

April 7, 2021

KIMBERLY D. BOSE, SECRETARY  
FEDERAL ENERGY REGULATORY COMMISSION  
888 FIRST STREET, NE, SUITE 1A  
WASHINGTON, D.C. 20426

Re: Skagit River Hydroelectric Project FERC No. 553-235 – Filing of Revised Study Plan

Dear Secretary Bose:

In accordance with Federal Energy Regulatory Commission (FERC or Commission) regulations at 18 CFR § 5.13, the City of Seattle, Washington, through its publicly-owned electric power utility Seattle City Light (City Light), herewith files with the Commission its Revised Study Plan (RSP) for the relicensing of the Skagit River Hydroelectric Project (FERC No. 553) (Project). The current license for the Project expires on April 30, 2025.

In January 2019, City Light began a voluntary Study Plan Development Process with resource agencies, Indian Tribes, Canadian First Nations, and other interested parties (collectively “licensing participants” or “LPs”) in advance of the formal relicensing process to identify resource issues that warrant study during relicensing. City Light filed a Notice of Intent to relicense the Project and Pre-Application Document (PAD) on April 27, 2020. Following the filing of its PAD, City Light continued meeting with LPs to discuss studies necessary to inform the relicensing process. City Light also provided early drafts of study plans for comment and discussion.

A total of 23 comment letters from LPs were submitted to the Commission on the Project PAD and the Commission’s Scoping Document 1, along with nearly 100 study requests. In addition, some LPs provided comments on City Light’s early versions of study plans and suggestions for studies at voluntary Resource Work Group meetings held in 2019 and 2020.

Pursuant to 18 CFR § 5.11, City Light filed the Proposed Study Plan (PSP) with the Commission on December 8, 2020. The PSP provided a suite of 28 studies in addition to reflecting responses to study requests submitted to FERC by LPs. As required by FERC’s Integrated Licensing Process regulations at 18 CFR § 5.11(e), City Light held study plan meetings regarding the PSP on January 6, and 12-14, 2021. The background, concepts, and studies described in the PSP were presented during the study plan meetings. In addition, City Light hosted ten additional topic-based meetings, and several one-on-one meetings, with LPs in late January through April 2021 aimed at resolving and minimizing outstanding differences between City Light’s proposed studies and LPs’ study requests.

A total of 17 letters providing comments on the PSP and the Commission's Scoping Document 2 (SD2) were filed by federal and state agencies, Indian Tribes, Canadian First Nations, non-governmental organizations, and other LPs.

City Light greatly appreciates the significant time and expertise that LPs provided in developing their PSP comments. City Light has carefully reviewed, analyzed, and considered each set of comments and engaged in additional dialogue with LPs on their study requests and information needs. After thoughtful deliberation, City Light has decided to make significant revisions to its proposed studies, as reflected in the RSP, including the addition of five new studies and modification of many proposed studies included in the PSP to address LP comments and concerns. In some instances, City Light has fully adopted studies requested by LPs. In others, City Light incorporated elements of requested studies into its proposed study plans. The RSP sets forth a proposed suite of 33 studies that City Light believes will accommodate the information needs of federal and state regulators, Indian Tribes, Canadian First Nations, and other LPs and inform regulatory analyses and decisions in the relicensing effort and beyond. City Light hopes that the significant changes in this RSP will set the stage for further collaboration as LPs and City Light work together in the coming months to refine the technical details of each proposed study.

In accordance with the Commission's process plan and schedule included in SD2, as amended by the Commission's order dated April 6, 2021, LPs have until May 6, 2021 to file comments on the RSP, after which the Commission will issue its study plan determination by May 21, 2021.

City Light looks forward to continuing to collaborate with LPs and FERC staff in finalizing the study plan for the Project's relicensing. If there are any questions about this filing, please contact me by phone at (206) 304-1210 or by email at [Chris.Townsend@seattle.gov](mailto:Chris.Townsend@seattle.gov).

Sincerely,



[Chris Townsend \(Apr 6, 2021 12:29 PDT\)](#)

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Enclosure

cc: Distribution List (attached)

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**REVISED STUDY PLAN**

**SKAGIT RIVER HYDROELECTRIC PROJECT**  
**FERC NO. 553**



April 2021

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## List of Acronyms and Abbreviations

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1-D .....	one-dimensional
2-D .....	two-dimensional
ADCP .....	acoustic Doppler current profilers
AF .....	Access Fund
APE .....	area of potential effect
ARMMP.....	Archaeological Resources Mitigation and Management Plan
BDA .....	beaver dam analog
BIA.....	Bureau of Indian Affairs
BIP .....	Beaver Intrinsic Potential
BMP .....	best management practice
CFR.....	Code of Federal Regulations
City Light.....	Seattle City Light
CMA .....	climbing management area
CMZ.....	channel migration zone
CoSD.....	City of Seattle datum
COVID-19.....	Novel Coronavirus
CWA .....	Clean Water Act
DDE .....	dichlorodiphenyldichloroethylene
DEM.....	digital elevation model
DHSVM .....	Distributed Hydrology Soil Vegetation Model
DLA .....	Draft License Application
DMS.....	Digital Management System
DNR .....	Department of Natural Resources (Washington State)
Ecology .....	Washington State Department of Ecology
ELC.....	Environmental Learning Center
EO .....	executive order
EPA.....	Environmental Protection Agency
ESA.....	Endangered Species Act
FERC.....	Federal Energy Regulatory Commission
FLA .....	Final License Application
FSA .....	Fisheries Settlement Agreement

