain to any of the rights and claims reserved by the Tulalip Tribes of Washington in paragraph 9.0 of the Settlement Agreement Between the Tulalip Tribes and Licensees, dated February 16, 1982." Id. Among these, is the settlement exemption in ¶9.5, undr which Tribes reserved the right to object and/or bring suit concerning any request for extension of the license that would "continue the effectiveness of said license beyond the year 2032; provided that such objections and/or suit may only pertain to the rights of the Tribe, if any, or damages to be sustained by the Tribe, if any, after the year 2032." Agreement at ¶9.5, pp. 8-9. Discussions with the District are ongoing, and we agree with the District that the measures proposed in the PLP should be considered a work in progress. Ultimately these discussions may result in a comprehensive agreement. Until then, however, we renew our concerns over the Project- related loss of treaty reserved fishing rights on the Sultan River as reserved in the approved 1982 settlement, and we cannot support the preliminary licensing proposal to the extent that it assumes the effectiveness of any new license beyond the year 2032. Additionally, we object for the record to the any new license term beyond the year 2032, as being inconsistent with the Commission's stated policies. In a recent order establishing a license for operation of the Rocky Reach Dam on the Columbia River, the Commission reiterated its "general policy ... to establish 30-year terms for projects with little or no redevelopment, new construction, new capacity, or environmental	*project is extensive in nature," when the new license required the licensee to provide for continuous flow releases; implement whitewater boating releases; limit daily flow fluctuations; install plated trashracks; install minimum flow turbines; and add 188 acres of undeveloped land to the project boundary. See also Swift Creek Power Co., 81 FERC ¶ 61,347 (1997).* As described in the FLA, the District's proposed environmental mitigative and enhancement measures are extensive in nature. For example, These measures, summarized in Section E.3.1.3 and discussed in detail, by resource, in Section E.6, are expected to provide substantial benefits at an estimated capital cost of $10,876,000 and an annual cost of approximately $574,000. Accordingly, a 50-year license is warranted.

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	mitigation and enhancement measures; 40-year terms for projects with a moderate amount of such activities; and 50-year terms for projects with extensive measures. 126 FERC ¶ 61,138 (Order on Offer of Settlement and Issuing New License, Project No. 2145-060, February 19, 2009), at p. 42 and footnote 110. Project 2145 was relicensed for a 43 year term despite a comprehensive agreement among stakeholders who agreed, among other things, not to object to a 50 year term. Id. at 42-43. Presently we believe a 30 year term would be more consistent with the Commission's policies, for conditions outlined in the PLP. See PLP ¶ 5.2.3.1.1, at pp. 58-60 (proposed minimum flow regime and flows in bypass reach would be the same as under existing conditions); id., ¶ 5.3.3.1.10, at pp. 136-140 (proposing to continue the current ramping rate requirements with minor modifications).	
Tribe-2	***5.2.3.1 Water Quantity PM&E Analysis*** The Tribe recommends the formation of an ***Instream Flow Committee*** (IFC; a subcommittee of the ***Aquatic Resource Committee*** [ARC]) consisting of the District, Tribe, agencies and other stakeholders. The IFC would be charged with developing an ***Operational Flow Regime*** (OFR). Managers would be expected to implement the OFR whenever sufficient water is available. The OFR would comprise ***Instream Flow Targets*** (IFTs) and ***Special Purpose Flows*** (SPFs). IFTs are defined as instream flows that to promote normal ecological processes and maximize the amount and quality of habitat present within different reaches of the Sultan River, subject to water availability. Special Purpose Flows (SPFs) are flows that would either help prevent or minimize adverse impacts caused by the project or would result in significant ecological and economic benefits. Examples include Minimum Flows, Process Flows, Redd and Incubation Flows, Outmigration Flows and Recreation Flows. All SPFs would be implemented on an annual basis, with the exception of	The District has committed to establishing the Aquatic Resource Committee (ARC) and giving that committee certain latitude and discretion on some types of flow releases. The District believes clearly-defined guidelines and parameters around flow releases are necessary, but recognizes that some flexibility will be beneficial to the future management of the aquatic ecosystem in the Sultan River. Within the ARC, a modest level of operational flexibility, coupled with monitoring and adaptive management, should address the concerns raised in the comment.

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	Process Flows, which would occur at greater intervals. Since SPFs are undergoing refinement in the settlement agreement proceedings, our comments should be considered preliminary. The IFC would develop an OFR at the beginning of each year based on anticipated hydrological and ecological conditions, but would be able to modify it as circumstances warrant. For example, during periods when water availability is well below the historical average, the Instream Flow Committee would be able to recommend appropriately scaled IFTs and SPFs. The IFC will need to define appropriate thresholds, but the one we recommend for use in identifying "critical" water periods is the 90 percent exceedence probability determined from monthly precipitation (rain and snow) or pre-project flow duration curves constructed from historical data. Conflicts over water use are expected to increase over time as the demand for municipal and industrial water grows; in fact, the District predicts that it will not be able to meet minimum instream flows in 8 out of 10 years during the latter portion of the license. It is at these times that input of the IFC will be particularly important.	
Tribe-3	***5.2.3.1.1 Modify Minimum Instream Flows*** Tulalip agrees that the existing minimum instream flow requirements need to be revised upward in order to better protect ESA listed Chinook salmon and steelhead trout and other aquatic biota in the Sultan River. However, the Tribe considers the minimum flows proposed by the District to be the minimum necessary for species survival; if these are the only flows provided, they will not guarantee the long-term persistence of viable populations. For this reason, we encourage the adoption of a more holistic flow management approach that relies on Instream Flow Targets and Special Purpose Flows to achieve some semblance to the flow regime under which fish and other organisms in the Sultan River evolved.	The concept behind the process flow budget is to integrate information collected from monitoring programs and adaptively and creatively manage the release of water (above minimum flow levels) to achieve the desired goals.

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Tribe-4	***5.2.3.1.2. Protect Everett Water Supply and District Power Supply Dependability*** ***(Implement Reservoir Elevation Minimum Flow Trigger)*** The Tribe agrees that the citizens of Snohomish County are entitled to a reliable supply of water and electricity. The Tribe is a customer of the District and has a water supply agreement with the City of Everett. However, the Tribe is also a strong advocate for the protection of our fish and wildlife resources. We feel that that these resources should be accorded equal weight in decisions affecting reservoir and hydropower operations. Specifically, we do not support the District's proposal to immediately revert to existing minimum flows when the elevation of Spada Lake reservoir reaches 1410 feet. To do so would result in an immediate reduction in streamflow (assuming that the flow at the time the 1410' elevation is reached is equal to the proposed minimum flow of 360 cfs) below the powerhouse of 160 cfs, or 45 percent. The District follows a set of reservoir rule curves to ensure that sufficient water is available for water supply, hydropower generation and instream flow needs, and to reduce the risk of uncontrolled spill and downstream flooding. The District proposes to modify the rule curves so that the reservoir can be drawn down more rapidly in the fall of each year. The goal is to be able to draw down the reservoir to 1410 feet by October 1 to create sufficient storage before fall rains commence and to minimize the potential for spill. The District's proposal will trigger lower minimum flows during the peak of the Chinook spawning season, something the Tribe is unwilling to accept. The Tribe encourages the District to take a more balanced approach to managing reservoir levels during ecologically sensitive periods. It may be possible, for example, to gradually reduce power production and instream flows (i.e., commence draw down earlier but at a slower rate) earlier in the summer in order to extend the period of power production and higher flows. At the same time, the	The FLA has been updated to reflect this comment and allow a staged decrease in the minimum flow regime between elevations 1,420 and 1,405 feet msl. This is not an accurate representation of the District's proposal or any information presented in meetings on the PLP. The proposal to modify the rule curve is a protection measure to ensure that wet fall conditions will not place spawning Chinook redds at risk of high flows from spill. The District has agreed to target elevation 1,420 feet msl by September 15 and keep temperature conditioning in Reach 3 above elevation 1,410 feet msl available for a long as practical into October. The approach taken is balanced given the many competing interests of the stakeholders. A more moderate flow reduction plan has been developed and incorporated into the FLA.

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	City of Everett should enact increasingly stringent conservation measures. In addition to avoiding sudden, severe reductions in instream flows and facilitating temperature conditioning in Reach 3 (see below), this approach would ensure that all three uses – water supply, hydropower generation and instream flows – would contribute in equal measure to conservation when the reservoir approaches critical levels.	
Tribe-5	***5.2.3.1.3 Control Maximum Flow during Salmon Spawning*** Tulalip agree in principle to capping flows during spawning to minimize the potential for subsequent redd dewatering. However, to the extent possible, the maximum flows allowed should increase over the spawning period to ensure dispersion of spawners into unused habitat. The maximum spawning flow should be estimated by first determining where the highest redd (relative to the water surface) would be located if, at 200 cfs (i.e., the minimum flow during incubation), it was inundated to a depth of 1 inch. The maximum spawning flow is the flow that would result in water approximately 0.75 feet deep over the redd. This would ensure that a flow reduction from maximum to minimum flow levels would not dewater the redd.	In essence, this is very similar to the program the District currently has in place and proposes to continue over the next license term. In the simplest view, a discharge of any flow between 300 and 550 cfs during the spawning season will provide any abundance of spawning habitat and ensure that all redds remain watered should the discharge be reduced to the minimum of 300 cfs at anytime during incubation.

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Tribe-6	***5.2.3.1.4. Provide Process Flows*** The Tribe supports the introduction of Process Flows and other Special Purpose Flows (e.g. outmigration flows, recreation flows and process flows) into the management of the Jackson hydroelectric project. We encourage the District to continue discussions regarding the intent and specific goals for Special Purpose Flows and hope to negotiate a suitable alternative to the PLP version of the process flow. The District's specification of 4,100 cfs as a bankfull flow is not correct, as the flow was calculated as simply having a 1.5 year return period. A bankfull flow is defined by stage and return period; stage is the depth of water within the river channel at a specific flow. The stage at bankfull is at the top of the river bank and it is at this stage that desired channel maintenance functions such as pool scour, margin accretion, riffle mobilization, lateral channel activation occur. Therefore, the offer of 80% of the magnitude of post-project 'bankfull flow' is insufficient to accomplish any geomorphic goals that might be set for the process flows. The District's proposal does not provide sufficient frequency, magnitude or duration of flow to achieve much beyond flushing fine sediment from gravels. It is the Tribe's opinion, based upon the results of previous sediment studies, that sufficient flushing of fines already occurs on the Sultan River. Reactivation of the gravel stored in the forested islands and gravel bars will only be achieved by a medium to long duration spill event, estimated at a minimum of 9,500+ cfs over 2-3 days, with a frequency of every 5-7 years over the period of the license. Spills are infrequent on the Sultan River and occur over short durations. The most likely scenario for increasing lateral activity and diversification of habitat on the river will be a combination of the project adding to the magnitude and duration of naturally occurring high accretion events and mechanical interventions, such as the addition of large woody debris.	The District recognizes that there is much debate around the science of process flows. The District has committed to allocating a water budget of 22,000 acre-feet for process flow releases. The District believes that the timing and wise use of this budget, the reality of continued spill events, and the installation of mechanical interventions (such as LWD structures) will meet the desired goals and objectives.

