Boundary Hydroelectric Project (FERC No. 2144)

Addendum to Exhibit E of the License Application

Seattle City Light

March 2010

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1 INTRODUCTION TO EXHIBIT E ADDENDUM

This document is an addendum to Exhibit E of Seattle City Light's (SCL) License Application for the Boundary Hydroelectric Project (FERC No. 2144). The inserts on the following pages represent complete replacements of the corresponding sections in Exhibit E, allowing the reviewer to refer to only one document, i.e., either the Exhibit E filed with the License Application or this addendum, for any given section or subsection. Each replacement section below is specifically identified so that it is clear which portions of Exhibit E have been replaced.

The organization of the following document parallels that of Exhibit E, i.e., resource sections are presented in the same order and all revised sections, tables, or figures are numbered or referred to according to the same scheme used in Exhibit E. New sections, tables, or figures are clearly identified as such.

2 REVISED AND AUGMENTED SECTIONS OF EXHIBIT E

2.1. Proposed Power Plant Equipment Upgrades, Other Improvements, and Maintenance Activities (Section 2.3.2 of Exhibit E)

SCL proposes to install new high efficiency turbines in Units 55 and 56. The turbine runner upgrades would increase efficiency, i.e., they would use the same flow to produce a greater amount of energy and would have a higher total generation capacity. The turbine runner efficiency upgrades would be performed concurrently with planned electrical generator rewinds and step-up transformer replacements. The generator rewinds are scheduled for Years 1 and 2 following license issuance.

The Project's total authorized installed capacity is 1,003,253 kilowatts (kW) based on total turbine ratings, with a total generator capacity of 1,039.8 megawatts (MW) (1,040 MW) based on an assumed peak efficiency of 95 percent (FERC 2007a). By 2008, SCL conducted actual performance tests that produced a peak efficiency of approximately 90 percent, resulting in a revised total installed capacity of 981,518 kW based on turbine ratings and a total generator capacity of 1,039.8 MW (1,040 MW). The proposed total authorized installed capacity after Units 55 and 56 turbine upgrades and generator rewinds will be approximately 1,002,518 kW, based on turbine ratings with a total generator capacity of approximately 1,119,800 kW (1,120 MW). Current, revised, and estimated total authorized installed and generator capacities are detailed in Exhibit B of the License Application (as revised March 2010).

Reconnaissance-level engineering and cost studies for the turbine runner upgrades were performed in 2008 and 2009. Recent results indicate that the proposed generator capability for Units 55 and 56 will each increase from 200 MW to 240 MW for an increase of total Project generator capability from 1,040 MW to 1,120 MW and an estimated increase in average annual generation of 39,838 MWh. Cost estimates for this effort are detailed in Exhibit D of the License Application (as revised March 2010).

SCL anticipates rebuilding the generators and replacing runners approximately every 30 years. All year-designations are based on a license issuance date of 2011. Generator rebuilding and runner replacement for Units 55 and 56 are scheduled for approximately Years 28-32 following license issuance and Years 29-33 following license issuance, respectively.

SCL also plans to rewind the generators and replace the runners and transformers for Units 51 through 54 during the new license term; however, it is not expected at this time that these changes would result in an increase in capacity or generation. The proposed schedule for rebuilding and replacing turbine runners in units 51, 52, 53, and 54 is outlined below.

The approximate schedule for rebuilding units is as follows:

- Unit 54 - Years 4-6 and Years 34-36 following license issuance
- Unit 53 - Years 5-7 and Years 35-37 following license issuance
- Unit 51 - Years 6-8 and Years 36-38 following license issuance
- Unit 52 - Years 7-9 and Years 37-39 following license issuance

The approximate schedule for replacing the turbine runners is as follows:

- Unit 54 - Years 17-19 and 47-49 following license issuance
- Unit 52 - Years 18-20 and 48-50 following license issuance
- Unit 53 - Years 19-21 and 49-51 following license issuance
- Unit 51 - Years 20-22 and 50-52 following license issuance

SCL plans to undertake other major improvements that likely would require shoreline or other permit approvals due to project scope or project activities, such as in-water work or ground disturbance. These projects include:

- Replacing the step-up transformer – early in the new license term, and again 40 years later (approximately Years 1-5 and Years 41-45 following license issuance).
- Stabilizing rock slopes above the transformer banks by constructing a road up to the pickle folks, removing trees and shrubs, and scaling/removing surface rock – early in the new license term and then approximately every 25 years (approximately 2009-2014 [Year 3], Years 23-24, and Years 48-49 following license issuance).
- Hardening the forebay wall by dropping the water level in the forebay and applying shotcrete to the rock face to reduce spalling – approximately one year after license issuance (within Years 1-7 following license issuance).

Minor capital improvement projects (CIP) are difficult to predict but likely would include continued structural improvement of the facilities and grounds, continued North American Electric Reliability Corporation (NERC) compliance, control and network improvements, continued forebay stabilization efforts (and, potentially, periodic forebay dredging), replacement of information technology (IT) and security systems, groundwater control in the power plant and dam, refurbishing buildings and improvements to service, recreation, and tourism areas, dam safety instrumentation upgrades and new installations, generator operational improvements, gate upgrades (all varieties), safety projects, sump and other containment improvements, well decommissioning, service water piping replacement, lighting systems, protective relaying, shaft seal replacements, draft tube discharge improvements, high-voltage breaker and switchgear replacements, infrastructure improvements, and communication projects.

SCL also anticipates recurring operations and maintenance (O&M) activities. As with the major CIP projects, the more extensive projects would include ground disturbance, work in the regulated shoreline, or other activities that would require permit approvals. For structures that are normally submerged, the structures either would be removed to conduct the work (e.g., sluice maintenance gate refurbishment) or conducted in the dry (e.g., trash rack refurbishment). Such O&M projects potentially include:

- Sluice maintenance gate refurbishment – approximately 2010-2011 (i.e., prior to issuance of the new license) and then approximately every 10 years, as needed.
    - Site preparation includes removing up to 10 cubic yards of accumulated sediment from an area approximately 50 x 300 feet and replacing it with coarse gravel to accommodate the 300-ton sluice maintenance gate and the

trucks and dollies necessary to move it to a dedicated location in the Forebay Recreation Area.

  - Once on land, the operating mechanism would be disassembled and repaired, and the gate completely blasted and repainted with a lead-free coating. Much of the work would occur under cover; the old paint would be contained and disposed of according to applicable regulations.
  - Work associated with the sluice maintenance gate requires drawing down the reservoir to 1,970 feet NAVD 88 twice in one year to inspect and remove the gate and once in the following year to reinstall the gate. If reinstallation of the gate in 2011 is delayed, some of the current work could occur in Year 1 following license issuance. Future repairs would follow a similar two-year schedule.

- Trash rack refurbishment – approximately Year 1 following license issuance and then approximately every 30 years (Year 31 following license issuance).
- Septic system maintenance (including excavation, grading, and potential installation of new system if necessary) – approximately Years 16-17 following license issuance.
- Draft tube gate refurbishment (12) – approximately Years 17-19 following license issuance.
- Spill gate refurbishment – approximately Years 19-21 following license issuance.
- Domestic water system replacement (including excavation, grading, and installation of replacement domestic water system) – approximately Years 19-21 following license issuance.
- Sluice gate refurbishment – approximately Years 24-25 following license issuance.
- Head gate and hoist refurbishment – approximately Year 25 following license issuance.
- Transmission conductors repairs/replacement – approximately Years 50-51 following license issuance.

Exhibit C (Table C.3-1, as revised March 2010) summarizes the general timeframes for the major planned and proposed Project development.

2.2. Proposed Environmental Measures (Section 2.3.3 of Exhibit E)

The following sections are revisions or augmentations to the PM&E summary section (Section 2.3.3) of Exhibit E. The more detailed description of proposed PM&E measures, as required under the Boundary Hydroelectric Project Relicensing Settlement Agreement (Settlement Agreement), are provided in section 2.5 through 2.11 of this Exhibit E Addendum and in the respective management plans and attainment plans referred to throughout this document.

The following section replaces Section 2.3.3.1, Proposed Environmental Measures - Geology and Soils.

Proposed PM&E measures associated with geology and soils resources are described in Section 2.5 of this addendum and in the Terrestrial Resources Management Plan (TRMP) (Exhibit 2 of the Settlement Agreement).

SCL will implement erosion control measures at the following locations to mitigate for Project-related erosion losses: Erosion Site 17W1 (Forebay Recreation Area); Erosion Site 19W9 (BLM Boundary Recreation Area); and Erosion Site 21W19 (Dispersed Recreation Day Use/Overnight Campsite on BLM-Managed Land). SCL will also monitor erosion rates at 16 select sites during the new license period and evaluate the need to control potential future erosion if high value resources are being affected. The erosion control measures and monitoring will be implemented in consultation with the Terrestrial Resources Workgroup (TRWG) and with the approval of the USDA Forest Service (USFS) and Washington Department of Ecology (Ecology).

In addition, four other SCL-owned parcels that currently reside outside of the Project boundary will be brought into the boundary and be subject to management prescriptions as part of a comprehensive mitigation and enhancement package related to terrestrial resources in the Project area: the BWP Addition (89 acres), the portion of the Tailrace East parcel not currently included in the boundary (86.9 acres), the portion of the Everett Creek parcel not currently included in the boundary (82.7 acres), and the portion of the Sullivan Creek parcel not currently included in the boundary (17.7 acres). These additions are intended, in part, to compensate for ongoing Project-related erosion and the loss, conservatively estimated at 15 acres, of terrestrial habitat over the new license term. SCL has also agreed to purchase additional property, with a target area of approximately 158 acres and approximately 13,022 lineal feet of land immediately adjacent to water.

The following section replaces Section 2.3.3.2.2, Proposed Environmental Measures - Temperature.

To help meet Ecology's temperature improvement goals for the Pend Oreille River, SCL will implement a variety of measures to improve habitat conditions for aquatic species in the Pend Oreille River system. These measures include tributary riparian plantings, stream channel modifications, large woody debris (LWD) supplementation, bank improvements, and culvert replacements. These activities are described in the Temperature Attainment Plan and FAMP (Exhibits 9 and 11, respectively, of the Settlement Agreement). SCL is also implementing measures, including placement of LWD jams in tributary deltas in Boundary Reservoir and revegetation at select locations to improve habitat conditions and reduce ongoing erosion along the shoreline of Boundary Reservoir. Greater detail regarding these mainstem measures is provided in the TRMP (Exhibit 2 of the Settlement Agreement), FAMP, and Temperature Attainment Plan.

In addition, SCL will collect continuous temperature data from June through September at the following four locations: Metaline Pool (Project river mile [PRM] 28.4), Slate Creek Pool (PRM 22.5), Boundary Forebay (PRM 17.0), and the Boundary Tailrace (PRM 16.1). SCL will collect temperature data at these four locations annually, unless the approach is modified through

Ecology's annual review of the Temperature Monitoring Quality Assurance Project Plan (QAPP). SCL will also conduct temperature monitoring in the deltas of Sullivan, Sweet, and Linton creeks (see the Temperature Attainment Plan).

The following section replaces Section 2.3.3.2.3, Proposed Environmental Measures - Total Dissolved Gas.

As required by the Water Quality Standards for Surface Waters of the State of Washington 173-201A-510(5)(b), SCL is submitting a Total Dissolved Gas Attainment Plan for the Project (Exhibit 10 of the Settlement Agreement). SCL will evaluate and implement as appropriate the following measures designed to attain TDG compliance at the Project, consistent with the approved TDG total maximum daily load (TMDL): throttle sluice gates, which involves operation of sluice gates in partially open positions; roughen sluice flow, which entails modification of the sluice gate outlets to break up and spread flow; and spillway flow splitter/aerator, which entails modifying the spillways to aerate, break up, and spread flow. The three gate alternatives all involve spilling flow through existing outlets (the seven sluice gates and two spillway gates) into the tailwater plunge pool and rely on reduction in TDG production by spreading the flow and limiting plunging effects of the confined water jets.

In 2010, SCL will conduct activities that will include using physical and computational hydraulic models to help clarify the preferred configuration of the TDG abatement alternative or alternatives for construction in 2012, including the sequence of alternatives and their incremental plan of development. The first alternative selected for construction may consist of one of the three gate alternatives identified above, but more likely it will consist of a combination of two or more of these alternatives.

Following implementation of each set of TDG improvement measures, SCL will conduct biological sampling in the Project tailrace area within two days of a spill event. SCL will use boat electrofishing to sample along five 200-meter transects in the tailrace during each sampling period, once per year in years following installation of a new TDG abatement measure or measures. Fish captured will be examined for injury and indications of gas bubble trauma. Sampling will not be conducted during spill due to safety concerns for field crews in the tailrace.

The following section replaces Section 2.3.3.2.5, Proposed Environmental Measures - Aquatic Macrophytes and Potential Invasive Species.

SCL will install bottom barriers to reduce the risk of macrophyte-related fish stranding and trapping, benefit recreational use by creating boat lanes free of macrophytes, and reduce boat contact with invasive macrophytes to lower the risk of dispersing invasive macrophytes to locations outside the Project area (see Section 2.6 of this addendum and the Aquatic Invasive Species Control and Prevention Plan [AISCPP], Exhibit 6 of the Settlement Agreement).

Bottom barriers will be installed at the following four locations where milfoil is abundant: Everett Island side channel (PRM 19.4), Metaline Pool, across from the Town of Metaline (PRM 28.7), Fish Stranding and Trapping Region 9 (PRM 28.8), and Fish Stranding and Trapping Region 11 (PRM 30.3). SCL, in consultation with the WQWG and FAWG, will evaluate

whether macrophyte suppression is needed at the Forebay Recreation Area and/or the Metaline Waterfront Park boat launches following proposed modifications to these areas, which are described in the Recreation Resources Management Plan (RRMP) (Exhibit 3 of the Settlement Agreement). SCL will implement appropriate macrophyte suppression measures at these two boat launches, if needed, in consultation with the WQWG and FAWG. Because of the risk of a dislodged bottom barrier becoming impinged on the forebay trashrack or being entrained into the power plant unit intakes, bottom barriers will not be installed at the Forebay Recreation Area boat launch.

In addition to the four target locations and the two boat ramps, SCL will suppress the abundance of invasive aquatic macrophytes through the use of bottom barriers, at up to three additional locations in the Project area where macrophytes are likely to increase fish stranding and trapping or interfere with recreational boating, as determined appropriate by the WQWG and FAWG following license issuance. Suppression of invasive submerged aquatic macrophytes will be addressed adaptively. Adaptive management will allow for changes in the way in which bottom barriers are deployed or, possibly, the use of alternative methods of macrophyte control. During the term of the license, the WQWG and FAWG may choose to discontinue suppression at the total of seven macrophyte suppression locations (i.e., the four target sites identified in the preceding paragraph and the three additional locations), in favor of other similarly-sized locations within Boundary Reservoir.

To monitor for zebra and quagga mussel colonization, SCL will install artificial substrate samplers at the Forebay Recreation Area and Metaline Waterfront Park boat launches and conduct tow sampling for mussel veligers in an effort to provide early detection of these species should they be introduced to the Project area. Before deploying artificial substrates, SCL, in conjunction with the WQWG and FAWG, will coordinate with the Center for Lakes and Reservoirs at Portland State University to ensure that the proposed sampling approach is appropriate (up to two additional substrate sampling sites may be added, following license issuance, if deemed appropriate by the workgroups and the Center for Lakes and Reservoirs). Field crews will also opportunistically inspect hard surfaces in the vicinity of the boat launches for the presence of sessile bivalves. Horizontal and vertical zooplankton tow net samples will be collected at three locations in the reservoir to represent inflow (below Box Canyon dam, PRM 34.3), outflow (Boundary Dam forebay, PRM 17.6), and mid-reservoir (Metaline Pool area, PRM 28.7) locations. Samples will be taken three times annually between June and September when conditions are suitable for mussel spawning and larval dispersal. Greater detail regarding the proposed approach to zebra and quagga mussel monitoring is contained in the AISCPP.

SCL will conduct New Zealand mudsnail surveys in the immediate vicinities of the Forebay Recreation Area boat launch and the Metaline Waterfront Park boat launch. Mudsnail surveys will be conducted according to the same schedule as the zebra and quagga mussel monitoring. Sampling methods for the mudsnail surveys are described in the AISCPP.

If additional species are officially recognized as invasive aquatic species in the vicinity of the Project, and Ecology or WDFW believes that monitoring for these species is warranted, SCL will develop and implement appropriate monitoring protocols, in consultation with the WQWG and FAWG, provided they are considered safe, feasible, and will not jeopardize fish and aquatic

resources or water quality. Should zebra or quagga mussels or New Zealand mudsnails, or any other newly listed invasive species, become established and problematic in the Project area, as determined by the WQWG and FAWG, SCL will consult with the workgroups to determine potential management strategies, which would include additional monitoring and reasonable and feasible control measures implemented by SCL consistent with regional control programs.

SCL proposes to implement an I&E program aimed at reducing the potential for the spread of invasive macrophyte species, zebra and quagga mussels, and New Zealand mudsnails. Signs will be installed at boat launches as part of a larger public education program, which is discussed in the RRMP.

The following section, Fish Tissue Sampling, is new and addresses a measure not included in the Water Resources Proposed Environmental Measures section of Exhibit E of the License Application.

One year after license issuance SCL will collect and analyze fish tissue samples from Boundary Reservoir for lead and zinc concentrations. Data will be provided to Ecology and the Washington Department of Health (WDOH) to assess possible human health risks due to consumption of fish in the reservoir. If health advisories are warranted, Ecology and WDOH will determine the next steps for tissue sampling or health advisory issuance (see the Fish Tissue Sampling Plan, Exhibit 8 of the Settlement Agreement).

Fish tissue samples will be collected at the following locations: Boundary Dam forebay, near Everett Island in the Canyon Reach, near Metaline Falls, and just downstream of the Box Canyon Dam tailrace. At each site, three centrarchids (greater than 7 inches long) and three suckers (greater than 8 inches long) will be collected by electrofishing, angling, or fyke netting. If any naturally reproduced salmonids (other than bull trout) greater than 7 inches in length are captured while sampling for centrarchids, they will be substituted for the centrarchids, for up to a total of three game fish species (centrarchids and salmonids) at each of the sites. Tissue samples will be analyzed in a laboratory accredited by Ecology.

The following section replaces Section 2.3.3.3, Proposed Environmental Measures - Fish and Aquatic Resources.

The following sections include brief summaries of proposed fish and aquatics resources PM&E measures, which are described in greater detail in Section 2.7 of this Exhibit E Addendum and in even greater detail in the FAMP (Exhibit 11 of the Settlement Agreement). Specifics regarding procedures associated with each PM&E measure, compliance and effectiveness monitoring, adaptive management, and reporting and implementation schedules, are included in the FAMP.

The following section replaces Section 2.3.3.3.1, Proposed Environmental Measures, Gravel Augmentation below Box Canyon Dam, of Exhibit E of the License Application.

SCL will deposit 1,500 cubic yards of screened gravels to increase potential mountain whitefish spawning habitat in the upper reservoir. Gravels of a size suitable for mountain whitefish spawning will be placed at up to six sites between PRM 29.1 and Box Canyon Dam. Tentative

sites have been identified at PRM 33.7, but final site selection will be approved by the FAWG. Up to 25 percent of the initial gravel volume will be replenished every five years. Depth, velocity, existing substrate, proximity to existing mountain whitefish spawning areas, and other criteria necessary for final site selection will be identified during implementation planning. To increase gravel retention at the placement sites, SCL will install up to 189 tons of 3-4 foot diameter boulders in weirs or other structures. Up to 25 percent of the boulders will be replenished every ten years, as needed.

The following section replaces Section 2.3.3.3.2, Proposed Environmental Measures, Channel Modifications of Mainstem Trapping Pools at Project RM 30.3, of Exhibit E of the License Application.

SCL will excavate a channel to connect mainstem flow to several isolated pools at a large cobble bar near PRM 30.3 ("Cobble Sisters") to reduce the risk of fish becoming trapped during periods of declining water surface elevation. SCL will excavate a 1,800-foot channel to an elevation below 1,979 feet NAVD 88 to connect three trapping pools to mainstem flows. Spoils from excavation will be used to fill a fourth pool near the channel margin.

The following section replaces Section 2.3.3.3.3, Proposed Environmental Measures, Upstream Fish Passage, of Exhibit E of the License Application.

SCL will install, operate, maintain, and monitor a single upstream trap-and-haul fishway facility in the Project tailrace. The purpose of the upstream fishway will be to provide safe, timely, and effective passage for bull trout, cutthroat trout, and mountain whitefish in the Project area. The fishway will include a fixed entrance(s) and a release location(s) at least one mile upstream of Boundary Dam. Attraction flows will not exceed 1,650 cfs (3 percent of maximum Project generation discharge). The final design will be subject to the approval of the USFS, Ecology, and Department of Interior.

SCL will undertake a research and development phase of up to 12 years to evaluate the fishway entrance design, entrance location, and attraction flow volumes. Within 12 years of license issuance, SCL will file with FERC for approval, a plan to install, operate, and maintain an upstream trap-and-haul fishway. SCL will complete construction of the upstream fishway within two years of receiving FERC approval and will monitor fishway operations for the term of the license and any annual licenses issued for the Project. SCL will work collaboratively with the FAWG in all aspects of fishway development and implementation.

The following section, Reduction of Project Related Entrainment Mortality, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

SCL will implement a program over the license term to mitigate for the effects of entrainment on bull trout, westslope cutthroat trout, and mountain whitefish (target species). SCL will work collaboratively with the FAWG on all aspects of the program, and all decisions made by SCL and the FAWG will be subject to the approval of the USFS, Ecology, and Department of Interior.

In Years 1-18 of the new license term, SCL will implement studies to quantify the effects of entrainment on target species and to determine whether any population of target fish species or a substantial number of target fish are affected by Project entrainment. Starting in Year 19 of the new license term, if entrainment reduction measures are determined to be necessary, SCL will build facilities at the Project to improve Boundary Dam survival of target species or implement appropriate non-operational measures to improve survival of target species. If a population or a substantial number of target species continues to be affected by Year 34, SCL will construct new facilities at the Project, expand existing facilities, or implement operational changes to improve survival of target species.

The following section replaces Section 2.3.3.3.4, Mainstem Engineered Large Woody Debris at Tributary Deltas, of Exhibit E of the License Application (Now referred to as* Mainstem Large Woody Debris at Tributary Deltas*).

SCL will enhance tributary delta habitat by providing additional cover for salmonids occupying coldwater refugia at tributary mouths. LWD jams will be placed and maintained in the thalweg in the upper delta regions of four tributaries to Boundary Reservoir. Two LWD jams will be placed at the Sullivan Creek delta and one LWD jam will be placed at the deltas of Sweet, Slate, and Linton creeks (total of 5 LWD jams). The Sullivan Creek LWD jams will have a total volume of not less than 1,700 cubic feet, while each LWD jam in Slate, Sweet, and Linton creeks will have a volume of not less than 530 cubic feet. The specific location and design of the LWD jams will be determined during implementation planning by SCL in consultation with and subject to approval by the FAWG. LWD jams will be located in the upper ends of tributary deltas to minimize use by non-salmonids. Orientation and construction of each LWD jam will be based on site-specific hydraulic and channel conditions.

The following section replaces Section 2.3.3.3.5, Proposed Environmental Measures, Boundary Reservoir Fish Community Monitoring, of Exhibit E of the License Application (Now referred to as* Boundary Reservoir Fish Community Monitoring and Evaluation of Salmonid Predation at Select Tributary Deltas*).

SCL will conduct fish community surveys in Boundary Reservoir beginning in Year 5 following license issuance and at five-year intervals thereafter. The objective is to monitor changes in fish population abundance and size structure of focal species (i.e., westslope cutthroat trout, bull trout, mountain whitefish, smallmouth bass, northern pikeminnow, and northern pike and may include other species identified by the FAWG). Study planning will be completed during the calendar year prior to conducting the field surveys, and a summary report will be completed within one year of completion of the field surveys. Study design, schedule, implementation, and reporting activities will be developed in consultation with and subject to approval by the FAWG.

SCL will conduct a study to evaluate predation on outmigrating native salmonids at select tributary deltas. The objective is to quantify the proportion (percent by number and biomass) of outmigrating native salmonids being consumed by predatory fish within select tributary deltas and determine consumption rates of select predators consistent with the general methods described in Baldwin et al. (2003). The level of effort of the delta predation study will be commensurate with that expended by researchers in Baldwin et al. (2003). SCL will conduct this

study during Year 4 and Year 15 following license issuance. Study planning will be completed during the calendar year prior to conducting the field surveys, and a summary report will be completed within one year of completion of the field surveys. The study design and implementation schedule will be subject to approval by the FAWG.

The following section replaces Section 2.3.3.3.6, Habitat Protection, Riparian Improvement, and Stream Channel Enhancement in Sullivan Creek from RM 0.00 to 0.54, of Exhibit E of the License Application (Now referred to as* Riparian Improvement and Stream Channel Enhancement in Sullivan Creek RM 0.30 to RM 0.54*).

