



**Skagit Hydroelectric Facility
Low Impact Hydropower Review
Recertification Report**

2017

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October 12, 2017



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I. ABBREVIATIONS

SCL	Seattle City and Light
FWS	U.S. Fish and Wildlife Service
FERC	Federal Energy Regulatory Commission
LIHI	Low Impact Hydropower Institute
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
RLNRA	Ross Lake National Recreation Area
NPS	National Park Service
FCC	Flow Plan Coordinating Committee
NCC	Non-Flow Plan Coordinating Committee
FEA	Final Environmental Assessment
WDFW	Washington Department of Fish and Wildlife
SA	Settlement Agreement
WQC	Water Quality Certificate
ECY	Washington Department of Ecology
HRMMP	Historic Resources Mitigation and Management Plan
ARMMP	Archaeological Resources Mitigation and Management Plan
ESA	Endangered Species Act
EAP	Early Action Program
NRHP	National Register of Historic Places
SWC	Skagit Watershed Council

II. INTRODUCTION

This report reviews Seattle City and Light's ("SCL") Application for Re-Certification of the Skagit River Hydroelectric Project (FERC License #553, LIHI Certificate #5) submitted to the Low Impact Hydropower Institute ("LIHI") on June 12, 2017. The Skagit Project (the "Project" or "Facility") consists of a series of three dams and hydroelectric plants on the Skagit River in Northwest Washington, comprising 690 MW of total capacity. The dams were constructed sequentially over 40+ years to meet growing power demands for the City of Seattle, with completion dates in 1924 (Gorge Dam) 1936 (Diablo Dam) and 1952 (Ross Dam). Together, these facilities provide one-fifth of SCL's power, along with flood control, recreational opportunities, and natural resource protection. The Facility is operated according to the terms and conditions of a FERC License issued in 1995, and subsequently amended in 2013. Throughout the licensing processes and subsequent amendments, multiple Settlement Agreements have been reached with federal, state and local stakeholders to protect and preserve natural and cultural resources in the region. The Facility is located within the Ross Lake National Recreation Area (RLNRA), managed by the National Park Service (NPS). Downstream of the Facility, the Skagit River is classified as a Wild and Scenic River for its outstanding fisheries, wildlife and scenic quality.

The Skagit Project was originally certified as "Low Impact" in May 2003, based on a unanimous vote of LIHI's Governing Board. In April 2008, SCL applied for re-certification of the Facility. LIHI decided to re-certify Skagit for an eight-year term, based off the project's approved \$17M watershed enhancement fund included in the Settlement Agreement. The Facility is the largest in LIHI's portfolio on a capacity basis, and operates as a peaking facility with the three reservoirs and hydroelectric plants operating as one hydraulically-connected unit. Despite the large size and footprint of the Facility, SCL has demonstrated a strong ongoing commitment to reduce the environmental impact of operations. This includes both regulated and voluntary measures to protect and preserve habitat, including a "Fish First" policy that meets LIHI Criteria and supports migration and reproduction of fish species on the lower stretches of the Skagit River. Improved return rates for salmonids on the Skagit is one indicator of success of the program, and the resource agencies and other riverine stakeholders interviewed during this Recertification Review commented on both the success of this program and the willingness of SCL to go above and beyond to preserve habitat and reduce their impact on resident and migratory species.

SCL submitted a Phase I Intake Review application to LIHI on January 5, 2017. During the time of Skagit's most recent certification, LIHI published the 2nd edition Handbook, which establishes new Criteria for projects that all facilities must meet. Dr. Mike Sale, Senior Technical Advisor for LIHI, provided SCL feedback on the Intake Review to structure the application under the new LIHI Criteria contained in the 2nd edition Handbook. SCL subsequently submitted a Phase II Full Application on June 12, 2017. I have conducted a review of this Application and all supporting materials, thoroughly researched the public record since the most recent LIHI certification, interviewed stakeholders involved in monitoring and enforcing the terms and conditions of the License and Settlement Agreements, and compared this information with the relevant LIHI Standards, and have determined that the Facility satisfies all of the basic criteria and some of the PLUS standards contained in the 2nd edition Handbook.

III. PROJECT LOCATION AND SITE CHARACTERISTICS

The “Skagit Project” includes three separate but hydraulically-connected dams and hydropower facilities located on the Skagit River in Whatcom County in Northwest Washington State. The Skagit River runs 150 miles east-to-west from its headwaters in the Canadian Cascades of British Columbia to the Puget Sound near Mount Vernon, Washington, draining 1.7 million acres along its route. Snowmelt from the mountain ranges in British Columbia and Washington provide a source of cool water that offers abundant fish habitat. Outside of Alaska, this region is the most heavily glaciated regions in the U.S., and is also one of the snowiest places on earth, according to the NPS. The Skagit enters the 24-mile long Ross Lake, the first and largest reservoir in the Skagit Hydroelectric Facility, north of the U.S.-Canada border.

The Skagit Facilities are surrounded by the North Cascades National Park, which includes a temperate rainforest on the western side and a ponderosa pine forest on the eastern side, and features over 300 glaciers. Roughly 70% of the basin is under federal administration as designated wilderness and/or national park. The topography changes from mountainous regions to floodplains and rolling uplands as the Skagit approaches the Puget Sound. The estuaries and tidal flats located in these downstream reaches attract numerous migratory bird species, including snow geese and trumpeter swans. According to the Federal Agencies that manage the Wild and Scenic Rivers Program, the Skagit is “the largest and most biologically important river draining to Puget Sound.” The River is host to healthy populations of all five native salmon species, and Bald Eagle populations soar in the winter to feed on returning salmon. The Skagit hydropower facilities are coordinated and operated in a manner to protect and preserve the outstanding natural resources of the Skagit River.



Figure 1 – Skagit Watershed Locations

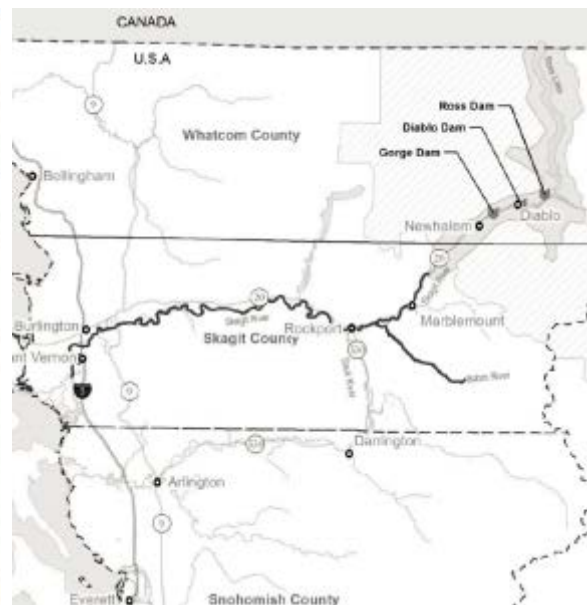


Figure 2 – Skagit River & Dam

Water quality in the Skagit River Basin remains excellent. Tributaries to the Skagit are typically rated exceptional (Class AA) by the Washington Department of Environment. Discharge just downstream of the Skagit Project is approximately 4,500 cfs, and turbidity increases as the Skagit progresses downstream. The Skagit provides adequate sediment for fish spawning gravels, due to the rapid natural erosion of the Cascade Mountains carried in by tributaries. The erosion control practices used by SCL

were deemed adequate in the Final Environmental Assessment (“FEA”) carried out by FERC during the project’s relicensing, and SCL provides a “Fish First” flow policy as described in Section V, below. In general, the impacts of the Skagit Project on water quality were deemed to be minor, as described in the FEA. Prior to the project’s construction, the narrow canyons and highly turbulent Skagit River prevented anadromous fish from migrating upstream above the project site, except for the most favorable water years. The construction of the dams likely improved habitat for resident trout species, including Rainbow, Cutthroat Trout, Bull Trout and Dolly Varden, while negatively impacting downstream conditions for anadromous fish due to fluctuations of the water level. This problem has been widely accepted to be mitigated since the 1980s with significantly improved flow conditions provided by SCL.

Ross Lake

The Ross Dam impounds Ross Lake, the largest and uppermost reservoir on the Skagit Project. This 24-mile-long reservoir extends into Canada and consists of the primary water storage system for the Facility, and is used for flood control, power generation, fishery protection, and recreation. The Lake is home to the largest-known population of Bull trout (a federally-threatened species) in the contiguous U.S., due in part to the cold water conditions from ice and snowmelt that provides suitable summer habitat conditions. The reservoir level is managed to provide flood control, ensure recreation in the summer months (generally maintained at full pool), accommodate the snowmelt from surrounding mountains and glaciers and release as needed for downstream fishery protection and power generation. The shoreline is predominantly wooded, with several recreational access points. Water recreation includes fishing, canoeing, kayaking, and limited motorboating. One study estimated that 1.7 acres/year are lost to shoreline erosion each year at Ross Lake, and 25% of the shoreline is in some stage of erosion-related retreat (Riedel 1990). The primary cause of erosion at Ross Lake is due to the larger pool elevation fluctuations and less bedrock on the shoreline than both Diablo and Gorge reservoirs. Multiple tributaries also contribute to water levels in Ross Lake, including Big Beaver, Little Beaver, Ruby, Lightning, and Devil’s creeks. These tributaries are well suited for spawning for the Bull trout and Rainbow trout native to Ross Lake.

Diablo Lake

Four miles downstream of Ross Dam, the Diablo Dam impounds the 4.5-mile-long Diablo Lake. Water levels in the reservoir are maintained primarily for daily and weekly regulation of flows coming from Ross Powerhouse. Annual fluctuations range from 10-12 feet, and average daily fluctuations are around 5 ft. Diablo is considered the most accessible of the three reservoirs, with a variety of recreational and learning opportunities, and hiking trails surrounding the reservoir. As with Ross Lake, the reservoir is home to healthy populations of rainbow, cutthroat, brook, and Bull trout, and is a popular destination for kayakers and canoeists. An estimated 10% of the shoreline is in some stage of erosion-related retreat (Riedel 1990), considerably less than Ross Dam due to bedrock-lined shorelines and reduced pool level fluctuations. The shoreline is moderately to steeply sloped throughout, with coniferous forests and shrubs. Thunder Creek is the major tributary to Diablo Lake, although the reservoir is primarily impacted by inflow from the Ross Powerhouse. Diablo Lake is particularly well-known for its brilliant bright turquoise color, a result of suspended powder from ground rocks due to the surrounding glaciers.



Figure 3 – Ross Lake



Figure 4 - Diablo Lake

Gorge Lake

The Gorge Dam impounds Gorge Lake, the smallest and furthest downstream development at Skagit. Located 4 miles downstream from Diablo, the reservoir fluctuates only several feet and flows are regulated by operating conditions at Diablo and Ross dams. During spring and summer, the Gorge Powerhouse alters flow to promote steelhead spawning, incubation and outmigration, according to release schedules provided in an adaptive manner. The Gorge Lake has steep, wooded slopes on almost all sides, hence its name. There is only one significant tributary, Stetattle Creek, although water levels are primarily impacted by inflow from the Diablo Dam and Powerhouse. Downstream of the dam, the bypassed reach is often dewatered, as the power tunnels carry water to the powerhouse located in the historic town of Newhalem approximately 2 miles downstream.

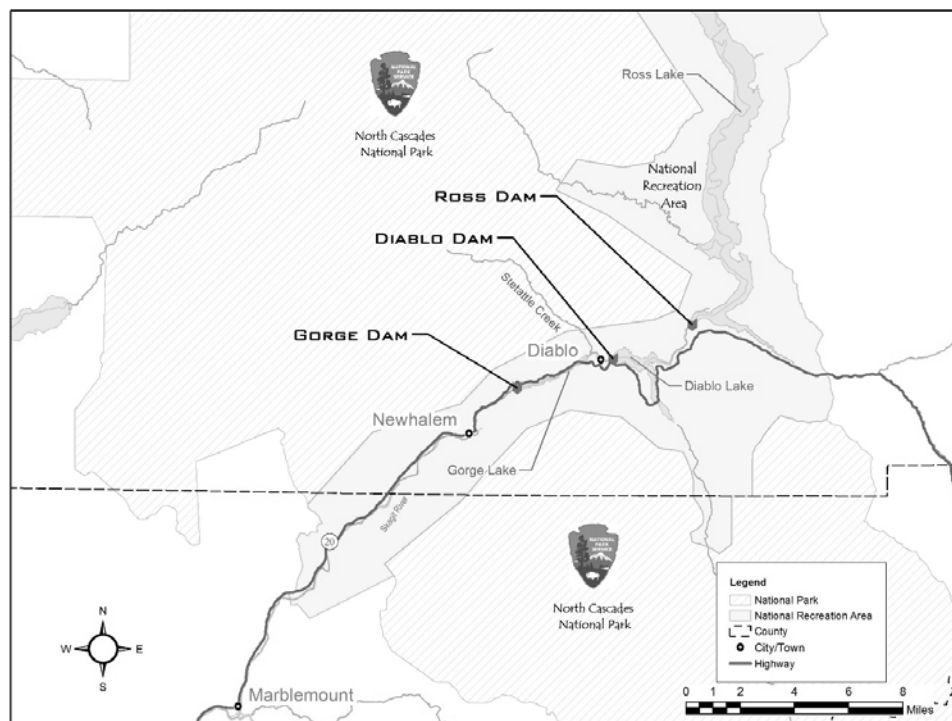


Figure 5 - Dam Locations in North Cascades National Park

IV. PROJECT WORKS

Ross Dam and Powerhouse	
Dam Type	Concrete Arch
Dam Height	540 ft.
Spillway Elevation and Hydraulic Capacity	1582 ft. and 119,500 max cfs
Tailwater Elevation	1205 ft.
Turbines	Four (4), vertical-type Francis turbines, max 16,000 cfs
Total Nameplate Capacity	450 MW
Average Annual Generation	803,603 MWh
Water Conveyance Structures	Two (2), 24.5 foot-diameter, 1900 foot-long concrete power tunnels
Diablo Dam and Powerhouse	
Dam Type	Concrete Arch
Dam Height	389 ft.
Spillway Elevation and Hydraulic Capacity	1187 ft. and 98,500 max cfs
Tailwater Elevation	875 ft.
Turbines	Four (4), vertical-type, Francis turbines, max 7,130 cfs
Total Nameplate Capacity	190.4 MW
Average Annual Generation	863,919 MWh
Water Conveyance Structures	One (1), 19.5 foot-diameter, 1900 foot-long concrete power tunnel feeding Two (2), 15 foot-diameter, 290 foot-long steel lined penstocks
Gorge Dam and Powerhouse	
Dam Type	Concrete arch and gravity
Dam Height	300 ft.
Spillway Elevation and Hydraulic Capacity	825 ft. and 89,000 max cfs
Tailwater Elevation	495 ft.
Turbines	Four (4), vertical-type, Francis turbines, max 7,440 cfs
Total Nameplate Capacity	190.6 MW
Average Annual Generation	1,028,527 MWh
Water Conveyance Structures	One (1), 20.5 foot-diameter, 11,000 foot-long concrete power tunnel with four penstocks controlled by butterfly valves



Figure 6 - Gorge Dam



Figure 7 - Gorge Powerhouse



Figure 8 - Diablo Dam



Figure 9 - Diablo Powerhouse



Figure 10 - Ross Dam and Powerhouse

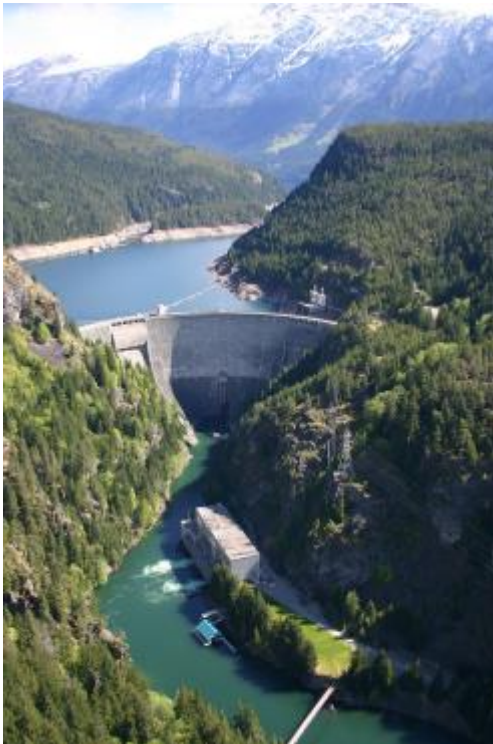


Figure 11 - Ross Dam and Powerhouse, aerial view



Figure 12 - Ross Dam

V. REGULATORY STATUS

In the early 20th century, demand for municipal power soared in the Seattle region. In 1910, Seattle City Light was founded as a separate lighting department to provide electric utility services to the region, and J.D. Ross, a self-taught engineer and second superintendent of SCL pushed ahead with the goal of harnessing the power of the Skagit River through a series of three dams. Ross and SCL received approval from the federal government in 1918, and began to construct a railroad to transport workers to the remote site of Newhalem, where workers would live while they worked on the first dam, the Gorge Dam. After several years of construction, the Gorge Dam was completed and the first power produced on September 14, 1924. Additional dam sites began to be explored further upstream.