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Tribe-7	***5.2.3.1.5 Whitewater Boating Flows*** Recreational flows are another type of Special Purpose Flows that can be managed by the Instream Flow Committee. The Tribe considers the amount of water reserved for recreational flows to be too low to provide a high quality boating experience and number of trips. It may be possible to simultaneously achieve the purpose of two or more Special Purpose Flows, such as smolt outmigration flows and recreational flows, through a single release of water.	For resource allocation purposes, the District has elected to address recreational flows separately from instream flows. As previously stated, the District does not believe that the formation of an Instream Flow Committee, operating under the ARC, is necessary. Finally, the District recognizes that the potential exists for whitewater releases to benefit aquatic resources. If releases continue beyond the 3-year trial period, the District, in consultation with the ARC, will investigate ways to achieve multiple flow related objectives in the most economical manner possible.
	5.2.3.1.6 Control Flows During Winter Steelhead Fishing Season No comment.	N/A
Tribe-8	***5.2.3.1.7 Reservoir Rule Curve*** Tulalip objects to the proposed modification of the rule curve and prefers that the reservoir be operated to facilitate temperature conditioning in Reach 3 and to meet Instream Flow Targets. The proposed modification of the Rule Curve will have impacts beyond those identified by the District in section 4.5. Additional impacts to the resource are a reduced time period of proposed temperature conditioning in Reach 3 and a reduction in the ability of the project to meet proposed minimum instream flows. *Impacts to Proposed Temperature Conditioning* Under the current license, stream temperatures in Reach 3 are extremely cold (4 - 6°C) because water released into the reach is drawn from deep within Spada Lake. In response to Tribe and agency requests to improve temperature conditions for resident fish in Reach 3, the District is exploring options to add warmer water from the upper strata of Spada Lake, which is thermally stratified from late May to late October (PLP 5.2.1.2.2). The District is currently exploring adding water into Reach 3 from an	Revised rule curves were designed to balance water withdrawals to meet the many competing needs of municipal water supply, electricity production, recreation, and ecological function, while taking into account important incidental flood control capabilities to protect property and human safety in the lower Sultan River and Skykomish/Snohomish River floodplains. Modeling indicates that the revised rule curves can provide for increased minimum stream flow requirements, while minimize the chance that the reservoir elevation would drop below elevation 1,380 feet msl. In addition, revised rule curves were designed to minimize the potential for spill during the Chinook spawning season and to minimize salmon and steelhead redd dewatering potential. Water released in the upper end of Reach 3 is cold but

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	auxiliary line, located at elevation 1408'. Under this proposal, the District can add warmer water to Reach 3 until the Spada Lake water elevation reaches 1410', after which the only water added to Reach 3 is from the cone valve, at 5 – 6 °C. The sudden temperature change may reduce the positive benefits of temperature conditioning on the ecological productivity of Reach 3. The Tribe would prefer that the reservoir be operated to prolong stratification and avoid dropping below the auxiliary line's 1408' elevation so that temperatures in Reach 3 can be conditioned for as long as possible. For further information regarding the benefits of temperature conditioning in Reach 3, please refer to the Tribe's January 20, 2009 USR comment letter to Federal Energy Regulatory Commission Secretary Bose. *Impacts to meeting instream flows in October* It is understandable the District wishes to avoid spill in order to maximize available water for generation of hydroelectric power and to minimize scour of redds downstream. The reservoir elevation should be held higher for a longer period of time in order to maximize the ability of the project to meet instream flows through the month of October.	warms up as it migrates to the lower end of Reach 3. Most habitat and resident fish production occurs in the lower end of Reach 3. By the time Spada Lake drops below 1,410 feet msl, Spada Lake will be close to isothermal conditions and the effect on Reach 3 resources will be negligible. The reservoir cannot be held above the 1,410-foot msl elevation all the time because of the need to balance multiple requirements of the Project. Many stakeholders, including the Tribes, want more instream flows below the Powerhouse to keep new and existing side channels watered during the majority of the year. The only way to hold the reservoir up is to not provide the instream flows for the downstream side channels. Water demand from all competing resources must be balanced. See Section E.6.2.3.1.
Tribe-9	***5.2.3.1.9 Ramping Rate Requirements*** The ramping rates proposed by the District are based largely on one season of study which occurred in 1985, part-way through the existing license on the project. This study indicates that the recommended ramping rates are an attempt to balance power production with fish production. In light of the recent decline and subsequent ESA listing of Chinook salmon and steelhead trout in the Puget Sound region, we	

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	believe a more conservative approach is warranted for the Sultan River. The ramping rate standards developed by WDFW (Hunter 1992) have been incorporated into the licenses of several hydroelectric projects in western Washington. The results have been generally positive, although at least one study (White River Hydroelectric Project) suggested that WDFW's standard ramping rates do not offer sufficient protection for juvenile salmonids (Mark Hunter, WDFW, personal communication). The Tribe has not seen evidence from the District to support a higher rate. Ramping rate restrictions are necessary to protect fish and invertebrates from sudden fluctuations in flow and increased risk of mortality by asphyxiation or predation. Recently emerged salmonid fry, in particular, are vulnerable to stranding along river margins and side channels caused by rapid flow reductions. There are three primary considerations regarding the level of protection afforded by ramping rates: 1) the rate of change, typically expressed as inches/hour; 2) temporal aspects, including season and time of day; and 3) prevailing discharge levels. Different ramping rate requirements are appropriate for different times of the year depending on the life stages present and prevailing flows. Lower ramping rates should apply when large areas of streambed comprising key habitat areas, such as mid-channel bars used for spawning, would be exposed by comparatively small changes in flow. The relationship between river stage and discharge is not linear, but tends to be S shaped, flat at very low flows and again at higher flows. Different ramping rates should therefore be prescribed for different ranges of discharge. Typically, lower rates are recommended for lower discharges. An empirically derived predictive equation that relates changes in river stage to side channel connectivity and streambed exposure as a function of flow should be developed for the different reaches of the Sultan River. The proposed ramping rate	There is no evidence that supports the assertion that the current rates are not adequate for protection of any species, ESA listed or otherwise. The ESA listings occurred because of environmental conditions for which the Project is not responsible. In a 2005 study entitled "Project Effects on Anadromous Salmonids & Bull Trout in the Sultan River" the District performed a site-specific study to determine appropriate downramping rates. This report was prepared in cooperation with Washington Department of Fish and Wildlife (WDFW), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS) and others and all the agencies involved with review and approval of this study concurred with the study results. Interim ramping rates recommended in Hunter (1992) are designed to provide an adequate level of protection for juvenile salmonids in lieu of ramping rates developed during site-specific evaluations. The ramping rates included in the District's proposed PM&Es are generally consistent with those recommended in Hunter (1992) and moreover, were developed in consultation with the Joint Agencies, based on the results of rigorous site-specific ramping rate studies

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	requirements should be based on observations of channel and flow characteristics (i.e., the number and extent of isolated depressions, potholes, etc.) in low gradient areas where salmonid fry are most vulnerable to stranding. River channels change over time due to changes in flow, sediment and LWD regimes. This means that, over time, different locations may represent the highest-risk areas for stranding and entrapment due to ramping. Flow thresholds associated with side-channel connectivity should be integrated into the ramping rate protocols. Side channels are notorious for trapping juvenile salmonids as flows recede. It is incorrect to assume that by virtue of an assumption of dynamic equilibrium, the relevant flow thresholds remain unchanged, even if the locations of high-risk areas are different than in the past. Due to the highly altered flow, sediment and LWD regimes in the Sultan River, dynamic equilibrium, for purposes of establishing ramping rate requirements, cannot be assumed. The location of high-biological value, high risk areas of mainstem and side-channel habitat should be identified, and the sensitivity of associated biota to different ramping rates should be investigated. In a letter dated August 14, 2006 to FERC Secretary Salas, we requested a study of ramping rates in order to properly evaluate any effects of project operations on fisheries. No evaluation of ramping rates in the Sultan River was conducted by the District, as called for in our letter. Although we agree in principle that a protective ramping rate should be established at the diversion dam, we cannot agree to specific ramping rate requirements until the effects on instream and riparian biota are more thoroughly assessed. Tulalip opposes the District's current proposal unless it is supported by further study and endorsed by the Instream Flow Committee. Downramping rates in Reaches 2 and 3 should be as protective of	conducted in the lower Sultan River. As discussed in Section E.6.3.3.4, the District believes these ramping rates would provide adequate protection for fish in the Project-affected river reaches. The proposed ramping rates are based on site-specific testing and 20+ years of monitoring the results. See responses above.

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	aquatic species as rates proposed for Reach 1 below the powerhouse. The Tribe requests that WDFW ramping rate standards be used until side channels are constructed or re-connected in Reach 1 and the potential for stranding is evaluated in conjunction with controlled flow releases (e.g., process flows, outmigration flows).	The District does not see evidence that supports the assertion that the rates proposed are not reasonable and protective. The site-specific study discussed above addressed all reasonable concerns to the aquatic resources. We disagree with this scheduled approach. We will stay with the proposed ramping rates which are based on the tried and true historical rates and will re-test once the side channel structures are constructed.
Tribe-10	***Section 5.3 Aquatic Resources*** Throughout this section, we provide information on existing conditions and project effects. Please refer to the January 20, 2009 USR comment letter from the Tulalip Tribes to Secretary Bose, and to previous Tulalip comments on the study reports, the interpretation of current conditions, and the interpretation of project effects.	See response to the Tribe's letter of January 20, 2009. dated February 20, 2009. The Aquatic Resources section in the FLA was prepared considering the most current information available and relicensing technical study results, in addition to considering stakeholder comments.
Tribe-11	***5.3.3.1.1 Modify Minimum Instream Flow Schedule*** See comments above for 5.2.3.1.1.	See response above.
Tribe-12	***5.3.3.1.2 Protect Everett Water Supply and District Power Supply Dependability*** ***(Implement Reservoir Elevation Minimum Flow Trigger)*** See comments above for 5.2.3.1.2.	See response above.
Tribe-13	***5.3.3.1.3 Control Maximum Flow during Salmon Spawning***	This level of protection is already in place on the Project.

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	Redd and Incubation Protection The District should maintain adequate flow over all redds during spawning, incubation and fry emergence periods. For all salmonid species, flows should not be allowed to decline to the point that redds are exposed. After the last spawner has spawned, flows should be maintained at levels that ensure that all redds are inundated to a depth of at least 1 inch. Flows should not decrease below this level until all fry have emerged from the gravel. We believe that decisions related to redd and incubation protection flows should be made by the IFC, and not solely the Joint Agencies as the District has proposed.	The District conducts spawning surveys within index areas that collectively comprise approximately 40 percent of the river downstream of the Diversion Dam. These surveys are conducted at 10 to 14 day intervals. Every redd observed within the index areas is marked and depth noted. The District will continue this practice under the new license.
Tribe-14	***5.3.3.1.4 Provide Process Level Flows*** See comments above for 5.2.3.1.4.	See response above.
Tribe-15	***5.3.3.1.5 Ensure Connectivity with Existing Side Channels*** The Tribe supports the maintenance of side channels in order to increase complexity and increase habitat in the OR1. In regards to the method of maintaining side channel connectivity, the Tribe advocates the use of large woody debris installations in order to deflect flow into the off channel habitat in combination with process flows. Large woody debris will accomplish goals in addition to side channel connectivity such as gravel retention, pool scour and the creation of cover for juveniles. The Tribe opposes the extensive excavation proposed as part of the side channel PM&E. Although limited excavation may be necessary, it should not be used in place of flow deflection. In addition to flow deflection LWD structures, there should be habitat improvement measures taken in the side channels themselves. The side channels that are currently connected to the mainstem and used by fish are made up entirely of glides and low gradient riffles. Wood should be added to these side channels in order to create pools and	The District agrees with much of the philosophy presented by the Tribe. Where possible, and subject to landowner approval, we will use large woody debris structures to deflect flow into side channels habitats. The District also agrees that side channel areas are the areas best suited for the use of wood the collects at Culmback Dam. This is the practice that was employed when the District partnered with Adopt-A-Stream, the City of Sultan, and DNR on the installation of wood within the Osprey Park Side Channel.

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	cover. Strategically placed wood could also encourage the development of off channel wetlands which are used for juvenile rearing. The Tribe suggests that a wood management system be developed between the Jackson Dam and the side channels. Wood collected at the top of the dam is not large enough to be stable in the main channel. However, the wood collected at the dam could be functional in the side channels. Currently the wood collected at the dam is trucked out of the basin. This practice should not continue. Instead, the wood could be used to create habitat in the newly accessed off channel habitat.	
Tribe-16	***5.3.3.1.6 Create New Habitat*** As stated above, Tulalip supports the effort to open relict side channels to allow the river to reaccess the habitat. While there may need to be limited excavation, the Tribe advocates the use of flow deflection and higher flows to create and maintain these connections. Additionally, enhance measures should take place in the side channels as proposed above.	Comment noted
Tribe-17	***5.3.3.1.7 Enhance In-Channel Habitat with LWD*** We support the construction of large woody debris jams in the channel to improve habitat conditions but five large wood installations are not adequate. It is recommended that pools are located every 5-7 channel widths in order to support salmonids. In the case of the lower Sultan River, this would suggest the District needs to place upwards of 10 jams in the main channel in order to create proper pool spacing. To increase the number of LWD installations, there should be more specificity in the PM&E as to what kind of structures will be built. The structures must have significant interaction with the active channel at low flows and have the structural integrity to stay in place in high flows. The structures must meet the LWD restoration goals which	The District has revised the PM&E presented in the PLP, increasing the number of jams and adding flexibility regarding location and design. The District welcomes ARC's participation in selecting locations for jam installations and the design process.