This measure consists of two components, riparian improvement and stream channel enhancement, that will be implemented in Sullivan Creek between RM 0.3 to RM 0.54 within 10 years of license issuance. If permitting, landowner permission, or other issues prevent implementation of this measure over portions of the reach, funds equivalent to what would have been expended will be allocated to other PM&E measures as determined in consultation with the FAWG and subject to the approval of the USFS if they occur on NFS lands.

Riparian improvements will be implemented along the left bank for up to 1,200 feet of stream to improve shade, potential instream LWD, and erosion control. Activities in some sections of the reach would depend on obtaining easements from non-SCL landowners. Selection of specific plant species and planting locations will be determined as part of post-license planning and design work to be approved by the FAWG and following WDFW guidelines.

Stream channel enhancement will improve instream spawning and rearing habitat and channel conditions along 1,200 feet of stream via LWD (> 4 inches in diameter and > 6.6 feet long) placement (15 to 20 pieces), large boulder placement (5 to 10 boulders), and channel modification. Addition of structural elements will contribute to pool formation, retention of LWD, and retention of coarse sediment suitable for salmonid spawning. Structural elements along the left bank will help stabilize the streambank, protecting downstream property owners and decreasing bank erosion. Selection of specific structural elements and their placement will be determined as part of post-licensing implementation planning, be subject to approval by the FAWG and generally follow WDFW guidelines. LWD replenishment will occur on an eight-year basis throughout the term of the license.

The following section replaces Section 2.3.3.3.7, Riparian, Streambank, and Channel Improvements in Sullivan Creek from RM 2.30 to 3.93, of Exhibit E of the License Application (Now referred to as* Stream and Riparian Improvements in Sullivan Creek RM 2.3 to RM 3.0 and North Fork Sullivan Creek*).

Streambank and channel enhancement and riparian planting will be implemented in Sullivan Creek from approximately RM 2.3 to RM 3.0. The objectives of this measure are to decrease bank erosion on the right bank, provide instream structure to create pools and enhance deposition and retention of spawning gravel, decrease the channel width-to-depth ratio, and promote the riparian buffer along the right bank. If permitting or other issues prevent implementation of this measure over portions of the reach, funds equivalent to what would have been expended will be allocated to other PM&E measures in tributaries to Boundary Reservoir as determined in

consultation with the FAWG and subject to the approval of the USFS for activities that occur on NFS lands.

The following activities will be completed within 10 years of license issuance between RM 2.3 and 3.0 of Sullivan Creek:

- Design and construction of seven engineered LWD jams (1,100 cubic feet volume each)
- Placement of 10 to 20 boulders (average of 3 feet in diameter)
- Channel modifications
- Riparian plantings
- Streambank modifications at two locations (sections 475 feet long and 317 feet long) where Sullivan Lake Road is hydrologically connected to the Creek. Modifications will include decreasing the bank angle through flow redirection, structural, and/or biotechnical techniques.
- Either road relocation/reconstruction or stream channel diversion at one site on Sullivan Creek (County Road 9345 in SCL Segment 4; RM 2.5-3.0).

Boulders will primarily be placed in clusters but could also be used to anchor LWD. Selection of specific structural elements and their placement will be determined as part of post-license planning and design work, will generally follow WDFW guidelines, and will require approval by the FAWG prior to implementation.

SCL will replace the culvert at the Sullivan Lake Road stream crossing of North Fork Sullivan Creek and place LWD in North Fork Sullivan Creek from the mouth to the North Fork Sullivan Creek Dam (RM 0.25) by Year 15. Instream LWD placement will include 70 pieces of LWD. Of these pieces, at least six will be 12 inches or greater in diameter and a minimum of 35 feet in length. The final number and size of LWD to be placed in North Fork Sullivan Creek will be approved by the FAWG and based on site-specific conditions.

The following section, Large Woody Debris Placement and Road Improvements in Sullivan Creek and Selected Tributaries Upstream of the Confluence with Outlet Creek, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

This measure will be implemented in Sullivan Creek and select tributaries upstream of the confluence with Outlet Creek (RM 5.3). SCL will place LWD in Sullivan Creek by Year 10 of the new license term in the amounts listed below:

- Outlet Creek to Rainy Creek – 681 pieces, of which 136 will be greater than or equal to 12 inches in diameter and 35 feet in length.
- Rainy Creek to Gypsy Creek – 330 pieces, of which 46 will be greater than or equal to 12 inches in diameter and 35 feet in length.
- Gypsy Creek to the end of fish bearing waters – 728 pieces, of which 76 will be greater than or equal to 12 inches in diameter and 35 feet in length.

Engineered LWD jams will account for a portion of LWD. The number of LWD jams will be determined as part of post-license planning and subject to approval by the FAWG.

SCL will implement the following road improvements along the 12 miles of Sullivan Creek Road (FS Road 2200) between the mouth of Outlet Creek and Leola Creek:

- Sullivan Creek Road – Approximately 6.5 miles of road (described in Table 2.7-1 in Section 2.7 of this addendum) will be reconstructed, including resurfacing with 4 inches of gravel; re-grading to divert stormwater to the inside ditch; replacing deficient or adding up to a total of 35 new stormwater ditch relief culverts, including sediment traps or energy dissipaters as needed to reduce delivery of road-related erosion to streams. Two cutslope slides located approximately 1.5 and 1.7 miles from the junction with Sullivan Lake Road (MP12) (described in Table 2.7-1 in Section 2.7 of this addendum) will be stabilized by removing slumped material, installing drainage, revegetating, and installing retaining structures while maintaining road width.
- Kinyon Creek – Replace FS Road 2220 culvert with a fish passable structure.
- Stony Creek – Replace FS Road 2200 culvert with a fish passable structure.
- Unnamed creek downstream of Cascade Creek – Replace culvert with a multi-plate arch structure.

SCL will undertake the following road and habitat improvements in the Sullivan Creek basin upstream of Outlet Creek:

- Johns Creek – Remove the FS Road 2200 505 culvert and implement streambank restoration within the road imprint. Replace FS Road 2200 500 culvert with a fish-passable structure.
- Rainy Creek – Remove fish barrier at the mouth of the creek.
- Streambank stabilization near Cascade Creek – Create three engineered LWD jams from LWD currently causing bank instability; supplement with boulders and rock barbs/vanes.
- Channel and weir rehabilitation near mouth of unnamed creek downstream of Cascade Creek – Augment existing log weirs and redirect flows to the thalweg of the channel.

The following section replaces Section 2.3.3.3.8, Culvert Replacements in Slate Creek Tributaries Slumber Creek at RM 0.2 and Styx Creek at RM 0.1, of Exhibit E of the License Application (Now referred to as* Culvert Replacements and Large Woody Debris Placement in Tributaries to Boundary Reservoir*).

SCL will replace six culverts in Slumber, Styx, Flume, and Pocahontas creeks (see Table 2.7-2 in Section 2.7 of this addendum for detail) with new stream crossings that meet Washington State and/or USFS criteria, as applicable. SCL will also place LWD in Lime, Flume, and Sand creeks (see Table 2.7-3 in Section 2.7 of this addendum for detail). The objective is to improve access to, and/or the habitat quality of, selected tributary reaches used by native salmonids. The culvert

replacements will provide passage for juvenile, sub-adult, and adult salmonid lifestages at all design flows and allow access to suitable habitat located upstream of the culverts. The culvert replacements in Slumber and Styx creeks will also incorporate LWD as needed for bank stabilization and grade control at each site. A secondary objective of the culvert replacements is to improve downstream transport of LWD and reduce the risk of road failure during peak flow events.

The following section replaces Section 2.3.3.3.9, Riparian Planting in Linton Creek RM 0.0 to 0.2, of Exhibit E of the License Application (Now referred to as* Riparian Planting, Culvert Replacement, and Channel Reconstruction in Linton Creek RM 0.0 to RM 0.24*).

This measure will be implemented in Linton Creek between RM 0.0 and 0.24 and will involve replacement of up to three culverts, reconstruction of the stream channel, placement of 20 to 25 pieces of LWD, augmentation of gravel, and riparian planting within a distance of up to 50 feet of the stream banks. The objective is to improve riparian functions, fish passage conditions at the stream crossings, and salmonid spawning and rearing habitat. Implementation of this measure would occur between Years 16 and 20 following issuance of the new license. Because the Metaline Waterfront Park is a multi-use public recreation area, specific objectives and measurable success criteria for this measure will be developed as part of post-license planning and design work to be conducted in consultation with the FAWG and the City of Metaline, and will need the city's approval prior to implementation. Restoration work would generally follow WDFW guidelines. It is anticipated that woody vegetation will be planted at a high density (approximately 4,360 plants per acre) and consist of regionally appropriate, native riparian plant seed mixes and shrubs as well as native tree saplings, with the objective of achieving at least 80 percent survival and 50 percent vegetative areal cover of native species after three years from the date of planting. Implementation of this measure depends on securing permission from the City of Metaline. If permission is not obtained, the funds allocated to this measure would be allocated to other tributary measures to be developed in consultation with the FAWG.

The following section replaces Sections 2.3.3.3.10 - 2.3.3.3.11, Channel Improvements in Sweet Creek from RM 0.4 to 0.5 and Riparian Buffer Protection and Improvement in Sweet Creek from RM 0.0 to 0.5, of Exhibit E of the License Application (Now referred to as* Riparian and Channel Improvements in Sweet Creek RM 0.0 to RM 0.6*).

This measure includes riparian buffer protection and plantings, LWD placement, and Highway 31 culvert improvements. The objective of riparian buffer protection and plantings is to provide long-term protection for the relatively intact riparian zone along Sweet Creek downstream of the Highway 31 culvert. SCL will pursue the acquisition of, or protective land easements for, 11.8 acres within a 100-foot buffer (excluding existing roads) on either side of Sweet Creek from the mouth to the Highway 31 culvert (RM 0.50). In addition, SCL will remove non-native vegetation and plant native brush and trees over a 0.3-acre area north of the access road near the high school football field to improve riparian functions such as shade, LWD availability, and nutrient (i.e., leaf and needle) production. Implementation of the protective portion of this PM&E measure depends on the willingness of current owners (three private owners: the Selkirk School District, Washington State Department of Natural Resources [WDNR], and Washington Department of Transportation [WDOT]) to sell a portion of their land or enter into easement

agreements. Similarly, implementing riparian plantings would require permission from the Selkirk School District, even if long-term protection could not be provided. If owners are unwilling to sell or provide easements within the 100-foot buffer, then long-term protection would not be provided. If owners do not grant permission for riparian plantings, funds equal to the cost of these plantings would be reallocated to other PM&E measures in tributaries to Boundary Reservoir as determined in consultation with the FAWG.

The objective of LWD placement is to increase channel complexity and gravel retention from the mouth of Sweet Creek to RM 0.60. One hundred and sixty-six pieces of LWD will be placed, and of these pieces, at least 12 will be 12 inches or greater in diameter and a minimum of 35 feet in length. The bankfull width of Sweet Creek is approximately 33 feet in this reach, making it suitable for placement of channel-spanning LWD. As part of the LWD placement, up to 10 channel-spanning structures will be installed over a 558-foot reach downstream of the Highway 31 culvert. Each structure will have one to three LWD pieces, of which at least one will have a minimum volume of 88.2 cubic feet. Selection of the specific locations and design of the spanning structures and the actual amount, location, and size of the wood to be placed in Sweet Creek depends on site-specific conditions and will be determined as part of post-license planning and design work that will generally follow WDFW guidelines and will be subject to approval by the FAWG. The presence of eroding stream banks will be considered during this process, and streambank reshaping could be implemented as part of structure placement to reduce erosion.

The objective of Highway 31 culvert improvements is to improve upstream fish passage at the culvert located at RM 0.5 under Highway 31. Improvements may include the addition of baffles, weirs, and/or aprons on the downstream end of the existing culvert. The design of the improvements will occur in consultation with the WDOT, WDFW, and the FAWG and will require their approval.

The following section, Habitat Improvement in Tier-2 Tributaries to Boundary Reservoir, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

As part of studies conducted during the relicensing of the Project, SCL categorized tributaries flowing into Boundary Reservoir according to habitat availability for native salmonids and the potential opportunity to improve existing conditions through habitat manipulation. The results of the analysis were reported in the Assessment of Factors Affecting Aquatic Productivity in Tributary Habitats Final Report (SCL 2009a). Tributaries to Boundary Reservoir were categorized as primary (tributaries with high opportunity), secondary (tributaries with moderate opportunity), or excluded from evaluation (tributaries with little to no opportunity). PM&E measures designed to improve habitat conditions in primary tributaries, termed Tier-1 tributaries, are addressed in other sections of this addendum and in the FAMP (Exhibit 11 of the Settlement Agreement). All other secondary and excluded tributaries, collectively referred to as Tier-2 tributaries, are listed in Section 2.7 of this addendum (see schedule in Table 2.7-4 in Section 2.7 of this addendum).

For this PM&E measure, SCL, in consultation with the FAWG, will implement measures to improve aquatic habitat conditions in Tier-2 tributaries commensurate with the resulting benefits

to native salmonids. The FAMP describes the process for identifying Tier-2 tributaries that provide an opportunity for habitat improvement and identifies measures that SCL will implement in Tier-2 tributaries to benefit native salmonids.

The following section, Closure and Restoration of Sullivan Creek Dispersed Recreation Sites, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

The objective of this PM&E measure is to establish the process for the closure and restoration by SCL of up to 38 recreation sites located in riparian areas along Sullivan Creek to help restore fish habitat. SCL will develop an Initial Recreation Site Restoration Plan (Initial Plan) in consultation with the FAWG and subject to the approval of the USFS. The Initial Plan will describe, in sufficient detail for NEPA purposes, the recreation sites to be closed and restored and the site-specific measures for each site. The Initial Plan will form the basis for the proposed action under the USFS NEPA process. The Initial Plan will be based on a list of up to 38 sites provided by the USFS to SCL that identifies the potential sites to be closed.

The Initial Plan will also include draft biological evaluations or assessments, including survey data as required by regulations applicable to habitat or ground-disturbing activities on NFS lands in existence at the time the Plan is prepared. Upon completion of the Initial Plan, SCL will provide it to the USFS for use in the NEPA process. The USFS will develop for use in the NEPA process a comparable level of information on potential replacement recreation opportunities, including but not limited to new sites and facilities to be opened.

SCL will fund the portion of the USFS NEPA process for the proposed action described in the Initial Plan to close and rehabilitate recreation sites. SCL will provide funds to the USFS through a reimbursable collection agreement, consistent with USFS policy and regulations at the time USFS NEPA process is initiated. The NEPA process conducted by the USFS will incorporate all required evaluations and assessments completed by SCL for ground disturbing activities related to closing and rehabilitating recreation sites. Through the NEPA process, the USFS will also evaluate and identify replacement recreation opportunities, including but not limited to new sites and facilities, to help offset the loss of sites along Sullivan Creek.

SCL's commitment under this measure does not include an obligation to develop replacement recreation sites or to provide amenities, e.g., sanitation facilities, at any replacement recreation sites. Public education regarding closure of dispersed sites and locations of replacement recreation sites will be provided by SCL as part of its Multi-Resource Information & Education program (see the RRMP, Exhibit 3 of the Settlement Agreement).

The following section, Fund for Habitat Improvements in Tributaries to Sullivan Lake, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

Within one year of license issuance SCL will establish a $2.5 million fund called the Fund for Habitat Improvements in Tributaries to Sullivan Lake (Fund) in an interest bearing account for improving aquatic habitat in Harvey Creek, Noisy Creek, and Jungle Creek. This obligation is a

payment obligation and not an obligation for SCL to undertake any particular work. Distributions will be made in installments from the Fund, as determined by the FAWG, for planning and implementation activities. If there are any unexpended funds in the Fund after fund distributions for the measures described above have been completed, SCL will use such unexpended funds for additional habitat improvement in tributaries to Boundary Reservoir, as directed by the FAWG.

The following section, Mill Pond Dam Site Monitoring and Maintenance, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

SCL will monitor the Mill Pond Dam site and maintain the site to remediation design specifications following completion of dam removal and restoration efforts. SCL will monitor the Mill Pond Dam site to assess stream channel, floodplain, and upslope conditions to determine if any structures or plantings fall below the success levels established during implementation planning for the decommissioning of Mill Pond Dam. In consultation with the FAWG, SCL shall adaptively manage the site and adjust stream restoration components to maintain remediation benefits.

As part of the Sullivan Creek Project Application for Surrender of License, the POPUD will implement the Mill Pond Decommissioning Plan, which describes the decommissioning work to be performed at the Mill Pond Dam site. In general, the Mill Pond Decommissioning Plan covers removal and restoration work that will be completed within five years of FERC issuance of a surrender order for the Sullivan Creek Project. Upon FERC's determination that the work required by the Mill Pond Decommissioning Plan has been completed, and FERC's termination of its jurisdiction over the Mill Pond area, SCL shall monitor and maintain the site as described in this measure.

The following section replaces Section 2.3.3.3.12, Tributary Non-native Trout Suppression, of Exhibit E of the License Application (Now referred to as* Tributary Non-native Trout Suppression and Eradication*)

SCL will implement non-native trout suppression or eradication activities in portions of 23 waterbodies in the Boundary Reservoir drainage (see schedule in Table 2.7-5 in Section 2.7 of this addendum). Within 12 months of license issuance, SCL will submit to FERC an integrated schedule that has been approved by the FAWG for the completion of non-native fish suppression and eradication activities that is coordinated with tributary enhancement and native salmonid conservation activities.

The type of treatment, number of treatment miles, and treatment schedule (see schedule in Table 2.7-5) represent the total effort to be expended during implementation of this measure. Suppression and eradication treatments include associated permitting and monitoring activities. As part of post-license monitoring and adaptive management, SCL, in consultation with and subject to approval by the FAWG, may reallocate suppression and eradication effort provided the total level of effort is commensurate with proposed activities (see Table 2.7-5). The level of effort for suppression may vary among stream reaches but will be consistent with an average of

six electrofishing efforts per reach every 10 years from the start of implementation through the remaining term of the license. Eradication of non-native salmonids will be consistent with a level of effort associated with three chemical treatment applications assuming the use of antimycin, rotenone, or an equivalent fish toxicant.

The following section replaces Section 2.3.3.3.13, Native Trout Supplementation Facility, of Exhibit E of the License Application (Now referred to as* Native Salmonid Conservation Program*).

SCL will fund the design, construction, and operation of a fish propagation facility for the production of native salmonids to outplant into tributaries draining into Boundary Reservoir. Implementation planning will be completed within three years of license issuance, and the facility will be operational within six years of license issuance. Facility design and operational protocols will be completed in consultation with and subject to approval by the FAWG and WDFW prior to and during implementation. Facility operations will be conducted by qualified staff either contracted or hired by SCL. Staff qualifications will be developed by SCL in consultation with the FAWG. For a state-owned facility, facility design, staff qualifications, and operational protocols are subject to completion of an operations agreement between SCL and WDFW. SCL will outplant propagated native salmonids to supplement existing populations or to introduce native salmonids into reaches where they are not currently present. Target release sites will include those reaches where non-native trout have been actively suppressed or where underutilized habitat is available in tributaries draining into Boundary Reservoir. Outplanting native salmonids in Boundary Reservoir tributaries is expected to complement non-native trout suppression and stream habitat improvement activities. See Section 2.7 of this addendum for greater detail regarding hatchery capacity, target fish species (westslope cutthroat trout will be the initial target species for propagation, but the facility will be designed to propagate bull trout or other native salmonids), broodstock, rearing facility design requirements, water supply, and potential methods of fish distribution in receiving waterbodies.

The following section, Recreational Fish Stocking Program, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

SCL will stock trout in 18 lakes within a 15-mile area around the Project. Trout species stocked in these lakes will be westslope cutthroat trout, rainbow trout, triploid rainbow trout, or tiger trout, and may include fall fry, fingerlings, spring fry, and catchable-size fish. These fish will be produced and planted annually by WDFW; however, fish may be obtained from a commercial production facility if fish are unavailable from WDFW. Approximately 11,678 pounds of fish will be stocked annually. See Section 2.7 of this addendum (Table 2.7-6) for the number, size, and species of trout to be stocked. The species stocked annually in these lakes may vary and will depend on whether the lake is a closed system or has connection to a tributary. See Section 2.7 of this addendum (Table 2.7-7) for a list of the lakes to be stocked under this PM&E measure. The number, size, and species of fish, planting schedule, and location may be adjusted in consultation with, and will require the approval of, WDFW.

SCL will monitor and evaluate lakes receiving the stocked fish prior to the springtime opening day of trout season. The objective will be to annually conduct biological monitoring on a rotating subset of lakes. Site-specific conditions (i.e., lake ice, weather, and road access) may determine monitoring opportunities. At least six of the lakes receiving stocked fish will be monitored each year. Monitoring activities will consist of yearly fall or pre-Opening Day spring index gillnetting to evaluate recruitment of planted trout fry, trout growth rates, relative trout abundance, and detection of illegally introduced and/or undesirable fish species. Net specifications will be consistent with gill nets employed by WDFW regional biologists for index netting on lowland trout lakes. Nets will be set in each lake during the afternoon and retrieved the following morning allowing net soak times of 12-18 hours. Index net sample sites for each lake sampled will be selected in collaboration with WDFW, and the number of sample sites will be dependent on lake surface area (see Section 2.7 of this addendum):

Opening Day creel censuses will be performed on two lakes per year. Lakes to be creel-sampled will be selected each year in collaboration with the WDFW District 1 Fish Biologist. For each lake sampled, standard WDFW creel sampling protocols will be employed, including standardized angler interviews and angler utilization estimates (fishing pressure counts). An annual report will be prepared identifying the amount, size, species, timing, and location of stocking efforts and the results of monitoring and evaluation activities. Survey timing, location, and protocol and the locations and protocol for Opening-Day creel census activities will be developed in consultation with, and with the approval of, WDFW.

The following section replaces Section 2.3.3.4, Proposed Environmental Measures - Terrestrial Resources.

Proposed PM&E measures associated with botanical and wildlife resources are described in Sections 2.8 and 2.9, respectively, of this addendum and in the TRMP (Exhibit 2 of the Settlement Agreement).

Environmental measures related to botanical resources include an Integrated Weed Management Plan (IWMP) and a RTE plant monitoring program, both of which will be implemented in consultation with the TRWG and with the approval of the USFS and Ecology, as specified in the TRMP. The IWMP and RTE plant programs include regular monitoring and reporting.

Measures applicable to wildlife include monitoring of bald eagles, peregrine falcons, and bank swallows; enhancing habitat on select SCL-owned parcels; implementing BMPs and a worker education program to minimize Project-related human disturbances and other Project-related effects on wildlife and habitats; and adaptive management to address ongoing resource needs. In addition, the TRMP includes a provision for developing a monitoring plan for RTE wildlife species, such as wolves, if a substantial increase in their use of the Project area is detected. The implementation of measures outlined in the TRMP will be conducted in consultation with the TRWG and with the approval of the USFS and Ecology and will include regular reporting and meetings with the TRWG throughout the license term.

Four other SCL-owned parcels that currently reside outside the Project boundary will be brought into the boundary and managed for the benefit of both botanical and wildlife resources, per the

prescriptions and programs described in the TRMP: the BWP Addition (89 acres), the portion of the Tailrace East parcel not currently included in the boundary (86.9 acres), the portion of the Everett Creek parcel not currently included in the boundary (82.7 acres), and the portion of the Sullivan Creek parcel not currently included in the boundary (17.7 acres). SCL has also agreed to purchase additional property, with a target area of approximately 158 acres and approximately 13,022 lineal feet of land immediately adjacent to water.

The following section replaces Section 2.3.3.6, Proposed Environmental Measures - Recreation and Land Use.

The RRMP (Exhibit 3 of the Settlement Agreement) describes all applicable Project-related recreation measures and contains several management programs that will help guide SCL's recreation-related decision-making during the new license term. The RRMP includes Capital Facility Development, Operations and Maintenance, Shoreline Dispersed Recreation Management, Recreation Monitoring, and Multi-Resource I&E programs (see below). Each of these programs includes a set of appropriate measures, as described below, as well as implementation plans, a schedule, and budget guidance. The RRMP also includes general goals, objectives, resource integration and coordination guidance, Recreation Opportunity Spectrum (ROS)-type land management classifications, and other appropriate management considerations for recreation at the Project under the new license.

A Shoreline Management Program consistent with FERC guidelines is included in the TRMP (Exhibit 2 of the Settlement Agreement). The Shoreline Management Program identifies appropriate shoreline land uses to minimize potential environmental effects on sensitive plant and wildlife species and their habitats and to protect and enhance the reservoir shoreline. It also addresses management and coordination of private and public (non-federal) shoreline development permitting within the Project boundary and management of debris accumulation and removal along the reservoir shoreline, particularly following spring runoff.