The first license for the Skagit Project was provided by FERC on October 28, 1927. Following issuance of the license, construction began on two upstream dams, the Diablo Dam in 1937 and the Ross Dam in 1937. Power began generating from the final project in 1952, marking the conclusion of the Skagit Project and the nearly 50-year construction project it supported. The 50-year FERC license expired in 1977, and Seattle filed for a new license. Several federal and state agencies, tribal groups, and environmental organizations intervened and were granted intervenor status. After nearly a decade of review, the FERC directed Seattle to conduct new studies, provide additional data and submit several new plans in support of their License Application. During these studies and negotiations with various parties, FERC issued a series of annual licenses, which continued for nearly 20 years. On April 30, 1991, Seattle filed with FERC an Offer of Settlement that included eight supporting SAs with stakeholders. Two subsequent SAs were filed on September 17, 1993.

Parties to the SA included 8 federal agencies, three Native American Tribes, two Washington State Agencies, and the North Cascades Conservation Council. The purpose of the SA was to “...resolve all issues for the period specified in each agreement related to the effects of the project, as currently constructed, upon the subject areas identified...” The SA requirements included additional flow management, aquatic habitat enhancement and protection, recreational facility improvements, revegetation, archaeologic and historic resources protection, and compensation to Native American tribes. The signatories to the SA agreed that the agreement provided adequate compensation and protection for resource impacts from the Skagit Project, and requested FERC approve and accept the SA in its entirety.

A Draft Environmental Assessment was issued for comment on March 4, 1994, and received comments from nine parties. The Final Environmental Assessment was issued on May 16, 1995 and concluded that the preferred alternative was issuance of a new license, and this would result in the “best comprehensive development of the Skagit River.” A 30-year FERC License was issued for the project that same day, which expires in 2025. Timely requests for intervention were filed by six parties to the proceeding. The requests varied in nature, but in general, the intervenors were disappointed that specific language from the Settlement Agreement was not included verbatim in the final License. FERC made some amendments to the original order on an Order on Rehearing filed June 26, 1996, and a Revised Settlement Agreement was filed in 2011, incorporating additional requirements. The most recent License Amendment was issued in July 17, 2013, during the term of the current LIHI certificate, due to construction of a second power tunnel between Gorge Dam and Powerhouse. Specific terms of the Settlement Agreement are included in the relevant LIHI Criteria in Section VI, below.

There are a variety of stakeholders involved in monitoring, enforcing and implementing the terms of the Settlement Agreements and the Project License. A detailed discussion of each group's member and responsibilities is outside the scope of this Review, but in general there are three committees that implement the terms: (1) Wildlife Lands Acquisition Group; (2) Flow Plan Coordinating Committee (FCC) for managing flow-related impacts to fisheries, and (3) the Nonflow Plan Coordinating Committee (NCC) for non-flow related impacts. These Committees operate with delegated field monitoring representatives, and specific decision-making authority can be granted to Subcommittees (although decisions must be made by a consensus of members constituting a quorum.) The members of the FCC and NCC consist of the NPS, U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Upper Skagit Tribe, Sauk-Suiattle Tribe, Swinomish Indian Tribal Community, Washington Department of Fish and Wildlife (WDFW), and SCL.

The LIHI Handbook requires a consideration of whether any “material changes” have occurred at the Facility during the most recent LIHI term (defined as areas of non-compliance, operational changes, and/or new or renewed issues of concern.) During my review, I identified the following material changes:

- 2011 Revised Fisheries Settlement Agreement, effectively creating new flow and monitoring protocols for protection of anadromous fish species
- 2011 Biological Opinion for Chinook Salmon, Steelhead, and other species by NMFS, requiring a monitoring plan and annual take statements
- 2013 Biological Opinion for Bull Trout, issued by USFWS, requiring a monitoring plan and annual take statements
- Discovery of one steelhead in the plunge pool of the bypassed reach immediately at the base of the Gorge Dam

Agencies responsible for managing the project and license implementation commended the Applicant for full compliance, approach to collaboration with agencies and tribes, and prioritization of natural resource protection. In general, these agencies noted the Applicant's willingness to go “above and beyond” license requirements to protect fish and wildlife resources in the Skagit Watershed. There have been no recorded violations of the FERC License from 2000-2017 (the range searched during the investigation for this report). These agencies also noted the upcoming expiration of the Project License, on April 30, 2025, and their preparations to begin reviewing current structures and operations in anticipation of upcoming re-licensing discussions.

VI. COMPLIANCE WITH LIHI STANDARDS

SCL proposed four Zones of Effect for this project, and I concur that these are appropriate. Zone 1 consists of the regulated riverine reach downstream of the Gorge Powerhouse. This is a free-flowing reach that extends from the powerhouse to the Puget Sound, although the delineation of Zone 1 is at River Mile 66, at which point the flows are influenced by the confluence of the Sauk River. Zone 2 consists of the bypassed reach from the Gorge Dam to Gorge Powerhouse. Zone 3 consists of the Gorge Lake and Diablo Lake impoundments, and project works in between, including the Diablo Powerhouse and short stretch of the Skagit prior to entering Gorge Lake. These were combined due to the operational characteristics of these reservoirs – both are operated to re-regulate flows coming from Ross Lake, and no unique passage requirements are in place that would require multiple zones in this area. Zone 4 consists of the Ross Lake impoundment, operated as the primary storage reservoir for the Skagit Project. Although

these are appropriate Zones, it should be clarified that the true extent of impact also extends to the feeding tributaries leading to these reservoirs, as this habitat is used for resident trout spawning and is regulated as part of the Skagit Project (this mostly applies to Ross Lake, Zone 4.)

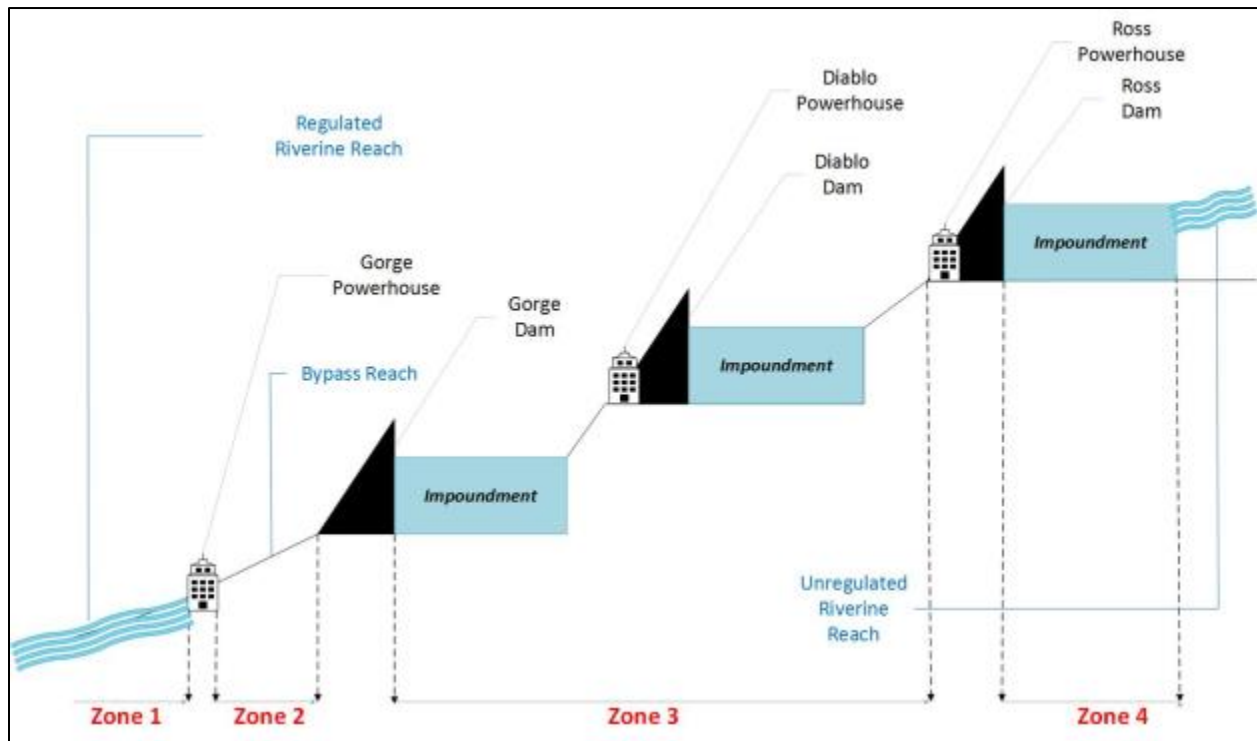


Figure 13 - Skagit Zones of Effect

Criterion A – Ecological Flows

Note for all Zones:

1. Flows at the Skagit Project are managed by the Flow Plan Coordinating Committee (FPCC), established in the 2011 Revised Settlement Agreement. The charter for this Committee is outlined in the SA. In summary, the FPCC coordinates an adaptive management program, monitoring flow conditions, conducting studies and proposing modifications as necessary to promote aquatic habitat.
2. As the Skagit Project is hydraulically and operationally interconnected, the flows are also coordinated and it is challenging (and misleading) to separate out each flow requirement by Zone. Ross Lake functions as a giant “flow battery,” storing up flows from winter snowmelt to provide downstream flow to Diablo and Gorge, which re-regulate this flow and ultimately provide adequate flows for anadromous fish reproduction as determined by the adaptive management program. As a result, the flow requirements for Zone 4 ultimately impact the requirements for Zone 1, and in my opinion, it is misleading to consider them as separate for LIHI evaluation.

Zone 1 – The stretch of Skagit River from the discharge of Gorge Powerhouse to the Puget Sound has always been the region of concern from a flow management standpoint, due to populations of spawning salmon and steelhead that migrate upriver to this point. (The historic record suggests very few salmon ever made it far past the natural barrier of the Skagit where Gorge Dam was built.) Upstream, the Diablo Dam is operated to re-regulate flows from Ross Dam, the primary storage reservoir for the entire Skagit system. On January 2011, a Revised Settlement Agreement was filed to FERC on behalf of Seattle City Light and signatories involved in the original SA. This SA included detailed calculations to govern project flow requirements in this Zone. Flow requirements are adaptively managed each year based on precipitation, river level, tributary outflows below the project, and seasonal runoff, with the objective of promoting successful salmon and steelhead populations throughout all stages of their life-cycle.

Although detailed calculations based on seasonal conditions govern the specific flows released from the Gorge Powerhouse, the general trend is as follows. In winter, stable flows are released to minimize the threat of stranding salmon fry on gravel bars and encourage fry to emerge from gravel and migrate to the Puget Sound. To facilitate this, Diablo and Gorge reservoirs reregulate flows and the Ross reservoir is lowered in preparation for spring melt. In the spring, Gorge modifies flows (according to site conditions and the Revised Settlement Agreement of 2011,) to allow steelhead to spawn and support outmigration of salmon fry. Once the steelhead spawn is over, Diablo and Gorge dams typically spill to release the high inflows that have filled their reservoirs as a result of the spring snowmelt. In summer, Gorge releases adequate flows for steelhead incubation and Chinook salmon spawning (and in certain years, Pink salmon.) In the fall, Gorge Powerhouse flow regimes are managed to support Chinook, Pink and Chum salmon spawning and incubation.

SCL must file semi-annual reports with FERC detailing flows for the salmon and steelhead spawning and rearing periods. Furthermore, SCL biologists conduct surveys every 7-10 days during spawning periods, and this data is used to modify, in real time, flows at the project to facilitate optimal reproduction and inform the stakeholders at the state and tribal level to make resource management decisions. Furthermore, SCL facilitates research studies each year by universities and other groups to improve understanding of

the salmonid populations and life history in this Zone. Data is used to inform decisions for all stakeholders in the project.

The Applicant selected Standard A-2 Agency Recommendation and applied the PLUS Standard as well. The flow monitoring reports provided to FERC are considerably more detailed than a typical flow verification letter, and show actual data on flows released for protection of various species, and detailed graphs showing actual flows compared with minimum required flows. There are no recorded violations, and the Project is in compliance with the Agency Recommendations contained in the Settlement Agreement and the License. The Skagit River System Cooperative – the fisheries and environmental group for the Swinomish and Sauk-Suiattle Tribes noted that “throughout the 22 years I have worked with SCL on the implementation of their license they have routinely gone beyond their minimum requirements to provide additional protection for fish, they readily and collaboratively work with the agencies and tribes, and they participate in workgroups and forums not directly tied to their license to the benefit of habitat and scientific knowledge in the basin” (Walsh, 2017).

The process used by SCL to provide and adjust flows is a clear example of an Adaptive Management Program according to the LIHI 2nd edition Handbook, and qualifies this project for PLUS Certification in this category. Standard A-PLUS states the following:

“Standard A-PLUS: In addition to satisfying one or more of the standards above, the Facility is operating an adaptive management program to regularly evaluate and adjust the operation of the Facility with respect to flows and habitat conditions, or has implemented significant, non-flow habitat enhancements (e.g., structural improvements leading to river restoration) with demonstrated positive net benefits to fish and wildlife resources affected by the facility.”

Clearly, the Applicant fits this description by modifying operation of the facility based off real-time information collected by its biologists, and implementing numerous and voluntary non-flow habitat enhancements. The net benefits are also demonstrated by steadily increasing proportion of Skagit Chinook salmon spawning in this Zone since 1991, with an average of 78% of all fall/summer Chinook spawning in this region (~8,000 fish). Washington Department of Fish and Wildlife (WDFW) considers the Chinook salmon stock “healthy,” and this basin features the most abundant run of naturally spawning Chinook in Puget Sound. The Skagit River System Cooperative noted that “tangible benefits I have observed while working with SCL to implement their license include routinely providing additional flow beyond their minimum requirements to provide a higher level of incubation and emergence success of salmon and steelhead as well as funding research that has increased the scientific knowledge of fish and fish habitat specific to the basin” (Walsh, 2017).

Zone 2 – The 2.7-mile-long bypassed reach is from the Gorge Dam to Powerhouse is often dewatered. The narrow canyons and highly turbulent Skagit River prevented anadromous fish from migrating to this region, except for the most favorable condition years¹. One steelhead was recently discovered in the

¹ The original Application Reviewer, Stillwater Sciences, could not conclude that the Project met LIHI Criteria due to an inability to conclude definitively that migratory fish did not historically pass through the Skagit now inundated by the Gorge Reservoir. However, further analysis of the historical evidence and a LIHI Staff Report drafted by Lydia Grimm, LIHI Executive Director at that time, concluded that this was an overly literal interpretation of the LIHI standard for Fish Passage (more on this decision in Section V.) LIHI’s report concluded: “LIHI has to consider whether by asking this question, it’s looking for whether or not one or two fish ever made it up this far, or whether

plunge pool beneath Gorge Dam, and WDFW noted that any necessary passage/protection measures will be discussed during the upcoming license discussions (expiration date 2025.) For this review, I am relying on the preponderance of existing evidence, and the identification of a single fish is not enough evidence to overturn the existing conclusion². During the Settlement Agreement negotiations, all parties agreed that SCL should not be required to provide flows in this reach (Revised Fisheries Settlement, 2011,) and instead water is stored and used to provide flows downstream of Gorge Powerhouse to encourage salmon and steelhead spawning and incubation. The original LIHI Reviewer noted that: “Agency and tribal representatives indicated that habitat in the bypass reach was given up to allow for additional flows in higher quality habitats downstream of the Gorge powerhouse, and to provide more funds for habitat improvement and mitigation projects” (Stillwater Sciences, 2003). As noted by the comments above, the Applicant is both complying with these requirements and going above and beyond to improve habitat in Zone 1.

The FEA states that this reach “could otherwise host anadromous salmon and steelhead, as well as resident species. The Gorge bypass reach is fairly well populated with resident fish, and with anadromous species at the downstream end. The habitat quality is good at fairly low flows. Habitat quality in much of the bypass reach becomes marginal at normal Skagit River flows due to severe cascades and rapids...the proposed action [re-licensing the facility under the SA] would accept these habitat losses but enhance the anadromous fishes in downstream reaches,” then goes on to describe flow and non-flow enhancements developed under various plans, and incorporated into the SA, that mitigate for any lost habitat. The FEA concludes: “There was little in the way of good mainstem or tributary spawning habitat in this reach, so flow enhancements in the Gorge bypassed reach would have little value for fisheries. The river below the Gorge powerhouse and the town of Newhalem that is affected by river flows from the powerhouse is of far more value to the anadromous fishery. We view the enhancement actions proposed in the SA as related to impacts of project operations on each species, and therefore, appropriate.”