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	include: Increase gravel retention on the upstream side of the jam Create pools and cover in the jam vicinity Encourage lateral movement of high flows into side channels and other off-channel habitat Increase habitat complexity Meeting these goals will require HEC-RAS modeling of proposed sites and the involvement of a team that has significant experience in jam installations on large rivers. The Tribe would like the Aquatic Resource Committee (ARC) to be involved in the design process and approve both final designs and locations of the jam installations.	
Tribe-18	***5.3.3.1.8 Prepare Woody Debris Management Plan*** Tulalip objects to using the collected wood outside of the Sultan River system. As stated above, we prefer to address the problem of low wood loading with local resources. Though the captured wood may not be big enough to have an effect on the geomorphology of the main channel where there is a dearth of wood, there are several other places in the system (primarily side channels) where the wood could improve habitat conditions. We propose that the District implement a Wood Management Plan formulated by the ARC within 12 months after license issuance. The plan should call for the collection of wood at the dam and from ongoing forest management practices and its strategic placement in mainstem areas and side channels. This effort could be triggered once a certain number of pieces are collected and would not have to be initiated every year.	Comment noted. A Large Woody Debris plan is included as part of the LWD PM&E proposal (see Section E.6.3.3.6 of the FLA).
Tribe-19	***5.3.3.1.9 Powerhouse Pelton Unit Flow Continuation System*** Tulalip appreciates the District's efforts to avoid powerhouse disruptions and flow discontinuation. The District should specify contingency measures it would implement if the proposed continuation system does not work.	The District has committed to resolving this issue. Depending on the results from testing of the preferred solution, alternative measures will be determined as necessary to ensure flow continuity at the Powerhouse.

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Tribe-20	***5.3.3.1.10 Revise Project Downramping Requirements*** See above comments for 5.2.3.1.9.	See response above.
Tribe-21	***5.3.3.1.14 Revise Reservoir Rule Curve*** See above comments for 5.2.3.1.7.	See response above.
Tribe-22	**5.3.3.2 Fish and Macroinvertebrates** Although this section is entitled "Fish and Macroinvertebrates", there are no PM&E's proposed for macroinvertebrate monitoring. The Tribe is aware of the 2005 survey conducted in the watershed and request that continued macroinvertebrate monitoring be conducted during the new license period. Macroinvertebrate biomonitoring will be particularly useful in identifying lower trophic level response to proposed restoration actions (side-channel reconnection, LWD placement, etc.). Biomonitoring should be conducted pre- and posttreatment to fully identify macroinvertebrate response to restoration actions. Benthic macroinvertebrates (BMI) are well suited for biomonitoring assessments within stream habitats for several reasons (Morley 2000; Fore et al. 1996): 1. The macroinvertebrate community is extremely diverse, represented by thousands of different species with a variety of feeding strategies; 2. The pollution tolerance levels of macroinvertebrates range from very high to very low; 3. Sampling macroinvertebrates can be performed with relative ease with simple equipment; 4. The aquatic life spans of macroinvertebrates range from several weeks to several years, which provides an indication of stream quality over a period of time, not just the sampling window; 5. Unlike fish, macroinvertebrates are fairly limited in mobility, meaning they cannot avoid anthropogenically-influenced areas. The adults will lay the eggs where they may, and the benthic larvae are dependent upon the water quality and habitat to survive;	The District is not proposing to conduct macroinvertebrate monitoring in the Sultan River and believes that its proposed PM&E package, coupled with extensive fish habitat and fish population monitoring, is more than adequate to protect and enhance aquatic resources in the Sultan River basin.

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	6. The methods for collecting, subsampling, preserving, and identifying macroinvertebrates are well established, facilitating comparison of data between sites; 7. Macroinvertebrates can be found in any aquatic habitat as long as the water quality is high enough to sustain them; and 8. Macroinvertebrate communities can recover rapidly from repeated sampling events, providing the ability for repeated sampling.	
Tribe-23	***5.3.3.2.1 Monitor Salmon and Steelhead Escapement*** According to the PLP, the District suggests that it is complying with Article 55 of their current operating license, which states that: *Licensee shall … study to determine the effects of Powerhouse discharge and flow fluctuations on migration, spawning, and rearing of resident and anadromous trout and salmon populations in the Sultan River.* The PLP further suggests that the District proposes no changes to the existing monitoring strategy under the new license. The Tribe strongly recommends that the District implement additional fish monitoring measures under the new license to assure comprehensive population management of all species and life stages. The acquisition of reliable data that can be used to evaluate environmental conditions and project-related effects will be essential to managing fish populations in the Sultan River during the new license period. We recommend collection of data to determine salmonid abundance, productivity, spatial structure, and diversity within the Sultan River watershed.	The District believes that its current program of monitoring spawning escapement in over 40 percent of the river downstream of the Diversion Dam is extremely rigorous. The District also believes that the current habitat protection measures provided by the instream flow program and the reduced redd scour associated with the Project operation are beneficial to fishery resources. Finally, the management of water quality conditions, notably temperature, avoid exceedences of state water quality criteria in the river downstream of the Diversion Dam. In summary, the combined program of population monitoring and habitat management provides more than sufficient data to inform the current and future management of the Project.
Tribe-24	Abundance and Productivity The Tribe disagrees with the District's current salmon and steelhead monitoring approach, which relies primarily on adult escapement as an indicator of project impacts and salmonid population status. The number of spawners returning to the Sultan River is not only a function of the number of smolts that previously emigrated from the	We appreciate the Tribe's acknowledement that there are environmental conditions beyond the effect of Project operations that create a significant and highly variable impact to survival rates. It is the state's responsibility to monitor survival rates in other areas of the riverine and

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	system, but is also determined by their survival during outmigration, ocean residency, and return migration. Since conditions encountered by fish during this phase of life are largely unaffected by project operations, and smolt-to-adult survival can be both significant and highly variable from year to year, it follows that annual trends in spawner escapement do not provide an accurate picture of project effects. To overcome this deficiency, Tulalip recommends that the number of juvenile salmon and steelhead emigrating from the system be monitored on an annual basis. Collection of juvenile salmonid emigration data, in combination with adult escapement to the watershed, would allow annual calculation of abundance and productivity, which would provide a more comprehensive understanding of project-related effects on salmonid populations. Productivity would be estimated as downstream migrant production divided by parent brood escapement. We suggest that adult escapement and juvenile production be measured following the sampling (e.g., redd surveys, juvenile trapping) and analytical protocols described in the "2007-2009 NPCC/BPA Proposal for a Salmonid Abundance and Productivity Monitoring Framework" (http://www.rco.wa.gov/Documents/Monitoring/agendas&minutes/01-17-06/WDFW_NWPCC_Proposal.pdf). Specifically, the Tribe is suggesting that abundance and productivity parameters would be measured as follows: 1. System-wide adult (post-harvest) escapement of pink, coho, and Chinook salmon, and steelhead and cutthroat trout, as indexed by spawner and redd counts (continuation of existing monitoring); and 2. Juvenile abundance of the same species, as measured by the total number of juvenile migrants exiting the system each year. Since the study-plan development phase of the relicensing process in 2006, the Tribe has repeatedly argued that smolt trapping is necessary to	ocean system.

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	estimate the timing and abundance of outmigrants, calculate freshwater productivity, evaluate project effects, and modify project operations to minimize impacts and improve instream conditions. A smolt trapping program would provide data that can be directly compared with similar data obtained on the Skykomish River and other Puget Sound river systems. We continue to implore the District to adopt a smolt trapping monitoring strategy to provide information on the timing of juvenile migration and on the absolute abundance of juveniles by species.	
Tribe-25	Spatial Structure Another population viability criterion that the Tribe recommends for use in gauging the health of Sultan River fish populations is spatial structure. A population is most viable when its abundance is maximized, subject to the carrying capacity of the local environment, in all reaches containing suitable habitat in the Sultan River system. Conversely, a population is at risk when the number and extent of occupied areas has been significantly reduced. The distribution of fish throughout the system provides an index of a population's spatial structure, and is directly related to its ability to respond to factors that affect its ability to reproduce and survive over the long run. Maintaining access to areas containing suitable spawning habitat is especially important. The evaluation of a population's spatial structure should be referenced to its historical spawning distribution, if possible, or to an idealized distribution that will maximize local productivity and adaptation, and reduce the risk of catastrophic impacts. The Tribe recommends that spatial structure be measured by the relative proportion (percentage of total abundance) of adult spawners (or their surrogate – redds) in different reaches of the Sultan River over time. Performance standards would need to be defined that describe the number and location of reaches to be occupied by each population (i.e., the desired distribution) and the proportion of fish (redds) found in each reach.	This program is currently in place and has been since 1991. The District monitors escapement within over 40 percent of the Sultan River downstream of the Diversion Dam spanning RM 0 to RM 9.7. Escapement is monitored in four discrete index areas spanning the 9.7 mile reach. The proportion of redds in any index area over time is well documented. The District does not agree with the performance standard approach given the inherent variability in habitat use.

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	Diversity Population diversity refers to the expression of fitness-related life-history traits within a population that enable it to survive and adapt to a changing environment. Direct measures of diversity include life history characteristics such as age structure, size, and migration timing. Changes in these life history characteristics in Sultan River populations can be monitored over time, compared with pre-project data, and compared to data collected from fish in nearby, unregulated river systems. Assuming that historical information is unavailable for the Sultan River populations, we propose tracking life history traits of fish from the Sultan and the Skykomish River systems. Observed changes in life history traits over time or differences between the two systems can be evaluated in light of environmental factors that might be responsible. Note that changes in life history characters may be due to a wide range of anthropogenic and natural causes, including fishing and hatchery manipulations, altered environmental conditions that affect access to and suitability of different habitats, and delays caused by temperature changes, physical obstructions, or environmental modification (e.g., altered flow regime). Random genetic changes are also more likely when population sizes drop below critical levels. It will be necessary to discriminate between differences in life history characters that appear to result from differing environmental conditions resulting from project operations, and those that reflect the absence of desirable traits (i.e., ones normally found in viable populations) due to other causes (e.g., hatchery influences). Because of the difficulty in monitoring and interpreting changes in life history traits, we recommend that population diversity be accorded less weight than productivity, abundance and spatial structure. The relative density of fish in a given environment (habitat type, reach, etc.) reflects the apportionment of resources among life stages and	Historical information (pre-Project) on Sultan River fish species life history is sparse. Therefore, no comparison can be made.

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	species present. A balance is needed to support the long-term survival of individual species and a diverse biological community. Although not a population-level viability criterion, the diversity of the biological community is an important indicator of ecosystem health. As such, it should be monitored and, to the extent possible, managed in the Sultan River system.	
Tribe-26	Trout Monitoring It is apparent that Article 55 requires monitoring "of resident and anadromous trout and salmon populations"; however, the District has not conducted, nor proposes to conduct resident and anadromous trout (other than steelhead) monitoring. A result of Revised Study Plan 5 (R2 Resource Consultants) during the relicensing process indicates extensive use of the mainstem Sultan River by rainbow and cutthroat trout. Further monitoring is warranted to determine project-related effects on all trout life stages and life-history strategies. Although bull trout spawning and rearing within the Sultan River watershed is unlikely due to temperature requirements (CH2M Hill 2005), further study into the timing and use of the lower Sultan River by bull trout is warranted to address potential project-related impacts.	The monitoring program currently in place on the Sultan River is patterned after the model established by the co-managers in the State of Washington. In fact, this monitoring program is conducted in cooperation with the Tribes and the Washington Department of Fish and Wildlife.
Tribe-27	Committee Oversight The development, evaluation and application of new salmonid monitoring information should be the responsibility of the District and the Aquatic Resource Committee (ARC), a project oversight committee formed to oversee implementation of the FERC license terms and conditions. The ARC would comprise the District, the cities of Everett and Sultan, Snohomish County, state and federal resource agencies, Tulalip Tribes and selected recreation and conservation groups. Subcommittees such as the Instream Flow Committee (IFC) can be formed to address specific issues.	The District has proposed the formation of the Aquatic Resources Committee as a PM&E.