A Travel and Public Access Management Program addresses the following Project-related access needs: operational access to Project facilities and the reservoir, restricted public access at or near Project facilities and areas where public safety is a concern, and adequate public access to Project recreation facilities and use areas.

SCL collaborated with the USFS on a plan for the decommissioning of various National Forest roads that were used in the past by SCL to access groundwater monitoring wells installed by SCL but which are no longer needed. SCL proposes to close a spur off of Forest Road (FR) 3165-200 to public use and to decommission a spur off of FR 3165-340; both of these roads have been used in the past to access survey monuments. Greater detail regarding road closure and decommissioning can be found in Section 2.11 of this addendum and the Monitoring Well and Road Decommissioning Plan (Exhibit 4 of the Settlement Agreement). Additionally, SCL's plan for ongoing maintenance of roads used exclusively or primarily for Project purposes is presented in Section 2.11 of this addendum.

The following section replaces Section 2.3.3.6.1, Proposed Environmental Measures - Recreation and Land Use, Capital Facility Development Measures.

Measures included in the Capital Facility Development Program are listed below. Proposed new facilities or modifications to existing facilities will follow ADA regulations and guidance[1], general aesthetic/visual design guidelines, and an appropriate development scale level and will be subject to FERC review and approval.

The following capital facility measures are included in the RRMP (Exhibit 3 of the Settlement Agreement):

- Forebay Recreation Area
    - Enhance campground facilities by increasing the number of and better delineating campsites, providing appropriate signage, using vegetation and/or other site features to create separation between campsites and day-use picnic sites, and regulating vehicle access.
    - Enhance day-use picnic sites with signage, improved access, and separation from campsites.
    - Provide additional I&E signage and/or other visitor I&E opportunities.
    - Extend the existing boat ramp lane so that boats can be launched/retrieved during the primary recreation season without limitations due to fluctuating reservoir water surface elevations; provide adequate parking, signage, and circulation at the boat launch.
    - Provide for a sluice maintenance gate area to be used approximately every 10 years, as needed.
    - Incorporate ADA enhancements into the design.
- Vista House Recreation Area
    - Add I&E signage and/or other opportunities at the overlook platform.
    - Incorporate ADA enhancements into the design.
- Tailrace Recreation Area/Machine Hall Visitors' Gallery
    - Update I&E signage, displays, and visitor opportunities at the Machine Hall Visitors' Gallery consistent with the level of anticipated use and security restrictions.
    - Incorporate ADA enhancements into the design.

[1] FERC encourages "Universal Design" and "Universal Access" at licensed-hydroelectric projects, which refer to sites, facilities, and other features that are usable by all people, not just those with disabilities. SCL will consider universal design during the design of capital improvements, but will rely on ADA guidelines to foster consistency between Project recreation sites located on federal and SCL-managed Project lands.

- Peewee Falls Viewpoint and Trail
    - Extend existing FS Road 3165315 as needed and develop a new trailhead at the end of that road, an accessible trail, and an accessible viewpoint of Peewee Falls.
    - Develop appropriate support facilities, including parking, vault toilet, and signage.
    - Incorporate ADA enhancements into the design.
- Riverside Mine Canyon Viewpoint and Trail
    - Develop a new accesible trail and trailhead in the vicinity of the Riverside Mine to a viewpoint of the canyon. The trail alignment will take advantage of the existing FS road network, specifically FS Road 3100-172 and 3100-178.
    - Develop trail and appropriate support facilities, including parking, vault toilet, and signage.
- Eastside Trail
    - Construct a semi-primitive, non-motorized Eastside Trail (to USFS standards) that connects the Peewee Falls and Riverside Mine Canyon viewpoints.
- Metaline Falls Portage Trail
    - Develop a new portage trail in the vicinity of Metaline Falls.[2]
    - Construct a non-motorized boat access at the northern terminus of the portage trail, which will inlcude parking, appropriate signage, and restrooms.[3]
    - Provide I&E signage.
- Metaline Waterfront Park Boat Launch
    - Replace the existing boat launch and extend the boat ramp lane so boats can be launched/retrieved during the primary recreation season without limitations due to fluctuating reservoir water surface elevations.
    - Provide adequate roadway access to the boat ramp, improve circulation and parking for single vehicles and vehicles with trailers, and other boat launch support facilities (e.g., signage, dock, and boarding float).
    - Provide an accessible restroom in the vicinity of the boat launch parking area (possibly dual vault toilets or the new facility may be combined with an upgraded park restroom facility, location to be determined).
    - Incorporate ADA enhancements into the design.

[2] Subject to acquiring necessary property rights and any applicable agency approvals; in the event that acquisition of the necessary property rights cannot be achieved, SCL, in consultation with the RRWG, shall identify and implement the appropriate next best option for providing a portage trail at the falls.

[3] Subject to acquiring necessary property rights and any applicable agency approvals; in the event that acquisition of the necessary property rights cannot be achieved, SCL, in consultation with the RRWG, shall identify and implement the appropriate next best option for providing a non-motorized boat access point.

- Future repair and/or replacement of existing recreation sites
    - Replace and/or repair recreation site facilities, infrastructure, and amenities, as needed, based on monitoring and normal facility life cycles during the new license term.
    - If needed, consider additional recreation capital facility development based on monitoring during the new license term.

The following section replaces Section 2.3.3.6.2, Proposed Environmental Measures - Recreation and Land Use, Programmatic and O&M Measures.

- Operations and Maintenance (O&M) Program
    - Develop an O&M Program for SCL-managed recreation sites and use areas.
    - Provide annual maintenance at the boat launch at the Town of Metaline Waterfront Park.
    - Provide appropriate O&M of Project-related recreation sites and use areas.
    - Periodically reassess public access/security policies at the Tailrace Recreation Area and Machine Hall Visitors' Gallery; assessments will include a review of safety and security related to a potential portage opportunity around Boundary Dam.
- Shoreline Dispersed Recreation Management Program
    - Develop a Shoreline Dispersed Recreation Management Program to guide development and management of shoreline dispersed recreation sites and use areas.
    - Incorporate 16 existing shoreline sites into the management program by establishing appropriate development levels and management direction for dispersed shoreline recreation sites.
- Recreation Monitoring Program
    - Develop and implement a periodic Recreation Monitoring Program with facility and visitor management actions and triggers.
    - SCL will fund a seasonal (Memorial Day through Labor Day) River Ranger to observe and record resource conditions along the Boundary Reservoir shoreline, including at designated dispersed shoreline recreation sites.
- Multi-Resource Interpretation and Education (I&E) Program
    - Develop a comprehensive Multi-Resource Interpretation and Education (I&E) Program that establishes themes, messages, and media to be presented at recreation sites; all resources will be addressed including, recreation, aesthetics, geology, engineering, scenic byway, fisheries/aquatics, cultural/historic, and terrestrial.
    - SCL will coordinate its Multi-Resource I&E Program with the Pend Oreille River Water Trail Planning Group.

- Communicate to the public the seasonal changes in flows, spring runoff conditions, and Project operations that may affect conditions at the falls north of the Highway 31 bridge, as well as issues related to fluctuation in water surface elevation.

2.3. Proposed Changes to the Project Boundary (Section 2.3.4 of Exhibit E)

The following section replaces Section 2.3.4, Proposed Changes to the Project Boundary.

As noted above, SCL is proposing to expand the existing Project boundary to include features currently not included in the boundary. Exhibit G of this License Application (as revised March 2010) explains in greater detail the specifics of the proposed Project boundary expansion and the rationale for the proposal.[4]

There are two categories of proposed Project boundary changes: (1) items being proposed now for inclusion in the Project boundary, with the proposed change delineated on Exhibit G maps (as revised March 2010) and (2) items for which there is currently insufficient detail to propose a specific change, but which have been identified by SCL as activities for which the Project boundary will be modified in the future as appropriate; most of these are shown as "approximate" locations on the Exhibit G Addendum maps, but there is no associated, specific proposed Project boundary change. Both categories are identified and explained in the Exhibit G Addendum. The following text identifies the items that fall into these two categories:

SCL proposes at this time to expand the Project boundary to include the following features:

- Operations and Maintenance Support Area
- BWP and adjacent 89-acre parcel (the BWP Addition)
- The portions of the Tailrace East, Everett Creek, and Sullivan Creek parcels that currently reside outside the Project boundary
- Metaline Falls Portage Trail
- Roads (all existing roads used exclusively or primarily for Project purposes)
    - West Side Access Road (portion not already in the boundary)
    - Operations and Maintenance Support Area road network
    - Bonneville Power Administration (BPA) substation road
    - Spur off of BPA substation road (portion not already in the boundary)
    - South end of Forest Road (FR) 6200-348 (portion not already in the boundary)
    - FR 3165-350 (small portion not already in the boundary)
    - FR 3100-325 (for East Peewee Falls Trail and Viewpoint)
    - FR 3100-315 (for East Peewee Falls Trail and Viewpoint)
    - FR 3100-172 (for Riverside Mine Canyon Overlook)
    - FR 3100-178 (for Riverside Mine Canyon Overlook)

[4] Study plans and their respective reports, as reflected in Exhibit E, are based on the existing Project boundary in Exhibit K of the existing license. As such, Exhibit E and its attachments may present acreage values that differ slightly from those values presented in Exhibits A and G. In addition, the Project boundary shown on maps of Exhibit E and its attachments is the existing Project boundary of Exhibit K. For the location of the proposed boundary, see Exhibit G of this License Application (as revised March 2010).

SCL is not proposing at this time to include the items listed below in the Project boundary because plans are not sufficiently developed to define the location/boundary (see Exhibit G Addendum for approximate locations). At such time as these measures are approved and their specific locations determined, they will be proposed for inclusion in the Project boundary.

- The additional approximately 158-acres of Project Habitat Lands (PHLs) that SCL has agreed to purchase (or some portion thereof)
- East Peewee Falls Viewpoint and Trail
- Eastside Trail
- Riverside Mine Canyon Overlook
- Additional land in the area of the Metaline Waterfront Park boat launch
- Wolf Creek dispersed recreation site
- Dispersed recreation Site #15
- Mouth of Sweet Creek for tributary fish habitat restoration
- Large woody debris placement in tributary deltas

SCL is also proposing to re-establish the 200-foot no-mining buffer in locations in the lower reservoir where the current Project Boundary is either less than or more than 200 feet from the line of ordinary high water.

Finally, SCL is proposing to revise the Project boundary in the vicinity of the Pend Oreille County PUD (POPUD) Campbell Park boat ramp and downstream end of Box Canyon Project boundary, where the recently revised FERC boundary for the Box Canyon Project overlaps with the current FERC boundary for the Project. SCL proposes to revise the Project boundary in this area to align with the Box Canyon Project boundary, thereby eliminating the overlap. Following issuance of the new Project license, SCL will consult with FERC to finalize necessary revisions to the Project boundary.

2.4. Proposed Project Facilities (Section 2.3.6 of Exhibit E)

The following section replaces Section 2.3.6, Proposed Project Facilities.

The following facilities installations or modifications are proposed for implementation under the new Project license (see Sections 2.5 - 2.11 of this addendum). Any proposed new facilities or modifications to existing facilities will be subject to FERC review and approval. For greater detail regarding the facilities listed below see the TDG Attainment Plan, FAMP, and RRMP (Exhibits 10, 11, and 3, respectively, of the Settlement Agreement).

- Upstream trap-and-haul fishway facility
- Structural TDG abatement measures
- Recreation Facilities
    - Boundary Dam Forebay Recreation Area
        - Enhancements of campground and day-use facilities
        - Extension to existing boat launch
        - I&E signs

        - ADA enhancements
    - Vista House Recreation Area
        - I&E signs
        - ADA enhancements
    - Tailrace Recreation Area/Machine Hall Visitors' Gallery
        - Update I&E signs
        - ADA enhancements
    - Peewee Falls Viewpoint and Trail
        - ADA enhancements
    - Riverside Mine Canyon Viewpoint and Trail
        - Support facilities, including parking, vault toilet, and signage
    - Eastside Trail
    - Metaline Falls Portage Trail
        - Non-motorized boat access at the northern terminus of the portage trail
        - Parking, appropriate signage, and restrooms at boat access
    - Metaline Waterfront Park boat launch
        - Replace existing boat launch and extend a boat ramp lane
        - Provide adequate road access to boat ramp
        - Improve circulation and parking
        - Restroom in the vicinity of the boat launch parking area
        - ADA enhancements

2.5. Geology and Soils (Section 4.5.1 of Exhibit E)

2.5.1. Proposed Environmental Measures

The following section replaces Section 4.5.1.3, Proposed Environmental Measures, of Exhibit E of the License Application.

The environmental measures proposed below are designed to reduce ongoing erosion where important resources are at risk and to mitigate for Project-related erosion losses. These measures are discussed in more detail in the TRMP (Exhibit 2 of the Settlement Agreement).

Erosion Site 17W1 (Forebay Recreation Area) – Bank erosion at this site will be controlled by installing seeded erosion control blankets or turf reinforcement mats. Minor slope grading prior to installation is recommended. Toe protection is not required; however, the erosion control fabric should be anchored at the toe of the slope and at the top of the bank. Controlling surface erosion from the recreation area will also reduce future bank erosion. Runoff from the picnic area currently flows in a drainage swale that discharges at the bank and contributes to erosion. Armoring the outlet of the swale where it discharges to the bank, or rerouting the swale to discharge closer to the boat ramp, would reduce bank erosion.

Erosion Site 19W9 (BLM Boundary Recreation Area) – Bank erosion at this site will be controlled by a combination of biotechnical stabilization techniques. Various measures such as tree revetments, live cribwalls, live siltation, coconut logs, and native rock could be installed to

protect the toe of the bank. The bank itself will be revegetated using brushlayering, branch packing, and/or live cribwalls. Any stabilization technique should be carefully planned to minimize further destruction of established vegetation on the bank. The site could be further improved by constructing more formal public access to the reservoir using terraced log cribwalls and eliminating the existing casual trails by revegetating the trails and blocking access with downed trees or other natural materials.

Erosion Site 21W19 (Dispersed Recreation Day Use/Overnight Campsite on BLM-Managed Land) – Bank erosion at this site will be controlled by a combination of biotechnical stabilization techniques such as brushlayering, branch packing, and/or live cribwalls. Native rock should be used to help protect the toe of the bank. Other soft toe protection techniques also might be used; however, the soft, friable nature of the bank toe should be considered when designing the toe protection. Constructing more formal public access using terraced log cribwalls and minimizing the number of access points to the reservoir would reduce the amount of human-caused bank erosion.

Monitor erosion rate – The TRMP describes the general approach to monitoring erosion rates at 16 select sites during the new license period and evaluating the need to control potential future erosion if high value resources are being affected. The specific monitoring methods, schedule, and other details will be developed as part of a long-term erosion monitoring plan to be implemented as part of the Erosion Program.

Provide off-site mitigation for continuing erosion effects – Four other SCL-owned parcels that currently reside outside the Project boundary will be brought into the boundary and managed as part of a comprehensive mitigation and enhancement package related to terrestrial resources in the Project area. These additions are intended, in part, to compensate for ongoing Project-related erosion and the loss, conservatively estimated at 15 acres, of terrestrial habitat over the new license term: the BWP Addition (89 acres), the portion of the Tailrace East parcel not currently included in the boundary (86.9 acres), the portion of the Everett Creek parcel not currently included in the boundary (82.7 acres), and the portion of the Sullivan Creek parcel not currently included in the boundary (17.7 acres). With the same intent of mitigating for and enhancing terrestrial resources in the Project area, SCL has also agreed to purchase additional property, with a target area of approximately 158 acres and approximately 13,022 lineal feet of land immediately adjacent to water. The TRMP provides a comprehensive set of management, protection, and enhancement measures for the lands currently in SCL ownership, and will be modified to include the new property once it is purchased.

2.6. Water Resources (Section 4.5.2 of Exhibit E)

2.6.1. Proposed Environmental Measures

The following section replaces Section 4.5.2.3.2, Proposed Environmental Measures - Temperature, of Exhibit E of the License Application.

Modeled flow-weighted daily maximum temperatures in the Project area are within water quality standards. Under certain conditions, the Project has a slight warming effect on surface daily maximum temperatures at the forebay, but has no effect at Metaline Pool and has a cooling effect

at the Tailrace that is greater than the warming effect at the Boundary Forebay. Changes in Project operations would increase rather than reduce the slight surface warming at the Boundary Forebay location.

To address the minor temperature effects of the Project on surface daily maximum water temperatures, Ecology has indicated that improving fish habitat in tributaries to the reservoir and in tributary delta areas will help meet Ecology's temperature improvement goals for the Pend Oreille River. These measures include tributary riparian plantings, stream channel modifications, LWD supplementation, bank improvements, and culvert replacements (see the Temperature Attainment Plan and FAMP, Exhibits 9 and11, respectively, of the Settlement Agreement). SCL is also implementing measures, including placement of LWD jams at tributary deltas and revegetation at select locations to improve habitat conditions and reduce ongoing erosion along the shoreline of Boundary Reservoir. Greater detail regarding these mainstem measures is provided in the TRMP (Exhibit 2 of the Settlement Agreement), FAMP, and Temperature Attainment Plan.

In addition, SCL will collect continuous temperature data from June through September at the following four locations: Metaline Pool (Project river mile [PRM] 28.4), Slate Creek Pool (PRM 22.5), Boundary Dam Forebay (PRM 17.0), and the Boundary Dam Tailrace (PRM 16.1). SCL will collect temperature data at these four locations annually, unless the approach is modified through Ecology's annual review of the Temperature Monitoring QAPP. SCL will also conduct temperature monitoring in the deltas of Sullivan, Sweet, and Linton creeks (see the Temperature Attainment Plan).

The following section replaces Section 4.5.2.3.3, Proposed Environmental Measures - Total Dissolved Gas, of Exhibit E of the License Application.

Following issuance of the new Project license, SCL will implement measures identified in the TDG Attainment Plan (Exhibit 10 of the Settlement Agreement) that are designed to attain TDG compliance at the Project consistent with the approved TMDL for TDG. SCL will evaluate and implement as appropriate the following three gate alternatives for TDG abatement:

- Throttle Sluice Gates, which involves operation of sluice gates in partially open positions.
- Roughen Sluice Flow, which entails modification of the sluice gate outlets to break up and spread flow.
- Spillway Flow Splitter/Aerator, which entails modifying the spillways to aerate, break up, and spread flow.

The three gate alternatives all involve spilling flow through existing outlets (the seven sluice gates and two spillway gates) into the tailwater plunge pool and rely on reduction in TDG production by spreading the flow and limiting plunging effects of the confined water jets. The historic performance of these outlets at small gate openings indicates the potential for successfully reducing TDG levels in the Project tailrace.

In 2010, SCL will conduct activities that will include using physical and computational hydraulic models to help clarify the preferred configuration of the TDG abatement alternative or alternatives for construction in 2012, including the sequence of alternatives and their incremental plan of development. The first alternative selected for construction may consist of one of the three gate alternatives identified above, but more likely it will consist of a combination of two or more of these alternatives.

Following implementation of TDG improvement measures, SCL will conduct biological sampling in the Project tailrace within two days of a spill event. SCL will use boat electrofishing to sample along five 200-meter transects in the tailrace during each sampling period once per year in years following installation of a new TDG measure. Fish captured will be examined for injury and indications of gas bubble trauma. Sampling will not be conducted during spill due to concerns regarding the safety of field crews in the tailrace.

To reduce TDG under normal, non-spill operations, SCL will operate Units 55 and 56 above 125 MW and sequence their startup and shutdown so that they are the last units to be brought on line and the first units to be shut down (see Section 5.4.7 of the Evaluation of Total Dissolved Gas and Potential Abatement Measures Final Report, SCL 2009a). Turbine unit sequencing to reduce TDG production will be accomplished by programming and documenting (Numbered Dispatching Memoranda) these measures as administered by SCL's System Control Center.

As noted above, during the new license term SCL plans to upgrade equipment at the Boundary Dam power plant (see Section 2.1 of this addendum). Proposed upgrades to the turbines may reduce or eliminate the conditions that in the past have led to TDG production during non-spill operations. When the proposed turbine upgrades are completed, SCL plans to reevaluate the need for the unit sequencing identified above and adjust the approach to, or eliminate, the sequencing restrictions if appropriate.

The following section replaces Section 4.5.2.3.5, Proposed Environmental Measures - Aquatic Macrophytes and Potential Invasive Species, of Exhibit E of the License Application.

SCL will install bottom barriers to reduce the risk of macrophyte-related fish stranding and trapping, benefit recreational use by creating boat lanes free of macrophytes, and reduce boat contact with invasive macrophytes to lower the risk of their dispersal to locations outside the Project area (see the AISCPP, Exhibit 6 of the Settlement Agreement). In some locations in the reservoir, submerged macrophytes have been shown to reduce the ability of fish to escape from stranding and trapping areas by blocking routes of egress during periods of declining water surface elevation (see the Mainstem Aquatic Habitat Modeling Final Report, SCL 2009a).

Bottom barriers will be installed at the following four locations where milfoil is abundant:

- Everett Island side channel (PRM 19.4) - A bottom barrier will be placed to maintain a lane from the informal recreation site upstream (south) through the middle of the side channel to reduce the risk of fish stranding and trapping during reservoir drawdown, to reduce contact between boats and invasive macrophytes and thereby lower the potential for milfoil dispersal, and to improve boat transit in and out of the side channel.

- Metaline Pool, across from the Town of Metaline (PRM 28.7) - A bottom barrier will be placed to reduce boat contact with macrophytes where a dense macrophyte bed is located adjacent to a region of open channel. This area was identified by the field crews that conducted relicensing studies as a location where boats commonly come in contact with macrophytes.
- Fish Stranding and Trapping Region 9 (PRM 28.8) - A bottom barrier will be placed in a location beginning just downstream of the midpoint of the side channel, adjacent to the shoreline and extending downstream (north) through the channel thalweg to reduce the risk of fish trapping during reservoir drawdown.
- Fish Stranding and Trapping Region 11 (PRM 30.3) - To reduce the risk of fish trapping during reservoir drawdown, a bottom barrier will be placed beginning at the south shoreline to create an open channel through the middle of the trapping pool and end at the upper end of the narrow channel that drains the trapping pool. In addition to providing egress for fish potentially stranded or trapped in this area, it will reduce the risk of injury and mortality from potential oxygen depletion in trapping pools with dense macrophytes.

SCL will evaluate whether macrophyte suppression is needed at the Forebay Recreation Area and/or the Metaline Waterfront Park boat launches following proposed modifications to these areas, which are described in the RRMP (Exhibit 3 of the Settlement Agreement). Beginning in the third year following the completion of boat launch modifications at these sites, SCL will conduct annual surveys from a boat to monitor site conditions and, in consultation with the WQWG and FAWG and subject to agreement by Ecology, determine whether macrophytes have reestablished to a degree requiring implementation of suppression measures. SCL will implement appropriate suppression measures in consultation with the workgroups. Because of the risk of a dislodged bottom barrier becoming impinged on the forebay trashrack or being entrained into the power plant unit intakes, bottom barriers will not be installed at the Forebay Recreation Area boat launch.

In addition to the four target locations and the Boundary Forebay and Metaline Waterfront Park boat ramps, SCL will suppress the abundance of invasive aquatic macrophytes, through the use of bottom barriers, at up to three additional locations in the Project area (for a maximum total area of 50,000 square feet) where macrophytes are likely to increase fish stranding and trapping or interfere with recreational boating, as determined appropriate by the WQWG and FAWG following license issuance.

Greater detail regarding the proposed approach to the use of bottom barriers in the Project area, including maps of proposed deployment locations, deployment methods, timing of installation, and permitting, is contained in the AISCPP.

Suppression of invasive submerged aquatic macrophytes will be addressed adaptively. Adaptive management will allow for changes in the way in which bottom barriers are deployed or, possibly, the use of alternative methods of macrophyte control at the designated sites.

To monitor for zebra and quagga mussel colonization, SCL will install artificial substrate samplers at the Forebay Recreation Area boat launch and the Metaline Waterfront Park Boat

Launch and conduct tow sampling for mussel veligers in an effort to provide early detection in the event that these mussels are introduced to the Project area in the future. Before deploying artificial substrates, SCL, in conjunction with the WQWG and FAWG, will coordinate with the Center for Lakes and Reservoirs at Portland State University to ensure that the proposed design, placement, and monitoring regime associated with the artificial substrate samplers is appropriate (up to two additional substrate sampling sites may be added, following license issuance, if deemed appropriate by the Center for Lakes and Reservoirs). In addition to data gathered from the artificial samplers, field crews will opportunistically inspect hard structures in the vicinity of the boat launches for the presence of sessile bivalves. Horizontal and vertical zooplankton tow net samples will be collected at three locations in the Project area to represent inflow (below Box Canyon dam, PRM 34.3), outflow (Boundary forebay, PRM 17.6), and mid-reservoir (Metaline Pool area, PRM 28.7) locations. Samples will be taken three times annually between June and September when conditions are suitable for mussel spawning and larval dispersal. Greater detail regarding the proposed approach to zebra and quagga mussel monitoring, including methods, timing of monitoring, and estimated costs, is contained in the AISCPP.