Given this conclusion, it appears there was significant discussion among stakeholders and a determination was made that it was more appropriate for the Gorge Powerhouse to discharge flows downstream to the mainstem Skagit than for minimum flows to be provided in the bypassed reach. One comment received from WDFW noted that a steelhead was recently discovered at the base of Gorge Dam. They noted that conditions in Zone 2 may have changed during the course of the most recent license, and upstream and downstream passage will both be discussed during the next license discussions (which are anticipated to begin in earnest in the next several years as the license is due to expire in 2025.) The applicant selected Standard A2 – Agency Recommendation, (although in this case this is more of an obviated recommendation for good cause.) The scientific basis includes several studies that concluded this reach was primarily off-limits for anadromous fish migration due to high turbulence and rapids. The project is operated in a manner where flows that could be provided into this bypassed reach are instead stored and passed through the powerhouse according to a strict adaptive management program (see Zone 1, above,)

it’s asking about biologically significant movement, i.e., regular returning runs for spawning. I think the record we’re presented with is that this area was, at the very best, marginal habitat for some steelhead that could sometimes migrate up to the Stetattle Creek to spawn. This was not an area that provided habitat for multiple salmon or steelheads runs.” (Grimm, 2003) As a result, the Application Reviewer and Board agreed that the Facility could be certified for a five year term.

to promote healthy downstream habitat. As a result, these two Zones are linked in flow management (and indeed all Zones are,) with the primary focus of resource protection occurring in Zone 1.

Zone 3 – This Zone consists of two impoundments, two stretches of unregulated river reach, and one short bypassed reach (<1 mile) below the Diablo Powerhouse. SCL selected Standard A1(N/A – De Minimis) to pass this Criterion, but the existence of a bypassed reach technically would make this Zone ineligible for Standard A1. However, the operations of the project are conducted to mitigate for any negative impacts that result to this bypassed reach. Specifically, the FEA noted that any loss of habitat in this reach would be mitigated by the plan to stock fish in both Diablo and Ross reservoirs: “the proposal to stock the reservoirs to compensate for degraded habitat in the bypassed reach properly places emphasis in an area that is likely to be more suitable trout habitat. No additional measures are warranted.” The FEA cites evidence from past reports (Brueggeman et al., 1988) that shows that reservoir populations of resident trout are successful despite dewatering of bypassed reach.

Despite the efforts to compensate for the bypassed reach and improved ability to pass flows in the downstream reach, it is not appropriate to select the Not Applicable/De Minimis standard here. LIHI defines this standard for flows as following:

“The Facility operates in a true run-of-river operational mode and there are no bypassed reaches or water diversions associated with the Facility; or the facility is located within an existing water conduit that does not discharge into natural waterways”

Clearly, the Facility does not fit this definition, as it operates in a re-regulating flow protocol with storage and has one bypassed reach³. Instead, Standard A-2, Agency Recommendation is better suited here. The flow regime that has been established is contained in the most recent Revised Fisheries Settlement Agreement in 2011. As described above, this is a well thought-out, science-based, adaptive management program that modifies flows across the three reservoirs in real-time to improve downstream fish reproduction.

Zone 4 – As noted above, the operational protocol for Ross Dam is to draw down in fall and winter to make room for spring glacial melt and runoff, in support of flood control efforts⁴. This drawdown also assists with generating electricity during the winter peak demand period. Furthermore, Ross Dam functions like a giant “flow battery” that sustains downstream Skagit River anadromous fish reproduction. Water that is stored in Ross Reservoir ultimately is allowed to flow to Diablo Lake and finally the Gorge Powerhouse according to a schedule that is described in Zone 1, above. The FEA considered the impacts of the reservoir drawdowns at Ross – which do bear an environmental cost by reducing fish habitat along shoreline and exposing areas to erosion – with the benefit of its current ability to provide downstream flows for fish reproduction. They noted that “loss of sustained minimum flows in the downstream reaches [past Gorge powerhouse] would have severe impacts on populations by reducing spawning habitat, dewatering redds built in higher flows, and reducing fry habitat...” Clearly, the advantage of Ross’

³ In their application, SCL noted that there were no bypassed reaches, noting that the reach between the Diablo Powerhouse and dam is “inundated by backwater from the reservoir and the tailrace.” This is still a bypassed reach by LIHI’s definition. Regardless, the Zone still would not qualify under Standard A1 because it is not operated in a true “run-of-river” mode.

⁴ 200,000 acre-feet of Ross Dam is reserved for flood control

current operational flow protocol is a net benefit to downstream aquatic habitat. There is no bypassed reach at the Ross Dam.

SCL correctly applied Standard A1 – Not applicable/De Minimis for this Zone. Although the reservoir clearly does not operate in a run-of-river mode under any definition, it is an impoundment Zone and therefore qualifies under LIHI’s instructions: “All impoundment zones can apply Criterion A-1 to pass this criterion.”

Criterion B – Water Quality

Zone 1 – The State of Washington has a unique system of classifying water quality standards, using use-specific standards (e.g., “aquatic life, recreation, water supply”) rather than traditional class-based (e.g., “AA”) standards. For Aquatic Life, the Skagit River reach impacted by Zone 1 is classified as “Core Summer Salmonid Habitat,” the 2nd most stringent standard in the State. These standards establish water temperature, dissolved oxygen, turbidity and pH criteria for specie reproduction and specific spawning distribution maps for tributaries that provide spawning and incubation habitat. These criteria are provided in the Application by SCL⁵, and do not need repeating here. For Recreation, this Zone is listed as “Exceptional, Primary Contact Recreation,” and meets all Criteria for water use as well.

There was no 401 Water Quality Certificate issued for the Skagit Facility, primarily due to staffing constraints at Ecology. In a 1991 letter stating their intent not to issue a 401 and therefore delay relicensing the project, Ecology stated that they supported the water quality conditions established in the Settlement Agreements. In 2009, the issue of a 401 came up again during the license amendment process for construction of a new power tunnel for the Gorge Powerhouse. Ecology noted that they had considered issuing a new 401 certification for the entire project, but decided against since “there are no changes to flow conditions, and since there is a settlement agreement in place.” (Kevin Fitzpatrick, 2009) The letter appeared to be satisfied with the existing flow agreement established by that SA. Washington Department of Ecology (“ECY”) was contacted in the preparation of this report to comment on water quality. They noted that given their lack of current oversight of water quality conditions due to the 401 waiver, they do not “have much information on the water quality concerns related to current operations.” They further noted that the FERC License expires on April 30, 2025, and ECY will soon be working with SCL to review the project in preparation for relicensing and to assist with developing necessary conditions to issue a 401 WQC.

For Zone 1, the Applicant selected LIHI Standard B3, Site-Specific Monitoring. The applicant cited data from the Washington State Water Quality Assessment database to support this selection⁶. As noted above, this section of the Skagit is designated as the 2nd most stringent water quality standards in Washington State, core summer salmonid habitat, and Zone 1 is in full compliance with those standards. The only impairments downstream of this project consist of either PCBs or Bacteria, both of which are well downstream on the Skagit River and unrelated to any hydropower operations. Furthermore, the water provided into this Zone ultimately originates from Ross Reservoir, where the plant intakes are located 140 ft. below the surface where average water temperatures are 7 degree C. This result in a cooling impact on water provided to downstream habitat, including this Zone. In summary, I agree that Standard B3 – Site-Specific Monitoring is the correct Standard for this Zone, and the Facility meets this criterion.

Zone 2 – Please review the response to Zone 2 for Flows Criteria, above. The 2.7-mile-long bypassed reach is often dewatered, but agencies agreed this was acceptable to provide improved downstream flows into better spawning and incubation habitat located further downstream of the project (in Zone 1.) The considerable thought and discussion that went into this decision is documented in the Settlement Agreements, agency letters, Environmental Impact Statement, and FERC License. To support the negotiated dewatered conditions of the bypass reach, the reach was given a “special condition status” by

⁵ For full <http://lowimpacthydro.org/lihi-certificate-5-skagit-project-washington-ferc-553/>

⁶ <https://fortress.wa.gov/ecy/approvedwqa/ApprovedSearch.aspx>

the Washington State Department of Ecology that allows for higher instream water temperatures than required in downstream waters. Specifically, water temperatures are allowed to increase up to 21° C due to human activities, and naturally-occurring temperature increases are also modified to prevent increases beyond 0.3° C at a time.

The Applicant selected Standard B3, Site-specific Monitoring Studies for this Zone. However, I do not find this appropriate as LIHI states that this Standard be used “in the absence of an applicable agency recommendation specific to the facility.” In this case, the applicable recommendation is the requirement to maintain water quality below 21° C in the bypassed reach. In my opinion, Standard B2, Agency Recommendation is more appropriate here, and SCL is in compliance with this Criterion.

Zone 3 – Diablo and Gorge Lakes are both classified as Category 1 by Ecology (State of Washington Water Quality Assessment, June 2016), the highest water quality status. There are no agency recommendations specific to water quality in these locations. The FEA concluded that the effect of the existing project on water quality are minor, while acknowledging that regulation of flow by impoundments always affects river temperatures. The Applicant chose Standard B3 – Site Specific Monitoring, for this Zone. However, there have only been occasional, ad-hoc site-specific monitoring studies in these Zones,⁷ not a dedicated sampling regime designed to assure they meet quantitative standards. Given that the 2016 Water Quality Assessment ranks Diablo and Gorge as Category 1 water quality, it does not appear that any sampling was required. As noted above, ECY will be working with SCL to review the project in preparation for relicensing and to assist with developing necessary conditions to issue a 401 WQC. Given the excellent Category 1 water quality and no evidence that the facility negatively impacts water quality in this Zone, the Facility appears to fit Standard B1 – Not Applicable/De Minimis.

Zone 4 – Since 2014, SCL has supported water quality monitoring activities at Ross Lake and six tributaries through the Skagit Environmental Endowment Commission. This monitoring assesses threats from land-use practices, climate change and atmospheric depositions. Four monitoring stations are positioned along Ross Lake (see Figure X), providing continuous data on water temperature, water chemistry, chlorophyll-*a*, and zooplankton. This data collection effort is important due to the population of federally-threatened Bull Trout in the reservoir, and the results from the monitoring help guide management actions. Specifically, the objectives of this study include:

1. Assess the current water quality conditions and determine the trophic status of Ross Lake.
2. Characterize the seasonal variation of the water quality conditions in Ross Lake.
3. Develop a context for interpreting how the ecological integrity of Ross Lake is responding to fluctuations in nutrient levels, the atmospheric deposition and run-off of pollutants, climate change and introduced non-native species.
4. Determine and verify the long-term trends in the water quality and trophic status of Ross Lake.

The Skagit Environmental Endowment Commission (partially funded by SCL,) also is establishing a Ross Lake Tributary Stream Water Quality Assessment in 2017. The objective is to determine the status and

⁷ The most recent study was in August 2017. SCL conducted vertical profile sampling of Diablo Lake for water temperature, pH, and dissolved oxygen.

trends of water quality for streams draining into Ross Lake, and identify specific land management activities affecting those streams.

In my opinion, the Applicant properly selected Standard B-3 for this Zone. SCL is actively engaged in monitoring water quality at Ross Lake and the feeder tributaries, as demonstrated above. The consultation for this water quality monitoring activity occurred with the National Park Service through the Skagit Environmental Endowment Commission. The water quality parameters include water temperature, water chemistry, chlorophyll-*a*, and zooplankton. Along with their application, SCL provided a white paper from the National Park Service describing the Ross Lake Water Quality monitoring efforts as a 2015 Accomplishment, and included data from that monitoring year. In my opinion, this is valid supporting documentation that the agency accepted these results.

Criterion C – Upstream Fish Passage

The Skagit River is a critical region and focus area for fish recovery in the Puget Sound region, with abundant populations of all five species of Pacific salmon (chinook, coho, pink, chum, and sockeye) and three anadromous species (steelhead, sea-run cutthroat trout, and sea-run Dolly Varden). These species run the Skagit downstream of the Gorge Dam in Zone 1 at various times of year. Although many species run and spawn well downstream of the Facility, other runs do extend up to the Gorge Powerhouse. These species typically spawn in tributary streams, many of which offer prime habitat and exceptional water quality. Runs are cyclical, so examining population trends requires a multi-factor analysis. However, Chinook salmon have maintained a steady (and slightly increasing) population count over the past 40 years, with positive signs from spring populations. Steelhead populations have experienced a decline over 40 years, but have shown resilience and slightly rebounding numbers over the past 5 years.

Fish passage has never been required at any of the dams associated with the Skagit Project. This was due to historical evidence that populations of steelhead and salmon likely never made it past the natural migratory barriers of turbulent rapids and waterfalls of Gorge Canyon. The validity of this finding has been confirmed numerous times, including in the original LIHI certification. Genetic studies have showed the populations of fish above and below the Gorge Dam indicate two distinct populations, and resource agencies manage them accordingly. However, LIHI fish passage criteria is not explicitly limited to physical passage past a dam, but rather is “intended to ensure that migratory species can successfully complete their life cycles and maintain healthy, sustainable fish and wildlife resources in areas affected by the facility” (LIHI 2nd edition Handbook, 2016). In Ross Lake (Zone 4) Bull Trout migrate into the feeder tributaries to spawn. In the free-flowing stretch of the Skagit River (Zone 1) steelhead and Chinook salmon migrate upstream to use the various tributaries to spawn. SCL’s ability to support upstream fish migration in these Zones – including but not limited to physical passage – is therefore considered in the following sections.

Zone 1 – Downstream of the Gorge Powerhouses there are no migratory barriers to upstream fish passage. However, this region (and the tributaries it supports,) contains critical habitat for spawning salmonids and steelhead, and operational flow requirements at the Facility are designed to support those uses. A healthy flow regime is maintained to allow adult salmon spawning in the fall and steelhead in the spring, and to ensure adequate fry incubation. Water temperatures are maintained for optimal adult migration, incubation of salmon and steelhead eggs, and juvenile rearing throughout the year. These specific requirements are described in detail in Flows Criterion, above, and even further in appendices to the Revised Fisheries Settlement Agreement (2011), as part of the adaptive management program. The Applicant selected Standard C1 – Not Applicable/De Minimis for this Criterion, but given that the flow requirements are designed to support upstream migrating anadromous fish in this Zone, Standard C2 – Agency Recommendation is also appropriate.

Furthermore, in my opinion, the Applicant could also select the PLUS Standard for this Criterion due to the adaptive management program in place that guides management actions to support anadromous fish on a real-time basis. The monitoring program employed by SCL includes the following elements: (1) annual field monitoring surveys to measure any adult chinook and steelhead take during spawning low flow periods; (2) surveys conducted every ten days during spawning periods to document number of redds dewatered due to project operations; (3) estimates of chinook and steelhead fry stranding take due to flow fluctuations. These events were focused on developing a Take as required by the NMFS during

the construction of a second power tunnel at Gorge Powerhouse. Further action that informs the management actions are contained in the Revised Fisheries Settlement Agreement in 2011, which provides key formulas and methods for adjusting project flows on a real-time basis to promote healthy anadromous fish reproduction downstream. Although these actions do not involve fish passage at the dam, in my opinion, these are supportive of the LIHI goal for upstream fish passage, to “allow for the safe, timely, and effective upstream passage of migratory fish...intended to ensure that migratory species can successfully complete their life cycles and maintain healthy, sustainable fish and wildlife resources in areas affected by the facility.”

Zone 2 – As noted in Flows Criterion above, the Gorge Powerhouse is approximately 0.5 mile below natural barriers to fish migration. This section is lined with steep canyons and was originally very turbulent, preventing anadromous fish from migrating past this point outside of the most favorable conditions. FERC requested further study to confirm this during project relicensing. A report by Envirosphere (1989) noted a large barrier in the river channel with no plunge pool beneath it to allow fish movement upstream, in addition to many other factors which would have rendered upstream salmon and steelhead migration essentially impossible. LIHI also considered this claim during the 2003 certification and 2008 re-certification of the Facility. In both staff reports, LIHI determined that the body of evidence did not support claims that migratory fish may have made it past these natural barriers in any kind of substantial numbers. One steelhead was recently discovered in the plunge pool beneath Gorge Dam, and WDFW noted that any necessary passage/protection measures will be discussed during the upcoming license discussions (expiration date 2025.) For this review, I am relying on the preponderance of existing evidence, and the identification of a single fish is not enough evidence to overturn the existing conclusion. As a result, the Facility does not pose a barrier to upstream passage, as very few migratory fish would have historically made it pass the location of the Gorge Dam. This bypassed reach Zone does not contribute to upstream fish passage, as all flows are passed from the Gorge Powerhouse in Zone 1. In conclusion, the Applicant correctly selected Standard C1 – Not Applicable/De Minimis.