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Tribe-28	For clarification, the Tribe is not advocating, implicitly or otherwise, for introduction or reintroduction of anadromous fish or bull trout above the Diversion Dam. Rather, the Tribe is suggesting that fish management would be best accomplished if the District took a holistic view of the Sultan River and attempted to integrate with and support regional salmon recovery efforts. This approach makes the most sense from both an ecological and a policy perspective, especially when attempting to balance environmental protection with the City and the Tribe's shared interest in dependable, uninterrupted water supply. Simply put, the Tribe believes that the river, its biota and water should be managed in the context of policy that attempts to balance the variety of shared interests, without causing undue harm to environmental values.	The District view is holistic. We are required to advance a plan which balances all of the many needs for the Project, rather than advocating solely for one party's interest.
Tribe-29	***5.5 Wetlands, Riparian Areas and Littoral Habitat*** With regard to wetland and riparian areas directly adjacent to the area, the Tribe advocates for the restoration of natural processes. Specifically, the Tribe wants the riparian and riverine wetland areas to be accessible by high flows. This goal is partially addressed in the request for higher process flows. The river must be able to access riparian forests in order to recruit new organic debris into the river, recharge hyporheic zones and wet areas that depend on the river's variability to drive their annual cycles. The Tribe's suggestions for side channel management also address the wetland and riparian area issue. The Tribe recommends that structures be put into the side channels in order to encourage the formation of off channel wetlands. Overall, the District needs to treat the riparian and wetland areas near the river as part of the riverine system. Although the District suggests managing the areas through the WHMP, the Tribe would like to see many of these areas treated as a integral part of the Aquatic Resources as well (in section 5.3).	Process flows are proposed by the District to aid habitats such as wetlands and riparian areas. However, peak flow reduction will continue to protect life and property

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Tribe-30	***5.9 Cultural Resources*** The District proposes to implement a Historic Properties Management Plan (HPMP) to guide its treatment of historic properties within the area of potential effect during the new license term. According to the District, implementing the HPMP will minimize the potential effects of the Project on cultural resources by providing guidelines for evaluation, management and avoidance of potential effects, and by determining specific actions to address effects on known or yet to be discovered sites in the Project area. Tulalip does not object to implementation of the HPMP, and we appreciate the efforts of the District to consult with Tribal staff and elders and begin to better understand and protect cultural resources of significance to the Tulalip Tribes. We disagree with the statement in the PLP, however, that the District is unaware of possible project effects on traditional cultural properties and no specific access concerns have been identified. This statement reflects perhaps a misunderstanding of the Tribe's interests in Project lands including submerged lands and the essential nature of traditional cultural properties. For many years the Tribe's access to Project lands and to lands adjacent and generally north of Spada Lake has been blocked by gates and other Project barriers. Of course there is no Tribal access to the Project's artificially inundated lands. Since the NOI filing, the District has met with Tulalip representatives in a cultural resources working group, has met separately with Tulalip staff to discuss sensitive cultural issues, and has even taken Tribal staff and tribal elders on guided tours of the Project. But these efforts alone, while appreciated, do not provide the means for the Tribe to effectively conduct accurate or culturally sensitive surveys of traditional cultural properties, or to engage in traditional cultural practices such as hunting, meditation, prayer, bathing or other spiritual work, on lands	The District is appreciative of the Tribe's willingness to meet and discuss the Project's area and any cultural importance it may have to the Tribe. The District is encouraged by these meetings that an agreement can be reached to provide better access to gated areas for Tribe's cultural practices; this agreement will be off-license per the Tribe's request due to the sensitive nature of cultural practices. An Unanticipated Discovery Plan (UDP) was developed in consultation with the Cultural Resources Group prior to the conduct of the Historic Properties Study. The UDP is included in the Historic Properties Management Plan as Appendix C. The UDP and relevant training will be provided to operational staff and contractors prior to any earth-disturbing activities. Additionally, at the request of the Cultural Resources Group, the HPMP requires the District to create an annual report and offer an annual meeting to detail any upcoming land-disturbing activities that may require archaeological survey. The report and meeting will provide opportunities for the Tribes to review upcoming work and inform the District of any concerns regarding Traditional Cultural Properties (TCPs) or other cultural resources. Again, the District thanks the Tribe for meeting with us to discuss the Project and our mutual desire to protect the environment and cultural resources.

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	that have long been gated off by the District. Culturally important locations and practices, and the wildlife and plant resources and habitat within those locations, can themselves qualify as traditional cultural properties. See U.S. Department of the Interior, Guidelines for Evaluating and Documenting Traditional Cultural Properties (1990; rev. 1992, 1998), at 2-3. We have described for the District that longstanding Project barriers have effectively prevented the Tribe from access to unspoiled areas around Spada Lake for cultural practices or for any meaningful survey of cultural resources within the APE. Meaningful access would enable the Tribe or tribal elders to begin identifying traditional cultural properties that may be eligible for listing and protection. Since we have discussed these issues with the District, we cannot agree with the statement in the PLP that the District is unaware of possible Project effects on TCPs, and that no specific Tribal access concerns have been identified. We cannot reasonably know the full scope of what TCPs exist, or Project effects on them, without having access to the lands. We do know that the Project's gated barriers prevent the Tribe from reaching TCPs. We are again discussing these concerns with the District, and while discussions are promising, we make these comments to protect our record. Lastly, the full scope of earth-disturbing activity for Project operations, or for mitigation, etc., is not yet known. We are aware that a draft unanticipated discovery plan for Jackson Project related activities has been prepared, but the PLP is silent as to its implementation. Therefore, pending any final resolution, we object to the PLP to the extent that it does not give adequate protection to traditional cultural properties, both known and undiscovered at this time, nor ensure that the Tulalip Tribes and Tribe members have meaningful access to areas presently gated off to the public by the Project for cultural practices. We also object to the PLP to the extent that it does not	

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	require the development and implementation of a mandatory unanticipated discovery plan applicable to all future earth-disturbing activities relating to Project operations (including mitigation and related work).	
Tribe-31	***5.10 Estimated Costs of PM&E Measures*** There is little to no detail provided to support the reported estimates. The Tribe will reserve comment until the revised PM&Es, accompanied by detailed cost estimates, are provided in the Final License Application.	An updated list of estimated cost is provided in the FLA. Background detail on the cost estimates can be obtained from the District by contacting the Relicensing Specialist.

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AW-1	Thank you for the opportunity to comment on the Preliminary Licensing Proposal presented by the Public Utility District of Snohomish County (PUD), dated December 31, 2008. American Whitewater is a participant in this relicensing process due to our longstanding interest in the unique and highly valued recreational opportunities on the Sultan River along with the opportunities to improve project operations for the benefit of fish and wildlife resources on this river. We are currently a party to comprehensive settlement negotiations in this proceeding. Through this process we believe an opportunity exists to resolve outstanding issues but wish to raise a specific issue related to river access as presented in the PLP.	Comment noted.
AW-2	In the PLP the PUD discusses a proposed New Sultan River Canyon Trail and notes that a "preliminary trail alignment has been identified by the District for construction on District-owned land" and that "District-owned lands extend downstream of Culmback Dam on the south and north banks." To our knowledge this proposal is new to the PLP and there have been no opportunities to review this route or determine its feasibility with respect to meeting the identified recreation needs.	The location of the New Sultan River Canyon Trail along the dam face would be quite similar in location to the trail used to access the river before access restrictions were put in place after September 11, 2001.
AW-3	As described this route would require that paddlers start their runs with Segment 1, and we have not determined if this is even feasible. The PLP incorrectly implies that we have knowledge of this section that is currently not available. Specifically the PLP states, "Experienced boaters who ran this segment in the past determined that it may be boatable at flows between 300 and 1,000 cfs, although some rapids may be unrunnable" (emphasis added). This text has been modified from the original Flow Recreation Technical Report which stated "The reach may have been boated in the past, but reports are not certain (Williams 2007); it likely provides Class IV-V whitewater but may have unboatable rapids that require portaging" (emphasis added). In describing the rapids in this section the report further stated that "it is unknown if those would provide boatable lines (or portage routes, if unrunnable). The canyon was extremely steep, with sheer cliff walls."	In Section 4.1.4 on page 29 of the Flow-Recreation Study Technical Report, dated July 2008, it states *"Based on core team discussion after a review of known information, the steep and constricted segment (Segment 1) appears likely to be boatable at flows between 300 and 1,000 cfs, but involves at least two difficult rapids that may be unrunnable"* The District acknowledges that additional information regarding Segment 1 would be useful and suggests that this deficiency be addressed early on during the three-year trial. As suggested

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	The fact that this section of the gorge (Segment 1 immediately downstream of Culmback Dam) may contain rapids that are unrunnable or lack portage routes is a cause for concern if the PUD is proposing a trail that requires boaters to enter the river upstream of this section. We did not study this reach in detail during the whitewater flow study due to concerns the PUD raised at the time of study development concerning safety in this section of the gorge. American Whitewater agreed not to pursue further study of this reach as the information available suggested that Segments 2 and 3 held the highest value for whitewater paddlers and were most likely to drive decisions on what flows would be desirable. The report noted that an "expert team" could explore this segment at a later date and estimated that 300 to 600 cfs would be appropriate to do so. While we will continue to work with all parties through the settlement process we felt it was important to document this information gap at this time. While some of our members do have an interest in exploring Segment 1, we do not have enough information at this time to determine if a trail that accesses the river at the start of this reach is appropriate to best meet recreational needs at this project. If the Commission includes this trail route in their analysis we would request that additional information be provided to specifically identify feasibility of paddling or portaging in this section. Based on information contained within the Flow Recreation Study Technical Report and extensive comments by members of the paddling community and our organization which are on the record in this proceeding, we believe a trail route would need to cross Forest Service land to a point downstream of the most challenging rapids in Segment 1 to adequately meet the broadest needs of recreational users who have an interest in this reach. If alternatives to this route are analyzed, additional information needs exist.	in the technical report, an expert team could assess the segment *("with 300 to 600 cfs providing an initial estimate of the safest flow range for such an exploration"*).
AW-4	Thank you for this opportunity to comment. We have found PUD staff and their consultants to be a pleasure to work with on this project. We have found the PUD to be responsive to our input and we anticipate that we will be able to resolve issues related to this trail. In the event that we are not and the	The District appreciates these comments and American Whitewater's involvement in the relicensing process.

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	Commission must begin analysis of alternatives, we felt it was important to raise this issue now.	