SCL will conduct New Zealand mudsnail surveys in the vicinities of the Forebay Recreation Area boat launch and the Metaline Waterfront Park boat launch. Mudsnail surveys will be conducted according to the same schedule as zebra and quagga mussel monitoring. Greater detail regarding the proposed approach to mudsnail surveys, including methods, timing of monitoring, and estimated costs, is contained in the AISCPP.

At annual meetings (see below), WQWG and FAWG participants will have the opportunity to propose additional invasive aquatic species (beyond zebra and quagga mussels and New Zealand mudsnails) for monitoring. If these species are officially recognized as invasive aquatic species in the vicinity of the Project, and Ecology or WDFW believes that monitoring for these species is warranted, SCL will develop appropriate monitoring protocols in consultation with the WQWG and FAWG, and implement the protocols, provided they are considered safe, feasible from the standpoint of logistics and cost, and do not have the potential to jeopardize fish and aquatic resources or water quality. Should zebra or quagga mussels or New Zealand mudsnails, or any other newly listed invasive species, become established and problematic as determined by the WQWG and FAWG, SCL will consult with the workgroups to determine potential management strategies, which would include additional monitoring and reasonable and feasible control measures implemented by SCL consistent with regional control programs.

SCL proposes to implement an I&E program aimed at reducing the potential for the spread of invasive macrophyte species, zebra and quagga mussels, and New Zealand mudsnails. Signs will be installed at boat launches as part of a larger public education program, which is discussed in the RRMP.

SCL proposes to implement all measures identified above in consultation with the WQWG and FAWG, as described in the AISCPP. Administering the AISCPP is expected to require one meeting per year of the WQWG to discuss the outcome of the year's field activities and plan the following year's activities. In addition to the meetings, site visits may be needed at times. Each year, SCL, in consultation with the WQWG and FAWG, will determine whether any changes to the AISCPP may be warranted. If changes are agreed to by SCL and Ecology, SCL will revise

the AISCPP and submit it to the workgroups before the spring implementation efforts occur. Representatives of the FAWG will be invited to attend meetings of the WQWG and review the AISCPP following any revisions.

The following section, Fish Tissue Sampling, is new, i.e., it addresses a measure not included in the Water Resources Proposed Environmental Measures section of Exhibit E of the License Application.

One year after license issuance SCL will collect and analyze tissue samples from centrarchids and largescale suckers in Boundary Reservoir for lead and zinc concentrations. Data will be provided to Ecology and the Washington Department of Health (WDOH) to assess possible human health risks due to consumption of fish in the reservoir. If health advisories are warranted, Ecology and WDOH will determine the next steps for tissue sampling or health advisory issuance (see the Fish Tissue Sampling Plan, Exhibit 8 of the Settlement Agreement).

Fish tissue samples will be collected at the following locations (see Figure 2.2-1 of the Fish Tissue Sampling Plan for delineations of fish sampling areas): Boundary Dam forebay, near Everett Island in the Canyon Reach, near Metaline Falls, and just downstream of the Box Canyon Dam tailrace. Fish will be collected by electrofishing, angling, or fyke netting. At each site three centrarchids (smallmouth bass, largemouth bass, black crappie, or pumpkinseed) and three suckers will be collected for tissue analysis. Field crews will attempt to capture centrarchids greater than 7 inches and largescale suckers greater than 8 inches in total length. If any naturally reproduced salmonids (other than bull trout) greater than 7 inches in length are captured while sampling for centrarchids and suckers at the sites identified above, they will be substituted for the centrarchids, for up to a total of three game fish species (i.e., some combination of centrarchids and salmonids) at each of the sites.

Field crews will carefully document all field sample collection and processing activities and identify personnel conducting the sampling. A chain-of-custody label will be completed for each individual fish specimen. Each fish will be stored on ice and sent to the laboratory within 48 hours of initial collection. Tissue samples will be analyzed in a laboratory accredited by Ecology for analysis of samples originating from natural surface waters. Within 90 days of receiving final results from the laboratory, SCL will provide Ecology and WDOH with a table showing the results of fish tissue analysis for lead and zinc, reported for each fish at each sampling site.

2.7. Fish and Aquatic Resources (Section 4.5.3 of Exhibit E)

2.7.1. Affected Environment

The following section replaces Section 4.5.3.1, Affected Environment, of Exhibit E of the License Application (Note: the following text replaces only the introductory language of Section 4.5.3.1, i.e., that found on pages E-147 through E-151 of Exhibit E. Subsequent subsections of Section 4.5.3.1 of Exhibit E required no revision as the result of PM&E modifications or additions associated with the Settlement Agreement.).

With a total drainage area of 26,260 square miles (25,090 square miles in the US and 1,170 square miles in Canada), the Pend Oreille River is one of the two main tributaries to the

Columbia River, contributing about 10 percent of the Columbia River's flow on an annual basis (Muckleston 2003). The Pend Oreille River is approximately 120 miles long from its head at the outlet of Lake Pend Oreille to its confluence with the Columbia River. Average annual precipitation in the Pend Oreille River valley is approximately 27 inches, most of which occurs from November through February. Much of this precipitation is stored in the snowpack at higher elevations and subsequently released when temperatures rise in spring. The drainage area of the Pend Oreille River between Box Canyon Dam and Boundary Dam is 268.3 square miles, and inflow from Boundary Reservoir tributaries accounts for only a small fraction of flow in the Project area at any time during the year.

Boundary Reservoir has a small active storage capacity relative to mean daily river flow, and Project operations therefore have little effect on the annual, seasonal, or monthly storage and release of water to the Pend Oreille River. Retention time of water in Boundary Reservoir averages less than two days; consequently, the reservoir more closely resembles a riverine system according to WAC 173-201A, where the state defines lacustrine systems as those with retention times greater than 15 days. The Project is operated as a daily load-following facility, which primarily affects instream flow releases on a daily or hourly interval. Water surface elevations in Boundary Reservoir fluctuate in response to inflow variation, Project operations, and wind-induced waves. Daily water surface elevation fluctuations range from 1.15 feet to 18.02 feet in the Boundary Dam forebay and from 0.42 feet to 4.80 feet in the Box Canyon Dam tailrace (based on data from 1987 - 2005). Greater detail regarding existing Project operations can be found in Section 2.1.2, Existing Project Operation, of Exhibit E and in SCL (2008).

A detailed description of hydrologic conditions in the Project area, and a description of the detailed hydrologic dataset and statistics compiled to evaluate hydrology and provide data to support relicensing studies, can be found in SCL (2008a). Topics addressed in the report include a characterization of (1) overall basin hydrology, including long-term trends, impacts of upstream projects, and tributaries to the Pend Oreille River, (2) Boundary Reservoir hydrology, including reservoir inflows, water surface elevations, and ramping rates, and (3) hydrology of the river downstream of Boundary Dam, including inflows to Seven Mile Reservoir, water surface elevations in Seven Mile Reservoir, and ramping rates.

In summer, water temperatures in Boundary Reservoir often exceed 20 ˚C. Vertical temperature profile measurements indicate that the reservoir is largely vertically mixed throughout the year, although limited surface warming occurs in the forebay during summer and early fall. Data reveal no substantial longitudinal trends in temperature at any time during the year. Summer pH values at times exceed 8.5, and some spatial variability in pH occurs as a result of localized geochemistry. DO concentrations are typically at or above saturation. Turbidity, conductivity, and nutrient concentrations are low, with SRP and TKN concentrations often below detection limits. Greater detail regarding temperature and water quality in the Project area can be found in Section 4.5.2 of this Exhibit E and in Study No. 5, Water Quality Constituent and Productivity Monitoring Final Report (Water Quality Study), of SCL's USR (SCL 2009a).

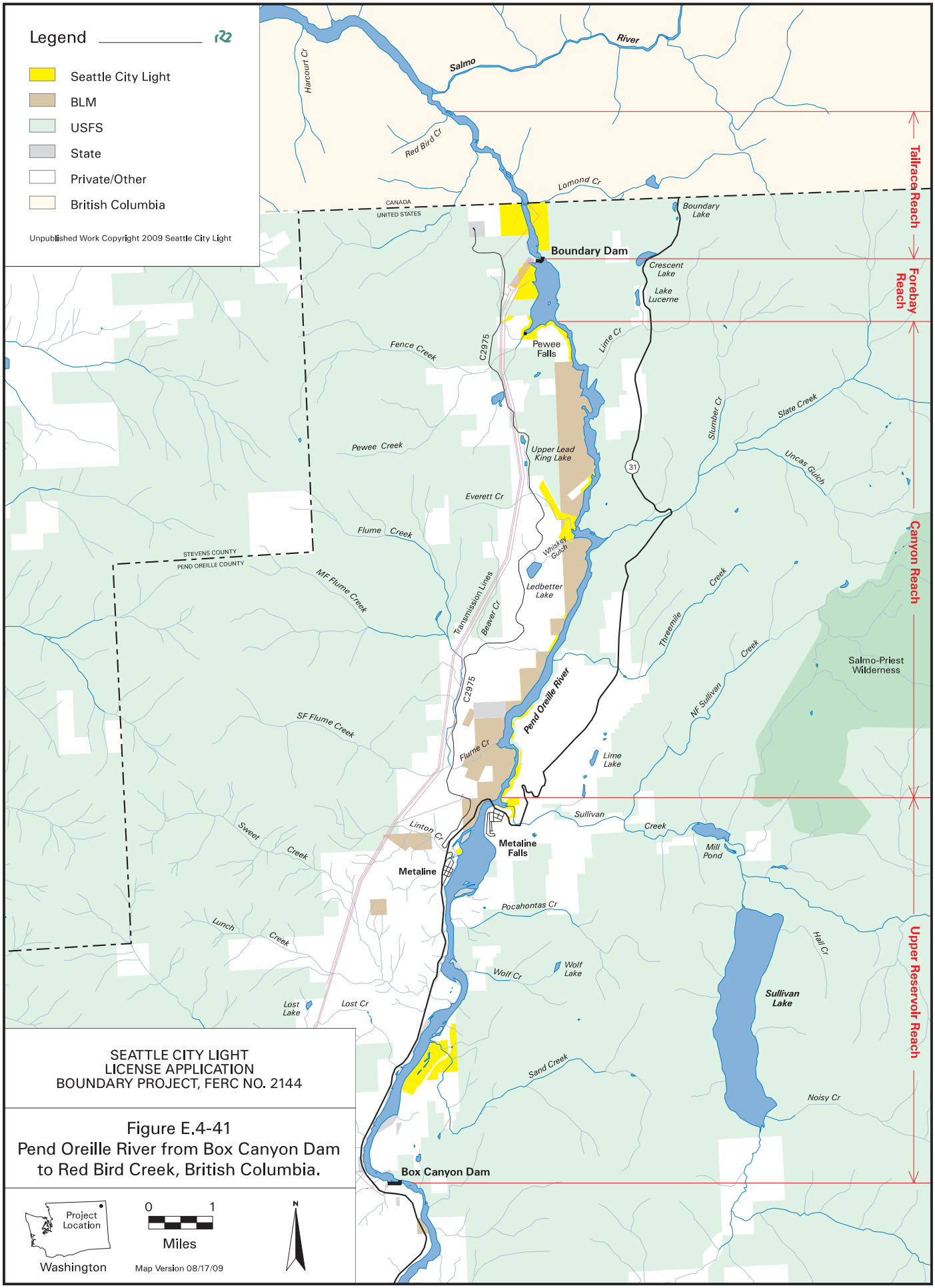
For the analysis of Project effects on fish and aquatic resources, the Affected Environment extends from Redbird Creek, which is located 3.9 miles downstream of Boundary Dam in Seven Mile Reservoir, British Columbia, upstream to Box Canyon Dam (Figure E.4-41). The Project

area was delineated into four reaches based on habitat characteristics that result from reservoir physiography: the Tailrace/Seven Mile Reservoir Reach, the Forebay Reach, the Canyon Reach, and the Upper Reservoir Reach (Figure E.4-41).

The Tailrace Reach extends from Boundary Dam downstream to the confluence with Red Bird Creek (PRM 13.1 - 17.0). At low Seven Mile Reservoir water surface elevations, riverine habitat is present in the Pend Oreille River downstream to the confluence with Red Bird Creek. At high Seven Mile Reservoir water surface elevations, the riverine habitat above the Red Bird Creek confluence becomes reservoir habitat. The Boundary Dam tailrace area is characterized by deep pools (> 75 feet) in the spillway and turbine afterbays but is generally less than 30 feet deep elsewhere. Downstream of the spillway and afterbay pools, the tailrace is relatively swift, with cobble and boulder substrates. Habitat diversity is provided primarily by instream boulders and alcoves along the channel margins. Varial zone habitat (≤ 10 feet) makes up between 12.9 percent and 33.3 percent of the total area of the Tailrace Reach, depending on flow.

The Forebay Reach, which extends from Boundary Dam upstream to the lower end of Z Canyon (PRM 17.0 - 18.0), is wide and deep, with steep-walled banks, and water depths to approximately 270 feet. There is little shallow, littoral habitat in this reach. A small island near the center of this reach provides some habitat complexity, although the shores of the island are also steep. Varial zone habitat (≤ 10 feet deep) makes up between 3.4 percent and 4.4 percent of the total area of the Forebay Reach, depending on flow and reservoir water surface elevation. One tributary, Pewee Creek (PRM 17.9), drains into this section of the reservoir. The mouth of Pewee Creek is a vertical 164-foot waterfall (McLellan 2001).

The Canyon Reach, which extends from the downstream end of Z Canyon to Metaline Falls (PRM 18.0 - 26.8), is predominantly narrow with steep rock walls. A few large embayments and backwater channels provide localized shallow habitats with aquatic macrophyte beds, and areas of rock outcroppings provide habitat complexity. Downstream of Slate Creek the canyon is more constricted, and water depths exceed 100 feet, whereas depths upstream of Slate Creek are typically 80 to 100 feet. Varial zone habitat (≤ 10 feet) makes up between 6.4 percent and 8.4 percent of the total area of the Canyon Reach, depending on flow and reservoir water surface elevation. In addition to Slate Creek, six other tributaries drain into the Canyon Reach, including Lime Creek (PRM 19.0), Everett Creek (PRM 21.9), Whiskey Gulch (PRM 21.9), Beaver Creek (PRM 24.3, west side), Threemile Creek (PRM 24.3, east side), and Flume Creek (PRM 25.8). The upstream end of the Canyon Reach is bounded by Metaline Falls, which is inundated by Boundary Reservoir when flows/water surface elevations are high.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Fence Creek
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Pewee Falls
Lime Cr
Slumber Cr
Slate Creek
Pewee Creek
Upper Lead King Lake
Uncas Gulch
Everett Cr
Flume Creek
STEVENS COUNTY
PEND OREILLE COUNTY
Mf Flume Creek
Whiskey Gulch
Ledbetter Lake
Transmission Lines
Beaver Cr
Threemile Creek
Salmo-Priest Wilderness
NF Sullivan Creek
Pend Oreille River
SF Flume Creek
Flume Cr
Lime Lake
Sullivan Creek
Linton Cr
Metaline Falls
Metaline
Mill Pond
Sweet Creek
Pocahontas Cr
Lunch Creek
Wolf Cr
Wolf Lake
Hall Cr
Sullivan Lake
Lost Lake
Lost Cr
Sand Creek
Noisy Cr
Box Canyon Dam
SEATTLE CITY LIGHT
LICENSE APPLICATION
BOUNDARY PROJECT, FERC NO. 2144
Figure E.4-41
Pend Oreille River from Box Canyon Dam
to Red Bird Creek, British Columbia.
Project Location
Washington
0
1
Miles
Map Version 08/17/09
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The Upper Reservoir Reach, which extends from Metaline Falls to Box Canyon Dam (PRM 26.8 - 34.5), is relatively wide and shallow, with a combination of silt, sand, and hard substrates, and water depths typically ranging from 10 to 25 feet. Habitat diversity is provided primarily by islands, back channels, and near-shore aquatic vegetation. Varial zone habitat (≤ 10 feet) makes up between 14.8 percent and 52.5 percent of the total area of the Upper Reservoir Reach, depending on flow and reservoir water surface elevation. Sullivan Creek (PRM 26.9), the largest tributary that drains into Boundary Reservoir, is located in this reach just upstream of Metaline Falls. Other tributaries that drain into the Upper Reservoir Reach include Linton Creek (PRM 28.1), Pocahontas Creek (PRM 29.4), Wolf Creek (PRM 30.3), Lunch Creek/Sweet Creek (PRM 30.9), Sand Creek (PRM 31.7), and Lost Creek (PRM 32.2).

A brief discussion of physical habitat conditions, including macrophytes and large wood, is contained below in Section 4.5.3.1.3 (Physical Habitat). Greater detail regarding the Project reaches can be found in SCL's PAD (SCL 2006) and USR (SCL 2009a). SCL also produced maps based on recent (2006 - 2007) bathymetry surveys conducted from Box Canyon Dam to Seven Mile Dam.

Of the 28 tributaries that enter Boundary Reservoir, 14 are named (Table E.4-19). Sullivan Creek, with a drainage area of 142.46 square miles (about 57 percent of the total drainage area between Box Canyon and Boundary dams), is the largest tributary. None of the 28 tributaries, except Sullivan Creek, has a flow gage. Consequently, flow conditions in most tributaries are based on visual observations, infrequent measurements, and modeling. Flow in Sullivan Creek is modified by the operation of Sullivan Lake Dam.

Tributaries to Sullivan Creek include Cascade, Copper, Deemer, Fireline, Gypsy, Johns, Kinyon, Leola, Lookout, Mankato, North Fork Sullivan, Pass, Rainy, Stony, Thor, Thunder, and Totem creeks, as well as some small, unnamed tributaries. According to the Sullivan Creek watershed assessment (USFS 1996), the fish-bearing subwatersheds in the Sullivan Creek drainage include Copper, Deemer, Fireline, Gypsy, Kinyon, Leola, Mankato, North Fork Sullivan, and Stony creeks. Westslope cutthroat trout are known to occur in all fish bearing drainages except Cooper, Fireline, and Stony creeks (USFS 1996). Eastern brook trout and brown trout, both introduced species, occur in many locations in the Sullivan Creek watershed, and rainbow trout are thought to occur mostly in the mainstem of Sullivan Creek (USFS 1996). Streams draining into Sullivan Creek that, according to the POSRT (2005), contain bull trout habitat include Deemer, Gypsy, Leola (and some of its tributaries), North Fork Sullivan, Outlet, and Pass creeks. Non fish-bearing sub-watersheds in the Sullivan Creek drainage include Cascade, Johns, Lookout, Pass, Rainy, Thor, Thunder, and Totem creeks, as well as some small, unnamed tributaries (USFS 1996).

Table E.4-19. Descriptive statistics for tributaries to Boundary Reservoir (SCL 2009a).

Stream Name	Project River Mile	Basin Area (mi^2)	Adfluvial Habitat Length (ft)	2000		2007		2008		Sport Fish Present[1]
				Flow (cfs)	Date	Flow (cfs)	Date	Flow (cfs)	Date	
Unnamed No. 1	17.2	0.61	82			0.1	9/6	0.1	9/22	
Peewee Creek	17.9	10.37	0	0.4	09/25	2[2]	9/6	2[2]	9/22	CTT, EBT
Unnamed No. 2	17.9	0.02	129			0.004	9/6	Dry	9/22	
Lime Creek	19.45	2.93	6,746	2.8	09/26	2.7	9/6	0.5	9/22	EBT
Everett Creek	21.9	2.18	60			0.3	9/6	2	9/22	
Whiskey Gulch	21.9	0.70	547			Dry	9/6	Dry	9/22	
Slate Creek	22.2	32.33	3,474	10.9	07/31	6.8	9/6	8.3	9/22	CTT, EBT, RBT
Beaver Creek	24.3	1.77	0			0.9	9/7	3	9/22	
Threemile Creek	24.3	4.91	0			0.5	9/7	2	9/22	EBT, RBT
Unnamed No. 3	25.4	0.15	58			0.04	9/7	Dry	9/22	
Flume Creek	25.8	19.33	1,056[3,4]	8.8	09/06	5.0	9/7	6.6	9/5	EBT
Sullivan Creek	26.9	142.46	21,729	77.7	08/16	40.5	9/10	59.5	9/5	BBT, BRT, CTT, EBT, KOK, MWF, RBT
Unnamed No. 4	27.1	0.08	77			--[5]	--[5]	--	--	
Linton Creek	28.1	2.11	19,159			1.9	9/8	1.8	9/6	
Unnamed No. 5	28.9	0.62	130			0.1	9/8	--	--	
Unnamed No. 6	29.2	0.01	955			Dry	9/11	--	--	
Pocahontas Creek	29.4	3.92	16,480			Dry	9/9	Dry	9/22	
Unnamed No. 7	29.6	0.30	53			Dry	9/11	--	--	
Unnamed No. 8	30.1	0.07	66			Dry	9/11	--	--	
Wolf Creek	30.3	1.57	236			Dry	9/11	--	--	
Sweet Creek / Lunch Creek	30.9	11.12	2,659[3]	5.3	09/11	2.5	9/11	2.8	9/5	BRT, CTT, EBT, MWF, RBT
Unnamed No. 9	31.1	0.04	67			Dry	9/11	Dry	9/22	
Sand Creek	31.7	8.22	1,320[3]	0.4	09/07	Dry	9/11	Dry	9/22	CTT, EBT, RBT
Lost Creek	32.2	1.20	165			0.03	9/12	1.4	9/23	CTT
Unnamed No. 10	33.5	0.93	99			0.001	9/12	0.3	9/23	
Unnamed No. 11	33.6	0.23	78			0.002	9/12	Dry	9/23	
Unnamed No. 12	34.0	0.93	<100			0.06	9/12	0.5	9/23	
Unnamed No. 13	34.3	1.72	<100			0.4	9/12	1.5	9/23	

Notes:

1 Blanks = non-fish-bearing or unsurveyed streams: EBT, eastern brook trout; CTT, cutthroat trout; RBT, rainbow trout; MWF, mountain whitefish; KOK, kokanee; BBT, burbot; sources: USFS (2005); McLellan (2001); FERC (1998).

2 Flow rate at the base of Pewee Falls was visually estimated.

3 Adfluvial habitat based on distance from stream mouth to lowermost migration barrier reported in McLellan (2001) and/or Andonaegui (2003).

4 A series of cascades/falls within 100 feet of the mouth of Flume Creek may also be a barrier to upstream migration.

5 No tributary channel could be found in September 2007.

cfs – cubic feet per second

Habitat conditions vary among Sullivan Creek's tributaries. Cascade, Copper, Kinyon, Rainy, and Totem creeks have the V-shape that is characteristic of a history of debris torrents, and Cascade, Kinyon and Totem creeks have landslide deposits at their mouths (USFS 1996). At the time of the Sullivan Creek watershed assessment (USFS 1996), Riparian Management Objectives (RMOs), with the exception temperature, were not being met in Deemer, Kinyon, Leola, and Stony creeks, which was thought to potentially be adversely affecting salmonid spawning in these tributaries. As the result of historic timber harvest, Leola and Deemer creeks did not meet INFISH guidelines for LWD and bankfull width-depth ratio objectives (USFS 1996), and dispersed recreation had adverse impacts ("heavy" to "extreme" ratings under the "impact of previous use" characterization) at some locations on Deemer Creek. North Fork Sullivan Creek Dam, located 0.25 miles upstream of the mouth of North Fork Sullivan Creek, is a barrier to upstream fish passage.

Harvey Creek, which originates at the peaks of Monumental and Salmon mountains, primarily consists of a middle and north fork and flows approximately 15 miles north-northwest from its headwaters before entering Sullivan Lake (Andonaegui 2003). Other significant tributaries to Sullivan Lake include Noisy and Jungle creeks. Sullivan Lake Dam is a complete barrier to fish passage, which currently limits Harvey creek and Sullivan Lake's other tributaries to resident fish production, i.e., these streams provide no habitat for adfluvial fish populations in the Pend Oreille River. Native salmonids in Harvey Creek include cutthroat trout and mountain whitefish. According to the POSRT (2005), Harvey Creek and some of its tributaries constitute bull trout habitat. Harvey Creek is considered a high priority habitat for cutthroat trout upstream of fish passage barriers (2007, pers. comm. T. Shuhda, USFS, August - September 2007).

Slate Creek has four main tributaries and two forks: Slumber Creek, Uncas Gulch, Styx Creek, and North and South Fork Slate Creek. Although bull trout have been observed at the mouth of Slate Creek (Andonaegui 2003), there are no documented observations of bull trout farther upstream is Slate Creek or in its tributaries. Westslope cutthroat and eastern brook trout are found in Slumber Creek, Styx Creek, Uncas Gulch and the South Fork of Slate Creek (USFS 1998a). Slumber Creek was stocked with brook trout in 1981, and all life stages of this species have been observed during snorkeling surveys in Slate Creek and its tributaries, confirming that successful reproduction is occurring.