Zone 3 – This is a diverse project area from a fish passage perspective, including two impoundments, two riverine reaches and one bypassed reach. The area is host to strong populations of resident (non-migrating) fish species, including Dolly Varden, cutthroat trout, bull trout, rainbow trout, and eastern brook trout. Given the downstream barriers, it is not clear how these species populated this Zone originally⁸. These species spawn in the tributaries leading to the reservoirs, so upstream passage requires maintaining reservoir levels at an appropriate level to allow migration up these tributaries, and removing any barriers to migration. However, the WDFW noted that “Gorge and Diablo are extremely limited in both spawning and rearing habitat for rainbow trout.”

During the time of the FEIS, a trout supplementation program was established for the Gorge and Diablo reservoirs, with \$300,000 committed by SCL. Spawning rainbow trout in Ross Lake accounted for over 90% of the total population of trout species in all three reservoirs impounded by the Facility. After genetic studies showed strong similarities between the populations, WDFW decided to manage these as one population. The broodstock program was implemented in 2002, focusing on five areas: (1) broodstock development; (2) fish production; (3) investigation of life history and status of Ross Lake trout

⁸ There are two competing theories. One theory is that the trout were able to migrate past the downstream barriers at some point when conditions were right in the past, while other evidence points to a time where the Upper Skagit converged with the Fraser River, which may have provided an opportunity for these species to populate this Zone.

populations and (4) baseline surveys of Diablo and Gorge reservoirs; and (5) development of management recommendations to improve fisheries. The WDFW notes this program is founded on adaptive management, and is intended to “support the native populations, minimize impacts of cultured fish to wild populations in the basin, and enhance recreational opportunity.” (Downen, 2014) In summary, the primary objective of this program for Zone 3 is fish supplementation, given the paucity of natural spawning habitat⁹.

The Applicant selected Standard C1 – Not Applicable/De Minimis. WDFW established that the opportunities for spawning in the various tributaries into Gorge and Diablo reservoirs are “extremely limited.” It has also been established by agencies, as described in Flows Criterion above, that anadromous fish rarely if ever would have made it this far in the original Skagit River due to downstream waterfalls and turbulence. In my opinion, Standard C1 is the correct standard.

Zone 4 – Ross Lake hosts the largest population of Federally-threatened Bull Trout in the U.S. and is the only location known where Bull Trout and Dolly Varden co-exist. Populations have been steadily increasing, as has the average size of these trout. These fisheries have been managed through wild production, due to the extensive spawning habitat in the various tributaries leading to Ross Lake. As a result of studies conducted during the settlement agreement negotiations and re-licensing process in the 80’s and 90’s, new management strategies were developed for Ross Lake to address declining rainbow trout population. These culminated in a multi-pronged mitigation plan focused on restoring populations through harvest regulations and habitat enhancement. Transitory barriers such as debris, logs, etc., in the drawdown zone were surveyed annually and removed when necessary. The parties established the Ross Reservoir Resident Trout Working Group, co-managed by the NPS and WDFW. This is essentially another adaptive management program, influenced by policies set by federal and state agencies, including the Wild Salmonid Policy and the Northwest Forest Aquatic Conservation Plan.

SCL selected Standard C1 – Not Applicable/De Minimis for this Zone, noting that there are no applicable upstream fish passage standards for Zone 4. However, SCL only applied upstream and downstream passage in this Zone as it related to the dam, but in fact they should also consider the migration into and out of the tributaries that feed Ross Lake, as this is the spawning territory for the resident trout populations. In fact, historical records suggest that the flooding of Ross Lake improved spawning habitat for these species, by flooding previously unnavigable streams. These species spawn in the tributaries leading to the reservoirs, so upstream passage requires maintaining reservoir levels at an appropriate level to allow migration up these tributaries and removing any barriers to migration. SCL was required to survey and remove barriers to fish migration (logs, sediment, debris accumulations, etc.) in the tributaries leading to these reservoirs, as part of the SA. These surveys take place on an annual basis and are conducted by the WDFW and NPS. Given that trout species use the feeder streams to spawn, and lake levels are managed to allow for this migration, and conservation efforts are taken to remove debris and ensure annual migration is possible, it is more appropriate to apply Standard C2 – Agency Recommendation for this Zone. Furthermore, Standard C-PLUS can also apply here, as an adaptive management strategy has been employed as part of the Ross Reservoir Resident Trout Working Group. This group monitors results and recommends management actions to improve sustainability of the wild populations of resident trout.

⁹ Contrast this strategy with Ross Lake, where the primary focus is habitat enhancement, removing debris and sediment from feeder streams to promote natural reproduction.

Criterion D – Downstream Fish Passage and Protection

Zone 1 – As noted in Upstream Fish Passage, above, Zone 1 is home to abundant species of all five species of Pacific salmon (chinook, coho, pink, chum, and sockeye) and three anadromous species (steelhead, sea-run cutthroat trout, and sea-run Dolly Varden). These species all inhabit Zone 1 at various times of year, and both adults and juveniles use this stretch for outmigration at the conclusion of spawning and incubation, respectively. There are no barriers to downstream passage in this Zone, but flows in this Zone from the Gorge Powerhouse downstream are an important consideration for successful completion of lifecycles, and therefore are applicable under this Criterion. In winter, flows are managed to minimize the threat of stranding salmon fry on gravel bars and encourage fry to emerge from gravel and migrate to the Puget Sound. To facilitate this, Diablo and Gorge reservoirs reregulate flows and the Ross reservoir is lowered in preparation for spring melt. In the spring, Gorge modifies flows to allow steelhead to spawn and support outmigration of salmon fry.

These flow requirements are included in the Revised Fisheries Settlement Agreement, 2011. The Applicant selected Standard D1, Not Applicable/De Minimis for this Criterion. Although there are agency recommendations pertinent to downstream fish passage, I find the Applicant meets each criterion for D1 by passing the three part test given in the 2nd edition Handbook: (1) the facility does not create a barrier to downstream passage; (2) the Facility is not responsible for extirpation of migratory species, and (3) the Facility does not contribute adversely to the sustainability of riverine fish populations or to their habitat necessary for completion of their life cycles. Furthermore, I find the Applicant can meet Standard D-PLUS, for the same reasons that the Applicant meets standard A-PLUS for this Zone. SCL biologists monitor fish populations during the spawning and rearing periods, and then use this data is used to modify, in real time, flows at the project to facilitate optimal reproduction and inform the stakeholders at the state and tribal level to make resource management decisions. Furthermore, SCL facilitates research studies each year by universities and other groups to improve understanding of the salmonid populations and life history in this Zone. This is a clear example of an Adaptive Management Program as defined by LIHI.

Zone 2 – As noted previously, the Gorge bypassed reach was likely the upstream extent of natural fish migration and agencies have never required upstream or downstream passage in this Zone. Genetic studies conducted on Bull Trout and rainbow trout in the Upper and Lower Skagit Rivers (separated by this Zone) revealed very little genetic exchange between the two populations, further confirming the theory that passage to allow these species to reproduce is not necessary. The Flows Criterion above describes the conclusions during the Environmental Assessment process pertinent to downstream fish passage in this Zone. Although this bypassed reach does contain habitat for both resident species and anadromous species, it was determined that flow enhancements were more valuable downstream of the powerhouse (in Zone 1,) to mitigate for any lost habitat in this Zone. The FEA concludes: “There was little in the way of good mainstem or tributary spawning habitat in this reach, so flow enhancements in the Gorge bypassed reach would have little value for fisheries. The river below the Gorge powerhouse and the town of Newhalem that is affected by river flows from the powerhouse is of far more value to the anadromous fishery. We view the enhancement actions proposed in the SA as related to impacts of project operations on each species, and therefore, appropriate.”

The applicant appropriately selected Standard D2 – Agency Recommendation. The scientific basis includes several studies that concluded this reach was primarily off-limits for anadromous fish migration

due to high turbulence and rapids. The project is operated in a manner where flows that could be provided into this bypassed reach are instead stored and passed through the powerhouse according to a strict adaptive management program to promote healthy downstream habitat.

Zone 3 – As noted previously, the barriers in Gorge and Diablo Canyons likely rendered upstream fish passage impossible. However, downstream passage of the populations present in the Upper Skagit was likely prevented by the construction of the Gorge and Diablo dams. The 2014 WDFW study states quite clearly: “the construction of Gorge and Diablo dams in 1917 and more significantly construction of Ross Dam between 1937 and 1954, impeded opportunity for downstream migration which could have occurred in the free flowing waters of the Skagit River.” However, the study also notes: “the impounding of the Gorge, Diablo, and Ross reservoirs inundated many miles of river habitat and fragmented upper Skagit fish populations. It also created hundreds of hectares of lake-like habitat for fish and for recreational activity.” Although there does not appear to be any conclusion as to the net effect of these dams on the total population of resident trout in the Upper Skagit, it does seem quite clear that Standard D1 – Not Applicable/De Minimis (applied by SCL) is not appropriate here. Standard D1 requires that the construction of the facility is not a barrier to downstream passage for both migratory and riverine fish populations.

Although the Diablo and Gorge reservoirs are managed in a manner to allow flows to be available for Zone 1, there are no specific agency recommendations or technologies deployed for downstream fish passage in Zone 3. Instead, as part of the Settlement Agreement SCL maintains a broodstock program to supplement populations of Diablo and Gorge reservoirs with rainbow trout from Ross reservoir. This effort is described in detail in Criterion C for this Zone, above. In my opinion, this program is a clear example of Standard D4, Acceptable Mitigation. The SA shows strong consensus among all stakeholders involved in managing fishery resources that these measures are, in fact, acceptable. The Applicant employs approved mitigation measures that support all populations of migratory and native non-migratory fish affected by the Facility operations. These measures are approved by the FCC and NCC and include ongoing monitoring.

Zone 4 – As noted above in Zone 3, the construction of Ross Dam impeded downstream migration which could have occurred on the Skagit River. Furthermore, the Biological Opinion for Bull Trout in this Zone noted that the species will “continue to be entrained at the intakes and spillways of all three projects for the remainder of the license period.” However, this is later acknowledged to be an assumption, with no data available on entrainment of bull trout at spillways and/or intakes of the dams. Populations of trout in Ross Lake have been expanding and are considerably higher and more reproductively sustainable than Diablo or Gorge Lakes, due to the plethora of available spawning habitat in the feeding tributaries. The Applicant selected standard D1 – Not Applicable/De Minimis for this Zone. For all of the same reasons as Zone 3, I find that D4 – Acceptable Mitigation is more appropriate for this Zone, due to the stocking programs.

Criterion E – Shoreline and Watershed Protection

*Zones 1 and 2*¹⁰ – The Skagit from Gorge Powerhouse to 11 miles downstream is designated as a “Wild and Scenic River” (WSR). This region is managed by the National Park Service as part of the Ross Lake National Recreation Area, and is classified as the “Skagit River Zone,” managed to maintain and improve riparian quality. This designation is based on the outstanding resource values for fish, wildlife, geology, history, pre-history, recreation and scenic resources. Management goals are focused on natural and cultural resource preservation in this Zone, which consists of 1/4 mile on either side of the Skagit. Dozens of feeder tributaries join the Skagit in this Zone, fed by the numerous glaciers within the National Park. WSR designation comes with protections from logging, development, natural bank protection, and other management actions that protect the segment’s free flowing character, water quality, and resource values.

Guided by actions in the Settlement Agreement, SCL actively owns, protects and manages ~13,830 acres of habitat below the Facility, as part of three programs: Fisheries, Wildlife Mitigation Lands, and the Endangered Species Early Action Program (ESA). As part of the ESA program, SCL launched a series of actions to acquire and restore habitat for downstream fish species. As part of the Biological Opinion issued to protect threatened Chinook salmon and Bull Trout, these actions became included as an amendment to the FERC license. These actions are supported by ongoing monitoring of downstream habitat. In addition, the Revised Settlement Agreement (2011) establishes an Anadromous and resident fish non-flow improvement plan, which includes an off-channel Chum habitat development and improvement program. This is a phased approach, beginning with site inventory and prioritizing habitat restoration actions from there. The SA included \$1.5M for this effort. Finally, SCL is required to provide “\$300,000 for instream or off-channel habitat improvement and sediment reduction measures on the Skagit Wild and Scenic River...” These include reducing sediment load in tributaries, stabilizing banks through revegetation, and installing instream check dams.

In addition, the Facility is required to comply with its Erosion Control Plan, developed primarily for project lands around Ross Lake, but also includes some provisions for Zone 1 (e.g., actions around the design, maintenance and rehabilitation of roads). SCL also engages in voluntary activities to protect against the spread of invasive plant species by engaging with local groups to do weed control along the Skagit River and transmission right-of-ways. Perhaps the largest actions taken by SCL to protect and preserve local watersheds are related to the Wildlife Habitat Protection and Management Plan, developed in the initial Settlement Agreement in 1991. This Plan included \$17M from SCL operations to acquire wildlife habitat property rights and provide enhancements. The SA defined target areas as lands that possess “riparian areas and corridors, wetlands, and mature forest communities; have eagle usage or provide elk winter range; and/or are adjacent to other protected lands.” The Agreement included ongoing support to fund wildlife and environmental research and studies in the impacted area, and it provides ongoing payments to the North Cascades Environmental Learning Center to advanced public knowledge about the values and issues in wildlife management.

One comment received from the National Park Service noted “Seattle City Light has been exemplary in its attention to wildlife needs as pertains to the National Park Service Complex and regularly reaches out

¹⁰ These Zones are combined because similar Shoreline and Management Protections apply to the Gorge Bypassed Reach. However, this area is not eligible for the “Wild and Scenic” designation of the downstream reach due to the dewatered conditions. This area is characterized by a steep rocky canyon bordered by State Route 20 and a transmission line.

for informal consultation on potential wildlife issues. They have observed necessary protection protocols when sensitive species are known to be present in an area” (Ransom, 2017). A comment from the Skagit Watershed Council noted that SCL engages in and financially supports voluntary activities in support of SWC’s mission to understand, protect and restore healthy habitats for sustainable fisheries in the Skagit, and concluded “Seattle City Light has been an excellent steward of the Skagit Watershed’s many natural and cultural resources, and an unwavering partner in our Council’s varied efforts to preserve habitat for sustainable fisheries” (Brooksmith, 2017). The Applicant properly selected Standard E2, Agency Recommendation for this Criterion.

Zones 3 and 4 – The three reservoirs that comprise the SRP reservoirs occupy approximately 12,850 acres, which are within federal ownership and managed by the National Park Service as part of the Ross Lake National Recreation Area and the North Cascades National Park. NPS classifies land within 200 feet of Gorge and Diablo reservoirs as “Hydroelectric Zone.” This area is managed with the recognition that alteration of habitat will occur due to the Facility, but these impacts are minimized to preserve the local ecosystem. Management actions are primarily focused on educational opportunities in this Zone. The same habitat enhancement actions taken as part of the non-flow improvement plan also apply for this Zone. This area consists primarily of upland forest, with pockets of riparian forest, riverine habitat, wetland, non-forested areas and some limited developed areas. Extensive forests of Douglas fir and western hemlock grow beyond the immediate project area area, along with agricultural areas. Immediately surrounding the reservoirs, there are approximately 306 acres of upland and riparian old-growth coniferous forest, and 11 acres of wetlands. Surveys showed areas of erosion along shorelines, roads and campgrounds, although only four sites were identified to have “particularly important habitat or species,” according to the FEA. The populations of most wildlife species home to the Skagit River Basin are deterred by the presence of the reservoirs, which provide “no suitable habitat.” The FEA further notes that the one exception to this is the osprey, with several nest sites in the project area.

In Zone 4, only the immediate area around the Ross Dam and Powerhouse is classified as a “Hydroelectric Zone,” and the remaining area is classified as “Frontcountry” and “Backcountry” Zones. (Frontcountry Zones are managed primarily as recreational sites and nearby areas, allowing limited and necessary modifications while ensuring areas outside areas are preserved. Backcountry Zones are managed to preserve natural resources and restoration, and recreational opportunities in this area “focus on providing a sense of remoteness and immersion in nature within a mountainous wilderness setting.”) The Ross Lake National Recreation Area General Management Plan is a comprehensive guide to preserving and protecting land in these Zones.

The Settlement Agreement and accompanying Wildlife Habitat Protection and Management plan constitutes agency recommendations for this Zone to compensate for wildlife impacts as a result of this Project. Additional recommendations include the Erosion Control Plan, and annual reports are filed to FERC outlining progress and compliance with this plan. For example, SCL maintains greenhouse facilities to cultivate native plants for reintroduction to erosion control sites. Based off the comments from the NPS and SWC noted above, SCL’s activities to protect and preserve the watershed appear to be widely supported and successful. SCL appropriately selected Standard E2 – Agency Recommendation for Zones 3 and 4.