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SUL-1	1. A more consistent acknowledgement that flood control is a key component of project operations and planning. Any license agreement must recognize the Project's balance of multiple needs including water supply, in-stream flow, power generation and flood control. The City believes it is necessary to improve flood control and habitat restoration by addressing these issues together in the PM&E measures. The City requests the District adopt PM&E measures based upon existing studies that maximize the flood control benefits of the Project for protection of downstream landowners including City of Sultan while providing opportunities for controlled high flows that restore and maintain critical habitat. Specifically, this license must formalize flood control operations to ensure continued protection of downstream properties and enable the storage and attenuation of flood levels to be accounted for in future FEMA flood studies.	The District has been clear in all of our documents and discussions with the stakeholders about the substantial flood control benefits provided by the operation of the Project to achieve a balance with generation and the other Project benefits. The PM&E measures presented in the PLP are designed to continue to offer these benefits including additional flood control with the modification of the rule curves and increases in instream flows below the Powerhouse. The District cannot support any proposals which will maximize flood control benefits because the loss of power production would be substantial. Unfortunately, FEMA's approach to flood control calculations do not allow the appropriate amount of credit that is provided by the Project to be included as a Project benefit.
SUL-2	2. The analysis of flood stage conditions during future project operations should consider whether supplemental PM&E measures are required to reduce effects on flood prone areas at the mouth of the Sultan River, particularly near the City's central business district. The analysis should consider inter-relationships of the hydrologic regimes of the Sultan and Skykomish rivers since backwater conditions periodically occur in the CBD when high flows released from the project encounter flood flows in the Skykomish River that are at our near flood stage. PM&E measures should address the merits of altering the Skykomish River channel configuration and capacity in the vicinity of the mouth of the Sultan River as presented and discussed during the settlement negotiations in March 2009.	See response to SUL-1. No additional studies are warranted or recommended.
SUL-3	3. Confirm what circumstances would warrant the application of a higher seismic design standard when Culmback Dam's seismic integrity is next evaluated in the future. PM&E measures must address when and how frequently future seismic analyses will occur and what conditions or circumstances would trigger the need for re-analysis.	Seismic standards are reviewed every 5 years under the FERC Dam Safety Independent Consultant inspection program requirements. Any issues which arise from that review will be addressed under that regulatory process. The most recent Independent Consultant review indicates Culmback Dam can

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		withstand the Maximum Credible Earthquake (MCE) for this site.
SUL-4	4. The City has concerns regarding potential flood risks that could jeopardize public safety and property in the event of another landslide that results in a flow blockage in the Sultan River canyon. The PM&E measures must include Emergency Response Plans and fund warning systems that proactively assess potential future incidents of this type and provide sufficient notice of flood hazards based on current technology over the life of the license.	The Sultan River canyon has a history of landslide activity and the geologic investigations for the relicensing process have documented the instability of some areas. However, the slides never have been a threat to the City of Sultan and will not constitute a flood threat to the City of Sultan during the term of the next license. This is because the material involved is largely fractured rock which does not wash away quickly. Only over time and under the influence of large flood flows will this material be moved downstream. Therefore, the catastrophic breaches of material and the associated floods speculated on in the comment are unfounded. Because the District's operation of the Project is not a cause of these landslides, there is no nexus to obligate the District to mitigate for the speculated potential flood risks which are not an issue for concern.
SUL-5	5. Inclusion of project related effects and mitigation measures on forecasted socio-economic conditions in the City of Sultan and Snohomish River Watershed over the life of the license. Mitigation measures should include consideration of adopted plans and policies under the Growth Management Act particularly as related to proposed project facilities, operations, and mitigation measures on shorelines of the state, environmental critical areas, future growth, and land uses. The population in the City of Sultan is expected to increase from 4,500 people to 20,000 people over the proposed 50-year license period. The surrounding unincorporated area is also expected to increase significantly putting pressure on the Project boundaries. The PM&E's propose adding the Trout Farm Road access site and off-channel habitat projects to the project boundaries. The amended project boundaries will be within Sultan's city limits and urban growth area as defined by Washington State. This information is essential to provide a sufficient basis for understanding how project facilities and operations will affect the management of local and regional resources including opportunities and constraints to the City's growth. The license must mitigate these impacts.	The City of Sultan has enjoyed substantial benefits from the creation and operation of the Jackson Project in the form of economic stimulation from staff consumption of goods and services for the town merchants. In addition, the substantial flood management of the Sultan River has reduced the magnitude and frequency of flooding of the City properties occupied by its businesses and citizens. Recreation in the Sultan Area in the form of Spada Lake reservoir recreation sites, improved access to the lower Sultan River (including Trout Farm Road), steelhead smolt plantings, and increased fishery of both the fall Chinook and pink salmon are benefits of the current and future license. The District is also offering to provide whitewater recreation enhancements during the next license which will accrue direct economic benefits to the City business interests. Furthermore, the District is offering to purchase easements for the development of side channel habitat for several Sultan River species of interest. The Jackson Project's economic stimulus to the City of Sultan is substantial and should be appreciated. In

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		addition, the District has met and will continue to meet with the City of Sultan as requested to discuss issues of mutual benefit.
SUL-6	6. The City enthusiastically supports the District's plans to provide accessible public communications and notices using web-based platforms or other current technology over the life of the license. As envisioned, the PM&E's must provide an effective means to convey real time project information, timely notifications on access and recreational resources, and information of an interpretive or educational nature. The City recommends the PM&E's recognize and prepare for enhanced use of the Internet, the District's website and handheld devises by Project users over the life of the license. Any long-term dependence on written brochures, maps and signage may be obsolete during the life of the licenses.	The District has a long history of progressive leadership in the areas of communications with ratepayers and members of the public. As technology advances in these areas, the District expects to continue this leadership. The District is committed to ensuring information presented in any publication, written or electronic, will be kept up-to-date and address new technologies.
SUL-7	7. The City has strong interest in maintaining cooperative involvement with the District in developing and implementing certain PM&E measures such as those involving habitat process flows. In particular, the City is interested in reviewing future study plans, results, and design information relative to re-establishment of side-channel flows. The City also is interested in future design information that further evaluates potential effects of implementation on properties within the City's current or future jurisdiction. The Recreation PM&E measures must note that certain measures undertaken will require approvals under City code including but not limited to shoreline permits.	Comment noted. The District will obtain any necessary permits. In addition, the City of Sultan will be notified of any public meeting to discuss design criteria relating to implementation of any of the District's proposed PME's.
SUL-8	8. The City supports the District's efforts to enhance the project's recreational amenities to the extent this provides optimal benefit to the public while sufficiently managing potential risks to public health and safety and the environment.	Comment noted.
SUL-9	9. The City requests that properties directly or indirectly affected by re-establishment of side channels in the lower river become incorporated into the project boundary subject to mutual agreement of involved owners. Side channel re-establishment could result in changes to the local hydrogeology of adjacent parcels with potential consequences to septic systems, foundations, drainage, and expanded critical area buffers that could have impacts on future development and land uses.	Where appropriate, the side channels will be incorporated into the Project boundary. The District does not foresee that any of the side channels being considered for enhancement have the potential to impact existing or future development. The geographic locations under consideration are within the floodplain and in close proximity to the river, away from areas of existing or future development.

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SUL-10	1.1	Purpose and Structure of Preliminary License Proposal (p. 1) Flood control within capability of project; As stated in paragraph 1, providing flood control *within the capability* of the project is one of four key requirements of the project. This should be consistently reflected throughout the document.	Comment noted. See comment on SUL-1
SUL-11	1.2	Relicensing Goals and Objectives (p. 2) "…that will allow the Project to continue to operate in an economically feasible manner and protect the high quality public water supply *in balance with* fish, wildlife, recreation, and cultural resources." Should consider expanding the statement to read "and the long-term public safety and socio-economic vitality of the City of Sultan, Snohomish County and other local municipalities in the Snohomish River watershed." (p.3) First bullet mentions "environmental values" but makes reference only to natural resource and recreational based values. This statement should be revised to read "…power, socio-economic/natural resource values such as fish…..". This is more consistent with the top paragraph of page 4 which refers to "natural and social resources." Long term economic benefit and stability for communities (p. 3 second to last bullet) Lack flood control and public safety. Bullet should be expanded to also state "including a defined measure of flood protection." This bullet also makes reference to "co-licensees" and should be revised to "all stakeholders served by the licensee."	The District's Relicensing Goals and Objectives were approved by the District's Board of Commissioners in October 2004 and are not slated to be updated at this point in the relicensing process. These Relicensing Goals and Objectives are available for viewing on the relicensing web site, in the Pre-Application Document (December 2005), and the Preliminary License Proposal (December 2008).
SUL-12	2.1	Process Plan and Schedule (p. 4) Third paragraph makes reference to the 50 year license yet the plan and many of its protection, mitigation, and enhancement (PM&E) measures often address issues that appear to reflect a snapshot in time. A more long-term vision needs to be comprehensively integrated into the plan with provision for adaptive management concepts and procedures that address changes that may result from our climate, the natural and built environment, and evolving technology.	As stated further in the referenced paragraph, the District continues to work with the stakeholders to add or modify the PM&E measures. These on-going consultations have resulted in a PM&E measure that establishes an Aquatic Resource Committee (ARC) made up of stakeholder representatives with technical expertise in water quantity, water quality, fisheries and aquatic habitat. The ARC will advise the District on the effectiveness of the PM&E measures and recommend actions to address any issues not adequately addressed by the related PM&E measure. The District currently monitors changing climate trends and will continue to do so. As technology and the natural and built environments change over time, the District will

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		remain diligent in identifying those changes and address them in the appropriate manner at the appropriate time.
SUL-13	Table 2.1 Late agreement to add flood control analysis. Add flood control analysis work at the request of Snohomish County and City of Sultan to address the flood control/management issue.	The District attempted to engage FEMA with a proposal to assess the 100-year flood magnitude under current and proposed operations where flood control is incidental but substantial. However, FEMA would not accept the study results without a commitment to alter operations to maximize flood control. Therefore, the District will not conduct the proposed study. Should FEMA allow for a realistic assessment of the flood control benefit, the District will work to document the flood control benefits of the Project to the benefit of the City of Sultan and Snohomish County.

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SUL-14	3.1 Lands and Waters Overview (p. 13) Lacking discussion of long term land use. 50 Year permit. Discussion should describe the expected growth and land use changes anticipated in project lands and surrounding areas. Land use planning projections should be consistent with Puget Sound Regional Council growth targets for region. Section 3.1 provides a general description of historic and existing conditions related to lands affected by the project. Since the PLP addresses plans and programs to be implemented under the new license over a 50-year horizon, it is vital that the future vision and land management planning strategies related to such lands also are described. This will provide a better context for proposed operations over the next five decades. This can be captured from the adopted regional and local comprehensive plans of Snohomish County and City of Sultan that have been prepared in compliance with the Growth Management Act. This also should reflect land management plans of resource agencies with holdings within the Sultan Basin and downriver areas. Since providing flood control *within the capability* of the project is one of four key requirements of the project, a new section (3.5) should be added that provides an overview of the historic flow regime of the Sultan River system (before and after operation of the Jackson Project – summarized from Figure 4-8) relative to the magnitude and timing of flows, general morphologic changes to the river channel and adjacent riparian communities, and flooding in the lower river. This also should include a general description on how future operations under the new license would affect the flow regime, river channel, and flooding of lands in the lower river relative to future land uses as documented in regional and local comprehensive plans. The last paragraph of Section 4.2 provides some of this information (pre-project flow regime).	The District does not foresee any population or development growth in or adjacent to the Project lands or facilities over the term of a new license. The lands within the FERC Project boundary are dedicated to the operation and maintenance of the Project facilities to deliver safe and reliable energy to its rate payers. No land uses outside of this would be allowed. The lands surrounding the Project lands are managed by the DNR, the USFS, and the City of Everett. The majority of the DNR lands are protected from any development as they are included in the Morning Star NRCA; USFS lands are set aside as federal public lands; and use of the City of Everett lands are restricted to protect the municipal water supply. For additional information on effects and proposed management of Project lands and waters please see Section E.6.2.1.1 – Water Resources, Section E.6.3.2 – Aquatic Resources; and Sections E.6.7.1.2 and E.6.7.2.2 – Land Use.

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SUL-15	4.2	Project Location (p. 18) – Figure 4 – 1 should be supplemented (local) An additional figure of the Sultan River Watershed should be provided. It could be of a similar scale and content as Figure 4-5 including key features of the watershed, Jackson Project facilities, tributaries, and river miles. Figure 4-4 of the diversion dam should be referenced at the top of p. 19 where it is mentioned in the third sentence. The last paragraph of Section 4.2 on p. 19 should be moved to a new Section 3.5 as described above as it is more relevant to an overview of waters and not part of the project location. As mentioned, the discussion should be expanded to include an overview of flow conditions that have occurred since Stage I and Stage II operations as well as anticipated conditions under the new license.	Comments noted. The sole purpose of Figure 4-1 was to show the Snohomish River basin. That remains the function of this figure, which has been replaced and now appears as Figure E.5.1-1 in the FLA. The PLP is a separate document from the FLA and many of the editorial comments offered on the PLP do not carry forward to the FLA, which has a different structure.
SUL-16	4.3.1	Incidental flood storage – Date shows operating curves provide more than incidental. The 58,500 acre-feet in flood storage capacity prior to the onset of the October to December rains is 38% of the gross storage capacity. The District should provide an explanation why is this level of storage is considered "incidental"? The second to last paragraph on p. 21 should include a description of fish screens installed on the intake (or why they have been excluded).	Incidental means that it occurs while the District is pursuing the operation of the Project for other benefits such as power production, maintaining minimum aquatic flows and water supply. Fish screens have not been installed on the intake structure in Spada Lake because entrainment has not been occurring. Revised Study Plan #4 investigated this issue and the conclusion was that there is no evidence of entrainment occurring because the resident trout are not in the vicinity of the structure or known to swim at the deep levels required to enter the power tunnel.
SUL-17	4.4	Existing Project Operations and Maintenance (p. 23) This section should include a description on how the current Project Operating Plan manages flows for flood control. The last two paragraphs on p. 25 should describe any existing or proposed fish screening for the intake to the pipeline/tunnel between the Diversion Dam and Lake Chaplain.	Comment noted. See page 28 of the PLP. The current Spada Lake rule curves should have been included in this section. See Response to SUL-16 above.