Slumber Creek runs through a steep-sided valley and has an average channel gradient ranging from 3 percent in its lower reaches to 4 percent in its upper reaches (USFS 1998a). Channel sinuosity is low, and instream cover consists primarily of large wood. Dominant substrate types in the streambed include sand, gravel, and cobble, and substrate embeddedness is greater than 35 percent. Slumber Creek drains an area of decomposed limestone, which is considered to be the main cause of the high level of embeddedness, rather than human induced causes (USFS 1998a).

Styx Creek flows through a moderately steep-sided valley and has an average channel gradient ranging from 3 percent in its lower reaches to 6 percent in its upper reaches (USFS 1998a). Channel sinuosity is generally low, and instream cover consists mainly of large wood. Dominant substrate types in the streambed include sand, gravel, and cobble, and substrate embeddedness is less than 35 percent.

Uncas Gulch is contained in a steep-sided valley, and the channel has an average gradient ranging from 4 to 6 percent (USFS 1998a). Channel sinuosity is generally low, and instream cover consists primarily of large wood. Dominant substrate types in the streambed include sand, gravel, and cobble, and substrate embeddedness is less than 35 percent.

2.7.2. Proposed Environmental Measures

The following section replaces Section 4.5.3.3, Proposed Environmental Measures, of Exhibit E of the License Application.

Mainstem PM&E Measures

The following section replaces Section 4.5.3.3.1, Proposed Environmental Measures, Gravel Augmentation below Box Canyon Dam, of Exhibit E of the License Application.

SCL will deposit a total volume of 1,500 cubic yards of screened gravels to increase potential mountain whitefish spawning habitat in the upper Boundary Reservoir. Gravels of a size suitable for use by spawning mountain whitefish will be placed at up to six sites between Project river mile (PRM) 29.1 and Box Canyon Dam. Tentative sites have been identified at PRM 33.7 (0.8 mile below Box Canyon Dam), and final site selection will be approved by the FAWG during implementation planning. Up to 25 percent of the gravel/cobble volume (375 yd^3) will be replenished every five years. Implementation planning will be completed within three years following license issuance and will be developed in consultation with and approved by the FAWG. Implementation planning will identify depth, velocity, existing substrate, proximity to existing mountain whitefish spawning areas and other criteria necessary for final site selection. To increase gravel retention at the placement sites, SCL will install up to 189 tons of 3-4 foot diameter boulders in weirs or other structures. Up to 25 percent of the boulders (about 47 tons) will be replenished every ten years as needed to maintain gravel retention. Construction of the boulder weirs and gravel placement will occur in two steps: up to four of the sites will be constructed in Year 4 following license issuance, and the remaining sites will be constructed in Year 10 following license issuance or as otherwise determined by the FAWG. The design and location of the Year-10 gravel augmentation sites will be approved by the FAWG and will be based on assessment of the effectiveness of sites constructed in Year 4. Detail regarding procedures (including an aerial photo showing tentative gravel placement locations), compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

The following section replaces Section 4.5.3.3.2, Proposed Environmental Measures, Channel Modifications of Mainstem Trapping Pools at Project RM 30.3, of Exhibit E of the License Application.

SCL will excavate a channel to connect mainstem flow to several isolated pools at a large cobble bar near PRM 30.3 ("Cobble Sisters") to reduce the risk of fish becoming trapped during periods of declining water surface elevation. SCL will excavate a 1,800-foot channel to an elevation below 1,979 feet NAVD 88 to connect three trapping pools to mainstem flows. Spoils from excavation will be used to fill a fourth pool near the channel margin. The objective of this measure is to maintain a wetted connection to mainstem flows in the constructed channel to

reduce the risk of fish of being trapped in the pools during periods of declining flow and reservoir water surface elevation. Detail regarding procedures (including an aerial photo showing the conceptual plan for the proposed excavation), compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

The following section replaces Section 4.5.3.3.3, Proposed Environmental Measures, Upstream Fish Passage, of Exhibit E of the License Application.

SCL will install, operate, maintain, and monitor a single upstream trap-and haul fishway facility (upstream fishway or fishway) in the Project tailrace. The purpose of the upstream fishway will be to provide safe, timely, and effective passage for bull trout, cutthroat trout, and mountain whitefish (target fish species) in the Project area. The fishway will include a fixed entrance(s) and a release location(s) at least one mile upstream of Boundary Dam. The release location(s) will be determined by the FAWG and subject to approval by the USFS, Ecology, and Department of Interior. Attraction flows will not exceed 1,650 cfs (3 percent of maximum Project generation discharge).

SCL will design and construct the upstream fishway using the best available scientific information, including but not limited to the National Marine Fisheries Service Anadromous Salmonid Passage Facility Design Manual (Design Manual) (NMFS 2008), taking into account the site-specific conditions at the Project, biological information specific to the target species, and other relevant information. SCL must demonstrate that any departures from the Design Manual will be effective at achieving the purposes of the facility in providing safe, timely, and effective passage for target fish species. The final design will be subject to the approval of the USFS, Ecology, and Department of Interior.

SCL will undertake a research and development phase of up to 12 years to evaluate the fishway entrance design, entrance location, and attraction flow volumes that will achieve the purposes of the facility. Within 12 years of license issuance (2 planning years, 8 research years, and 2 design years), SCL will file with FERC for approval, a plan to install, operate, and maintain an upstream trap-and-haul fishway. SCL will complete construction of the upstream fishway within two years of receiving FERC approval and will monitor fishway operations for the term of the license and any annual licenses issued for the Project. SCL will work collaboratively with the FAWG in all aspects of fishway development and implementation. Detail regarding the fishway development plan, design and construction plan, consultation with the FAWG, compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

The following section, Reduction of Project Related Entrainment Mortality, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

SCL will implement a program over the license term to mitigate for the effects of entrainment on target fish species (bull trout, westslope cutthroat trout, and mountain whitefish). SCL will work

collaboratively with the FAWG in all aspects of the program, and all decisions made by SCL and the FAWG will be subject to approval by the USFS, Ecology, and Department of Interior.

In Years 1-18 of the new license term, SCL will develop and implement studies sufficient to quantify the effects of entrainment on target species and to determine whether any population of target fish species (i.e., a unique population that constitutes a substantial percentage of fish in the Project area or that has a unique evolutionary niche that requires special protection) or a substantial number of target fish are affected by Project entrainment. At the conclusion of the evaluation phase, the FAWG will determine whether a population of target species or a substantial number of target fish are affected by Project entrainment. The cost of the 18-year evaluation phase will not exceed $23 million.

Starting in Year 19 of the new license term, if entrainment reduction measures are determined to be necessary, SCL will make available up to an additional $47 million through Year 33 (plus any unexpended funds from the $23 million allocated for studies during the 18-year evaluation phase) to either build facilities at the Project to improve Boundary Dam survival of target species or implement appropriate non-operational measures to improve survival of target species. If a population or a substantial number of target species continues to be affected by Year 34, SCL will construct new facilities at the Project, expand existing facilities, or implement operational changes to improve survival of target species as explained in the FAMP (Exhibit 11 of the Settlement Agreement). Detail regarding procedures (including a decision matrix), compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP.

The following section replaces Section 4.5.3.3.4, Mainstem Engineered Large Woody Debris at Tributary Deltas, of Exhibit E of the License Application (Now referred to as* Mainstem Large Woody Debris at Tributary Deltas*).

SCL will enhance tributary delta habitat by providing additional cover for salmonids holding in coldwater refugia at tributary mouths. LWD jams will be placed and maintained in the thalweg in the upper delta regions of four tributaries to Boundary Reservoir. Two LWD jams will be placed at the Sullivan Creek delta and one LWD jam will be placed at the deltas of Sweet, Slate, and Linton creeks (total of 5 LWD jams). The Sullivan Creek LWD jams will have a total volume of not less than 1,700 cubic feet, while each LWD jam in Slate, Sweet, and Linton creeks will have a volume of not less than 530 cubic feet.

The specific location and design of the LWD jams will be determined during implementation planning by SCL in consultation with and subject to approval by the FAWG. LWD jams will be located in the upper ends of tributary deltas to minimize use by non-salmonids. Orientation and construction of each LWD jam will be based on site-specific hydraulic and channel conditions. Detail regarding procedures, compliance and effectiveness monitoring, adaptive management, and reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

The following section replaces Section 4.5.3.3.5, Proposed Environmental Measures, Boundary Reservoir Fish Community Monitoring, of Exhibit E of the License Application (Now referred to as* Boundary Reservoir Fish Community Monitoring and Evaluation of Salmonid Predation at Select Tributary Deltas*).

SCL will conduct fish community surveys in Boundary Reservoir beginning in Year 5 following license issuance and at five-year intervals thereafter. The objective of the surveys will be to monitor changes in fish population abundance and size structure of focal species over time. Focal species will be westslope cutthroat trout, bull trout, mountain whitefish, smallmouth bass, northern pikeminnow, and northern pike and may include other species as identified by the FAWG. Surveys will be at a level of effort commensurate with the reservoir fish survey portion of the McLellan (2001) study. Study planning will be completed during the calendar year prior to conducting the field surveys, and a summary report will be completed within one year of completion of the field surveys. The study design, schedule, implementation, and reporting activities will be developed in consultation with and subject to approval by the FAWG. Detail regarding procedures, compliance, adaptive management, and reporting schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

SCL will conduct a study to evaluate predation on outmigrating native salmonids at select tributary deltas. The objective of the study will be to quantify the proportion (percent by number and biomass) of outmigrating native salmonids from select tributaries that are being consumed by predatory fish within the selected tributary deltas and determine consumption rates of select predators consistent with the general methods described in Baldwin et al. (2003). The level of effort of the Boundary Reservoir tributary delta predation study will be commensurate with labor efforts expended by researchers in Baldwin et al. 2003. SCL shall conduct the tributary delta predation study during Year 4 and Year 15 following license issuance. Study planning will be completed during the calendar year prior to conducting the field surveys, and a summary report will be completed within one year of completion of the field surveys. The study design and implementation schedule will be subject to approval by the FAWG. Detail regarding procedures, compliance, adaptive management, and reporting schedule is included in the FAMP.

Tributary Fish Community and Aquatic Habitat Measures

The following section replaces Section 4.5.3.3.6, Habitat Protection, Riparian Improvement, and Stream Channel Enhancement in Sullivan Creek from RM 0.00 to 0.54, of Exhibit E of the License Application (Now referred to as* Riparian Improvement and Stream Channel Enhancement in Sullivan Creek RM 0.30 to RM 0.54*).

This measure consists of two components, riparian improvement and stream channel enhancement, that will be implemented in Sullivan Creek between RM 0.3 to RM 0.54 (downstream of the Highway 31 Bridge and Sullivan Creek Hydroelectric Project boundary) within 10 years of license issuance. If permitting, landowner permission, or other issues prevent implementation of this measure over portions of the reach within 10 years of license issuance, funds equivalent to what would have been expended will be allocated to other PM&E measures as determined in consultation with and subject to approval by the FAWG.

Riparian improvements will be implemented along the left bank for up to 1,200 feet of stream to improve shade, potential instream LWD, and erosion control. Activities in some sections of the reach would depend on obtaining easements from non-SCL landowners. Selection of specific plant species and planting locations will be determined as part of post-license planning and design work to be approved by the FAWG and following WDFW guidelines in Saldi-Caromile et al. (2004). It is anticipated that plants will be a mix of native coniferous and deciduous trees, shrubs, and herbaceous plants or groundcover.

Stream channel enhancement will improve instream spawning and rearing habitat and channel conditions along 1,200 feet of stream via LWD (> 4 inches in diameter and > 6.6 feet long) placement (15 to 20 pieces), large boulder placement (5 to 10 boulders), and channel modification. Addition of structural elements will contribute to pool formation, retention of LWD, and retention of coarse sediment suitable for salmonid spawning. Structural elements along the left bank will help stabilize the streambank, protecting downstream property owners and decreasing bank erosion. Selection of specific structural elements and their placement will be determined as part of post-licensing implementation planning and subject to approval by the FAWG and generally follow WDFW guidelines in Saldi-Caromile et al. (2004). SCL anticipates that LWD may need replenishment because of loss due to transport or degradation. LWD replenishment will occur on an eight-year basis throughout the term of the license. For riparian improvements and stream channel enhancements, detail regarding procedures, compliance and effectiveness monitoring, adaptive management, and reporting and implementation schedule is included in the FAMP (Exhibit 11 of the Settlement Agreement).

The following section replaces Section 4.5.3.3.7, Riparian, Streambank, and Channel Improvements in Sullivan Creek from RM 2.30 to 3.93, of Exhibit E of the License Application (Now referred to as* Stream and Riparian Improvements in Sullivan Creek RM 2.3 to RM 3.0 and North Fork Sullivan Creek*).

This PM&E measure will be implemented in Sullivan Creek, within 10 years of license issuance, from approximately 265 feet downstream of the confluence of Sullivan Creek and North Fork Sullivan Creek (RM 2.3) to RM 3.0 and consists primarily of streambank and channel enhancement but also includes riparian planting. The objectives are to decrease bank erosion on the right bank, provide instream structure to create pools and enhance deposition and retention of spawning gravel, decrease the channel width-to-depth ratio, and promote the riparian buffer along the right bank. If permitting or other issues prevent implementation of this measure over portions of the reach within 10 years after license issuance, funds equivalent to what would have been expended will be allocated to other PM&E measures in tributaries to Boundary Reservoir as determined in consultation with the FAWG and subject to the approval of the USFS for activities that occur on NFS lands.

A site visit that included biologists and engineers from the USFS and the SCL relicensing team suggested that the objectives could be achieved through road relocation/reconstruction or stream channel diversion. Stream channel diversion could be accomplished through the addition of log jam structures, rock barb structures, and LWD. The log jams and the barbs are anticipated to move the thalweg of Sullivan creek at least 10 feet towards the center of the channel and create at least a 10-foot-wide vegetative riparian zone. This action would promote deposition of stream

sediment along the existing bank, thereby reducing bank angles and providing a low lying bench appropriate for natural regeneration or riparian planting of willows and other native woody plants. SCL shall undertake additional post-license planning to add substance and detail to the conceptual plan developed in the field and to ensure that modifications do not cause adverse downstream impacts. This plan will be developed in consultation with the FAWG and subject to approval by the USFS. Implementation of this plan will result in completion of the following activities within 10 years after license issuance between RM 2.3 and 3.0:

- Design and construction of seven engineered LWD jams (1,100 cubic feet volume each)
- Placement of 10 to 20 boulders (average of 3 feet in diameter)
- Channel modifications
- Riparian plantings
- Streambank modifications at two locations (475 feet long and 317 feet long) where Sullivan Lake Road is hydrologically connected to the creek. Modifications will include decreasing the bank angle through flow redirection, structural techniques, and/or biotechnical techniques.
- Either road relocation/reconstruction or stream channel diversion at one site on Sullivan Creek (County Road 9345 in SCL Segment 4; RM 2.5-3.0).

Boulders will primarily be placed in clusters, but could also be used to anchor LWD pieces. Selection of specific structural elements and their placement will be determined as part of post-license planning and design work, will generally follow WDFW guidelines in Saldi-Caromile et al. (2004), and will require approval by the FAWG prior to implementation.

SCL will replace the culvert at the Sullivan Lake Road stream crossing of North Fork Sullivan Creek and place LWD in North Fork Sullivan Creek from its mouth to the North Fork Sullivan Creek Dam (RM 0.25) by Year 15. Instream LWD placement will include 70 pieces of LWD. Of these pieces, at least six will be 12 inches or greater in diameter and a minimum of 35 feet in length. The final number and size of LWD to be placed in North Fork Sullivan Creek will be approved by the FAWG and be based on site-specific conditions. Detail regarding procedures, compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

The following section, Large Woody Debris Placement and Road Improvements in Sullivan Creek and Selected Tributaries Upstream of the Confluence with Outlet Creek, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

This PM&E measure will be implemented in Sullivan Creek and select tributaries upstream of the confluence with Outlet Creek at RM 5.3. SCL will place LWD in Sullivan Creek by Year 10 of the new license term in the amounts listed below:

- Outlet Creek to Rainy Creek – 681 pieces, of which 136 will be greater than or equal to 12 inches in diameter and 35 feet in length.

- Rainy Creek to Gypsy Creek – 330 pieces, of which 46 will be greater than or equal to 12 inches in diameter and 35 feet in length.
- Gypsy Creek to the end of fish bearing waters – 728 pieces, of which 76 will be greater than or equal to 12 inches in diameter and 35 feet in length.

Engineered log jams will account for a portion of LWD. The number of LWD jams will be determined as part of post-license planning and subject to approval by the FAWG.

SCL will implement the following road improvements along the 12 miles of Sullivan Creek Road (FS Road 2200) between the mouth of Outlet Creek and Leola Creek:

- Sullivan Creek Road – Approximately 6.5 miles of road (described in Table 2.7-1) will be reconstructed, including resurfacing with 4 inches of gravel; re-grading to divert stormwater to the inside ditch; and replacing deficient or adding up to a total of 35 new stormwater ditch relief culverts, including sediment traps or energy dissipaters as needed to reduce delivery of road-related erosion to streams. Two cutslope slides located approximately 1.5 and 1.7 miles from the junction with Sullivan Lake Road (MP12) (described in Table 2.7-1) will be stabilized by removing slumped material, installing drainage, revegetating, and installing retaining structures while maintaining road width.
- Kinyon Creek – Replace FS Road 2220 culvert with a fish passable structure.
- Stony Creek – Replace FS Road 2200 culvert with a fish passable structure.
- Unnamed creek downstream of Cascade Creek– Replace culvert with a multi-plate arch structure.

Table 2.7-1 identifies road lengths using GIS. Preliminary estimates identify 34,190 feet of road to be re-graded. This estimate will be verified during implementation planning.

SCL will implement the following road and habitat improvements in the Sullivan Creek basin upstream of Outlet Creek:

- Johns Creek – Remove the FS Road 2200 505 culvert and implement streambank restoration within the road imprint. Replace FS Road 2200 500 culvert with a fish-passable structure.
- Rainy Creek – Remove fish barrier at the mouth of the creek.
- Streambank stabilization near Cascade Creek – Create three engineered LWD jams from LWD currently causing bank instability; supplement with boulders and rock barbs/vanes.
- Channel and weir rehabilitation near the mouth of the unnamed creek downstream of Cascade Creek – Augment existing log weirs and redirect flows to the thalweg of the channel.

Detail regarding procedures, compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

Table 2.7-1. Preliminary estimate of Sullivan Creek road segments to be graded and provided with stormwater relief culverts.

Road Segment	Location (Lat., Long., WGS84)		Length (ft)
	Start	End	
1	48.838701, -117.265967	48.838421, -117.262782	780
2	48.836344, -117.255665	48.833116, -117.249742	2,005
3	48.833099, -117.244231	48.833400, -117.243151	340
4	48.834759, -117.240511	48.835612, -117.235806	1,240
5	48.835079, -117.232928	48.836011, -117.226659	1,550
6	48.836930, -117.221959	48.837002, -117.218439	860
7	48.837701, -117.213904	48.838381, -117.212464	430
8	48.839229, -117.211475	48.840201, -117.211448	375
9	48.841995, -117.208698	48.842334, -117.207501	300
10	48.842622, -117.206403	48.842971, -117.205463	260
11	48.843382, -117.203629	48.843138, -117.200233	820
12	48.843299, -117.196963	48.845333, -117.190788	1,830
13	48.847663, -117.187558	48.848771, -117.185592	650
14	48.849650, -117.180512	48.853351, -117.168071	3,850
15	48.870465, -117.146005	48.871429, -117.145339	400
16	48.871903, -117.142637	48.898605, -117.083586	18,500
Cutslope Slide 1	48.836233,-117.254667		200
Cutslope Slide 2	48.838031,-117.258158		200

The following section replaces Section 4.5.3.3.8, Culvert Replacements in Slate Creek Tributaries Slumber Creek at RM 0.2 and Styx Creek at RM 0.1, of Exhibit E of the License Application (Now referred to as* Culvert Replacements and Large Woody Debris Placement in Tributaries to Boundary Reservoir *[Note: the tables in the following section are new, i.e., were not included in Exhibit E]).

SCL will replace the six culverts identified in Table 2.7-2 with new stream crossings that meet Washington State and/or USFS criteria, as applicable. SCL will also place LWD in Lime, Flume, and Sand creeks at the levels identified in Table 2.7-3. The objective is to improve access to, and/or the habitat quality of, selected tributary reaches used by native salmonids. The culvert replacements will provide passage for juvenile, sub-adult, and adult salmonid lifestages at all design flows and access to suitable habitat located upstream of the culverts. The culvert replacements in Slumber and Styx creeks will also incorporate LWD as needed for bank stabilization and grade control at each site. A secondary objective of the culvert replacements is to improve downstream transport of LWD and reduce the risk of road failure during peak flow events. Detail regarding procedures, compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

Table 2.7-2. Culvert replacements in Slumber, Styx, Flume, and Pocahontas creeks.

Stream	Schedule (license year)	River Mile	Road	Comment
Slumber Creek	11 – 15	0.20	FS Rd 3155	Incorporate LWD placement with culvert replacement as needed for bank stabilization and grade control
Styx Creek	11 – 15	0.10	FS Rd 3155	Incorporate LWD placement with culvert replacement as needed for bank stabilization and grade control
Flume Creek	11 – 15	0.82	County Rd 2975	
Flume Creek	11 – 15	4.37	FS Rd 350	
Pocahontas Creek	16 – 20	0.34	Lehigh Hill Rd	2 culverts

Table 2.7-3. LWD placement in Lime, Flume, and Sand creeks.

Stream	Schedule (license year)	Miles of Stream	Number of Pieces	Comment
Lime Creek	11 – 15	1.3	284	No log jams needed
Flume Creek	11 – 15	1.0	140	Mouth to SF Flume Cr; at least 20 pieces >=12 inches in diameter and >=35 ft long; no log jams needed
Sand Creek	11 – 15	2.7		Use LWD to create 10 pools RM 4.1 to 6.8; no log jams needed

The following section replaces Section 4.5.3.3.9, Riparian Planting in Linton Creek RM 0.0 to 0.2, of Exhibit E of the License Application (Now referred to as* Riparian Planting, Culvert Replacement, and Channel Reconstruction in Linton Creek RM 0.0 to RM 0.24*).

This PM&E measure will be implemented in Linton Creek downstream of the Highway 31 stream crossing (between RM 0.0 and 0.24) and will involve replacement of up to three culverts, reconstruction of the stream channel, placement of 20 to 25 pieces of LWD, augmentation of gravel substrate in numerous locations, and riparian planting within a distance of up to 50 feet of the stream banks. The objective is to improve riparian functions, fish passage conditions at the stream crossings, and salmonid spawning and rearing habitat. Implementation of this PM&E measure will occur between Years 16 and 20 following issuance of the new license. Because the Metaline Waterfront Park is a multi-use public recreation area, specific objectives and measurable success criteria for this PM&E will be developed as part of post license planning and design work to be conducted in consultation with the FAWG and the City of Metaline, and will need their approval prior to implementation. Restoration work would generally follow WDFW guidelines in Saldi-Caromile et al. (2004). It is anticipated that high density (approximately 4,360 plants per acre) planting of woody vegetation will be conducted, consisting of regionally appropriate, native riparian plant seed mixes and shrubs, as well as native tree saplings, with the objective of achieving at least 80 percent survival and 50 percent vegetative areal cover of native species after three years from the date of planting. Implementation of this PM&E measure depends on securing permission from the City of Metaline. If permission is not obtained, the funds allocated for any elements of this measure that are not implemented would be allocated to

other PM&E measures in tributaries to Boundary Reservoir, as determined in consultation with the FAWG and subject to the approval of the USFS if they occur on NFS lands. Detail regarding procedures, compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

The following section replaces Sections 4.5.3.3.10 - 4.5.3.3.11, Channel Improvements in Sweet Creek from RM 0.4 to 0.5 and Riparian Buffer Protection and Improvement in Sweet Creek from RM 0.0 to 0.5, of Exhibit E of the License Application (Now referred to as* Riparian and Channel Improvements in Sweet Creek RM 0.0 to RM 0.6*).