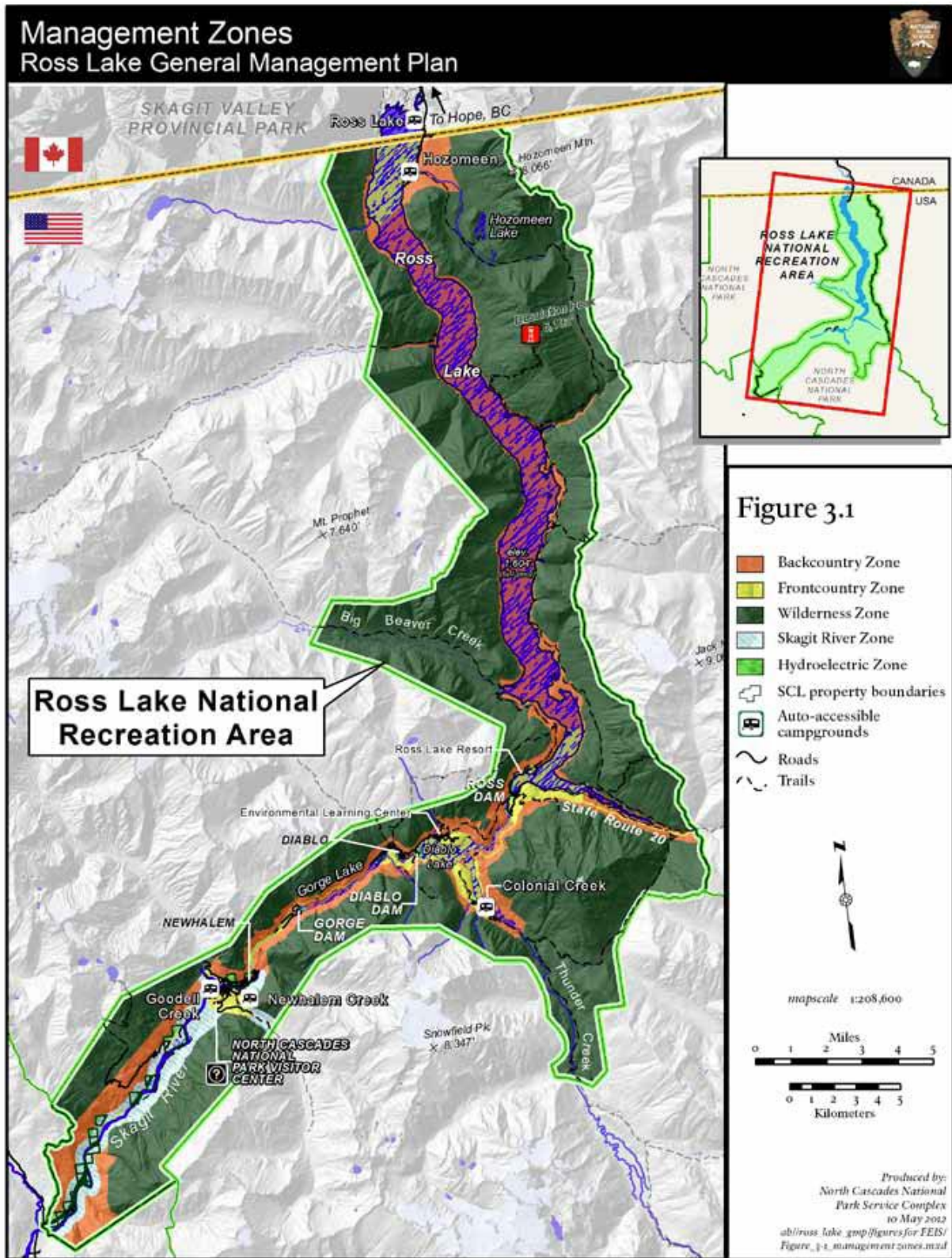


Figure 14 – Ross Lake National Recreation Area Watershed Zones (as managed by the NPS)

Criterion F – Threatened and Endangered Species Protection

All Zones – The Skagit Facility and surrounding area is habitat to five terrestrial and three aquatic threatened and endangered species, although the terrestrial species are unlikely to occur with significant frequency. No federally-listed plant species are known to occur in the Facility area. During project relicensing (circa 1994), FERC and USFWS concurred that the Facility was not likely to adversely affect federally listed species. Furthermore, the FEA noted that habitat acquisition activities pursuant to the Settlement Agreement would benefit T&E species in the region. Individual species and any relevant mitigation measures are discussed individually below:

Grey wolf (Federal: endangered) – Originally, gray wolves roamed North America from the Arctic to Mexico, but today they are concentrated primarily in Alaska and Canada. Wolf populations were nearly eliminated from Washington by 1930, but since that time have made a steady comeback. Sightings have been concentrated around Ross Lake, and SCL notes wolf tracks are frequently observed around the shoreline during winter when the reservoir is drawn down. Interestingly, a map available on the WDFW website does not report any wolf sightings close to the vicinity of the Zones of Effect for Skagit. Other than the general impacts to habitat due to the initial fill of the reservoirs in the early 1900s, there is no evidence that the Facility operations impact grey wolf populations.

Grizzly Bear (Federal: threatened, State: endangered) – Although there is potential for habitat for Grizzly Bears, there have been no recent observations in this area. The NPS states that during the past ten years only two have been verified in the Cascade Mountains, and those were in British Columbia. Other than the general impacts to habitat due to the initial fill of the reservoirs in the early 1900s, there is no evidence that the Facility operations impact grizzly bear populations. A Study conducted by Washington State University in 2000 concluded that there are approximately 6 grizzly bears in the entire North Cascades and that natural recovery was unlikely due to a variety of demographic and environmental effects.

Canada Lynx (Federal: threatened, State: endangered) – As of 2016, the Canada Lynx is endangered in Washington State, with state and federally biologists estimating between 50 and 100 remaining. Only a few hundred of these felines are suspected to remain in the lower 48 U.S. states. Habitat is primarily located in high elevations (peaks and ridges,) and east of the Skagit reservoirs. They depend on old forests, and their habitat is threatened by logging, development and road-building. Critical habitat was designated in 2006, and is limited to suitable habitat above 4,000 feet elevation in portions of Chelan and Okanogan counties. As a result, the lower altitude reservoirs of Skagit are likely well below suitable habitat for the Canada Lynx.

Northern Spotted Owl (Federal: threatened, State: endangered) – The spotted owl has been observed in northern Washington, primarily in elevations below 5,000 feet. They prefer dense forests for daytime roosts, and often nest nearby their roosting sites. Ross Lake National Recreation Area (RLNRA) is located within a designated conservation area in the recovery plan for the owl, which noted that up to 10 pairs *could potentially* nest in the area. However, the FEA acknowledged that spotted owls are *not known* to nest in the RLNRA, and this area does not include any critical habitat for the spotted owl.

Marbled Murrelet (Federal: threatened) – This threatened seabird typically ranges within 40 miles of the ocean, with a maximum of 55 miles inland, still leaving it well short of the Skagit Facility (60+ miles

from the ocean.) The Murrelet is a diving bird that feeds near oceans on small invertebrates and fish, and nests inland in coniferous forests. Historically, populations of the Murrelet were damaged by loss of habitat associated with oil spills and mortality associated with gill net fishing. This species was included in the FEA because of its potential to fly or nest near power lines associated with the Facility. In 2007, SCL purchased the 1,108-acre Boulder Creek parcel, which included over 200 acres of old-growth forest that may include habitat for Marbled Murrelet and Spotted Owls.

Aquatic Species (applicable to all)

At the time of re-licensing, Bull Trout, Chinook salmon and Steelhead were not listed as threatened under the Endangered Species Act. When these species were listed as federally threatened¹¹, SCL began implementing voluntary restoration actions under a new program known as the ESA Early Action Program (EAP.) This included funding and full-time staff to “develop and complete research, conservation land acquisition, and habitat restoration projects in the Skagit River water for the recovery of listed fish species.” The Biological Evaluation completed in 2013 for the Second Gorge Power Tunnel noted the success of this program, attributed to strong partnerships with the Skagit Watershed Council, local tribes, state and federal agencies, and NGOs. Through this EAP, SCL now has full-time fish biologists working with local partners to support ongoing recovery efforts and serving on the Skagit Chinook Recovery Planning Group, the FWS Puget Sound Bull Trout Recovery Implementation Team, and NOAA’s Puget Sound Steelhead Technical Recovery Team. SCL has provided approximately \$4M in direct funding to these efforts, which have leveraged an additional \$4.5M in grants and matching funds. SCL’s ongoing support includes the following goals:

1. Protecting the highest quality habitats remaining that are vital to existing fish populations in the watershed
2. Restoring habitat conditions in areas throughout the watershed that are limiting the survival and spatial distribution of listed fish species
3. Developing and implementing watershed-wide research programs that improve the scientific understanding of the life history and habitat requirements of listed species

A detailed description of the EAP, including history and actions to date, is provided in the 2013 Biological Evaluation. Key accomplishments and investments from the EAP program are summarized below:

- Direct investment of \$3.9M and matching funds of \$4.5M
- Acquisition of 2,000 acres of high quality habitat in Skagit watershed for ESA-listed fish species
- Restoration of native riparian vegetation along a 2-mile section of middle Skagit
- Native vegetation planting to reduce erosion in Iron Mountain Ranch conservation area
- Ongoing restoration of 140 acres of land in Skagit River delta to provide natural estuary habitat; initial \$200,000 investment from SCL has leveraged an additional \$2M from state/federal sources
- Direct funding of \$1+M in targeted research studies for Chinook salmon, bull trout, and steelhead research studies in Skagit watershed

¹¹ Bull Trout were federally listed as threatened in 1998, Chinook Salmon in 1999 and Steelhead in 2007

Bull Trout (Federal: threatened) – As noted in Fish Passage above, the Skagit River System has one of the most abundant and healthy Bull Trout populations in the lower 48 U.S. states, particularly in the Upper Skagit (Zones 3 and 4, although the Lower Skagit is also listed as a core area by the USFWS). These reservoirs contain the critical 4 “Cs” of healthy Bull Trout habitat – Cold, Clean, Complex and Connected. Controlled harvest is permitted in the reservoirs and river system. Genetic studies on bull trout populations above and below the Gorge Dam identified two distinct populations, confirming the theory that migration was unlikely or impossible between the Lower Skagit and Upper Skagit, due to the presence of natural barriers in the area. The resident trout populations migrate into the tributaries of the reservoirs to spawn in late summer. A Biological Evaluation conducted during construction of the second Gorge Power tunnel, found that actions taken would either maintain or improve physical and biological diagnostics for bull trout.

Specific ongoing actions pertinent to Bull Trout include monitoring programs and operational requirements. The Lower Skagit Bull Trout Monitoring Program is conducted in partnership with the WDFW, and consists of annual population surveys of bull trout populations to estimate abundance of spawning habitat and adult trout. The research provides early warning for resource managers to restrict harvests to improve reproduction opportunities. The Upper Skagit Bull Trout Monitoring Program is conducted in partnership with the British Columbia Ministry of Environment, Skagit Environmental Endowment Commission (SEEC), and North Cascades National Park, and is designed to guide recovery actions for bull trout in the Upper Skagit. Activities included implanting Bull Trout with telemetry tags to identify spawning movements and estimate total population of spawning fish. Operational measures include impoundment drawdown management and transitory barrier removal, to protect spawning fish in tributaries leading to reservoirs (see upstream and downstream passage, above)

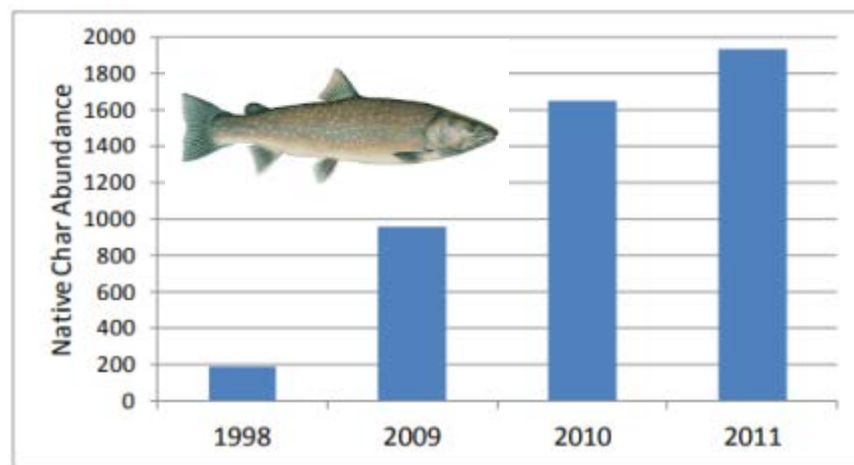


Figure 15 - Bull Trout Population Estimates (1998-2011)

Puget Sound Chinook Salmon (Federal: threatened) – Chinook or “King” salmon are the largest species of Pacific salmon, often exceeding 40 pounds. As an anadromous fish species, they live at sea and travel upriver to spawn in areas with high velocity and large gravel. Given their size and strength, they are capable of reaching the Gorge Dam, although historically this was likely the upper extent of their migration. Studies have indicated steady and slightly increasing populations of Chinook salmon in the

Skagit River over the past 40 years. Given these migration routes, extensive planning and recovery actions have been taken and/or funded by SCL to support restoration in the Lower Skagit. These efforts help keep redds (nests) submerged, promote upstream migration and spawning and provide stable flows for incubation and outmigration of fry. These operational protocols include controlling downramp amplitude, downramping rates, minimum flows, reservoir levels, etc., and are described in detail in Upstream and Downstream Passage Criterion, above. In addition, SCL funds extensive research, habitat acquisition projects, and watershed restoration projects, many of which are intended to protect (or have the result of protecting) Chinook salmon habitat. This includes \$100,000 annually dedicated to Chinook salmon and steelhead, and an additional \$400,000 annually to the EAP described above as a result of the Settlement Agreement.

Puget Sound Steelhead – The Skagit River is home to three distinct steelhead populations: Skagit River Winter Steelhead, Sauk River Summer Steelhead, and Cascade River Summer Steelhead. These populations overlap significantly with the Chinook salmon populations, although they make more extensive use of tributaries leading to the Skagit and are slightly more sensitive to gradient and turbulence. The Biological Evaluation conducted in 2011 concluded that “project operations are considered to have an adverse effect on the limited spawning habitat present in the reach [downstream of Gorge Dam]” primarily due to flow alterations and disruption of sediment transport. Actions to protect steelhead populations are similar to Chinook salmon, including flow protocols operated according to an adaptive management program described in Upstream and Downstream Fish Passage, above. In cooperation with WDFW and the Skagit tribes, SCL is assessing the impacts of hatchery steelhead on wild populations in the Skagit. In addition, SCL funds extensive research, habitat acquisition projects, and watershed restoration projects, many of which are intended to protect (or have the result of protecting) steelhead habitat. This includes \$100,000 annually dedicated to Chinook salmon and steelhead, and an additional \$400,000 annually to the EAP described above as a result of the Settlement Agreement.