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SUL-18	4.4.2 Reservoir Operations –flood control (p. 26) It would be useful to illustrate the extent to which floodwater storage in the reservoir reduces peak flows in the lower river by including a figure showing an annual hydrograph of daily flow exceedance plots in the lower river over the past years of record with separate plots for pre-project and post-project years.	Informational examples of flood flow reduction by the Project have been added to the FLA.
SUL-19	4.5 Proposed Operations and Maintenance Plan – add flood control (p. 30) Should include a bullet describing how the proposed operations plan would affect flood control capabilities.	This information has been added to the Operations Plan (Appendix A).
SUL-20	5.1.1.3 Seismicity – Supplemental seismic analysis should be conducted including a more descriptive assessment of event probability (p. 32). A 7.0 to 7.5 magnitude seismic design standard established on the basis of US Bureau of Reclamation procedures was applied to Culmback Dam in a 1990 study conducted by Woodward-Clyde Consultants. In 2001, MWH evaluated Culmback Dam relative to seismic forces anticipated from an event of this magnitude and determined the dam would be capable of withstanding such forces. Based on the analysis, MWH determined the structure is "*expected* to withstand the Maximum Credible Earthquake" for its given location. The District should provide analysis on the level of confidence associated with this statement and the professional basis for applying a higher design standard in the interest of improving the level of certainty for this analysis. The City requests confirmation regarding whether a 7.0 to 7.5 magnitude seismic design standard is currently applicable and will continue to be applicable over the life of the license. The District should describe what circumstances over the life of the license would trigger a re-analysis of the dam's seismic vulnerability and the potential need for a stability retrofit.	This is a dam safety question. See response to SUL-3 above.

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SUL-21	5.1.1.6 Slope Stability (p. 33/34) – The last sentence indicating that flow blockages in the Sultan River below Culmback Dam are temporary and eventually wash downstream seems to downplay the potential flood risk that could result from such events. Should the river become temporarily blocked by a substantial barrier that is subsequently breached, resulting flows could jeopardize people, property, and livestock in the lower river floodway. Because of the steep V-shaped valley walls in the gorge, it is expected that landslides along the river will continue to occur (p. 34 last sentence).	See response to SUL-4 above.
SUL-22	5.1.3 Proposed Protection, Mitigation and enhancement Measures (p. 35). As a result of seismic and ongoing slope stability issues, the PM&E measures must include replacing the inoperable warning system in Sultan provided by PUD in the 1980's to mitigate the Project's impacts on life and property with a regionally coordinated siren warning system that meets Department of Emergency Management criteria. Providing a telemetry gage (at the beginning of the river's floodplain near the BPA transmission lines) beyond which no further landslides could occur would further enhance public safety. The gage would detect sudden flow reductions/blockages and convey such information to the community flood warning system. An emergency response plan (including appropriate investments in technology and training for the City of Sultan) should be established and periodically updated over the life of the license to address the eventuality of a flow blockage and how it would be resolved in a manner that would minimize downstream flood risks to people, property, and aquatic resources.	The City of Sultan signed an agreement in 1986 to be responsible for the siren system purchased with PUD and County grant funds and that there would be no further obligation by the District for the City's emergency management measures. The major threat to the Sultan community manifests in the form of the Burlington Northern Railroad and US Hwy-2 both of which are vectors of hazardous waste through the City. A history of derailed train cars with chlorine gas leaks is evidence of this threat to the Sultan community and the source for needing any evacuation warning system. The FERC Dam Safety Program has been a part of the current Project's license and will continue to be for the term of the next license. The District's FERC-required Emergency Action Plan (EAP) more than meets the safety needs of the City and contacting the appropriate city, county and state emergency response personnel to address a variety of potential emergency conditions is the best means of protecting Sultan. A telemetry gage provided at the BPA power lines would not provide the City with enough warning time before a flood wave big enough to do damage would arrive in Sultan. Hence, this would not be an enhancement of public safety. See response to SUL-4 above rewarding the flood threat from landslides in the Sultan River Canyon.

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SUL-23	5.2.1.1.1 Reservoir Management – flood only incidental (p. 36) Commit to operate for flood control in State 3. Define "incidental floodwater storage" and "significant incidental floodwater storage" in the document. Formally recognize current operation of the Project to balance multiple needs including flood control.	The operation in State 3 is discretionary, based on power generation needs, Project maintenance needs, and aquatic resource events. State 3 is designed and has performed to provide the flood control benefits that the City of Sultan has enjoyed for over 20 years, which is incidental to operations for the other benefits.
SUL-24	5.2.1.1.2 Sultan River Flows – (p. 37) Winter steelhead fishery recreational flow – The Project should conspicuously display and maintain signage along the river particularly at public access points informing anglers of flow fluctuations planned to facilitate fishing access. There also should be a means for anglers to determine (with sufficient prior notice) if flow reductions will actually be occurring on a given weekend (web-based communications). Address the increased use over the life of the license of handheld devises (such as cell phones) for real time information. Enhance the District's website to convey real time information to recreation users.	The District is proposing to remove the provision for a flow reduction for recreational fishermen. This reduction has been triggered infrequently over the past 20 years and the value of the flow reduction in terms of increased angling success is unsubstantiated. Real-time flow information is available on the District's web site and on the web sites maintained by the U.S. Geological Survey and American Whitewater.
SUL-25	5.2.3.1 Water Quality PM&E Analysis (p. 57/58) Change reservoir management re: revising rule curves. Additional resource protection against flooding following spawning The City supports the District's proposal to change reservoir management by revising the reservoir operation rule curve to accommodate flow release modifications and offer additional resource protection against flooding during or immediately following spawning. Specifically, the City supports the PM&E measure to "revise reservoir rule curve to accommodate the proposed flow changes and increase reservoir storage capacity during high precipitation events." The revised rule curves must formalize flood control operations to ensure continued protection of downstream properties and enable the storage and attenuation of flood levels to be accounted for in future FEMA flood studies.	Comment noted. The District appreciates the City's recognition that the proposed revised rule curve will provide additional incidental flood benefits. See response to comments SUL-1 and SUL-13.
SUL-26	5.2.3.1.3 Control Maximum Flow During Salmon Spawning (p. 61) Describe the anticipated incremental reduction in peak flood flows (in terms of flow frequency, magnitude, and duration) during the October and November salmon spawning season in OR 1 (powerhouse to river mouth) as a result of the proposed change in reservoir management.	Analysis of spill has been included in the FLA

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SUL-27	5.2.3.1.4 Provide Habitat Process Flows (p. 62) Support with rule curve for flood control Habitat process flow releases should not occur when the river stage in the Skykomish River is substantially elevated in order to avoid backwater flooding in the City of Sultan. Perhaps such releases could occur just prior to the normal period of spring freshets (before snow melt is released) to facilitate downstream migrating salmonid smolts. Elevated flow releases in the fall could adversely affect incubating salmonid eggs. Effects, resulting from the magnitude and duration of such releases on side channel formation, must be regularly monitored over life of the license to ensure habitat creation and maintenance objectives are being achieved. Re-establishment of side channel flows must not directly or indirectly affect private- or public-owned properties within the City of Sultan to preclude opportunities related to changing land uses surrounding such parcels.	The District agrees that flow releases must be coordinated with the river stage in the Skykomish River to avoid backwater flooding in the City of Sultan. The timing of flow releases will be at the discretion of the Aquatic Resources Committee (ARC) and will consider immediate biological consequences and long-term habitat and resource benefits as well as flooding concerns for the City. Monitoring of side channel projects will be routinely conducted by District staff.
SUL-28	5.2.3.1.5 Proposed White Water Boating Flows (p. 63) Support Option A – Annual Should determine if such boating flows could occur at the onset or end of the habitat process flow release. Also should ensure that releases would not result in potential backwater flood conditions near the river mouth in the event the Skykomish River is nearing flood stage.	It is plausible that a whitewater boating experience could be provided with a process flow release, but this would not be considered an "expenditure" of the recreational water budget established for the 3-year trial. The District will notify American Whitewater of planned process flows which may be used for recreational benefit. All operations involving the opening of valves at the base of Culmback Dam will take into account the stage of the Skykomish River, so as not to exacerbate flooding in the City of Sultan.
SUL-29	5.2.3.1.6 Controlled Flows During Steelhead Fishing Season (p. 64) Controlled flows for fishing should be combined with flood control. More than incidental. Clarify flow reduction will not occur after 14 days if doing so would elevate the reservoir from state 3 to state 2 and pose a future downriver flood risk.	This is implicit in operations when in State 3 and State 2, and has never been a reality of the last 20 years. The flow reduction program for steelhead fishing is not included in the FLA. See response to comment SUL-24.

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SUL-30	5.2.3.1.7 Revise Reservoir Rule Curve (p. 65) Specific requirement (rule curve) for flood control PUD proposing to expand State 3 from July to September to lower Spada Lake to prevent spills in October – State the proposed revision to the reservoir rule curve will result in a beneficial reduction of the flood risk during the fall.	Analysis of the spill has been provided in the FLA
SUL-31	5.2.3.2 Water Quality PME Cumulative Analysis (p. 71) Support more stable flows with recognition of flood control. Based on Figure 5.2-12, there isn't much change in reduced flood flows in the lower river (OR-1) under the wet year scenario with respect to the exceedance of bank full conditions (over 4,000 cfs).	The water years chosen were based on the entire year, not on the fall spawning season. Therefore, the Dry Year may have a wetter fall spawning season than the wet year.
SUL-32	5.3.3.1.5 Sultan River Below Culmback Dam – Aquatic Habitat (p. 77) Last bullet on p. 80 states that it is probable another large landslide *will* occur in the Marsh Creek area. Should such an event occur, it could present a flood risk downriver if a sizeable amount of water temporarily accumulates and then is released from the breached blockage. See previous comments presented for Section 5.1.1.6. The City is requesting a PM&E measure to work cooperatively with downstream authorities to develop and fund an emergency response plan (including appropriate investments in technology and training for the City of Sultan, Fire District 5, Snohomish County Sheriff's Office, and Snohomish County Department of Emergency Management) to establish and periodically update over the life of the license to address the eventuality of a flow blockage and how it would be resolved in a manner that would minimize downstream flood risks to people, property, and aquatic resources.	See response to comment SUL-4.
SUL-33	5.3.3.1 Sultan River Aquatic Habitat (p. 123) Manage and regulate flows for aquatic habitat also minimizes flooding. Proposed measures should describe the flood control benefits of managing and regulating flows.	Comment noted.
SUL-34	5.3.3.1.1 Modify Minimum Instream Flow Schedule (p. 123) The top paragraph on p. 127 indicates that increased minimum flows in the lower river (OR-1) will re-	The intent of the side channel projects is to ensure year round flow connectivity. The modifications will focus on creating this connectivity at flows below 500 cfs while maintaining the existing