This PM&E measure has three components: riparian buffer protection and plantings, LWD placement, and Highway 31 culvert improvements. The objective of riparian buffer protection and plantings is to provide long-term protection for the relatively intact riparian zone along Sweet Creek downstream of the Highway 31 culvert. SCL will pursue the acquisition of, or protective land easements for, 11.8 acres within a 100-foot buffer (excluding existing roads) on either side of Sweet Creek from the mouth to RM 0.50, which is the location of the Highway 31 culvert. In addition, SCL proposes to remove non-native vegetation and plant native brush and trees over a 0.3-acre area north of the access road near the high school football field, with the objective of improving riparian functions such as shade, LWD availability, and nutrient (i.e., leaf and needle) production. Implementation of the protective portion of this PM&E measure depends on the willingness of current owners (three private owners: the Selkirk School District, WDNR, and WDOT) to sell a portion of their land or enter into easement agreements. Similarly, implementing riparian plantings would require permission from the Selkirk School District, even if long-term protection could not be provided. If owners are unwilling to sell or provide easements within the 100-foot buffer, then long-term protection would not be guaranteed. If owners do not grant permission for riparian plantings, then funds equal to the cost of these plantings would be allocated to other tributary PM&E measures as determined in consultation with the FAWG.

The objective of LWD placement will be to increase channel complexity and gravel retention through LWD placement from the mouth of Sweet Creek to RM 0.60. One hundred and sixty-six pieces of LWD will be placed, and of these pieces, at least 12 will be 12 inches or greater in diameter and a minimum of 35 feet in length. The bankfull width of Sweet Creek is approximately 33 feet in this reach, making it suitable for placement of channel-spanning LWD. As part of the LWD placement, up to 10 channel-spanning structures will be installed over a 558-foot reach downstream of the Highway 31 culvert. Each structure will have one to three LWD pieces, of which at least one will be a key piece with a minimum volume of 88.2 cubic feet, preferably with a rootwad attached (Fox and Bolton 2007). Selection of the specific locations and design of the spanning structures and the actual amount, location, and size of the wood to be placed in Sweet Creek depends on site-specific conditions and will be determined as part of post-license planning and design work that will generally follow WDFW guidelines in Saldi-Caromile et al. (2004) and will be subject to approval by the FAWG. The presence of eroding stream banks will be considered during this process, and streambank reshaping could be implemented as part of structure placement to reduce erosion.

The objective of Highway 31 culvert improvements is to improve upstream fish passage at the culvert located at RM 0.5 under Highway 31. Improvements may include the addition of baffles, weirs, and/or aprons on the downstream end of the existing culvert. The design of the improvements will occur in consultation with the WDOT, WDFW, and the FAWG and will require their approval. Detail regarding procedures, compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

The following section, Habitat Improvement in Tier-2 Tributaries to Boundary Reservoir, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

As part of studies conducted during the relicensing of the Project, SCL categorized tributaries flowing into Boundary Reservoir according to habitat availability for native salmonids and the potential opportunity to improve existing conditions through habitat manipulation. The results of the analysis were reported in the Assessment of Factors Affecting Aquatic Productivity in Tributary Habitats Final Report (SCL 2009a). Tributaries to Boundary Reservoir were categorized as primary (tributaries with high opportunity), secondary (tributaries with moderate opportunity), or excluded from evaluation (tributaries with little to no opportunity). PM&E measures designed to improve habitat conditions in primary tributaries, termed Tier-1 tributaries, are addressed in previous sections of this Exhibit E Addendum and in the FAMP. All other secondary and excluded tributaries, collectively referred to as Tier-2 tributaries, are listed in Table 2.7-4 and addressed as part of this PM&E measure. Maps showing the location of the Tier-2 tributaries are provided in SCL (2009a) (Figures 3.1-1 and 3.4-1).

For this PM&E measure, SCL, in consultation with the FAWG, will implement measures to improve aquatic habitat conditions in Tier-2 tributaries commensurate with the resulting benefits to native salmonids. The FAMP describes the process for identifying Tier-2 tributaries that provide an opportunity for habitat improvement and identifies measures that SCL will implement in Tier-2 tributaries to benefit native salmonids. Detail regarding procedures, compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

Table 2.7-4. Tier-2 tributaries to Boundary Reservoir.

Stream Name	Confluence with Boundary Reservoir at Project River Mile
Unnamed No. 1	17.2
Unnamed No. 2	17.9
Everett Creek	21.9
Whiskey Gulch	21.9
Beaver Creek	24.3
Threemile Creek	24.3
Unnamed No. 3	25.4
Unnamed No. 4	27.1
Unnamed No. 5	28.9
Unnamed No. 6	29.2
Unnamed No. 7	29.6
Unnamed No. 8	30.1
Wolf Creek	30.3
Unnamed No. 9	31.1
Lost Creek	32.2
Unnamed No. 10	33.5
Unnamed No. 11	33.6
Unnamed No. 12	34.0
Unnamed No. 13	34.3

The following section, Closure and Restoration of Sullivan Creek Dispersed Recreation Sites, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

The objective of this PM&E measure is to describe the process leading to the closure and restoration by SCL of up to 38 recreation sites located in riparian areas along Sullivan Creek to help restore fish habitat. SCL shall develop an Initial Recreation Site Restoration Plan (Initial Plan), in consultation with the FAWG and subject to the approval of the USFS. The Initial Plan shall describe, in sufficient detail for NEPA purposes, the recreation sites to be closed and restored and the site-specific measures for each site. The Initial Plan will form the basis for the proposed action under the USFS NEPA process. The Initial Plan shall be based on a list of up to 38 sites provided by the USFS to SCL that identifies the potential sites to be closed.

The Initial Plan will describe some combination of the following measures to be implemented at each recreation site to be closed:

- Placement of boulders to occupy existing camping and fire ring locations
- Placement of boulders to prevent vehicle access
- Loosening of compacted soils
- Streambank stabilization measures
- Slope grading
- Revegetation with locally derived native trees and shrubs

- One-time suppression of invasive weed species, if feasible[5]
- Removal of fire pits
- Trash removal
- Removing pit toilets
- Public education regarding closure of dispersed sites and locations of new dispersed sites as part of the Multi-Resource I&E program

The Initial Plan shall also include draft biological evaluations or assessments including survey data as required by regulations applicable to habitat or ground-disturbing activities on NFS lands in existence at the time the Plan is prepared. Upon completion of the Initial Plan, SCL shall provide it to the USFS for use in the NEPA process. The USFS will develop for use in the NEPA process a comparable level of information on potential replacement recreation opportunities, including but not limited to new sites and facilities to be opened.

SCL will fund the portion of the USFS NEPA process for the proposed action described in the Initial Plan to close and rehabilitate recreation sites. The NEPA process conducted by the USFS will incorporate all required evaluations and assessments completed by SCL for ground disturbing activities related to closing and rehabilitating recreation sites. Through the NEPA process, the USFS will also evaluate and identify replacement recreation opportunities, including but not limited to new sites and facilities, to help offset the loss of sites along Sullivan Creek.

Following the NEPA decision by the USFS to close and rehabilitate recreation sites and to open replacement recreation opportunities, including but not limited to new sites and facilities within the Sullivan Creek Drainage, SCL will develop a Final Recreation Site Restoration Plan (Final Plan) in consultation with the FAWG and subject to the approval of the USFS and Ecology. Based on the NEPA decision on which sites are to be closed, SCL will develop the site-specific designs for the closure and restoration of recreation sites. These designs will detail the exact methods and measures to be employed for site closure, site restoration, streambank stabilization, and all other activities. The Final Plan shall also contain an implementation schedule detailing the closing of recreation sites and opening of replacement recreation opportunities by the USFS.

SCL's commitment under this measure does not include an obligation to develop replacement recreation sites or for providing amenities, e.g., sanitation facilities, at any replacement recreation sites. Public education regarding closure of dispersed sites and locations of replacement recreation sites will be provided as part of the Multi-Resource Information & Education program (see the RRMP, Exhibit 3 of the Settlement Agreement). Detail regarding compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

Detail regarding procedures, compliance and effectiveness monitoring, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

[5] SCL would, if deemed appropriate and following USFS approval, eradicate invasive weeds existing within a given dispersed recreation site as a one-time measure during the restoration of the site.

The following section, Fund for Habitat Improvements in Tributaries to Sullivan Lake, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

Within one year of license issuance SCL will establish a $2.5 million fund called the Fund for Habitat Improvements in Tributaries to Sullivan Lake (Fund) in an interest bearing account for improving aquatic habitat in Harvey Creek, Noisy Creek, and Jungle Creek. This obligation is a payment obligation and not an obligation for SCL to undertake any particular work. Distributions will be made in installments from the Fund, as determined by the FAWG, for planning and implementation activities. If there are any unexpended funds in the Fund after fund distributions for the measures described above have been completed, SCL will use such unexpended funds for additional habitat improvement in tributaries to Boundary Reservoir, as directed by the FAWG.

The following section, Mill Pond Dam Site Monitoring and Maintenance, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

SCL will monitor the Mill Pond Dam site and maintain the site to remediation design specifications following completion of dam removal and restoration efforts. SCL will monitor the Mill Pond Dam site to assess stream channel, floodplain, and upslope conditions to determine if any structures or plantings fall below the success levels established during implementation planning for the decommissioning of Mill Pond Dam. In consultation with the FAWG, SCL shall adaptively manage the site and adjust stream restoration components to maintain remediation benefits.

As part of the Sullivan Creek Project Application for Surrender of License, the POPUD will implement the Mill Pond Decommissioning Plan, which describes the decommissioning work to be performed at the Mill Pond Dam site. In general, the Mill Pond Decommissioning Plan covers removal and restoration work that will be completed within five years of FERC issuance of a surrender order for the Sullivan Creek Project. Upon FERC's determination that the work required by the Mill Pond Decommissioning Plan has been completed, and FERC's termination of its jurisdiction over the Mill Pond area, SCL shall monitor and maintain the site as described in this measure. See the FAMP (Exhibit 11 of the Settlement Agreement) for greater detail regarding this measure.

Native Trout Conservation

The following section replaces Section 4.5.3.3.12, Tributary Non-native Trout Suppression, of Exhibit E of the License Application (Now referred to as* Tributary Non-native Trout Suppression and Eradication *[Note: the table in the following section is new, i.e., it was not included in Exhibit E.])

SCL will implement non-native trout suppression or eradication activities in portions of 23 waterbodies in the Boundary Reservoir watershed following the schedule identified in Table 2.7-5. Within 12 months of license issuance SCL will submit to FERC an integrated schedule that has been approved by the FAWG for the completion of non-native fish suppression and eradication activities that is coordinated with tributary enhancement activities and native salmonid conservation activities (see below). The integrated schedule will prioritize activities and include milestones for completing design, consultation, regulatory review, permitting, and implementation associated with this measure. The general schedule identified in Table 2.7-5 will guide the specific integrated schedule to be filed with the FERC.

The type of treatment, number of treatment miles, and treatment schedule in Table 2.7-5 identifies the total treatment effort to be expended during implementation of this PM&E measure. Suppression and eradication treatments include associated permitting and monitoring activities. As part of post-license monitoring and adaptive management, SCL, in consultation with and subject to approval by the FAWG, may reallocate suppression and eradication effort provided the total level of effort is commensurate with activities described in Table 2.7-5. The level of effort for suppression may vary among stream reaches but will be consistent with an average of six electrofishing efforts per reach every 10 years from the start of implementation through the remaining term of the license. Each effort will consist of one to three electrofishing passes to be determined during post-license planning and approved by the FAWG. Eradication of non-native salmonids will be consistent with a level of effort associated with three chemical treatment applications assuming the use of antimycin, rotenone, or an equivalent fish toxicant. Detail regarding procedures, compliance and effectiveness monitoring, adaptive management, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

Table 2.7-5. Boundary watershed waterbodies identified for suppression or eradication activities.

Waterbody	Schedule (License Year)	Anticipated Action[1]	Treatment Miles[1]	Comment
Sullivan Cr	1-10	Suppression	15.0	All of mainstem
Outlet Cr	1-10	Suppression	0.5	
NF Sullivan Cr	1-10	Suppression	0.3	To NF Sullivan Dam
Pass Cr	1-10	Suppression	0.5	Lowest reach
Rainy Cr	1-10	Suppression	0.1	
Thor Cr	1-10	Eradication	0.2	Mouth to FS Rd 300
Kinyon Cr	1-10	Suppression	0.2	Mouth to Sullivan Cr Rd
Gypsy Cr	1-10	Suppression	0.1	
Copper Cr	1-10	Suppression	0.1	
Deemer Cr	1-10	Suppression	0.5	
Leola Cr	1-10	Suppression	0.1	

Waterbody	Schedule (License Year)	Anticipated Action[1]	Treatment Miles[1]	Comment
Stony Cr	1-10	Suppression	0.5	
Johns Cr	1-10	Suppression	0.3	
Mankato Cr	1-10	Eradication	0.1	
Fireline Cr	1-10	Eradication	0.1	
Sweet Cr	1-20	Eradication	3.0	All watershed (except Lunch Cr)
Slate Cr	11-15	Suppression	6.5	All of mainstem
Uncas Gulch	11-15	Suppression	2.0	All of tributary
Flume Cr	11-15	Eradication	6.2	All of mainstem
Pewee Cr	16-20	Suppression	1.8	All of watershed
Lime Cr	16-20	Eradication	1.5	All of watershed
Lake Lucerne	16-20	Eradication		
Sand Cr	16-20	Eradication	0.3	Mouth to County Rd 3669
Tier-2 tributaries	20-25	Eradication	See SCL (2009a)[2]	

Notes:

1 At the direction of the FAWG, suppression or eradication treatments may be adjusted as part of post-license monitoring and adaptive management provided the total level of effort is consistent with Table 2.7-5.

2 Tier-2 tributaries are defined as all tributary reaches identified in Relicensing Study 14: Assessment of Factors Affecting Aquatic Productivity in Tributary Habitats (SCL 2009a) that were not categorized as primary restoration opportunities.

The following section replaces Section 4.5.3.3.13, Native Trout Supplementation Facility, of Exhibit E of the License Application (Now referred to as* Native Salmonid Conservation Program*).

SCL will fund the design, construction, and operation, of a fish propagation facility for the production of native salmonids to outplant into tributaries draining into Boundary Reservoir. Implementation planning will be completed within three years of license issuance, and the facility will be operational within six years of license issuance. Facility design and operational protocols are to occur in consultation with and subject to approval by the FAWG and WDFW prior to and during implementation. Facility operations will be conducted by qualified staff either contracted or hired by SCL. Staff qualifications will be developed by SCL in consultation with the FAWG. For a state-owned facility, facility design, staff qualifications, and operational protocols are subject to completion of an operations agreement between SCL and WDFW. SCL will outplant propagated native salmonids to supplement existing populations or to introduce native salmonids into reaches where they are not currently present. Target release sites will include those reaches where non-native trout have been actively suppressed or where underutilized habitat is available in tributaries draining into Boundary Reservoir. Outplanting native salmonids in Boundary Reservoir tributaries is expected to complement non-native trout suppression and stream habitat improvement activities.

The initial capacity for the facility will be up to 45,000 eyed eggs, fry, or fingerling (3-4 inch) fish per year and multiple age-class broodstock (capacity of 1,000-2000 pounds). Annual production will be commensurate with the need to outplant fish in areas where non-native suppression/eradication has occurred in tributaries draining into Boundary Reservoir. The frequency of outplanting and number of fish to be outplanted in each tributary shall be determined based on the specific population goal developed by the appropriate agencies for that

tributary. Any changes to the outplanting schedule will be determined as a result of effectiveness monitoring and adaptive management to be reviewed by the FAWG and subject to approval by WDFW.

SCL will be open to partnering arrangements at no additional expense to SCL, which would allow expansion and/or use of the facility to meet fish propagation needs beyond those of the Project. For any state owned facility, expansion or use of the facility beyond Project needs will be subject to WDFW approval. Expansion of the facility must not infringe upon the needs of the Project, and maximum capacity of an expanded facility will be no more than 20,000 pounds.

The facility will be designed to incorporate techniques to increase fish fitness and survival after release. Design considerations for outdoor rearing facilities will consist of a naturalized, sinuous channel lined with cobble and gravel substrate similar to Boundary Reservoir drainages, feeding system, natural shading, and instream woody habitat. Other design considerations not limited to outdoor rearing will be evaluated in consultation with the FAWG. Predator exclusion and protection systems will be incorporated into the facility. All water supplies will be alarmed. Broodstock holding and spawning facilities will consist of a naturalized pond designed to allow water drawdown and crowding, fish lift, and spawning area. The facility will also include ponds or tanks to hold fish captured during suppression or eradication treatments for re-introduction to target reaches. A propagation building will house administrative offices, an incubation room, and early rearing troughs. A pollution abatement facility incorporating BMPs and All Known and Reasonable Technology (AKART) will be constructed on site. The facility will be designed to produce eyed eggs, alevins, fry, and fingerling-sized fish. The primary mode of distribution of fish is assumed to be fingerlings, but may include stream-side incubators or artificial redds to minimize potential domestication. Broodstock collection activities, appropriate marking of all outplanted fish for the purpose of identification during effectiveness monitoring, and distribution of eggs, fry, and fingerlings will be funded by SCL.

Westslope cutthroat trout will be the initial target species for propagation, but the facility must be designed to propagate bull trout or other native salmonids. The facility will be designed to simultaneously propagate two species of fish and several year classes (life stages); selection of species, stocks, and lifestages to be produced will be determined as part of post-license planning in consultation with and subject to approval by the FAWG and WDFW. In addition, the facility will have the capacity to sustain the necessary numbers of broodstock fish to produce this number of eggs, fry, or fingerlings for the purposes of the native salmonid conservation program. Locally adapted, multiple age-class broodstock will be used to maintain long-term fitness traits, and the facility will be operated to minimize genetic divergence from local, naturally spawning stocks. Detail regarding procedures, compliance monitoring, and reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

Recreational Fishing

The following section, Recreational Fish Stocking Program, is new, i.e., it addresses a measure not included in the Fish and Aquatic Resources Proposed Environmental Measures section of Exhibit E of the License Application.

SCL will stock trout in 18 lakes within a 15-mile area around the Project. Trout species stocked in these lakes will consist of westslope cutthroat trout, rainbow trout, triploid rainbow trout, or tiger trout, and may include fall fry, fingerlings, spring fry, and catchable-size fish. These fish will be annually produced and planted by WDFW; however, fish may be obtained from a commercial production facility if fish are unavailable from WDFW. Approximately 11,678 pounds of fish will be stocked annually, consisting of the species, size, and number of trout shown in Table 2.7-6.

Table 2.7-6. Species, size, and number (by weight) of fish to be stocked annually under the recreational fish stocking program.

Species	Dominant Size Stocked	Pounds
Cutthroat trout	Fall fry	105
	Fingerling	1,744
Rainbow trout	Fall fry	2,660
	Fingerling	625
Rainbow trout (triploid)	Catchable	3,400
	Spring fry	317
Tiger trout	Fingerling	2,827
	Total	11,678

The species stocked annually in these lakes may vary and will depend on whether the lake is a closed system or has connection to a tributary. Lakes to be stocked as part of this PM&E measure are listed in Table 2.7-7. The number, size, and species of fish, planting schedule, and location may be adjusted in consultation with, and will be approved by, WDFW.

SCL will monitor and evaluate lakes receiving the stocked fish prior to the springtime opening day of trout season. The objective will be to annually conduct biological monitoring on a rotating subset of lakes. Site-specific conditions (i.e., lake ice, weather, and road access) may determine monitoring opportunities. At least six of the lakes receiving stocked fish will be monitored each year. Monitoring activities will consist of yearly fall or pre-Opening Day spring index gillnetting to evaluate recruitment of planted trout fry, trout growth rates, relative trout abundance, and detection of illegally introduced and/or undesirable fish species. Net specifications will be consistent with gill nets employed by WDFW regional biologists for index netting on lowland trout lakes. Nets will be set in each lake during the afternoon and retrieved the following morning allowing net soak times of 12-18 hours. Index net sample sites for each lake sampled will be selected in collaboration with WDFW, and the number of sample sites will be dependent on lake surface area as follows:

Surface Area (acres)	No. of nets set
1-24	1
25-149	2
150-349	3
>350	4

All fish captured in gill nets will be identified to species and measured for length and weight. Scales will be collected from trout for age determination.

Table 2.7-7. Name, county, distance from Boundary Reservoir, and surface area (acres) of lakes to be stocked with salmonids to provide recreational fishing opportunities.

Lake	County	Approximate Distance from Boundary Reservoir (miles)	Approximate Surface Area (acres)[1]
Big Meadow Lake	Pend Oreille	7.4	4
Boundary Lake	Pend Oreille	2.1	10
Carls Lake	Pend Oreille	8.3	7
Cedar Lake	Stevens	11.4	6
Crescent Lake	Pend Oreille	1.2	22
South Deception Lake	Pend Oreille	5.0	3.8
Deep Lake	Stevens	9.5	66
Frater Lake	Pend Oreille	9.2	11
Gillette Lake	Stevens	12.8	47
Heritage Lake	Stevens	10.9	71
Lead King Lakes[2]	Pend Oreille	0.9	6.6
Leo Lake	Pend Oreille	9.9	39
Little Lost Lake	Pend Oreille	1.8	6
Nile Lake	Pend Oreille	9.0	23
Sherry Lake	Stevens	13.3	26
Sullivan Lake	Pend Oreille	3.8	1,291
Thomas Lake	Stevens	12.0	163
Yocum Lake	Pend Oreille	11.9	42

Notes:
1 Wolcott (1973)
2 Two neighboring lakes 4.2 and 2.4 acres in size

Opening Day creel censuses will be performed on two lakes per year. Lakes to be creel-sampled will be selected each year in collaboration with the WDFW District 1 Fish Biologist. For each lake sampled, standard WDFW creel sampling protocols will be employed, including standardized angler interviews and angler utilization estimates (fishing pressure counts).

An annual report will be prepared identifying the amount, size, species, timing, and location of stocking efforts and the results of monitoring and evaluation activities. Any modifications to survey timing, location and protocol, and the location and protocol of Opening Day creel census activities will be developed in consultation with and approved by WDFW. Detail regarding procedures, compliance and effectiveness monitoring, and the reporting and implementation schedule, is included in the FAMP (Exhibit 11 of the Settlement Agreement).

2.7.3. Cumulative Effects Analysis

The following section replaces Section 4.5.3.4, Cumulative Effects Analysis, of Exhibit E of the License Application.

The Project is the third of five hydroelectric projects on the Pend Oreille River between Lake Pend Oreille and the Columbia River. Under existing conditions, the Project could contribute to the following cumulative effects:

- Lack of habitat connectivity for native salmonids
- Disruption of sediment transport
- Disruption of LWD transport

Under current conditions, none of the five dams on the Pend Oreille River has upstream or downstream fish passage or screening facilities. Consequently, all fish entrained over or through the projects are at risk of injury or mortality. Because the level of mortality at each of the dams is unknown, the cumulative level of injury or mortality for fish that pass multiple facilities is also unknown. However, some fish do survive passage, as evidenced by the capture and release of healthy fish in the Boundary Dam tailrace that had been tagged upstream of the dam. In addition, genetic analysis of tissue from two bull trout captured in the Boundary Tailrace Reach indicates that these fish were derived from populations in tributaries to Lake Pend Oreille and survived passage at Albeni Falls, Box Canyon, and Boundary dams. Status reviews for bull trout (Rieman and McIntyre 1993) and westslope cutthroat trout (McIntyre and Rieman 1995) identify the lack of habitat connectivity (i.e., upstream and downstream fish passage) as an important factor contributing to the patchy distribution and low viability of these species in the Pend Oreille River.

As described previously, SCL will implement upstream fish passage and fully mitigate for the effects of salmonid entrainment at the Project, thereby eliminating the Project's contribution to adverse cumulative impacts on native salmonids related to habitat connectivity. During the term of the new Project license SCL will install, operate, maintain, and monitor an upstream trap-and haul fishway facility in the Project tailrace to provide safe, timely, and effective passage for bull trout, cutthroat trout, and mountain whitefish in the Project area. SCL will also implement a program over the new license term to fully mitigate for the effects of Project entrainment on bull trout, westslope cutthroat trout, and mountain whitefish by either (1) preventing entrainment at the Project, (2) reducing entrainment at the Project and mitigating for the remaining effects, or (3) fully mitigating for the effects of entrainment through other measures.

The Pend Oreille River between Boundary Dam and Box Canyon Dam has two distinct segments in terms of sediment transport. The section from Boundary Dam upstream to Metaline Falls is a depositional environment created by Project-related inundation. Upstream of Metaline Falls, the Pend Oreille River is at times influenced by a backwater effect from Boundary Dam, but it is often characterized by riverine conditions, particularly when forebay water surface elevations are low or inflows to the Project area from Box Canyon Reservoir are high.

The operation of Box Canyon Dam limits the supply of bed material to the Upper Reservoir Reach to periods when flows exceed 80,000 cfs. At flows above 80,000 cfs, the leaves at Box Canyon Dam are opened, and bed material (primarily coarse gravel) stored behind the dam moves into Boundary Reservoir. The Box Canyon Project can at times reduce coarse sediment supply to Boundary Reservoir if peak flows do not reach 80,000 cfs for an extended period.