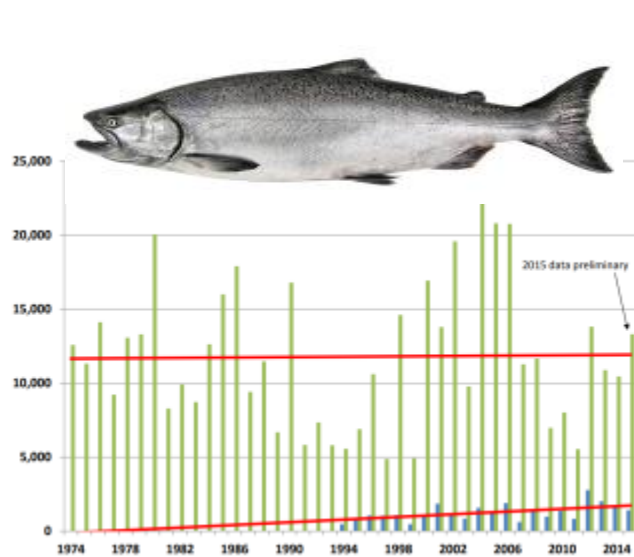


Figure 16 - Chinook Salmon Escapement (1974-2015)

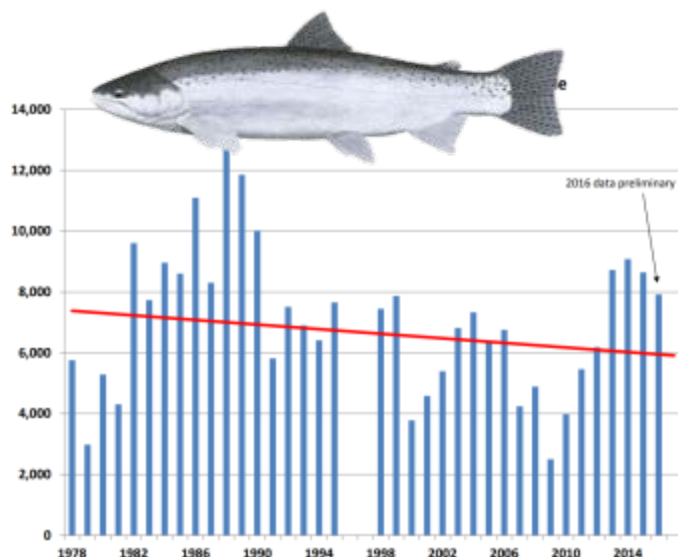


Figure 17 - Steelhead Escapement (1978 - 2016)

Zone 1 – SCL selected Standard F3 – Recovery Planning and Actions and applied the PLUS Standard for Zone 1. The project was found to not adversely impact terrestrial species during project re-licensing, and a comment received from the National Park Service noted “Seattle City Light has been exemplary in its attention to wildlife needs as pertains to the National Park Service Complex and regularly reaches out for informal consultation on potential wildlife issues. They have observed necessary protection protocols when sensitive species are known to be present in an area” (Ransom, 2017). During the License Amendment Process for construction of the second Gorge power tunnel, the USFWS and NOAA provided Biological Opinions for Chinook salmon, steelhead, and bull trout. The BO requires a monitoring plan and annual take report for Chinook salmon and steelhead. SCL provided evidence of this report, and no issues of non-compliance with recovery plans were identified during the review. SCL selected the Fisheries Settlement Agreement as evidence of the Enforceable Agreement needed to apply for PLUS Certification. The annual spawning survey and real-time modifications of project operations to protect migrating fish and incubating eggs qualifies as an adaptive management program, as described in Flows criterion, above. In addition, SCL makes extensive and ongoing investments, on a voluntary basis at times, to protect and preserve ESA-listed species in this Zone (and above Zones.)

Comments received from the Skagit Watershed Council noted that SCL engages in and financially supports voluntary activities in support of SWC’s mission to understand, protect and restore healthy habitats for sustainable fisheries in the Skagit, and concluded “Seattle City Light has been an excellent steward of the Skagit Watershed’s many natural and cultural resources, and an unwavering partner in our Council’s varied efforts to preserve habitat for sustainable fisheries” (Brocksmith, 2017). The Skagit River System Cooperative noted that “tangible benefits I have observed while working with SCL to implement their license include routinely providing additional flow beyond their minimum requirements to provide a higher level of incubation and emergence success of salmon and steelhead as well as funding research that has increased the scientific knowledge of fish and fish habitat specific to the basin” (Walsh, 2017). The WDFW also directly commended the habitat acquisition program by stating “SCL has gone outside the license to spend money on threatened and endangered species habitat. I have never witnessed a better or more successful acquisition or restoration program than provided by Seattle City Light” (Applegate, 2017). Finally, USFWS noted that SCL is “very responsive to our comments and recommendations...extremely timely and responsive to our requests for clarifications or information” (Chan, Wright 2017).

As part of the review process, I solicited comments from various non-agency Skagit River stakeholders. There was one comment from the Upper Skagit Indian Tribe that SCL has “not met all recommendations for protecting fish, and are not currently operating in a manner that protects fishery resources” (see Appendix A.) The commenter cited two pieces of evidence (1) an incident where the Facility shut down during a lightning storm, resulting in a de-watering of the Upper Skagit; (2) SCL staff recommending hatchery actions that significantly impact Tribal Treaty rights, without consulting impacted tribes, and (3) the promotion of the theory that the projects are historically above a natural fish barrier. This third piece of evidence is addressed in detail in Flows and Fish Passage Criteria, above. The following addresses the first two issues raised by this commenter:

The first incident occurred on August 10, 2013, when lightning strikes disabled all communication and control systems at the Facilities, resulting in a period of 42 minutes when little to no flow was passed through the Gorge powerhouse into the Skagit River. SCL consulted with the FCC and estimated potential damages to fishery resources, and as a result of the incident proposed three actions to reduce the likelihood of a similar event interrupting flows from the project. These included installing relays that sense certain conditions and activate the turbine bypass valve, installing a camera at Gorge powerhouse to visually monitor flow, and allocating funding to upgrade communications system and expand powerhouse circuitry. FERC determined the incident was beyond the control of the Applicant and the Force Majeure provision of the SA would apply. This was not considered a violation of the project license.

I requested further clarification on the hatchery recommendations issue. The commenter cited the 2013 report which addressed the interactions between hatchery and natural-origin steelhead in the Skagit Watershed (Pflug et al., 2013), and specifically a recommendation to discontinue the segregated hatchery steelhead program. The report included the following expected responses (benefits) for this recommendation: (1) elimination of hatchery and wild steelhead competition at all life stages, (2) rapid reduction of hybridization rates between hatchery and wild steelhead, and (3) an increase in survival of wild steelhead. The following recommendation is to evaluate the effects of replacing this segregated hatchery program with an integrated hatchery program. The report determined that “the segregated hatchery method is adverse for wild steelhead recovery but an integrated approach to hatchery steelhead production may be beneficial or neutral to wild steelhead recovery.” The report was authored by a well-qualified list of fish biologists from state and federal agencies, NGOs and tribes. The Upper Skagit Indian Tribe is listed as a Study Team Member (and acknowledged this in their comments.) Their point of contention is that they were not consulted on the final recommendations.

In the case of conflicting resource agency recommendations, LIHI offers a method for resolving this dispute. However, in this case, Upper Skagit provided no evidence that they ever made an alternative and/or competing recommendation. Should they have, it would be considered in the following way (2nd edition Handbook, page 48):

“Where there are conflicting resource agency recommendations and the conflict is not resolved by applying the most recent and most environmentally stringent recommendations, the conflict shall be resolved by applying the recommendations based upon the health of threatened or endangered biological organisms first, the health of other biological organisms second, cultural resources third and recreation fourth.”

The primary purpose of the recommendation is to increase the health and survival of wild steelhead, a threatened species. According to LIHI criteria, this is the highest priority consideration. Upper Skagit’s primary contention is that they were not consulted, however that would not supersede the need to protect and preserve this species. The actions taken by SCL to protect threatened and endangered species, and willingness to go “above and beyond” resource agency requirements as shown by the supporting

documentation and extensive stakeholder comments, demonstrates compliance with LIHI Standards .In my opinion, the Applicant appropriately selected Standard F3 and the PLUS Standard for this Zone¹².

Zone 2 – SCL selected Standard F1 – Not Applicable/De Minimis for Zone 2. The justification for this selection is the evidence that migratory fish rarely, if ever, made it through this Zone to spawn. Based on my previous conclusion that this finding is accurate (see Flows, Upstream Fish Passage), I also agree that Standard F1 is appropriate for this Zone. One steelhead was recently discovered in the plunge pool beneath Gorge Dam, and WDFW noted that any necessary passage/protection measures will be discussed during the upcoming license discussions (expiration date 2025.) For this review, I am relying on the preponderance of existing evidence, and on the fact that the identification of a single fish is not enough evidence to overturn the existing conclusion.

Zone 3 – SCL selected Standard F2 – Finding of No Negative Effect for Zone 3. The Applicant’s basis is a conclusion by USFWS that the actions to build a second Gorge power tunnel were “not likely” to jeopardize fish populations in the impacted area. The Biological Opinion estimates mortality rates for both Gorge and Diablo dams due to entrainment of 17 bull trout per year¹³, under normal operating conditions. The BO for Chinook salmon and steelhead, prepared by NMFS, and the BO for Bull Trout, prepared by USFWS, both concluded that the proposed action is not likely to jeopardize the continued existence of those species. However, this conclusion appears to be targeted at the construction of the power tunnel. The section of the BO that describes the impacts of *ongoing operations* on fish passage suggests that the project “may affect, likely to adversely affect” Chinook salmon, steelhead, and bull trout. In my opinion, Standard F4 – Acceptable Mitigation is more appropriate here. The various flow and non-flow enhancements to support Bull trout habitat in Gorge and Diablo reservoirs are enumerated in the fish passage criteria, above. These clearly qualify as acceptable mitigation, and resource agencies and fishery management groups appear satisfied with the results to date. Furthermore, the project was found to not adversely impact terrestrial species during project re-licensing.

Zone 4 – SCL selected Standard F4 – Acceptable Mitigation for Zone 4, and applied the PLUS criteria. As noted previously, Ross Lake is host to an abundant population of bull trout. These adfluvial trout spend their adult lives in Ross Lake and travel to the feeding tributaries to spawn. SCL maintains a monitoring program for these trout, including radio telemetry and spawning surveys, and has funded significant research on trout populations in concert with state, federal and Canadian partners. This research will be incorporated into the recovery plan for bull trout in the upper Skagit watershed, and provide useful information for resource managers to ensure healthy populations are maintained in Ross Lake. Furthermore, SCL conducts annual surveys of the drawdown zone and transitory barrier removal to allow fish to access feeder tributaries. These actions clearly qualify as Acceptable Mitigation, with data showing strong and growing populations in Ross Lake. These actions are also required in the Settlement Agreement, which is an enforceable agreement with proactive measures to minimize risk to species, and

¹² In my opinion, it would be inappropriate to grant PLUS certification for the Flows Standard and not grant PLUS certification for this Criterion, given that the adaptive management flows program is specifically designed to protect federally threatened species (Bull Trout and Chinook salmon.)

¹³ Diablo Dam – 4 fish entrained in intake, 6 fish entrained in spillway; Gorge Dam – 4 fish entrained in intake, 3 fish entrained in spillway

therefore qualifies for PLUS certification. The comments received from agencies and fishery management groups, referenced above and in Appendix A, support this finding.

Criterion G – Cultural and Historical Resource Protection

Surveys conducted by SCL in the re-licensing process concluded that prehistoric resources, historic resources, and Native American practices “may be adversely affected by the relicensing and continued operation of the SRP.” A Settlement Agreement on Cultural Resources was executed between SCL, the NPS, and the Tribes, which included a series of plans to mitigate impacts and promote educational opportunities for historic resources in the project areas. SCL originally funded these programs at an estimated \$1.5M, with additional funding to the NPS for surveys at the project and documenting historic building and engineering resources. SCL and NPS jointly developed a program to train staff in preservation techniques, and measures were implemented to enhance educational opportunities at the sites, including walking tours and interpretive displays. Measures to mitigate impacts to Native American practices were discussed and formalized in the form of MOAs between SCL, SHPO, the NPS and the Tribes. The FEA noted that the proposals in the SA fully addressed the Native American issues, and concluded that the measures would have beneficial cumulative impacts on traditional cultural properties. The impacts to each project Zone are discussed below.

Zone 1 – The town of Newhalem just downstream of Gorge Powerhouse contains many structures listed on the National Register of Historic Places (NRHP). Newhalem was constructed as a worker town to support the construction of the Skagit Project. Archaeological surveys have also revealed several buried sites downstream of the Gorge Powerhouse, and SCL has provided three Native American tribes funding to conduct their own inventories (results are confidential.) SCL must manage all identified historic and archaeological properties in accordance with the FERC license and several approved plans, including the Settlement Agreement Concerning Cultural Resources (Archaeological and Historic Resources, 1991) and two MOAs discussed above. SCL must comply with their Historic Resources Mitigation and Management Plan (HRMMP,) and Archaeological Resources Mitigation and Management Plan (ARMMP, 2014.) SCL selected Standard 2 – Approved Plan for this Criterion. The record showed no issue of noncompliance with these various plans for cultural and historic resource protection, and the National Park Service noted that the Facility is in compliance and is “doing their part to protect cultural resources” (Kwarsick, 2017). Furthermore, the Skagit River System Cooperative – the fisheries and environmental group for the Swinomish and Sauk-Suiattle Tribes noted that “throughout the 22 years I have worked with SCL on the implementation of their license they have routinely gone beyond their minimum requirements to provide additional protection for fish, they readily and collaboratively work with the agencies and tribes, and they participate in workgroups and forums not directly tied to their license to the benefit of habitat and scientific knowledge in the basin.” In my opinion, this Standard is appropriate.

Zone 2 – In 2013, SCL received an amendment to their FERC license to construct a second power tunnel to the Gorge Powerhouse. This construction would have the potential to impact two historic properties on the NRHP – the Gorge Railroad Bridge and Ross Crypt. Washington Department of Archaeology and Historic Preservation provided a letter on December 9, 2010 concluding that the proposed action would have “no adverse effect on the character-defining features of the bridge and the crypt.” The Upper Skagit Indian Tribe indicated support of the proposal by letter dated November 16, 2010, and the Swinomish Indian Tribal Community commented that the area of effect would not impact any cultural resources in the area. The project is currently on hold. The Applicant selected Standard G1 – Not Applicable/De

Minimis Effect, but this requires that no cultural or historic resources are located on facility lands. Standard G2 – Approved Plan would be more appropriate, as the Facility is in compliance with the various plans discussed in Zone 1.

Zone 3 – This Zone includes the Diablo Historic District and other NRHP-listed structures including the dams and powerhouses for Diablo and Ross. Given this listing, all maintenance activities are reviewed under the Project HRMMP. The Applicant noted that any ground-disturbing activities are evaluated by their staff archaeologist in consultation with NPS, the SHPO, and potentially affected tribes. The Applicant appropriately selected Standard G2 – Approved Plan for this Zone, as the Facility is in compliance with the various plans discussed in Zone 1. The Applicant further applied the PLUS Criterion for this Zone, based on a rehabilitation initiative for buildings located in the Diablo Historic District. These activities included foundation repair, windows and interior wood finishes, new roof installation, kitchen updates, etc. On August 14, 2015, SCL provided a five-year report for activities conducted between June 2010 and May 2015, which included pictures and descriptions of these rehabilitation projects. The report states that the purpose is to summarize historic resource protection and preservation activities *under the Settlement Agreement on Cultural Resources*. The LIHI PLUS Criteria requires a substantial commitment *beyond what is required in existing plans*, and this does not appear to be outside of existing plans. Although commendable, in my opinion this does not fit the LIHI definition of PLUS Criterion for Cultural and Historic Resources¹⁴.

Zone 4 – Surveys conducted between 1988 and 1990 identified archaeological resources in the vicinity of Ross Lake, including 144 prehistoric sites and 67 isolated prehistoric artifacts or features. These sites indicate the subsistence of the aboriginal Native American tribes, including fishing, hunting and gathering, among others. Some of these sites are adversely impacted due to erosion from impoundment level fluctuations, and measures agreed to in the SA focus on erosion control and monitoring of shoreline retreat. In 2004, the Upper Skagit River Valley Archaeological District (located within Zone 4) was listed on the National Register of Historic Places. According to SCL, the record shows nearly 10,000 years of settlement in the area by indigenous people groups. The FEA concluded that the measures taken by the applicant in the Settlement Agreement would result in a cumulative beneficial impact to archaeological resources in the area, by enhancing educational opportunities on historical uses of the sites. The measures include ongoing survey, testing and evaluation of archaeological sites and maintenance of historic structures. SCL selected Standard 2 – Approved Plan for this Criterion. The record showed no issue of noncompliance with these various plans for cultural and historic resource protection, and Kim Kwarsick noted that the Facility is in compliance and is “doing their part to protect cultural resources.” In my opinion, this Standard is appropriate.

¹⁴ This will not impact the term of LIHI certification, because the Applicant already qualifies for the maximum term due to previous two PLUS qualifications (Flows and Threatened and Endangered Species).

Criterion H – Recreational Resources

Zone 1 – As noted above, an 11-mile stretch of the Skagit River downstream of the Gorge Powerhouse is designated as a Wild and Scenic River, partially due to outstanding recreational resource values. Boating, fishing, hunting, camping and climbing are all popular activities in this Zone. The 1991 Settlement included a Recreation and Aesthetics Settlement Agreement, which serves as the primary plan governing recreational opportunities for the entire Skagit Project and included a total of \$17M (in 1990 dollars) over the term of the license. This includes funds to USFWS to construct and maintain facilities along the Skagit River and State Route 20 corridor and to NPS for facilities within the RLNRA, even though many of those projects are not on SCL-owned lands. In Newhalem, SCL maintains an active role in developing and restoring recreational facilities, and constructed and provides staff for the Skagit Information Center. SCL selected Standard H2 – Agency Recommendation for this Zone, and in my opinion, this is the appropriate standard.

Zone 2 – Recreational activities in this bypassed reach Zone are limited due to frequently dewatered conditions, and the Zone has signs notifying this as a hazardous area due to safety reasons. The area is searched and cleared each time a spill is planned over the Gorge Dam. Sport climbing is one potential activity in the Skagit Gorge from Newhalem to Diablo, and this activity is managed by NPS separately from other recreation forms due to the installation of bolt anchors into the rock faces. SCL funded the construction of the Gorge Creek Overlook, a viewing point along State Route 20 that includes parking, restrooms, trails and interpretive display. The Applicant selected Criterion H1 – Not Applicable/De Minimis for this Zone, and given the difficulty of any kind of public access to the bypassed reach, this is an appropriate selection.