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	establish side channel connectivity and increase off-channel rearing habitat for salmonids. Re-establishing side channels also will expand the flow capacity of the main channel and reduce flood risks downriver. Should assess the nature and magnitude of effects to properties within the affected riparian corridors of the lower river as a result of re-establishing side channels.	flow paths at higher flow volumes. Under bankfull or greater flood conditions, the flow course will remain largely unchanged when compared to the current condition.
SUL-35	5.3.3.1.3 Control Maximum Flow During Salmon Spawning (p. 128) The PM&E measure should emphasize the District's efforts to minimize flows above 550 cfs from 15 September to 15 October especially during wet years.	The specific flow values are described in the Project Operating Plan. The FLA contains more specifics.
SUL-36	5.3.3.1.4 Provide Process Level Flows (p. 129). PM&E measures should ensure that process flows are not released at times when the Skykomish River is approaching flood stage so as to avoid adding increased flood risks to properties in the lower river caused by a backwater effect.	This comment has been previously addressed and is included in the process flow PM&E measure.
SUL-37	5.3.3.1.5 Ensure Connectivity with Existing Side Channels (p. 131) See comment immediately below.	See response below.
SUL-38	5.3.3.1.6 Create New Habitat (p. 133) The District must sufficiently evaluate potential indirect effects of re-establishing relict side channels relative to groundwater conditions and potential consequences to wells, septic systems, foundations, etc. in and adjacent to the floodway.	This comment has been previously addressed.
SUL-39	5.3.3.2.1 Monitor Salmon and Steelhead Escapement (p. 144) The District should explore educational volunteer partnerships involving Sultan High School in support of the fish monitoring program.	The District will explore this concept.
SUL-40	5.3.3.2.2 Steelhead Planting (p. 145) Steelhead plantings support a popular local fishery. While the District intends to continue supporting this program "as long as it remains effective in providing a public angling opportunity," it is unclear what metric(s) will be used to confirm effectiveness. The District should provide a more descriptive performance standard.	There was no performance standard provided. The District is only responsible for the planting of a specified number of Steelhead smolts in the Snohomish Basin and has to-date chosen to specify the Sultan River as the location. This management decision affords those using the Sultan River for sport fishing the benefit. The State of Washington is responsible

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		for assessing the success of such programs.
SUL-41	5.3.3.2.3 Control Flows During Winter Steelhead Fishing Season - December to February (p. 145) 32 hours. Saturday – Sunday See 5.2.2.1.2 Since the proposed measure would occur on an infrequent basis, there needs to be a mechanism for notifying the public that flows will be reduced to facilitate fishing access. Signage at public access points and a web-based notifications on the Friday before such flow reductions would be helpful in making this measure more effective in achieving its intended purpose.	As stated herein the District plans on updating it's web site as appropriate
SUL-42	5.4 Vegetation PME – no comments	N/A
SUL-43	5.5 Wetlands and Riparian (map) 5.5.2.2.1 Wetlands (p. 184) Re-establishment of lower river side channels and alteration of related hydrogeology, channel morphology, and wetland communities must be preceded by rigorous investigations to comprehensively assess the range of effects and to determine if a net beneficial effect will likely occur. Because of the location of properties this would involve, the City of Sultan requests funding to support the City's participation in such investigations (confirming study plan, limited participation in site assessments, review and discussion of results). Ultimately, design plans likely will be subject to approval under the City's Shoreline Master Program and Critical Areas Ordinance and Grading Ordinance.	The Side Channel Enhancement Plan would include provisions for evaluating the potential effects of the proposed activities.
SUL-44	5.5.3 Proposed PMEs Wetlands (p. 186) revised rule curves for flood control The final paragraph on p. 186 indicates the extent of riparian cover may (or may not) increase in response to higher flow releases in the lower river. Since the intent of the revised flow regime is to increase the capacity of the active channel, proposed monitoring of channel morphology and stream buffer zones will confirm whether PME objectives are achieved. Because of the uncertainty of whether objectives will be achieved, the District in cooperation with the City should develop contingency measures in advance.	The District, in consultation with the ARC, will develop an appropriate monitoring program to ensure that the PM&E objectives are being met.

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SUL-45	5.7.1.2.3 Recreation and Land Use (p. 209) Provide a map of existing and proposed recreation sites showing where changes would occur.	A figure is included in the Recreation Resource Management Plan that addresses this comment.
SUL-46	5.7.1.1.1 Developed Recreation Facilities (p. 209) Sultan River area use – Prospecting now allowed in city limits. Float trips Trout Farm Rd to confluence. Legal target, practice site 116th St. Describe PUD's responsibilities and liabilities related to the use and management of developed recreation sites relative to direct or indirect effects on the City of Sultan. Describe the frequency of monitoring and cleanup on existing and proposed recreation sites. Is there a reason the target practice site on 116th Street is not mentioned as a recreation facility? The PLP lists mineral prospecting as an allowed use on the Sultan River (p. 211). Consistent with State guidelines, the City's adopted Shoreline Master Program prohibits mineral prospecting on the Sultan River. Snohomish County may prohibit mineral prospecting as well. The proposed Snohomish County Olney Creek Shooting Range should be identified as a potential future recreational facility to ensure proposed measures or operations do not preclude development or use of the site.	The target practice site referred to is on Washington Department of Natural Resources land. It is not a District site. There is no Project nexus. Mineral prospecting occurs only on National Forest System lands. This is not a District site. There is no Project nexus.
SUL-47	5.7.1.1.2 Recreation Use, Demand and Capacity (p. 212) 5.7.1.2 Land Use (p. 213) Describe future land use consistent with City and County Comprehensive Plans. District should identify existing or anticipated future ownerships, land uses, and management plans involving properties adjacent to the project based on the City's adopted Comprehensive Plan (or other documents). A figure showing existing and proposed future land use classifications under City and County Comprehensive Plans also would show relationships among various land uses, ownerships, and project operations.	Please refer to Section E.6.7 – Recreation and Land Use and Section E.9 – Comprehensive Plans. All comprehensive plans submitted to FERC for review and acceptance are identified and described in Section E.9. Although the City of Sultan and County comprehensive plans are not on FERC's list of approved plans, the District is aware of the content of these plans and will continue to consider them in any future actions where they may have relevance. As noted in the response to SUL 14, the District does not foresee any population or development growth in or adjacent to the Project lands or facilities over the term of a new license.

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Com-ment Number	**Comment**	**District Response**
SUL-48	5.7.1.1.2 General Access Patterns (p. 214) Should describe future access as related to anticipated land use and roadway changes included in the City's and County's Comprehensive Plans. Should describe plans for the proposed Shooting Park as this could affect traffic loads, circulation, and access patterns.	The District has no knowledge of the referenced Shooting Park plans. Activities related to this park would not take place on Project lands and would not be expected to affect Project traffic loads, circulation, and access patterns. We suggest contacting the entity responsible for the Shooting Park for plans.
SUL-49	5.7.1.2.3 Shoreline Management Policies and Buffer Zones (p. 215) Should describe the relationship of the City of Sultan's adopted Shoreline Master Plan to the long-term development, use, and management of recreational access sites and plans to reconnect former side channels with the main channel in the lower river.	Three of the proposed side channel improvement sites fall within the boundaries of the City of Sultan. See Section E.6.7.1.2 and E.6.7.2.2 for a discussion of relationship to the City of Sultan's Shoreline Master Plan. The City will be consulted prior to any developments within the City's boundary and easements and/or permits will be obtained prior to construction.
SUL-50	5.7.1.2.4 Floodplains (p. 217) The PLP mistakenly states, "No Project features are within this [floodplain] corridor." The Trout Farm Road river access is located in the lower Sultan River and situated within the 100 year flood plain. The site is subject to high flows that have been/will be moderated by the project. Reductions in flood risk would beneficially affect this parcel.	The Trout Farm Road property is high enough above the Sultan River to be rarely subjected to flooding since the Jackson Project was developed in the early 1980s. The Jackson Project is not capable of stopping all the flooding on the Sultan River. Rather, it reduces the magnitude and duration of most flood events.
SUL-51	5.7.2.1.1 Adequacy of Existing Recreation Facilities to Meet Demand (p. 217) The second to last sentence should mention that project flows also are controlled for and affect the ecological functions of instream and riparian habitats. The District should clarify how anticipated future recreation use is based on regional population growth estimates (p. 218).	The effects of Project flows on the ecological functions of instream and riparian habitat are discussed in the Aquatic Resources section of the PLP and will be further discussed in the FLA. To view the detailed study reports on instream and riparian habitats, please see the Project website at http://www.snopud.com/water/relicensing/relicensingdocs/studyrpts.ashx?p=3608, and access SP18, and SP22. For a more detailed description of the methodology used to estimate future recreation use, access SP13.
SUL-52	5.7.2.1.2 Effects of Illegal Activities on Recreation Use & Project Lands (p. 219) The City encourages the District to work cooperatively with the City and Snohomish County to monitor remote sites that are of high risk of illegal activities by installing security cameras.	The District provides monitoring at our remote sites using a variety of methods. The District has entered into annual contracts with the Snohomish County Sheriff's Department (SCSD) to provide patrol and security services throughout District properties including Spada reservoir and Trout Farm Road. In 2009, the District entered a new 3-year contract to provide security services with this department. In addition, City of Everett watershed patrol officers also monitor remote sites

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		and have authority to contact the SCSD as conditions warrant. The District also has installed and plans to install additional security cameras at Culmback Dam to enhance the overall security program required for this Project.
SUL-53	5.7.2.1.3 Flow Dependent Recreation Opportunities (p. 220) flood control. The District should analyze recreational demand and use patterns associated with the lower river and determined if there would be sufficient parking capacity at access points including Trout Farm Road. Monitoring commitments should be established in cooperation with the City of Sultan over the life of the license to ensure traffic loads and circulation patterns on City roadways are not adversely affected.	The District conducted a Recreation Needs Analysis during relicensing that assessed capacity at all recreation sites and use areas. Per the Recreation Resource Management Plan (RRMP), the District plans to continue monitoring use and reporting to FERC as required. The RRMP further discusses monitoring and reporting.

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Com-ment Number	**Comment**	**District Response**
SUL-54	5.7.3 Recreation PME 5.7.3.1.1 Develop and Implement a Recreation Resource Management Plan. (p. 223) Add advertising and marketing Recreation Facility Development Program (p. 224) The Interpretation and Education Program identified as a PME measure in RSP 13 (Recreation Needs Analysis) should consider partnerships with the City of Sultan and local businesses. This could include kiosks and displays containing literature that describe features and benefits of the Jackson Project relative to the local community. Educational/recreational information (maps and photos of facilities and trails, interpretive info, etc.) should be made available by the District and updated when appropriate. Communications on recreational opportunities should be readily accessible and make use of current technology and prepare for future technological advancements using an adaptive management process. Recreation website/wireless access The District's website should be wireless accessible so the public can be readily notified on fishing and boating opportunities including flow and river stage elevations at key points along the river. The District's website should include a separate recreation page readily accessible from the District's homepage. Trout Farm River Access Site (p. 229) This site is located inside city's UGA future city limits. Security cameras should be considered to manage vandalism, illegal dumping, and partying that has been regularly occurring.	The District already maintains a web site addressing Jackson Project recreation opportunities and per the Recreation Resource Management Plan (RRMP) will do so during the term of the next license. Future enhancements to this web site will occur over the term of a new license, embracing new technology and public interests, as suggested by the City of Sultan. The District provides brochures to those requesting them and will continue to do so during the term of the next license. At this time, the District does not propose to install security cameras at the Trout Farm Road Access site. See the RRMP for further details on the plan.

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	Recreation Operations and Maintenance (p. 230) The District should ensure recreational sites are frequently monitored. Trash and any potential hazardous materials released at the site should be removed on a weekly basis during periods of high use. Should monitor use to assess if parking demand at Trout Farm Rd access site exceeds capacity or if use creates conflicts with private property or local traffic circulation. Interpretation and Education Website, wireless technology, way-finding signs? Links to the District's webpage that provide interpretation and educational information should be included on City of Sultan's website. The District should provide support to seasonal interpretive discussions hosted by the City of Sultan and local businesses.	
SUL-55	5.7.3.1.2 Provide Whitewater Boating Opportunities (p. 232) Option A would provide a more predictable schedule for elevating awareness of the white water boating opportunity within the local community. Enhanced Access and Notification (p. 234) Public notifications of predicted flows and river stage elevations should be hosted on the District's website through enhanced communications methods. The webpage should be robust, reflect real time information, and provide interactive communications with links to the City of Sultan and resource/community groups.	The District has a web site that includes information on the Jackson Project recreation opportunities. See the RRMP for further details on the content of the web site. In addition, as proposed in the RRMP, the District will post real-time Spada reservoir information to our web site to assist the recreation and boating public.
SUL-56	5.7.3.1.3 Winter Steelhead Fishing Releases (p. 235) Notifications should be clearly publicized on the District's website and through other sources to ensure the timing of annual flow controls is conveyed to the public especially considering how infrequently such flow reduction will occur.	Periodic flow reductions for winter steelhead fishing are not proposed for the new license term. Please see our response to SUL-24.