The effect of Project operations on sediment transport in the reservoir is negligible. The Project ceases to operate in a load following mode when flows into the reservoir exceed power plant capacity (approximately 56,000 cfs). In general, most sediment is transported by flows approaching or greater than the "channel forming" flow (i.e., the estimated two-year recurrence interval peak flow magnitude is 85,800–107,000 cfs [SCL 1997]), on which the Project has little effect.

The cumulative effect of the dams is to disrupt the transport of coarse sediment, resulting in conditions in the Boundary Dam tailrace that are depleted of gravel suitable for spawning by some fish species. Of the native salmonids in the Project area, mountain whitefish appear to spawn in the 1-mile reach downstream of Box Canyon Dam and stage in the Boundary Dam tailrace prior to spawning farther downstream in Seven Mile Reservoir. In both of these areas, mountain whitefish spawning habitat could be adversely affected by the disruption of gravel-sized particles suitable for spawning. However, as described previously, SCL will deposit 1,500 cubic yards of screened gravel between PRM 29.1 and Box Canyon Dam to increase potential mountain whitefish spawning habitat, thereby lessening the Project's contribution to any cumulative effects. Up to 25 percent of the gravel will be replenished every five years. To increase gravel retention, SCL will install up to 189 tons of 3-4 foot diameter boulders in weirs or other structures, and up to 25 percent of the boulders will be replenished every ten years as needed to maintain gravel retention.

LWD is collected in the forebays of all dams on the Pend Oreille River to protect project facilities. The effect of this removal on the LWD budget of the river has not been quantified, but there is a cumulative loss of LWD that could otherwise provide aquatic habitat along the shoreline or at islands and cobble bars. However, as described previously, SCL will place and maintain LWD jams in the delta regions of Sullivan, Sweet, Slate, and Linton creeks to provide cover for salmonids occupying coldwater refugia at the mouths of these tributaries. LWD jams will be located in the upper ends of tributary deltas to minimize use by non-salmonids. This measure will to some extent offset any adverse effects resulting from disruption of LWD transport.

As part of the Sullivan Creek Project Application for Surrender of License, POPUD will remove Mill Pond Dam, manage sediment, and implement site restoration measures at the Mill Pond site and install a cold water release facility in Sullivan Lake. These measures will increase the extent of habitat connectivity for native salmonids and improve aquatic habitat and water quality in Sullivan Creek, the largest tributary to Boundary Reservoir. Pursuant to off-license agreements between SCL and POPUD, SCL will serve as contractor for the PUD for purposes of this work at the Mill Pond site and will provide financial support for the design, construction, operation, monitoring, and maintenance of the cold water release facility.

2.7.4. Unavoidable Adverse Impacts

The following section replaces Section 4.5.3.4, Unavoidable Adverse Impacts, of Exhibit E of the License Application.

Some potential effects of the Project are unavoidable or cannot be completely mitigated by proposed in-kind mitigation measures, and consequently, a number of out-of-kind mitigation measures are proposed for tributaries draining into Boundary Reservoir to provide complete mitigation. Unavoidable or partially mitigated potential adverse impacts to aquatic resources include:

- Reduced productivity in near-shore areas due to fluctuating water surface elevation, to the extent fluctuation is caused by Project operations
- Disruption of sediment transport
- Disruption of LWD transport
- Trapping and stranding of fish and other aquatic organisms due to fluctuating water surface elevation, to the extent fluctuation is caused by Project operations
- Fluctuations in aquatic habitat and thermal plume characteristics in tributary delta regions, to the extent fluctuation is caused by Project operations

All of the unavoidable adverse impacts identified above are long-term and would occur throughout the term of the new license. The magnitude of these effects on native salmonids is difficult to evaluate because few native salmonids reside in Boundary Reservoir and many out-of-Project factors also affect native salmonid population abundance.

As discussed above, disruption of sediment and LWD transport are caused by the existence and operation of dams on the Pend Oreille River and are, therefore, cumulative in nature. Gravel augmentation will be implemented between PRM 29.1 and Box Canyon Dam to increase potential mountain whitefish spawning habitat, and LWD jams will be placed in the deltas of Sullivan, Sweet, Slate, and Linton creeks to provide cover for salmonids occupying the mouths of these tributaries. These measures will reduce the Project's contribution to any adverse effects related to the disruption of sediment and LWD transport.

Trapping and stranding of fish and fluctuations in aquatic habitat and thermal plume characteristics are site-specific and occur episodically. Trapping and stranding impacts are largest during large drawdowns that occur infrequently. As described above, SCL will excavate a channel to connect mainstem flow to several isolated pools at a large cobble bar near PRM 30.3 to reduce the risk of fish becoming trapped during periods of declining water surface elevation. In addition, bottom barriers will be installed at select locations to suppress invasive macrophyte abundance, thereby reducing the risk of macrophyte-related stranding and trapping at these locations.

Thermal plume characteristics are important primarily during summer when mainstem water temperatures exceed 18 ˚C. Although some thermal plumes are generally available to fish seeking cool water, load following operations result in continuous changes to the shape and location of the thermal plumes, which means fish must frequently adjust their locations to remain

in desirable thermal conditions. For native salmonids, particularly bull trout, which prefer relatively low temperatures, these effects could be substantial, to the extent that these species occur in the Project area. Because no bull trout were captured, resulting in no biotelemetry being conducted for this species during relicensing studies, the magnitude of these effects on both a short-term basis and on the overall status of bull trout in Boundary Reservoir is uncertain.

2.8. Botanical Resources (Section 4.5.4 of Exhibit E)

2.8.1. Proposed Environmental Measures

The following section replaces Section 4.5.4.3, Proposed Environmental Measures, of Exhibit E of the License Application.

A number of environmental measures related to botanical resources will be implemented, in consultation with the TRWG and with the approval of the USFS and Ecology, as described in the TRMP (Exhibit 2 of the Settlement Agreement). Elements of the TRMP that apply to botanical resources include an Integrated Weed Management Plan (IWMP) and a RTE plant monitoring program. The IWMP and RTE plant programs include monitoring and reporting at regular intervals. The TRMP also provides for BMPs and a worker education program related to operation and maintenance of Project facilities, which will ensure that activities are conducted in a way that protects, maintains, and enhances RTE plants on Project lands and reduces the establishment and spread of weeds.

Four other SCL-owned parcels that currently reside outside the Project boundary will be brought into the boundary and managed for the benefit of botanical resources, per the prescriptions and programs described in the TRMP: the BWP Addition (89 acres), the portion of the Tailrace East parcel not currently included in the boundary (86.9 acres), the portion of the Everett Creek parcel not currently included in the boundary (82.7 acres), and the portion of the Sullivan Creek parcel not currently included in the boundary (17.7 acres). SCL has also agreed to purchase additional property, with a target area of approximately 158 acres and approximately 13,022 lineal feet of land immediately adjacent to water. All of these lands will be managed under the TRMP to protect RTE plant populations from the effects of Project-related recreation and to control select noxious weed species.

2.9. Wildlife Resources (Section 4.5.5 of Exhibit E)

2.9.1. Proposed Environmental Measures

The following section replaces Section 4.5.5.3, Proposed Environmental Measures, of Exhibit E of the License Application.

Proposed mitigation measures for wildlife resources are focused on the 748.7 acres of land that will be managed as Project habitat lands (472.4 acres of land currently in the Project boundary and 276.3 acres proposed for addition) and are described in the TRMP (Exhibit 2 of the Settlement Agreement). Specific measures include monitoring bald eagles, peregrine falcons, and bank swallows; enhancing habitat on select SCL-owned parcels; implementing BMPs and a worker education program to minimize Project-related human disturbances and other Project-

related effects on wildlife and habitats; and adaptive management to address ongoing resource needs. In addition, the TRMP includes a provision for developing a monitoring plan for RTE wildlife species, such as wolves, if a substantial increase in their use of the Project area is detected. All efforts will be implemented in consultation with the TRWG and with the approval of the USFS and Ecology. Regular meetings and reporting will occur throughout the license term.

The 276.3 acres to be brought into the Project area and managed for the benefit of wildlife and their habitats include the following SCL-owned parcels: the BWP Addition (89 acres), the portion of the Tailrace East parcel not currently included in the boundary (86.9 acres), the portion of the Everett Creek parcel not currently included in the boundary (82.7 acres), and the portion of the Sullivan Creek parcel not currently included in the boundary (17.7 acres). With the exception of Sullivan Creek, all of these parcels border land in federal ownership and thus create relatively large blocks of protected wildlife habitat that are connected to the reservoir. SCL will also purchase additional habitat lands, with a target area of approximately 158 acres and approximately 13,022 lineal feet of property immediately adjacent to water. Enhancement measures to be applied to these lands will be developed once this property is purchased and evaluated for wildlife values.

2.10. Threatened and Endangered Species (Section 4.5.6 of Exhibit E)

2.10.1. Proposed Environmental Measures

The following section replaces Section 4.5.6.3.1, Proposed Environmental Measures - Terrestrial Species, of Exhibit E of the License Application.

The addition of 276.3 acres of SCL-owned land to the Project boundary to be managed for wildlife increases the amount of protected habitat in the Pend Oreille drainage for terrestrial, federally-listed Threatened and Endangered species. With the exception of Sullivan Creek, all of these parcels border land in federal ownership and thus create relatively large blocks of protected habitat that are connected to the reservoir. SCL will also purchase additional habitat lands, with a target area of approximately 158 acres and approximately 13,022 lineal feet of property immediately adjacent to water.

Proposed mitigation measures that will benefit terrestrial, federally-listed Threatened and Endangered species are addressed in the TRMP (Exhibit 2 of the Settlement Agreement). If a listed species significantly increases its presence in the Project area during the term of the new license, SCL, in consultation with the TRWG and with the approval of the USFS and Ecology, will consider whether measures are necessary to protect those species. Other aspects of the TRMP that will benefit federally listed species include BMPs for Project operations and maintenance activities and enhancement prescriptions for the 748.7 acres of Project habitat lands.

The following section replaces Section 4.5.6.3.2, Proposed Environmental Measures - Aquatic Species, of Exhibit E of the License Application.

Bull trout could potentially benefit from the proposed environmental measures listed below. Greater detail regarding the effects of these measures is provided in Section 2.7 of this addendum and in the FAMP (Exhibit 11 of the Settlement Agreement):

- Gravel Augmentation below Box Canyon Dam (increases in mountain whitefish abundance resulting from spawning gravel augmentation could enhance the potential prey base for bull trout)
- Channel Modifications of Mainstem Trapping Pools at PRM 30.3
- Upstream Fish Passage
- Reduction of Project Related Entrainment Mortality
- Mainstem Large Woody Debris at Tributary Deltas
- Boundary Reservoir Fish Community Monitoring and Evaluation of Salmonid Predation at Select Tributary Deltas (information gathered from these studies could help guide bull trout management in the future)
- Riparian Improvement, and Stream Channel Enhancement in Sullivan Creek RM 0.30 to RM 0.54
- Stream and Riparian Improvements in Sullivan Creek RM 2.3 to RM 3.0 and North Fork Sullivan Creek
- LWD Placement and Road Improvements in Sullivan Creek and Selected Tributaries Upstream of the Confluence with Outlet Creek
- Culvert Replacements and LWD placement in Tributaries to Boundary Reservoir
- Riparian Planting, Culvert Replacement, and Channel Reconstruction in Linton Creek RM 0.0 to RM 0.24
- Riparian and Channel Improvements in Sweet Creek RM 0.0 to RM 0.6
- Habitat Improvement in Tier-2 Tributaries to Boundary Reservoir
- Restoration of Dispersed Recreation Sites Located in Sullivan Creek Riparian Areas
- Tributary Non-native Trout Suppression and Eradication
- Native Salmonid Conservation Program
- Bottom barriers to suppress invasive macrophyte abundance in select locations where macrophytes contribute to fish stranding and trapping
- Formalization of summer restrictions on water surface elevation fluctuations
- TDG abatement measures

2.11. Recreation and Land Use (Section 4.5.9 of Exhibit E)

2.11.1. Proposed Environmental Measures

The following section replaces Section 4.5.9.3.1, Recreation (Proposed Environmental Measures), of Exhibit E of the License Application.

The RRMP (Exhibit 3 of the Settlement Agreement) describes all applicable Project-related recreation measures and contains several management programs that will help guide SCL's recreation-related decision-making during the new license term. The RRMP includes Capital Facility Development, Operations and Maintenance, Shoreline Dispersed Recreation Management, Travel and Public Access Management, Recreation Monitoring, and Multi-Resource I&E programs. Each of these programs includes a set of appropriate measures, as described below, as well as implementation plans, a schedule, and budget guidance. The RRMP also includes general goals, objectives, resource integration and coordination guidance, Recreation Opportunity Spectrum (ROS)-type land management classifications, and other appropriate management considerations for recreation at the Project under the new license.

The following section replaces the Capital Facility Development Measures subsection of Section 4.5.9.3.1, Recreation (Proposed Environmental Measures), of Exhibit E of the License Application.

Specific measures included in the Capital Facility Development Program are listed below. Any proposed new facilities or modifications to existing facilities will be subject to FERC review and approval. The Capital Facility Development Measures will accommodate ADA regulations and guidance, general aesthetic/visual design guidelines, and an appropriate development scale level (that establishes the extent of development) to guide the design, construction, and management of Project recreation sites and facilities. Related to ADA regulations and guidance, FERC encourages "Universal Design" and "Universal Access" at licensed-hydroelectric projects. Universal design refers to sites, facilities, and other features that are usable for all people, not just those with disabilities. SCL will consider universal design during the design phase for recreation capital improvements, but will generally rely on ADA accessibility guidelines to help foster consistency between Project recreation sites located on federal and SCL-managed Project lands.

The following capital facility measures are included in the RRMP (Exhibit 3 of the Settlement Agreement):

- Forebay Recreation Area
    - Enhance campground facilities at this site: increase the number of designated RV and tent campsites (phased - up to approximately 24 total), better delineate campsites, provide appropriate signage, use vegetation and/or other site features (e.g., rocks) to create separation between campsites and day use picnic sites, and limit vehicle access to roads and parking areas
    - Enhance day use picnic sites with signage, improved access, and separation from campsites

  - Provide additional I&E signage and/or other visitor I&E opportunities (see I&E Program)
  - Extend an existing boat ramp lane so that boats may be launched/retrieved during the primary recreation season (Memorial Day weekend to Labor Day weekend) without problems due to fluctuating reservoir water surface elevations. Provide adequate parking, signage, and circulation at the boat launch
  - Provide for a sluice maintenance gate area to be used approximately every 10 years, as needed
  - Incorporate ADA enhancements into the design
- Vista House Recreation Area
  - Add I&E signage and/or other opportunities at the overlook platform
  - Incorporate ADA enhancements into the design
- Tailrace Recreation Area/Machine Hall Visitors' Gallery
  - Update I&E signage, displays and visitor opportunities at the Machine Hall Visitors' Gallery (see I&E Program) (the extent of upgrades at this site needs to be consistent with the level of anticipated use; security restrictions contribute to low use levels)
  - Incorporate ADA enhancements into the design
- Peewee Falls Viewpoint and Trail
  - Extend existing FS road (FS Road 316-5-315) as needed and develop a new trailhead at the end of that road, accessible trail, and accessible viewpoint of Peewee Falls
  - Develop appropriate support facilities, including parking, vault toilet, and signage
  - Incorporate ADA enhancements into the design
- Riverside Mine Canyon Viewpoint and Trail
  - Develop a new accesible trail and trailhead in the vicinity of the Riverside Mine to a viewpoint of the canyon; trail alignment to take advantage of the existing NFS road network in this area (specifically FS Road 310-0172 and 3100-178)
  - Develop trail and appropriate support facilities, including parking, vault toilet, and signage
- Eastside Trail
  - Construct an Eastside Trail (to USFS standards) that connects the Peewee Falls and Riverside Mine Canyon viewpoints; trail to be semi-primitive and non-motorized

- Metaline Falls Portage Trail
    - Develop a new portage trail in the vicinity of the falls to provide non-motorized boaters an alternative to avoiding or running the rapids at the falls under certain natural flow and Project operational conditions[6]
    - Construct a non-motorized boat access at the northern terminus of the portage trail; non-motorized boat access to inlcude parking, appropriate signage, and restrooms[7]
    - Provide I&E signage
- Metaline Waterfront Park Boat Launch
    - Replace existing boat launch and extend a boat ramp lane so that boats may be launched/ retrieved during the primary recreation season (Memorial Day weekend to Labor Day weekend) without problems due to fluctuating reservoir water surface elevations
    - Provide adequate roadway access to the boat ramp, improved circulation and parking for single vehicles and vehicles with trailers, and other boat launch support facilities (e.g., signage, dock, and boarding float)
    - Provide an accessible restroom in the vicinity of the boat launch parking area (may be dual vault toilets or may potentially combine this new facility with an upgraded park restroom facility, location to be determined)
    - Incorporate ADA enhancements into the design
- Future repair and/or replacement of existing recreation sites
    - Replace and/or repair recreation site facilities, infrastructure, and amenities, as needed, based on monitoring facility conditions and normal facility life cycles during the new license term
    - If needed, consider additional recreation capital facility development based on periodic monitoring during the new license term (see RRMP Monitoring Program)

The following section replaces the Programmatic and O&M Measures subsection of Section 4.5.9.3.1, Recreation (Proposed Environmental Measures), of Exhibit E of the License Application.

- Operations and Maintenance (O&M) Program
    - Develop an O&M Program for SCL-managed recreation sites and use areas
    - Provide annual maintenance at the boat launch at the Town of Metaline Waterfront Park

[6] Subject to acquiring necessary property rights and any applicable agency approvals; in the event that acquisition of the necessary property rights cannot be achieved, SCL, in consultation with the RRWG, shall identify and implement the appropriate next best option for providing a portage trail at the falls.

[7] Subject to acquiring necessary property rights and any applicable agency approvals; in the event that acquisition of the necessary property rights cannot be achieved, SCL, in consultation with the RRWG, shall identify and implement the appropriate next best option for providing a non-motorized boat access point.

  - Provide appropriate O&M of Project-related recreation sites and use areas
  - Periodically re-assess public access/security policies at the Tailrace Recreation Area and Machine Hall Visitors' Gallery; assessments to include a review of safety and security related to a potential portage opportunity around Boundary Dam (to help facilitate a regional water trail); if feasible, the portage opportunity would provide a connection between Boundary Reservoir (at the Forebay Recreation Area) and the Pend Oreille River below Boundary Dam (at the Tailrace Recreation Area)

- Shoreline Dispersed Recreation Management Program
  - Develop a Shoreline Dispersed Recreation Management Program to guide development and management of shoreline dispersed recreation sites and use areas
  - Incorporate 16 existing shoreline sites into the management program by establishing appropriate development levels and management direction for dispersed shoreline recreation sites
- Recreation Monitoring Program
  - Develop and implement a periodic Recreation Monitoring Program with facility and visitor management actions and triggers
  - To facilitate annual monitoring tasks, SCL will fund a seasonal (Memorial Day through Labor Day) River Ranger, to observe and record resource conditions along the Boundary Reservoir shoreline, including at designated dispersed shoreline recreation sites.
- Multi-Resource Interpretation and Education (I&E) Program
  - Develop a comprehensive Multi-Resource I&E Program that establishes themes, messages, and media that would be considered at recreation sites throughout the Project; address all Project resources in one integrated multi-resource I&E Program: i.e., recreation, aesthetics, geology, engineering, scenic byway, fisheries/aquatics/water resource, cultural/historic, and terrestrial resources
  - Coordinate the Multi-Resource I&E Program with the Pend Oreille River Water Trail Planning Group; the focus of SCL's Multi-Resource I&E Program will be on Project resources but may also include information that is consistent with broader water trail interpretive and educational goals and objectives.
  - Communicate to the public the seasonal changes in flows, spring runoff conditions, and Project operations that may affect conditions at the falls north of the Highway 31 bridge as well as issues related to fluctuating reservoir water surface elevation

The following section replaces Section 4.5.9.3.2, Land Use and Roads (Proposed Environmental Measures), of Exhibit E of the License Application.

As it relates to land use and roads, the key activity proposed under Exhibit E is the incorporation of certain roads and use areas into the Project boundary. As such, SCL is proposing to expand the existing Project boundary to include features used for Project purposes but not currently included in the boundary. Exhibit G of this License Application (as revised March 2010) explains in greater detail the specifics of the proposed Project boundary expansion and the rationale for the proposal.

There are two categories of proposed Project boundary changes: (1) items being proposed now for inclusion in the Project boundary, with the proposed change delineated on Exhibit G maps (as revised March 2010) and (2) items for which there is currently insufficient detail to propose a specific change, but which have been identified by SCL as activities for which the Project boundary will be modified in the future as appropriate; most of these are shown as "approximate" locations on the Exhibit G Addendum maps, but there is no associated, specific proposed Project boundary change. Both categories are identified and explained in the Exhibit G Addendum. The following text identifies the items that fall into these two categories:

Currently, SCL proposes to expand the Project boundary to include the following features:

- Operations and Maintenance Support Area
- BWP and adjacent 89-acre parcel (BWP Addition)
- The portions of the Tailrace East, Everett Creek, and Sullivan Creek parcels that currently reside outside the Project boundary
- Metaline Falls Portage Trail
- Roads (all existing roads used exclusively or primarily for Project purposes)
    - West Side Access Road (portion not already in the boundary)
    - Operations and Maintenance Support Area road network
    - Bonneville Power Administration (BPA) substation road
    - Spur off of BPA substation road (portion not already in the boundary)
    - South end of Forest Road (FR) 6200-348 (portion not already in the boundary)
    - FR 3165-350 (small portion not already in the boundary)
    - FR 3100-325 (for East Peewee Falls Trail and Viewpoint)
    - FR 3100-315 (for East Peewee Falls Trail and Viewpoint)
    - FR 3100-172 (for Riverside Mine Canyon Overlook)
    - FR 3100-178 (for Riverside Mine Canyon Overlook)

SCL is not proposing at this time to include the items listed below in the Project boundary because plans are not sufficiently developed to define the location/boundary (see Exhibit G Addendum for approximate locations). At such time as these measures are approved and their specific locations determined, they will be proposed for inclusion in the Project boundary.

- The additional approximately 158-acres of Project Habitat Lands (PHLs) that SCL has agreed to purchase (or some portion thereof)
- East Peewee Falls Viewpoint and Trail

- Eastside Trail
- Riverside Mine Canyon Overlook
- Additional land in the area of the Metaline Waterfront Park Boat Launch
- Wolf Creek dispersed recreation site
- Dispersed recreation site #15
- Mouth of Sweet Creek for tributary fish habitat restoration
- LWD placement in tributary deltas

SCL is also proposing to re-establish the 200-foot no-mining buffer in locations in the lower reservoir where the current Project Boundary is either less than or more than 200 feet from the line of ordinary high water.

Finally, SCL is proposing to revise the Project boundary in the vicinity of the POPUD Campbell Park boat ramp and downstream end of the Box Canyon Project boundary, where the recently revised FERC boundary for the Box Canyon Project overlaps with the current FERC boundary for the Project. SCL proposes to revise the Project boundary in this area to align with the Box Canyon Project boundary, thereby eliminating the overlap. Following issuance of the new Project license, SCL will consult with FERC to finalize necessary revisions to the Project boundary.

The TRMP (Exhibit 2 of the Settlement Agreement) contains a Shoreline Management Program that, consistent with FERC guidelines, identifies appropriate shoreline land uses to minimize potential environmental effects on sensitive plant and wildlife species and habitat and to protect and enhance the Project shoreline. It also recommends managing and coordinating private and public (non-federal) shoreline development permitting within the Project boundary. Finally, the Shoreline Management Program outlines protocol for managing debris accumulation and removal along the Project shoreline, particularly following spring runoff.

SCL has coordinated with the USFS regarding the decommissioning of various forest roads previously used by SCL to access groundwater monitoring wells installed by SCL but no longer needed (Monitoring Well and Road Decommissioning Plan, Exhibit 4 of the Settlement Agreement). Regarding ongoing maintenance of roads used for Project purposes, SCL will be fully responsible for maintenance of roads located on SCL-owned property. For roads located on NFS or other federal lands that are used exclusively or primarily for Project-related purposes, Table E.4-47 (as revised in this addendum) outlines SCL's proposal for maintenance of such roads (See also Exhibit 12, USDA Forest Service Draft Preliminary FPA Section 4(e) Terms and Conditions, of the Settlement Agreement).

The following table replaces Table E.4-47, Maintenance responsibility for Project-related roads, in Exhibit E of the License Application.

Table E.4-47. Authorization and responsibility for roads needed for Boundary Project operation and maintenance.