Zone 3 – There are many recreational opportunities in this Zone, including boating, fishing, hiking and camping. Recreational resources in Zone are also governed by the Recreation and Aesthetics Settlement Agreement included in the 1991 Settlement. SCL funded \$9M to support the construction of the development of the North Cascades Environmental Learning Center (ELC), located on the north shore of Diablo Lake¹⁵. This LEED Silver facility includes 16 buildings that offer multimedia and research opportunities, laboratories, dining and lodging for up to 92 guests. SCL also funded improvements to boat ramp facilities on Diablo and Gorge Lakes, picnic sites, interpretive facilities, trails, overlooks, water supply systems, handicap access fishing site, and other enhancement and mitigation measures. The Applicant selected Standard H2 – Agency Recommendation for this Zone, and in my opinion, this is the appropriate standard.

Zone 4 – There are many recreational opportunities in this Zone, including boating, fishing, hiking and camping. Recreational resources in Zone are also governed by the Recreation and Aesthetics Settlement Agreement included in the 1991 Settlement. In Zone 4, actions taken to protect and provide recreational access include providing access to Ross Lake and Ross Lake Resort, increasing boat access, improved docks to allow boat-in access to campgrounds, and in general providing capital funds to implement needs identified in consultation with NPS and USFWS, as appropriate. Furthermore, lake levels are required to be filled and maintained as quickly as possible after April 15 during the recreation season. SCL's actions

¹⁵ SCL also provides ongoing funding to support the operations of the Learning Center

to promote and expand populations of resident fish also benefits recreational opportunities at Ross Lake. The Applicant selected Standard H2 – Agency Recommendation for this Zone, and in my opinion, this is the appropriate standard.



Figure 19 - North Cascades Environmental Learning Center



Figure 18 - Skagit Information Center

VII. SUMMARY OF CRITERIA APPLICABILITY

As noted in the narrative for each Criterion, certain responses provided by SCL would be better suited to a different Standard, in my opinion. Although SCL meets each Criterion, the below table summarizes those cases where a different standard may be more appropriate.

Criterion	Standard Selected	Appropriate Standard	Justification for new standard recommendation
A. Flows (Zone 3)	1	2	Does not fit definition of true run-of-river mode, and includes bypassed reach; flow regime is re-regulating, part of broader project-wide flow management to improve aquatic habitat in Lower Skagit River, per Agency Recommendations in 2011 Revised Settlement Agreement
B. Water Quality (Zone 1)	3	1	Water quality is Category 1, Exceptional; no adverse impact on water quality observed
B. Water Quality (Zone 2)	3	2	Project is required to maintain water quality below 21° C in the bypassed reach
B. Water Quality (Zone 3)	3	1	Water quality is Category 1, Exceptional; no adverse impact on water quality observed
C. Upstream Fish Passage (Zone 1)	1	2 and PLUS	Facility has extensive agency recommendations to maintain suitable habitat for fish reproduction in this Zone; ongoing monitoring and adjustment of management actions qualify as an adaptive management program under LIHI standards
C. Upstream Fish Passage (Zone 4)	1	2 and PLUS	Upstream passage also includes passage of resident species (bull, rainbow trout) into the tributaries leading to Ross Lake; SCL maintains adaptive management program to remove transitory barriers in these tributaries, and provide fish stocking
D. Downstream Passage (Zone 1)	1	1 and PLUS	Correct as-is, but adaptive management program to promote downstream fish spawning clearly fits LIHI definition for PLUS standard
D. Downstream Passage (Zone 3)	1	4	Evidence shows the Diablo and Gorge Dams do present barriers to downstream passage, but the broodstock program for rainbow trout is a clear example of Acceptable Mitigation.
F. Threatened and Endangered Species (Zone 3)	2	4	“Finding of no negative affect” was focused on power tunnel construction, not project operation; Flow and non-flow enhancements to support Bull trout habitat in Gorge and Diablo reservoirs are enumerated in the fish passage criteria. These qualify as acceptable mitigation, and resource agencies appear satisfied with the results.
G. Cultural and Historic Resources (Zone 2)	1	2	Standard 1 requires that no cultural or historic resources are located on facility lands. Facility is in compliance with cultural/historic plans

VIII. PUBLIC COMMENTS RECEIVED

This Application was publicly noticed on July 26, 2017. There were no public comments received during the public comment period which ended on September 26, 2017. However, I contacted 18 stakeholders from six resource agencies, three tribes, and two NGOs, and received a total of ten comments. See Appendix A for records of these responses.

IX. CONCLUSIONS AND RECOMMENDATION

The Skagit Hydroelectric Project is a complex development, with multiple reservoirs, bypassed reaches, and riverine stretches, all located within a National Park with multiple outstanding resource values and important spawning habitat for threatened and endangered fish species. However, given the extensive track record of compliance and voluntary activity to promote the environmental compatibility of their operations and serve as a good steward of local resources, this Facility serves as an excellent example of a large, complex, store-and-release hydroelectric facility that can meet LIHI's goals to reduce the environmental impacts of hydropower generation and "provide positive recognition and economic reinforcement to hydropower owners who take steps to improve their facilities and invest in the local environment." SCL has a long history of going above and beyond license requirements to provide a net benefit to terrestrial and aquatic species residing in the lands and rivers impacted by the facility, and by improving cultural and recreational access in the North Cascades National Park.

After a thorough review of the public record, application and supporting materials, and consultation with resource agencies and other stakeholders involved in protecting natural resources associated with the Skagit Project, **I find the Facility meets LIHI standards under the 2nd edition Handbook.** Although I recommend changing the Standard applied to certain Criteria as noted in section VII above, I also find that the Applicant meets 2 PLUS Criteria, therefore making the Facility eligible to an extra 5 years of certification. This qualifies the Facility for the maximum LIHI term of 10 years. I do not find any conditions necessary, nor were any recommended by the resource agencies consulted.

APPENDIX A AGENCY COMMUNICATIONS (Chronological Order)

Date	August 07, 2017
Contact	Kimberly Kwarsick
Agency	National Park Service
Relevant LIHI Criteria	Cultural and Historical Resource Protection
Discussion Notes:	
<hr/>	
Skagit Project (LIHI Re-certification Review)	
<hr/>	
<p>Kwarsick, Kimberly <kim_kwarsick@nps.gov> Mon, Aug 7, 2017 at 4:08 PM To: Peter Drown <peter.drown@cleantechanalytics.com></p>	
<p>Peter-</p> <p>I have been with North Cascades National Park since March of 2014. My role since this time has been to fulfill the NPS's part of the Archeological Resources Mitigation and Management Plan. The vast majority of this work is to monitor and test archeological sites that are potentially eligible for the National Register of Historic Places and complete the mitigations for listed sites largely through data recovery contracts.</p> <p>In my opinion the Skagit project is in compliance with the terms of the plans and is doing their part to protect cultural resources. The addition of a part-time archeologist to the staff of the Skagit project has been a great improvement to the project and was probably long overdue.</p> <p>Thanks -Kim</p> <p><i>Kim Kwarsick</i> Archeologist, Section 106 Coordinator North Cascades National Park Service Complex 7280 Ranger Station Road Marblemount, WA 98267</p>	

Date	August 07, 2017
Contact	Stan Walsh, Environmental Services Manager
Agency	Skagit Cooperative
Relevant LIHI Criteria	Flows, Upstream and Downstream Fish Passage Protection, Cultural and Historic Resource Protection

Discussion Notes:

Skagit Hydropower LIHI Application Review

Stan Walsh <SWalsh@skagitcoop.org>

Mon, Aug 7, 2017 at 6:21 PM

To: Peter Drown <peter.drown@cleantechanalytics.com>

Cc: Stan Walsh <SWalsh@skagitcoop.org>

Hi Peter,

Skagit River System Cooperative is the fisheries and environmental group for the Swinomish Indian Tribal Community and the Sauk-Suiattle Indian Tribe, both federally recognized tribes and signatories to the Treaty of Point Elliott of 1855. Both tribes are signatories to the Skagit Settlement Agreement that forms the basis of SCL's FERC license.

I staff the Flow Coordinating Committee (FCC), Non-Flow Coordinating Committee (NCC), and Wildlife Management Review Committee (WMRC), which implements SCL's license, for the Swinomish Tribe and Sauk-Suiattle Tribe. Additionally I act as the primary agency/tribe staff in field monitoring the spawning and incubation flow implementation aspect of the license with SCL staff.

Throughout the 22 years I have worked with SCL on the implementation of their license they have routinely gone beyond their minimum requirements to provide additional protection for fish, they readily and collaboratively work with the agencies and tribes, and they participate in workgroups and forums not directly tied to their license to the benefit of habitat and scientific knowledge in the basin.

Tangible benefits I have observed while working with SCL to implement their license include routinely providing additional flow beyond their minimum requirements to provide a higher level of incubation and emergence success of salmon and steelhead as well as funding research that has increased the scientific knowledge of fish and fish habitat specific to the basin.

Feel free to call or email me if you have additional questions about SCL's implementation of their license.

Thanks, Stan

Stan Walsh

Environmental Services Manager

Date	August 07, 2017
Contact	Chad Brown, Water Quality Management Unit Supervisor
Agency	Washington Department of Ecology
Relevant LIHI Criteria	Water Quality
Discussion Notes:	
LIHI Re-certification Review (Skagit Project)	
<p>Brown, Chad (ECY) <CHBR461@ecy.wa.gov> Mon, Aug 7, 2017 at 7:50 PM To: Peter Drown <peter.drown@cleantechanalytics.com> Cc: "Applegate, Brock A (DFW)" <Brock.Applegate@dfw.wa.gov>, "Henley, Mark (ECY)" <MAHE461@ecy.wa.gov>, "Smith, Buck (ECY)" <JSMI461@ecy.wa.gov>, "Kannadaguli, Monika (ECY)" <MKAN461@ecy.wa.gov>, "Shervey, Jerry (ECY)" <GSHE461@ecy.wa.gov>, "Finch, Bryson (ECY)" <bfin461@ecy.wa.gov></p> <p>Hello Peter,</p> <p>I will try to provide the best information I can on WA Department of Ecology's role in the Skagit Hydroelectric Project.</p> <p>The Skagit projects are operated under the FERC license that includes many settlement agreements however, Ecology is not a signatory to any of the settlement agreements that occurred in the finalization of the FERC license.</p> <p>Additionally, under the Clean Water Act Section 401, Ecology has the authority to certify, deny, or waive authority through the 401 Water Quality Certification (WQC). Ecology developed a draft WQC, however <u>a final WQC was not issued, and in December 1995 Ecology formally acknowledged that we had waived our authority to condition the FERC license.</u> Therefore, (to my knowledge) Ecology does not have any current oversight of water quality conditions as they relate to the operation of the Skagit projects. Ecology has issued permits and certifications for individual activities associated with the Seattle City Light's (SCL) projects on the Skagit in the years since the current license was issued, including for projects in and around the waterbody for maintenance, painting of structures, etc. These type of projects are covered by either state issued NPDES permits, or CWA 401 WQCs for US Army Corp of Engineers Section 404 permits. To my knowledge, SCL has been in compliance with all conditions related to these permitted activities.</p> <p>The FERC License P-553 for the Skagit expires on April 30, 2025. Ecology will soon be working with SCL to begin reviewing the current structures and operations of the project for the upcoming relicensing process. to. This work will help us develop any necessary license conditions and issue a 401 WQC. Because Ecology chose to waive 401 certification authority for the current license, and the review process for the next licensing process has not yet begun in earnest, we don't have much information on the water quality concerns related to current operations.</p> <p>I know that there has been a large amount of work done within the Skagit project area on habitat and fisheries resources which are likely overseen by our state fish and wildlife agency. I believe WDFW (or its predecessor agencies WA Game/Fisheries) were signatories to some of the settlement agreements in the 1995 license. I am copying Brock Applegate who may be able to answer questions related to the progress and attainment of fish and habitat goals in the Skagit and tributaries within the project area.</p>	

Date	August 14, 2017
Contact	Richard Brocksmith, Executive Director
Agency/Organization	Skagit Watershed Council
Relevant LIHI Criteria	Watershed, Fish Passage

Discussion Notes:

LIHI Re-certification Review (Skagit Project, comments request)

Richard Brocksmith <rbrocksmith@skagitwatershed.org>
To: Peter Drown <peter.drown@cleantechanalytics.com>

Mon, Aug 14, 2017 at 12:12 PM

Thank you for contacting us regarding this application for Low Impact Hydropower Institute certification. Since your process is new to me, I've spent some time reviewing your certification handbook and criteria, as well as the project's application materials. Please note that my responses to your inquiries reflect my knowledge of the project in Zone of Effect 1, and not above, given our current focus on anadromous salmonids at the Skagit Watershed Council (SWC).

- SWC is a community partnership for salmon that provides a venue for coordination of the voluntary activities of 40 different organizational members who have a role in understanding, protecting, and restoring healthy habitats for sustainable fisheries in the Skagit and Samish Rivers in Puget Sound, Washington. We do not directly engage in regulatory matters relevant to salmonids and their habitats, however we must understand regulatory matters and their impacts, both positive and negative, so that voluntary activities are as focused and effective as possible in all contexts. A few relevant points to further explain our role related to the Skagit River Hydroelectric Project and its activities:
 - Seattle City Light personnel are heavily involved in SWC programs and projects. They have staff in our Board of Directors, our Technical Work Group, our Protection Subcommittee, our Monitoring & Adaptive Management Subcommittee, our Technical Review Committee, and our Lead Entity Citizens Committee. Many of the voluntary habitat projects occurring in Zone 1 that are implementing our 2015 Strategic Approach are supported by SCL personnel.
 - Seattle City Light supports voluntary habitat projects occurring in Zone 1 through financial resource allocations, partnering with many of our members.
 - Seattle City Light supports SWC with funding associated with an annual Memorandum of Agreement. This agreement documents areas of work to be implemented or facilitated by SWC staff. This scope of activities is available upon request.
 - SWC consumes and utilizes data generated through settlement agreement activities, and vice versa.
- To the extent of my knowledge, SCL and its Skagit River Hydroelectric Project are in compliance with its agreements and management plans, including those developed and implemented through the Skagit Watershed Council. Further, I've reviewed the Low Impact Hydropower Institute Re-certification Application dated June 2017 and concur with its findings.
- Seattle City Light has been an excellent steward of the Skagit Watershed's many natural and cultural resources, and an unwavering partner in our Council's varied efforts to preserve habitat for sustainable fisheries.

Please don't hesitate to contact me if further information would benefit your review of SCL's application.

Sincerely,

Date	August 18, 2017
Contact	Jason Ransom, Wildlife Biologist
Agency/Organization	North Cascades National Park Service Complex (National Park Service)
Relevant LIHI Criteria	Threatened and Endangered Species, Watershed Protection
Discussion Notes:	
<hr/> Skagit Project (Low Impact Hydropower Re-certification) <hr/>	
<p>Ransom, Jason <jason_i_ransom@nps.gov> Fri, Aug 18, 2017 at 12:35 PM To: Peter Drown <peter.drown@cleantechanalytics.com></p> <p>Hi Peter - Just back in the office and digging down into the mountain of emails. Here you go:</p> <ul style="list-style-type: none"> • Please explain your role in the Skagit Hydroelectric Project and License/Settlement Agreement activities. <p>I manage the wildlife program for North Cascades National Park Service Complex, including planning, implementing, and managing wildlife projects funded by NPS as well as those funded by the settlement agreement, and collaboration with outside researchers that are funded by the Seattle City Light Wildlife Research Grants Program. This work also includes areas outside of the park along the Skagit watershed, such as the winter eagle monitoring and fisher restoration projects.</p> <ul style="list-style-type: none"> • In your opinion, is the facility in compliance with any agency recommendations or management plans that are in effect for watershed management (pertinent to protection, mitigation or enhancement of shoreline surrounding the facilities?) <p>Yes, Seattle City Light has been exemplary in its attention to wildlife needs as pertains to the National Park Service Complex and regularly reaches out for informal consultation on potential wildlife issues. They have observed necessary protection protocols when sensitive species are known to be present in a project area. The facility has also been transparent and collaborative in implementing the wildlife lands acquisition part of the settlement and is genuinely appreciative of stakeholder concerns about each property under consideration.</p> <p>Hope that helps. Please let me know if you need any additional detail.</p> <p>best- Jason</p> <p>Jason I. Ransom, PhD Wildlife Biologist North Cascades National Park Service Complex 810 State Route 20 Sedro-Woolley, WA 98284</p>	

Date	August 18, 2017
Contact	Brock Applegate, Renewable Energy/Major Projects Mitigation Biologist
Agency/Organization	Washington Department of Fish and Wildlife
Relevant LIHI Criteria	Threatened and Endangered Species, Upstream and Downstream Fish Passage

Discussion Notes:

WDFW Comments for LIHI Re-certification Review (Skagit Project)

Applegate, Brock A (DFW) <Brock.Applegate@dfw.wa.gov>
 To: Peter Drown <peter.drown@cleantechanalytics.com>
 Cc: "Brown, Chad (ECY)" <CHBR461@ecy.wa.gov>

Fri, Aug 18, 2017 at 4:09 PM

Hi Peter, I would like to thank you for including the Washington Department of Fish and Wildlife (WDFW) on your list of reviewers. I will give you the most objective comments that I can muster for this project.