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Com-ment Number	**Comment**	**District Response**
SUL-57	5.7.3.2 Land Use (p. 236) 5.7.3.2.1 Changes in the Project Boundary (p. 236) The City of Sultan would like to better understand the District's proposal to add the Trout Farm Road property and those lands affected by the proposed re-establishment of side channel habitat to the Project boundary. A discussion of the pros and cons (costs and benefits) of the proposal would help the City determine whether to support the District's proposal.	The Project boundary is located in the Final License Application Exhibit G drawings.
SUL-58	5.7.3.2.2 Changes in Access to the Project Lands or Facilities (p. 238) Encourage use of real time information based on current/evolving technology to better notify the public about temporary road closures, access restrictions, recreational opportunities, and potential security concerns.	The District already maintains a web site addressing these items and per the Recreation Resource Management Plan will do so during the term of the next license.
SUL-59	5.9.1.3 Cultural History Information on the cultural history of the project area should be maintained over the life of the license on the District's website with web links also included on the City of Sultan's website.	Due to the sensitive nature of cultural resources information, the District does not maintain this type of information on its web site. The concept is supported by the Cultural Resources Group.

WA Climbers Coalition – dated March 26, 2009		
Comment Number	**Comment**	**District Response**
WCC-1	On behalf of the Washington Climbers Coalition and the Access Fund, we are writing in support of the relicensing proposal by the Public Utility District No. 1 of Snohomish County (District) to assume responsibility for maintenance of the South Shore Road from Olney Pass to the South Shore Recreation Site. *See* Preliminary License Proposal for the Jackson Hydroelectric Project (FERC Project No. 2157), Proposed Protection, Mitigation and Enhancement Measures, Section 5.7.3.1.1. This proposal would maintain existing access to one of the premier rock climbing locations in Washington, popularly known to climbers as "Static Point." ... The Washington Department of Natural Resources (DNR) currently intends to decommission and abandon the South Shore Road from Olney Pass onward. If implemented, DNR's proposal will add several miles to approach to Static Point. When coupled with the existing approach and the fact that most Static Point routes are typically all-day endeavors, abandoning the road will put a day trip to Static Point out of the reach of most parties. We believe that most climbers will no longer think it is "worth it" to climb at Static Point. This would be a significant loss for Washington climbers. Given the unique nature and quality of Static Point, we enthusiastically support the District's relicensing proposal to take over maintenance of the South Shore Road from Olney Pass to the South Shore Recreation Site. As between seasonal and year-round access to this road, we would prefer year-round access, snowpack permitting. We also wish to offer any support we can lend to the District's effort to develop a Recreation Resources Management Plan (RRMP) to further define this proposal and related trail planning (*see* Section 5.7.3.1.1, "South Shore Recreation Site (Site 3)").	Thank you for your participation in our relicensing process and for your support of our Recreation PM&Es. The District's Recreation Resources Management Plan (included as an appendix to the Final License Application) supports DNR's road abandonment plan and the maintenance for the South Shore Road for vehicular access from Olney Pass to the South Shore Recreation Site. Although the Static Point site is on DNR lands, one of the considerations in determining how far to maintain the road for vehicle access was based on your participation at our meetings and your request to keep the portion of the road open that would provide better access to that site.

Appendix K

Consultation Record

CONSULTATION

Over the course of the ILP, the District has consulted with a variety of stakeholders (agencies, tribes, non-governmental organizations, public) to discuss the Project, studies and protection, mitigation and enhancement measures (PM&Es). The consultations were divided among the various resource areas (aquatic, terrestrial, cultural and recreation). The resource groups were notified of significant events, periodic updates, meeting announcements, and opportunities for written comments – for both ILP required and non-required events. As the Federal Energy Regulatory Commission's (FERC or Commission) non-federal representative for informal consultation under Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act, the District informally consulted with the appropriate agencies and tribes as part of the resource groups during study plan implementation and results reporting. A list of the parties involved in each of the resource groups or receiving communications about the resource group activities is presented below.

CULTURAL RESOURCES GROUP

Organization	Contact Name
City of Everett	Jan Meston, Dave Koenig, Julie Sklare
FERC	Frank Winchell
District	Dawn Presler, Kim Moore
Snohomish County	Brent Lambert
Snoqualmie Tribe	Ian Kanair, Karen Suyama, Andrea Rodgers, Ray Mullen, Steve Mullen
Stillaguamish Tribe	Victoria Yeager
Tulalip Tribes	Hank Gobin, Daryl Williams, Reid Allison
U.S. Forest Service	Jan Hollenbeck
Washington Department of Archaeology and Historic Preservation	Rob Whitlam
Washington Department of Natural Resources	Lee Stilson

AQUATICS RESOURCES WORKING GROUP

Organization	Contact Name
American Whitewater	Tom O'Keefe
City of Everett	Julie Sklare, Jim Miller
City of Sultan	Deborah Knight
FERC	Matt Cutlip
National Marine Fishery Services	Steve Franzen
District	Keith Binkley, Bruce Meaker, Dawn Presler, Kim Moore
Snohomish County Surface Water Mgmt	David Brookings, Chris Nelson
Snoqualmie Tribe	Ian Kanair, Karen Suyama, Cindy Spiry

Organization	Contact Name
Trout Unlimited	Gary Bee, Kate Miller
Tulalip Tribes	Daryl Williams, Abby Hook, Anne Savery Cleve Steward, Dustin Hinson (AMEC)
U.S. Army Corps of Engineers	Carolyn Fitzgerald
U.S. Fish and Wildlife Service	Tim Romanski
U.S. Forest Service	Margaret Beilharz, Dean Grover
Washington Department of Ecology	Monika Kannadaguli, Paul Pickett, Jim Pacheco, Chris Maynard, Brad Caldwell, Gerry Shervey, Susan Braley (WQ only)
Washington Department of Fish and Wildlife	Rich Johnson, Al Wald, Hal Beecher, Mark Hunter
Washington Department of Natural Resources	Laurie Bergvall, Alison Hitchcock, Jay Gutherie

RECREATION RESOURCES GROUP

ORGANIZATION	CONTACT NAME
American Whitewater	Tom O'Keefe, Andy Bridge
Backcountry Bicycles Trails Club	Justin Vander Pol
Boeing Employees Everett Prospectors Society	Mike Dunican
Cascade Land Conservancy	Joe Sambataro
City of Everett	Julie Sklare
City of Sultan	Connie Dunn, Deborah Knight
Everett Mountaineers	
FERC	Patti Leppert
International Mountain Bike Association (Western WA)	Art Tuftee
Mining claimants	William Raether, David Dorough
National Park Service	Susan Rosebrough, Michael Linde
District	Karen Bedrossian, Dawn Presler, Bruce Meaker, Kim Moore, Mike Schutt, Barry Chrisman, Zeda Williams
Recreation and Conservation Office (formerly IAC)	Jim Eychaner
Snohomish County Fire District No. 5	Merlin Halverson
Snohomish County Parks and Recreation	Marc Krandel
Snohomish County Surface Water Mgmt	David Brookings
Snohomish Sportsmen Club	Bob Heirman, Ralph Dahlquist
Snoqualmie Tribe	Ian Kanair, Karen Suyama, Cindy Spiry, Steve Mullen
Tulalip Tribes	Daryl Williams

ORGANIZATION	CONTACT NAME
	Cleve Steward, Dustin Hinson (AMEC)
U.S. Fish and Wildlife Service	Tim Romanski
U.S. Forest Service	Don Gay, Tom Davis, Eric Ozog
Washington Climbers Coalition	Mark Hanna, Matt Perkins
Washington Department of Ecology	Monika Kannadaguli, Gerry Shervey
Washington Department of Fish and Wildlife	Rich Johnson
Washington Department of Health	Jolyn Leslie
Washington Department of Natural Resources	Laurie Bergvall, Jim Cahill, Peter McBride, Candace Johnson, Stan Kurowski, Alison Hitchcock, Jay Guthrie
Washington Prospectors Mining Association	Chuck Cox, Jim Miller
Washington Trails Association	
	Jane Shattuck
	James Cooke
	Kent O'Sell

TERRESTRIAL RESOURCES GROUP

Organization	Contact Name
American Whitewater	Tom O'Keefe
Cascade Conservation	Rick McGuire
City of Everett	Julie Sklare
City of Sultan	Deborah Knight
FERC	David Turner
District	Karen Bedrossian, Bruce Meaker, Dawn Presler, Kim Moore, Mike Schutt, Barry Chrisman, Zeda Williams
North Cascades Conservation Council	Rick McGuire
Snohomish County	Sonny Gohrman
Snoqualmie Tribe	Ian Kanair, Cindy Spiry, Karen Suyama, Steve Mullen
Tulalip Tribes	Daryl Williams Cleve Steward, Dustin Hinson (AMEC)
U.S. Fish and Wildlife Service	Tim Romanski
U.S. Forest Service	Don Gay, Ann Risvold
Washington Department of Ecology	Monika Kannadaguli, Gerry Shervey
Washington Department of Fish and Wildlife	Rich Johnson
Washington Department of Natural Resources	Laurie Bergvall, Peter McBride, Alison Hitchcock, Jay Guthrie

A summary of the consultation efforts from the Updated Study Report period (October 2008) to the filing of the FLA (May 2009) are listed below. This list does not include consultation that occurred via email or phone nor pursuant to settlement discussions or off-license agreements. Supporting consultation documents are available upon request.

Date	Resource Group/Agency	Type
12/16/2008	Aquatics	Meeting
2/23/2009	Terrestrial	Meeting
2/5/2009	Recreation	Meeting re: PLP PM&Es
4/15/2009	Recreation	Meeting re: draft RRMP
4/10/2009	USFWS	Meeting re: Marbled Murrelet
11/20/2008	Aquatics	Meeting re: PM&Es
12/4/2008	Aquatics	Meeting re: PM&Es
12/18/2008	Aquatics	Meeting re: PM&Es
10/28/2008	Aquatics	Meeting re: PM&Es
11/12/2008	WDFW	Meeting re: Spada Lake Fisheries
11/10/08	All resources	Meeting re: PM&Es
5/6/2009	Recreation	Due date for written comments re: draft RRMP
4/30/2009	Terrestrial	Due date for written comments re: draft TRMP
4/21/2009	Terrestrial	Meeting re: draft TRMP – cancelled due to no one RSVP
3/25/2009	WDFW	Due date for written comments re: draft TRMP
2/6/2009	Stakeholder emailing list	Announcement of FERC's Determination re: USR
1/2/2009	Stakeholder emailing list	Announcement of filing PLP with FERC
10/15/2008	Stakeholder emailing list	Announcement of filing of USR with FERC, USR meeting date, study reports posted to web site

Stakeholder comments on the draft management plans submitted with the Final License Application can be found in the management plan appendices, including the District's response to those comments. Additional documentation of consultation can be found on the District's web site at:

Pre-Application Document Consultation
http://www.snopud.com/Content/External/Documents/relicensing/Relicense/PAD/PAD_V2_AppA.pdf

Revised Study Plan Development Consultation
http://www.snopud.com/Content/External/Documents/relicensing/Relicense/RSP/Jackson_2157_%20RSP_%20Appendices_091206.pdf

Year 1 Study Report Consultation
http://www.snopud.com/water/relicensing/relicensingdocs/ISR.ashx?p=3661#

ISR Meeting and Response to Comments
http://www.snopud.com/Content/External/Documents/relicensing/Meetings/Jackson2157_ISRMtgSmry_110907.pdf

http://www.snopud.com/Content/External/Documents/relicensing/Meetings/Jackson2157_ISRMtgSmry_110907.pdf

Interim Comment Period Response to Comments
http://www.snopud.com/Content/External/Documents/relicensing/Relicense/Jackson2157_ICP_Resp_Filing_20080414%20.pdf

Responses to Stakeholder Comments on draft Study Technical Reports
http://www.snopud.com/water/relicensing/relicensingdocs/studyrpts.ashx?p=3608 (in appendix of each report)

USR Meeting and Response to Comments
http://www.snopud.com/Content/External/Documents/relicensing/Relicense/USRMtgSum.PDF

http://www.snopud.com/Content/External/Documents/relicensing/Relicense/USRresponse010909.PDF