Road Name/Number	Access Points	Authorization Across FS Land	SCL Maintenance/Reconstruction Responsibility
West Side Access Road	Main access road from Pend Oreille Co. Rd. 2975 to Boundary Dam	Use of this road segment shall be authorized by including the segment within the Project boundary or by issuance of a permit by USDA Forest Service for segments not included within the Project boundary.	SCL to maintain for Project and public access. To be maintained to Maintenance Level 5.
FS 6200348	Access to main transmission line towers between Boundary Dam and BPA yard.	Use of this road segment shall be authorized by including the segment within the Project boundary or by issuance of a permit by USDA Forest Service for segments not included within the Project boundary.	Share by first use.[1] To be maintained to Maintenance Level 2.
FS 3165000/ Pend Oreille Co. Rd. 3990	Main access route between State Route 31 and the east side of Boundary Dam and the Vista House	SCL shall be authorized to use, maintain and reconstruct this road across National Forest System lands by issuance of a permit by USDA Forest Service or through a grant of a Public Road Easement to Pend Oreille County.	To be maintained to Maintenance Level 5.
FS 3165350	Road across dam, connecting Pend Oreille Co. Rd. 3990 with the West Side Access Road	Use of this road segment shall be authorized by including the segment within the Project boundary or by issuance of a permit by USDA Forest Service for segments not included within the Project boundary.	SCL to maintain for project operation and maintenance use. To be maintained to Maintenance Level 2.
FS 3100172	Access to Riverside Mine reservoir overlook from SR 31 to junction with FS 3100178 and trailhead	Use of this road segment shall be authorized by including the segment within the Project boundary or by issuance of a permit t by USDA Forest Service for segments not included within the Project boundary.	SCL to reconstruct and maintain for public access. To be maintained to Maintenance Level 3.
FS 3165325	Access to Pee Wee Falls overlook from POC 3990/FS 3165000 to junction	Use of this road segment shall be authorized by including the segment within the Project boundary or by issuance of a	SCL to reconstruct and maintain for public access. To be maintained to Maintenance Level 3.

Road Name/Number	Access Points	Authorization Across FS Land	SCL Maintenance/Reconstruction Responsibility
	with FS 3165315	permit by USDA Forest Service for segments not included within the Project boundary.	
FS 3165315	Access to Pee Wee Falls overlook from FS 3165325 to trailhead	Use of this road segment shall be authorized by including the segment within the Project boundary or by issuance of a permit by USDA Forest Service for segments not included within the Project boundary.	SCL to reconstruct the existing segment of road and construct an extension of this road (if needed) to a proposed trailhead and maintain for public access. To be maintained to Maintenance Level 3.
FS 3165340	Road accessing up stream dam deflection monitoring point off of Pend Oreille Co. Rd. 3990/FS 3165000	Access shall be approved by USFS as described in USFS Condition 4 (Implementation of the License on National Forest System Lands).	SCL to close with an earthen-berm after the unauthorized road segment is decommissioned.
Unauthorized Road off FS 3165340	Road accessing up stream dam deflection monitoring point off of the 3165340 Road	Access shall be approved by USFS as described in USFS Condition 4 (Implementation of the License on National Forest System Lands)	SCL to decommission road and stabilize the 2 mass wasting sites.

Note:

1 Share the road maintenance and reconstruction based on who needs the road first. When the road is needed, the organization that needs the road first will perform the maintenance and reconstruction needed to accommodate their use. If the road is currently closed, once the road is no longer needed, it will be reclosed and maintained to a USDA Forest Service maintenance level 1 configuration.

2.12. Socioeconomics Resources (Section 4.5.10 of Exhibit E)

The following section replaces Section 4.5.10.2.2, Power plant equipment upgrades, other improvements, and maintenance activities, of Exhibit E of the License Application.

Over the course of the new license, SCL will perform numerous capital improvement projects (both major and minor) as well as ongoing and periodic O&M activities. Some of these activities and projects have been tentatively scheduled and budgeted, whereas others would occur on an as-needed basis over the course of the new license. These are summarized in Section 2.1 (Proposed Power Plant Equipment Upgrades) of this addendum; the anticipated socioeconomic impacts associated with these capital improvement and O&M projects are summarized below.

Planned, scheduled, and budgeted major CIPs include the rebuilding of and runner replacement for the generating units, rock damage mitigation for the transformer banks, forebay wall hardening, and other replacement projects. These are currently scheduled to occur over the course of the new license, with scheduled dates ranging from 2011 to 2059. The total costs associated with the major CIPs are estimated at approximately $365 million in 2009 dollars over

the course of the new license (see Table D.4-1 in Exhibit D of this License Application, as revised March 2010).

Planned minor CIPs over the course of the new license include (but are not limited to) the following types of projects: continued structural improvement of the facilities and the grounds; control and network improvements; continued forebay stabilization efforts (and associated dredging); replacement of IT and security systems; groundwater control in power plant and dam; refurbishing buildings and improvements to service, recreation and tourism areas; dam safety instrumentation upgrades and new installations; generator operational improvements; gate upgrades; safety projects; sump and other containment improvements; well decommissioning, service water piping replacement; lighting systems; protective relaying; shaft seal replacements; draft tube discharge improvements; high-voltage breaker and switchgear replacements; infrastructure improvements; and communication projects. The estimated annual budget for the minor CIPs is $11.4 million (see Table D.4-1 in Exhibit D of the License Application, as revised March 2010).

In addition to the CIPs, operation of the Project includes ongoing and periodic O&M activities. Anticipated O&M projects include (but are not limited to) the replacement of turbine bearings, transmission conductors, and domestic water system; refurbishment of the draft tube, spill gate, trash rack, and head gate; sluice gate refurbishment and maintenance; and road resurfacing. Like the CIPs, these O&M projects are scheduled periodically over the course of the new license. The estimated budget for the O&M projects (over the course of the new license) is approximately $29 million.

The majority of these CIP and O&M projects will be performed by existing SCL fulltime staff with specialized experience in maintaining hydroelectric facilities. Similarly, the specialized industrial equipment necessary to implement the projects requires custom fabrication, most of which would occur outside the Project vicinity. To a certain extent, however, the substantial costs and expenditures associated with these projects (more than $394 million in major CIP and O&M projects over the new license term, and $11.4 million annually in minor CIPs) would represent the potential for beneficial socioeconomic impacts in the Project vicinity, as a certain amount of goods and services would be procured locally, as would potential equipment rental. Short-term local laborers also could be involved, in particular for some of the O&M projects. In addition, the influx of SCL work crews into the Project vicinity to accomplish the work represents a positive impact in the form of expenditures on local goods and services and for short-term housing (for some of the projects that require longer term construction). These impacts have not been quantified but would be beneficial to the local communities.

The following section replaces Section 4.5.10.2.3, PM&E Measures related to recreation resources, of Exhibit E of the License Application.

Recreation use and activities in the Project area contribute substantially to socioeconomic benefits. SCL's proposed recreation-related PM&E measures may result in benefits to the economy of Pend Oreille County and in particular the towns of Metaline, Metaline Falls, and Ione. There are two primary methods by which the recreation-related PM&E measures may contribute to the local economy: (1) construction and O&M-related expenditures by SCL to

construct and maintain Project recreation facilities and (2) visitors' expenditures on products and services.

SCL proposes to improve facilities at its existing recreation sites (Vista House, Tailrace, and Forebay recreation areas), construct new improvements at several new sites (Peewee Falls Viewpoint and Trail, Metaline Falls Portage Trail, Metaline Waterfront Park Boat Launch, Riverside Mine Canyon Viewpoint and Trail, Eastside Trail, and six dispersed shoreline sites), and maintain these sites during the term of the new FERC license. The recreation capital improvements are proposed during the first 10 years of the new license and are estimated to cost approximately $7.1 million (including design and permitting costs; see Exhibit D, Table D.4-1, as revised March 2010). Assuming local construction firms are available and able to complete the recreation construction projects, these Project-related capital improvements would result in direct economic benefits, potentially including jobs, to Pend Oreille County during the first 10 years of the new license.

After the initial recreation construction projects are completed, SCL proposes to maintain the Project-related recreation sites and facilities during the new license term. SCL staff currently performs all O&M activities at Project recreation sites. During the new license term, SCL may opt to contract O&M responsibilities or hire new staff for this purpose. Either of these options would likely result in minor benefits to the local economy. In the long term, recreation sites and facilities typically need to be replaced periodically due to normal wear-and-tear. Over the term of the new license, it is estimated that recreation site and facility replacement costs will be between $2 million and $3 million. As with the initial recreation-related construction costs, the replacement of recreation sites and facilities may periodically benefit the local economy (again, assuming local firms are available and able to perform this type of work).

Recreation, specifically destination and nature/setting-based outdoor recreation, often has a positive economic impact on surrounding communities. Typically, visitors to a recreation area (from outside the identified area) spend money on products and services in the region. One of the challenges at the Project in terms of recreation expenditures is the short primary season (assumed to be late May through early September). In recognition of this peak season, SCL maintains forebay water surface elevations at levels conducive to recreation from Memorial Day weekend through Labor Day weekend. Because the primary season is short (approximately 100 days), the potential for year-round economic benefits from recreation is limited. Nonetheless, during the primary recreation season, visitors do spend money in the Project region, particularly in the local communities of Metaline, Metaline Falls, and Ione.

The Recreation Resource Study Final Report (SCL 2009a) includes a trip expenses component in the visitor survey. Visitors were asked to estimate how much money they had spent in Pend Oreille County during their trip to the Project. Table E.4-48 provides an overview of mean expenditures for several goods or services available in the Project region. In general, visitors spent the most money on lodging and groceries (based on average expenditures). However, the percentage of visitors who spent money on specific goods or services varied greatly, from as much as 73.3 percent of visitors who spent money on gasoline to as little as 2.4 percent of visitors who rented boats or RVs (Table E.4-48).

Current recreational use at the Project is estimated to be about 15,000 recreation days (RDs) annually (one RD is defined as a visit by a person to a recreation area for any length of time during a 24-hour period). RDs do not correspond to the number of visitors, so estimating direct economic impacts based on RDs is difficult. Assuming that visitors from outside Pend Oreille County reflect approximately 50 percent of current recreation use (approximately 7,500 recreation days) and that these visitors averaged three nights in the Project vicinity (per Recreation Resource Study results), then the estimated number of visitors (not including area residents) would be approximately 2,500 (7,500/3 recreation days). Given an estimate of 2,500 visitors and the percentages of visitors reporting specific expenditures (Table E.4-48), it is evident that certain Project-related recreation expenditures (e.g., gasoline, groceries) likely result in moderate economic benefit to Pend Oreille County, while other expenditures (e.g., recreation services, rental of boats/RVs, etc.) offer only modest benefits to the local economy.

Although the Recreation Resource Study limited its visitation projections to a 30-year timeframe (SCL 2009a), it is anticipated that recreation use at the Project will continue to increase at a similar rate throughout a 50-year license term (Cordell 2004). Because recreational use at the Project is anticipated to increase approximately 1 percent per year during the first 30 years of the new license, to about 19,500 RDs (SCL 2009a), it can reasonably be assumed that this annual level of increase will continue through a 50-year timeframe. Under this assumption, recreational use would account for approximately 22,500 RDs in 50 years.

Table E.4-48. Mean recreation-related expenditures in the Project region.

Type of Expenditure	Percentage of Visitors Reporting Expense	Mean Expenditure
Gasoline	73.3	$79.86
Groceries	69.6	$91.52
Eating and drinking establishments	45.5	$64.22
Hunting/fishing supplies	21.1	$42.34
Shopping/souvenirs	14.0	$77.27
Camping	12.3	$77.85
Lodging	10.8	$136.58
Other	5.8	$55.33
Recreation services, guided tours	3.2	$43.87
Rental of boats/RVs	2.4	$71.82

Source: Recreation Resource Study Final Report (SCL 2009a).

Again, assuming current use levels reflect approximately 2,500 visitors from outside of Pend Oreille County, a 50 percent increase over the next 50 years would result in about 1,250 more visitors (from outside of Pend Oreille County) to the Project annually. As with current expenditures, these new visitors likely would spend more on some goods and services than on others, thereby resulting in a range of potential economic benefits to the local economy. Note: both the 30- and 50-year visitation projections are based on the best available data and information at the time of relicensing. In the future, many factors will affect demand for and

participation in outdoor recreation activities, including population, age, demographics, and income, as well as the general state of the economy, education, leisure time, past experience, and the supply of recreation facilities (Cordell et al. 1999).

Demand for recreation opportunities can be manipulated or induced (much like demand for goods and services) through advertising, special promotions, news stories/articles, and other forms of publicity. Such actions may increase recreational use levels beyond those anticipated in the Recreation Resource Study (SCL 2009a). At the Project, the existing North Pend Oreille Scenic Byway and International Selkirk Loop, as well as the planned Pend Oreille Water Trail and federal recognition of the Pacific Northwest Trail (as a National Scenic Trail), may increase the demand for recreation at the Project, especially if these opportunities are heavily promoted. Higher recreation use levels likely would lead to greater potential economic benefit from recreation expenditures in Pend Oreille County.

Direct visitor-related expenditures represent only a portion of the total economic activity influenced by recreation opportunities at the Project. Local businesses that serve the Project visitor population may purchase goods and services from other local businesses, thereby creating a multiplier effect. If large enough, this multiplier can result in new jobs. While the current economic benefit of Project-related recreation is relatively minor, the increase in future benefits would correlate with the increase in recreation demand and use levels and factors contributing to increased demand. In addition, both increases in recreation use, as well as new opportunities (e.g., Pend Oreille Water Trail, Pacific Northwest Trail, etc.) may create conditions that are conducive to new recreation-related services (e.g., guide services, shuttle services, etc.). These potential new services may result in secondary economic benefits related to recreation opportunities at the Project.

The following section replaces Section 4.5.10.2.4, PM&E Measures for Facility Construction and Capital Improvements, of Exhibit E of the License Application.

In addition to the recreation-related PM&E measures described above, other environmental enhancement measures for facility construction and capital improvements have the potential to generate beneficial socioeconomic effects. In general, these measures would have less overall impact than recreation resources and are therefore described collectively below, rather than by resource area. These include the following:

- Upstream fish passage trap-and-haul facility
- Structural TDG abatement measures

Such socioeconomic effects are primarily beneficial and could include output (the total value of industry production), wages, other income, direct local expenditures, and indirect business taxes. These capital improvements are not considered major construction projects and would therefore not represent a significant increase in labor or related wages.

Upstream Fish Passage

Construction and operation of upstream fish passage facilities (fishway) have the potential to generate socioeconomic impacts in the Project area. As described in more detail in Section 2.7

(Upstream Fish Passage) of this addendum, SCL will undertake a research and development phase of up to 12 years to evaluate the fishway entrance design, entrance location, and attraction flow volumes that will achieve the purposes of the facility. Within 12 years of license issuance (2 planning years, 8 research years, and 2 design years), SCL will file with FERC for approval a plan to install, operate, and maintain an upstream trap-and-haul fishway. SCL will complete construction of the upstream fishway within 2 years of receiving FERC approval and monitor fishway operations for the term of the license and any annual licenses issued for the Project.

As with the major CIPs described above, the specialized equipment to be installed would require custom steel fabrication that most likely would be completed outside the immediate Project vicinity. However, some goods and services would be procured locally, including some potential equipment rental. The influx of SCL crews into the Project region to accomplish the work represents a positive impact in the form of expenditures on local goods and services, and for short-term housing. Capital costs associated with construction of the fishway are estimated at $70.7 million (including design and permitting costs; see Table D.4-1 in Exhibit D of the License Application, as revised March 2010).

In addition, the proposed trap-and-haul facility would require crews to handle operations over the longer term, including both full-time and seasonal workers, some of whom would be hired locally. Workers are assumed to be the equivalent of 1.5-3 fulltime employees over the term of the new license (each representing an approximate $34,000 annual compensation). The estimated payroll for the full-time staff and seasonal workers would have a multiplier effect on the local economy through expenditures on housing, goods, and services. All of these would be beneficial socioeconomic impacts, and no adverse impacts are anticipated.

Structural TDG Abatement Measures

Like the construction and operation of the proposed upstream fish passage facility, the implementation of the TDG abatement measures represents both construction and operations related components with the potential for socioeconomic impacts. As described in more detail in Section 2.6 (Total Dissolved Gas) of this addendum, SCL proposes to modify the operation or configuration of the existing facilities as follows:

- Throttle Sluice Gates, which involves operating the sluice gates in partially open positions
- Roughen Sluice Flow, which entails modifying the sluice gate outlets to break up and spread flow
- Spillway Flow Splitter/Aerator, which entails modifying the spillways to aerate, break up, and spread flow

These three options would entail capital expenditures, similar to those described above for upstream fish passage facilities, totaling approximately $18.1 million (including design and permitting costs; see Exhibit D, Table D.4-1, as revised March 2010). Any major steel fabrication would likely occur outside the Project area, with the products being transported to the Project for installation. The local socioeconomic effects of the installation and operation of TDG abatement measures would be beneficial.

The following section replaces the Habitat Enhancement and Maintenance Measures subsection of Section 4.5.10.2.5, Other Proposed PM&E Measures for Resource Enhancement, of Exhibit E of the License Application.

Other resource enhancement PM&E measures with the potential to have beneficial socioeconomic effects in the Project region are described below:

- Purchase of flood easements
- Fish and aquatic habitat enhancement and maintenance measures
- Terrestrial habitat and weed management
- Erosion control measures

Purchase of Flood Easements

SCL proposes to acquire flood easements from private landowners in the towns of Metaline and Metaline Falls to compensate them for the incremental component of flooding that is Project-related and that occurs on rare occasions on their properties during high-flow events. Easement rights will be acquired to compensate landowners for the occasional flooding of these properties and would provide some economic benefit to certain community members.

Enhancement and Maintenance Measures

Measures that would result in enhancement or maintenance activities in the Project vicinity over the term of the new license include reduction of Project-related fish entrainment mortality, the Native Salmonid Conservation Program, aquatic habitat enhancements, terrestrial habitat and weed management activities, and erosion control. The enhancement and maintenance activities are summarized in Table E-4-49, with more detailed information presented, by resource, in Sections 2.5 - 2.11 of this addendum and in Table D.4-1 in Exhibit D of the License Application, as revised March 2010.

Each of these activities could involve hiring seasonal or temporary work crews from the local area, as well as local expenditures for materials needed to complete the activities. Work crews would be managed by existing SCL staff and would include labor typically applied to small or medium-scale landscaping services. Some of the materials needed to accomplish the work, such as gravel, fill dirt and topsoil, felled logs, fuel, hand tools, nursery stock, etc., would be procured locally, to the extent feasible. Equipment such as front-end loaders (e.g., Bobcats) would be used, some of which may be rented locally if Project equipment is not available

These measures are not expected to generate a significant socioeconomic impact in terms of local employment, wages, or expenditures (direct or indirect). In most cases, specific designs, activities, or schedules associated with these measures have yet to be determined, and will be developed with respective resource workgroups after license issuance. Over the course of the new license term, such measures would represent a beneficial but minor socioeconomic impact.

The following table replaces Table E.4-49, Summary of enhancement and maintenance measures, in Exhibit E of the License Application.

Table E.4-49. Summary of enhancement and maintenance measures.

PM&E Measure	Description/Location of Activity	Estimated Capital Cost	Estimated FTE
Fish and aquatic enhancement measures	• Reduction of Project Related Entrainment Mortality • Native Salmonid Conservation Program • Gravel Augmentation below Box Canyon Dam • Channel Modifications of Mainstem Trapping Pools at PRM 30.3 • Mainstem Large Woody Debris at Tributary Deltas • Riparian Improvement, and Stream Channel Enhancement in Sullivan Creek RM 0.30 to RM 0.54 • Stream and Riparian Improvements in Sullivan Creek RM 2.3 to RM 3.0 and North Fork Sullivan Creek • LWD Placement and Road Improvements in Sullivan Creek and Selected Tributaries Upstream of the Confluence with Outlet Creek • Culvert Replacements and LWD placement in Tributaries to Boundary Reservoir • Riparian Planting, Culvert Replacement, and Channel Reconstruction in Linton Creek RM 0.0 to RM 0.24 • Riparian and Channel Improvements in Sweet Creek RM 0.0 to RM 0.6 • Habitat Improvement in Tier-2 Tributaries to Boundary Reservoir • Restoration of Dispersed Recreation Sites Located in Sullivan Creek Riparian Areas • Fund for Habitat Improvements in Tributaries to Sullivan Lake	$119.3 million	1) Potential hatchery manager at $47,000; 2) Potential technicians at $34,000
Terrestrial habitat and weed and reservoir shoreline management	• Habitat management, enhancement, and protection	$2.2 million	TBD
Erosion control	• Three sites include: o Forebay Recreation Area o BLM Boundary Recreation Area o Dispersed Recreation Day Use/Overnight Campsite on BLM-Managed Land • Potential measures include o Minor site grading o Installing erosion control mats o Using biotechnical stabilization techniques o Constructing swales to control runoff	$453,000	TBD

2.13. Developmental Analysis (Section 4.6 of Exhibit E)

The following section replaces Section 4.6.2, Costs of Environmental Measures, of Exhibit E of the License Application.

SCL's Proposed Action includes a variety of PM&E measures that would increase operating costs. Annualized costs of SCL's Proposed PM&E measures, by resource area, are presented in Table E.4-51. A breakdown of costs for each resource area can be found in Exhibit D, Attachment D-1 (as revised March 2010).

The following table replaces Table E.4-51, Summary of estimated costs associated with SCL's PM&E proposal (All costs in 2007 dollars), in Exhibit E of the License Application.

Table E.4-51. Summary of estimated costs associated with SCL's PM&E proposal (All costs in 2009 dollars).[1]

Component	Estimated Capital	Estimated Annual O&M	Annualized Cost[2]
Project Operational Measures	NA	$0[3]	$0
Geology and Soils	$397,000	$8,124	$24,144
Water Resources	$15,924,471	$541,301	$1,183,919
Fish and Aquatic Resources	$163,549,718	$5,836,807	$12,436,721
Botanical Resources	NA	$179,302	$179,302
Wildlife Resources	$1,919,000	$125,700	$203,139
Threatened and Endangered Resources (Addressed by Wildlife and Fish and Aquatics Resources measures)	NA	NA	NA
Aesthetics/Visual Resources (Addressed by Recreation Resources measures)	NA	NA	NA
Cultural Resources	NA	$10,969	$10,969
Recreation Resources and Land Use	$7,632,632	$211,096	$519,104
Socioeconomics (Addressed by measures of other resource areas)	NA	NA	NA
Tribal Resources (Addressed by measures of other resource areas)	NA	NA	NA
Operational PM&Es Subtotal:	**NA**	**$0**	**$0**
Non-operational PM&Es Subtotal:	**$189,422,821**	**$6,913,298**	**$14,557,298**
Total:	**$189,422,821**	**$6,913,298**	**$14,557,298**

Notes:
1 A breakdown of costs for each resource area can be found in Exhibit D, Attachment D-1, of this License Application (as revised March 2010).
2 Annualized values based on a 50-year license term.
3 There is no anticipated loss of total generation for the proposed operational PM&Es.

The following section replaces Section 4.6.3, Comparison of Alternatives, of Exhibit E of the License Application.

Annualized costs, benefits, and net benefits of the Proposed Action and No Action alternatives are presented in Table E.4-52. The net annual benefit under the No Action Alternative is $186.4 million ($45.35/MWh). Under the Proposed Action, annual net benefit would be $161.6 million ($39.00/MWh), a decrease of $24.8 million ($6.35/MWh) relative to the No Action Alternative.

The following table replaces Table E.4-52, Summary of cost, power benefits, and net benefits of the Boundary Project alternatives. (All costs in 2007 dollars), in Exhibit E of the License Application.

Table E.4-52. Summary of cost, power benefits, and net benefits of the Boundary Project alternatives.

Parameter	No Action	Proposed Action
Approximate power plant capability	1,040 MW [1]	1,120 MW [3]
Annual generation	4,110,505 MWh [1]	4,150,343 MWh [4]
Annual power values	$212.7 million [2]	$214.8 million [5]
Annual cost	$26.3 million [2]	$53.2 million [6]
Net annual benefit	$186.4 million [2]	$161.6 million

Notes:

1 From Exhibit B, Section 3 (annual generation based on optimization of Project operations for the average year [2002] using the Scenario Tool)

2 From Exhibit D, Section 6 (annual power value based on a 2007 power price of $51.75/MWh and annual cost based on 2007 cost information)

3 The increased power plant capability of 80 MW is due to proposed turbine upgrades (from Exhibit B, Section 5.2, as revised March 2010)

4 The increased Project generation of 39,838 MWh is due to proposed turbine upgrades (from Exhibit B, Section 5.2, as revised March 2010)

5 Based on a 2007 power price of $51.75/MWh (from Exhibit D, Section 6, footnote 2)

6 The annual cost for the Proposed Action includes ongoing operation of the Project ($22.5 million), the cost of all capital for hydroelectric infrastructure ($16.1 million), and the cost of PM&Es ($14.6 million; see Table E.4-51). All costs are in 2009 dollars and annualized over 50-year license term.

3 REFERENCES

This section provides references cited in this addendum that were not cited in Exhibit E of the License Application.

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