Under the Federal Power Act the state wildlife agencies have the power of consultation and 10(j) comments during the (re)licensing process of hydroelectric projects. We have participated on the consultation of the current license and the associated settlement agreements. The WDFW participates on most of the license implementation groups associated with this license. We continue to consult on the current license during meetings with the those interveners interested in certain resource topics such as the Non-Flow (items related to fish habitat) Coordination Committee (NCC), the Flow (related to fish habitat) Coordination Committee (FCC), (Wildlife) Land Acquisition Group (LAG), and the committee responsible for dispersing funds for wildlife research projects that the license created. Additionally, Seattle City Light (SCL) pursues state Hydraulic Project Approvals for all projects that SCL will construct in the water or bed of the river or lakes and within the license. WDFW has full involvement in the entire project and license implementation.

Overall, SCL has approached most project management with the license in a collaborative and environmentally ethical manner. We have experienced only one exception with the plan to dredge Stettattle Creek tail-out in Gorge Lake to regain their full head at Diable Lake Powerhouse. SCL refused twice to discuss their plan at aquatic resource meetings. None of the participants on the aquatic resource groups, outside of SCL, liked the proposal to dredge because of its decrease in fish habitat and impact to Stettattle Creek and Diablo Lake. Seattle City Light did eventually pull their plan, which we assume will lead to additional discussion and input on the dredge plan. We hope to have a collaborative discussion that protects the aquatic habitat or properly mitigates their impacts, while increasing the efficiency of their powerhouse. As I said before, SCL usually goes beyond other licensees in their implementation of the license and management of flows in the river. They truly manage their flows for fish, with active, continuous monitoring and collaboration with the resource agencies. We wish other licensees would manage their flow regime to this degree of collaboration.

SCL has an interesting situation with Fish Passage. The aquatic resource group's biologist have recently found a steelhead in the plunge pool below the most downstream dam, Gorge Dam. We fully recognize that conditions in the bypass reach may have changed over the course of the license, so some anadromous fish species may reach the lowest dam now. We will address upstream fish passage during the discussions of the new license. SCL does not have fish screens on their intakes, which may cause additional injury or mortality to downstream migrating fish. To mitigate for the lack of screens, SCL has given us extremely good flow regime for fish spawning and rearing. I think many biologist in the aquatic resource group had less concerns about downstream fish passage for resident fish. We will also address downstream fish passage in the upcoming, new license negotiations, particularly if SCL allow anadromous fish above any of the dams. The discovery of anadromous fish at the foot of Gorge Dam during the current license may change the negotiation topics for the upcoming license.

SCL has done an exemplary job in the acquisition of lands for wildlife, fish habitat, and threatened and endangered species. I compliment them on the amount of acres they have purchased and on the quality of habitat. SCL fully listened to our consultation with the purchase of lands for elk forage creation in the South Fork of the Nooksack, instead of the Skagit River Valley. They have actively and willingly led the pursuit of lands for acquisition. They have created so much funding for habitat acquisition, habitat restoration, and research that our resource group find themselves in a scramble to find projects and lands before the next license. SCL has gone outside the license to spend money on threatened and endangered species habitat. I have never witnessed a better or more successful acquisition or restoration program than provided by Seattle City Light.

I have listed a couple of negative actions by Seattle City Light during their current license. I would not allow those actions to take away from their overall contribution to fish and wildlife habitat. We will rectify many of these issues with modified plans and a new license. In general, SCL's efforts go beyond the efforts required by the license and other projects that I have experienced. SCL has already approached the stakeholders to conduct pre-licensing studies that will take more time than required by the Federal Energy Regulatory Commission (FERC). I have never had a potential licensee offer to do more years of licensing studies beyond the expectation of FERC. WDFW appreciates their collaborative approach and would highly recommend them for Low Impact Hydropower Institute (LIHI) re-certification.


Please feel free to follow up with me on any questions or clarifications.

Sincerely, Brock

Brock Applegate

Renewable Energy/Major Projects Mitigation Biologist

Washington Department of Fish and Wildlife

Date	August 11, 2017
Contact	Keith Kirkendall
Agency/Organization	NOAA Fisheries
Relevant LIHI Criteria	Threatened and Endangered Species
Discussion Notes: <hr/> LIHI Re-certification Review (Skagit) <hr/> <div> <div> Keith Kirkendall - NOAA Federal <keith.kirkendall@noaa.gov> To: Peter Drown <peter.drown@gmail.com> </div> <div> Fri, Aug 11, 2017 at 5:27 PM </div> </div> <p>Hi Peter</p> <p>As an agency that regulates the hydro industry I feel that weighing in on this subject matter is a conflict of interest.</p> <p>Through a wide array of Federal and State authorities the Utility has committed to resource enhancements. In line with that they monitor and report out on the result of their actions. These are all public records.</p> <p>Utilities from time to time make a similar request to NOAA to aid them in there exchange with their local PUC regarding setting rates--we decline to be involved with those proceedings also.</p> <p>I apologize for taking a little time to respond; the cause was double checking my thoughts within NOAA with my direct supervisor and legal counsel.</p> <p>Having said all that, I want you to know that I appreciate the work that you do in helping encourage this vital industry in being eco-friendly.</p> <p>sincerely keith</p> <p>[Quoted text hidden] --</p> <p>Keith Kirkendall <i>Chief, Environmental Services Branch</i> <i>NOAA Fisheries West Coast Region</i></p> <p>Office: 503-230-5431</p> <div>  NOAA FISHERIES West Coast Region </div>	

Date	August 25, 2017
Contact	Jon-Paul Shannahan
Agency/Organization	Upper Skagit Indian Tribe
Relevant LIHI Criteria	Fish Passage, Cultural and Historic Resources
Discussion Notes:	
LIHI Re-certification Review (Skagit Project)	
<div> <div>Jon-Paul Shannahan <jonpauls@upperskagit.com></div> <div>Fri, Aug 25, 2017 at 7:20 PM</div> <div>To: Peter Drown <peter.drown@cleantechanalytics.com></div> <div>Cc: Scott Schuyler <ScottS@upperskagit.com></div> </div>	
<p>Peter,</p> <p>I represent the Upper Skagit Indian Tribe on two of the Resource Committees under the FERC # 553, my title is the Managing Biologist for the Tribe and represent their interest in many forums related to fisheries, water and wildlife. I'm currently chair of the Non Flow Coordinating Committee under the Fisheries Settlement Agreement, and will represent the Tribe's Natural Resource interest's with the upcoming re-license process.</p> <p>In my opinion the applicant has not met all the recommendations for protecting fish, and are not currently operating in a manner that protects fishery resources. The applicant has proven progressive on several fronts of resource protection measures, yet outside of negotiated agreements there seems to be little effort to address the magnitude of impacts cause by the operation of these facilities. We have witnessed multiple actions with maintaining power transmission facilities, that fails to protect fishery resources. We have witnessed a situation where the facility through a lightning storm shut down cause the de-watering of the Upper Skagit, and in response they stated that few if any fish were impacted. We have also witnessed staff from the applicant make recommendations on hatchery actions that have significantly impacted Tribal Treaty rights, without the scientific rigor to support such actions, nor consultation with impacted tribes.</p> <p>Another fundamental issue supporting my response, is the continued promotion that the projects are upstream of the natural anadromous barrier- which is erroneous. Last year, a SCL employee along with National Park staff and tribal government staff caught an adult steelhead above the presumed barrier, prior to this submission. Citing the 1921 Smith paper (attached for reference) as the definitive ruling for barriers, or submitting the S & K (Pflug 2013) report as supporting that claim with genetics is also misleading. Please review the attached paper and read the first page to determine if one day of fishing, in the summer, after initiating dam construction is a way to determine historical distribution of fish. I'd also recommend that any genetics expert review the study design, study conclusions, and stocking history in the reservoirs to see if they reach similar conclusions. Since the listing of steelhead for protection under ESA, what actions have the applicant taken to review the fishery resources through the by-pass reach (also known as the Skagit Mainstem)?</p> <p>Lastly, I have seen some tangible benefits for fish and wildlife, but I have not been able to determine if we are at a net positive since we have been unable to assess the cumulative impacts from the ongoing operations of the facility. I'd be happy to discuss in detail some of my concerns with supporting a project consisting of three high heads dams "as low impact".</p> <p>Jon-Paul</p>	

Date	September 6, 2017
Contact	Jeff Chan, Tim Romanski, Lindsay Wright
Agency/Organization	U.S. Fish and Wildlife Service
Relevant LIHI Criteria	Fish Passage, Threatened and Endangered Species Protection, Shoreline and Watershed Protection
<p>Discussion Notes:</p> <p>Jeff Chan, Fish Biologist, U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, Division of Listing and Recovery</p> <ul style="list-style-type: none"> <i>Please explain your role in the Skagit Hydroelectric Project, and associated license/settlement agreement activities.</i> Provided past technical assistance regarding bull trout on this agreement/project. Currently not directly involved with implementation of specific license/settlement agreement activities. Aware of some of the ongoing bull trout research and monitoring activities related to the project. <i>To your knowledge, is the Facility in compliance with conditions listed in recovery plans for T&E species, incidental take permits, biological opinions, habitat conservation plans, or similar requirements? Please provide any examples of ongoing actions of the applicant in support of these efforts.</i> Yes, this facility is in compliance with actions listed in the Coastal Recovery Unit Implementation Plan of the Final Bull Trout Recovery Plan. A genetic analysis conducted after the 2004 draft Bull Trout Recovery Plan now indicate all bull trout upstream of Gorge Dam are significantly distinct from the Lower Skagit Core Area local populations below Gorge Dam (Smith and Nash 2010). Although the two bull trout local populations in Gorge and Diablo Reservoirs currently only have one-way (downstream) genetic exchange with upstream local populations within the Ross Lake system, the final Coastal Recovery Unit Implementation Plan has not made a determination that two-way passage is essential between these various reservoir populations within the Upper Skagit Core Area. However, the Coastal Recovery Unit Implementation Plan has identified tasks to evaluate the role of the local populations within Gorge and Diablo Reservoir for the long-term persistence of the Upper Skagit Core Area and whether or not it is necessary to provide enhanced connectivity between any of these populations (tasks 2.1.1 and 4.2.1; USFWS 2015). <p>Smith, M. J. and K. Naish. 2010. Population structure and genetic assignment of bull trout (<i>Salvelinus confluentus</i>) in the Skagit River Basin. Final report. School of Aquatic and Fishery Sciences, University of Washington, Seattle, Washington.</p> <p>USFWS. 2015. Coastal Recovery Unit Implementation Plan for Bull Trout. U.S. Fish and Wildlife Service, Prepared by the Washington Fish and Wildlife Office, Lacey, Washington and Oregon Fish and Wildlife Office, Portland, Oregon. 156 pp.</p> <p>Lindsay Wright, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, Division of Conservation and Hydropower Planning (Sept. 6, 2017)</p> <ul style="list-style-type: none"> <i>Please explain your role in the Skagit Hydroelectric Project, and associated license/settlement agreement activities.</i> My role is to provide technical assistance to the licensee as they progress through their implementation of the settlement agreement. I will also participate in the re-licensing process. My responsibility is to comment on and file reports they submit in compliance with the settlement agreement. I also provide feedback on land acquisitions, land management issues, and potential research studies. I attend meetings and conference calls and stay knowledgeable of the current events happening with the implementation of the project. <i>To your knowledge, is the Facility in compliance with conditions listed in recovery plans for T&E</i> 	

species, incidental take permits, biological opinions, habitat conservation plans, or similar requirements? Please provide any examples of ongoing actions of the applicant in support of these efforts.

Yes. Recently a research proposal arose the licensee was concerned they may exceed the take allowance for bull trout by the potential need for additional fish handling activities. They contacted us and we researched all avenues of potential take coverage they could use to cover any take associated with the activity.

Additionally, a power outage caused by maintenance of a generator prompted additional spill, resulting in a potential increase of incidental take for bull trout compared to prior years. The licensee contacted us and we coordinated on any necessary actions they would need to take to stay in compliance with the terms and conditions of their Biological Opinion. Because they would not exceed the total take allotment over the term of the license, there was no further action necessary.

- *To your knowledge, is the Project in compliance with any and all recommendations or management plans pertinent to protection, mitigation or enhancement of shoreline surrounding the facilities? (Please briefly reference the recommendation and plan in addition to comment on compliance.)*

Yes. The current license agreements are being implemented via three committees: 1) Wildlife Lands Acquisition Group for mitigation-related issues, 2) FCC Group for flow-related issues, and 3) NCC for non-flow related issues. The following requirements related to shoreline habitats surrounding the facility were submitted according to timelines and criteria established in the license agreement:

- a) Expenditures Statements (License Article 415) (how funding is allocated, including towards project work that offsets effects to shoreline habitats) (Wildlife Lands Group)
 - b) Meetings and coordination for acquisitions and protection of mitigation lands (to offset effects to shoreline habitats) (Wildlife Lands Group)
 - c) Pre-relicensing research study coordination (intended to evaluate and minimize effects to shoreline habitats) (FCC/NCC)
 - The research studies currently proposed include: 1) Scoping of a Hydrodynamics Model and/or a study of downstream effects from an altered flow regime on the Skagit River, and 2) Geomorphology Study through the lens of fish habitat and behavior as it relates to effects from the dam and its operation -reservoir ecology and how dam operations drive ecosystem processes that affect fishery resources
 - d) Semi-Annual Flow Compliance Reports (ensure flow requirements are met, which protects shoreline habitats) (FCC)
 - e) Chum salmon off-channel habitat restoration site maintenance (NCC)
- *Please also provide comments on general compliance with other requests/recommendations your agency has made pertaining to natural resource protection (fish, wildlife, etc.)*

The licensee is very responsive to our comments and recommendations, typically implementing any requests or recommendations unless further discussion is warranted. They regularly request feedback on mitigation land acquisitions, mitigation lands management, reports, and other issues related to implementing the license agreement. They are extremely timely and responsive to our requests for clarifications or information.

APPENDIX B REFERENCES

Downen, M. (2014). *Ross Lake Rainbow Broodstock Program, Upper Skagit Reservoir Fish Community Surveys and Management Plan* (U.S.A., Washington Department of Fish and Wildlife, Fish Management Division).

National Park Service (2015). *Ross Lake National Recreation Area General Management Plan* (U.S.A., National Park Service, Pacific West Region – Seattle Office).

Grimm, L. (2003). *Recommendation regarding the application for certification of the Skagit River Hydroelectric Project, Skagit River, Washington* (Memo provided in support of original LIHI Certification)

Seattle City Light. (2017). *Skagit River Hydroelectric Project (No. 553) Annual Fisheries Report No. 21 Reporting Period: January 1 - December 31, 2016*(Rep. No. 21). Seattle, WA: Seattle City Light.

Connor, E.J. and Pflug, D.E. 2004. Changes in the distribution and density of pink, chum, and Chinook salmon spawning in the upper Skagit River in response to flow management measures. *North American Journal of Fisheries Management* 24:3:835-852.

Envirosphere. 1988. Study of Skagit dams original impacts on wildlife and fish habitats and populations. Final report prepared for Seattle City Light by EnviroSphere Company, Bellevue, Washington.

FERC. (1995). *Final Environmental Assessment for New Hydropower License*(U.S.A., Federal Energy Regulatory Commission, Office of Hydropower Licensing, Division of Project Review). WA.

McShane, C. (2016). *Wildlife Resources 5-Year Report (Article 410) Settlement Agreement Concerning Wildlife, Skagit River Hydroelectric Project No. 553, April 2011-March 2016*(Rep.). Seattle, WA: Seattle City Light.

LoVullo, T. V. (2014). *Order Modifying and Approving Puget Sound Chinook Salmon and Steelhead Monitoring Plan Under July 2013 Commission Order*(U.S.A., Federal Energy Regulatory Commission, Division of Hydropower Administration and Compliance). Seattle, WA.

McShane, C. (2015). *Historic Resources - 5 Year Report, Section 5.5 of Settlement Agreement on Cultural Resources, Skagit River Hydroelectric Project No. 553, June 2010-May 2015 Activities*(Rep.). Seattle, WA: Seattle City Light.

Additional sources listed in Application were retrieved from FERC e-Library