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FTEC.....	fish tissue equivalent concentration
GIS .....	geographic information system
GRA .....	geospatial risk assessment
HPMP.....	Historic Properties Management Plan
HSC.....	habitat suitability criteria
IHA .....	Indicators of Hydraulic Alteration
ISR .....	Initial Study Report
kV.....	kilovolt
LP .....	licensing participant
LWD .....	large woody debris
MOA .....	Memorandum of Agreement
NCC .....	Non-Flow Plan Coordinating Committee
NEPA .....	National Environmental Policy Act
NGO.....	non-governmental organization
NHPA.....	National Historic Preservation Act
NMFS.....	National Marine Fisheries Service
NNTC.....	Nlaka'pamux Nation Tribal Council
NPCA.....	National Parks Conservation Association
NPS .....	National Park Service
NRF.....	nesting, roosting, and foraging
NSO.....	northern spotted owl
O&M.....	operations and maintenance
PA .....	programmatic agreement
PBDE .....	polybrominated diphenyl ether
PCB.....	polychlorinated biphenyl
PCDD/F.....	polychlorinated dibenzodioxins/ dibenzofurans
PLP.....	Preliminary Licensing Proposal
PME .....	protection, mitigation, and enhancement
PRM.....	Project River Mile
Project .....	Skagit River Hydroelectric Project
PS .....	Puget Sound
PSP.....	Proposed Study Plan
RLNRA.....	Ross Lake National Recreation Area



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RM .....	river mile
ROW .....	right-of-way
RSP .....	Revised Study Plan
RWG .....	Resource Work Group
SD1 .....	Scoping Document 1
SD2 .....	Scoping Document 2
SDIDC.....	Skagit County Drainage and Irrigation District Consortium, LLC
SHPO .....	State Historic Preservation Officer
SITC.....	Swinomish Indian Tribal Community
SOW.....	scope of work
SR.....	State Route
SSIT .....	Sauk-Suiattle Indian Tribe
STL.....	Stillaguamish Tribe of Indians
TCL.....	traditional cultural landscape
TCP .....	traditional cultural property
TDG .....	total dissolved gas
THPO .....	Tribal Historic Preservation Officer
TSS.....	total suspended solid
UDP.....	Unanticipated Discovery Plan
USACE .....	U.S. Army Corps of Engineers
U.S.C.....	United States Code
USFS .....	U.S. Forest Service
USFWS .....	U.S. Fish and Wildlife Service
USGS .....	U.S. Geological Survey
USIT.....	Upper Skagit Indian Tribe
USR.....	Updated Study Report
WCC .....	Washington Climbers Coalition
WDFW .....	Washington Department of Fish and Wildlife
WMRC.....	Wildlife Management Review Committee
WRIA.....	Water Resources Inventory Area

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## EXECUTIVE SUMMARY

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The Skagit River Hydroelectric Project (Skagit River Project or Project) is located in the upper Skagit River Watershed in the middle of the North Cascades National Park. The Skagit River is the traditional territory of several Indian Tribes and Canadian First Nations. The ecosystem supports important runs of anadromous fish that are key to the cultural and economic health of Tribes and other residents and of Orca whales and the entire Puget Sound ecosystem. Recognizing this, the City of Seattle has embraced an ecosystem approach under which it looks beyond what is strictly required under the Federal Energy Regulatory Commission (FERC or Commission) study criteria and has focused its relicensing studies to inform decisions on operating the Project over the next 40-50 years.

The City of Seattle, through its publicly-owned power utility Seattle City Light (City Light), is the licensee of the existing 700-megawatt Skagit River Project. The Project is located in Whatcom, Skagit, and Snohomish counties, Washington. The Project consists of three power generating developments on the Skagit River – Ross, Diablo, and Gorge – and associated lands and facilities. The Project was originally licensed in 1927 by FERC’s predecessor agency, the Federal Power Commission. The Project was developed over a 42-year period, beginning with construction of Gorge Powerhouse and a timber-crib dam in 1919, and finishing with the completion of the existing concrete-arch dam at the Gorge Development in 1961. The final phase of the Project, construction of High Ross dam, was suspended in 1984 with the signing of the High Ross Treaty between the United States and Canada.

The Project generating facilities are entirely within the Ross Lake National Recreation Area (RLNRA), which is administered by the National Park Service (NPS) as part of the North Cascades National Park. Approximately one mile of Ross Lake, the upper-most Project reservoir, is in British Columbia and is part of the Skagit Valley Provincial Park. The roughly 60-mile stretch of the Skagit River several miles downstream of the Project is designated as a Wild and Scenic river and is managed by the U.S. Forest Service.

The three Skagit generating developments are hydraulically coordinated to act as a single project and supply approximately 20 percent of City Light’s power requirements. The operational priorities for the Project are: flood control; downstream fish protection; recreation; and power production. The Project also plays an important role in the regional energy market by integrating renewable resources and providing generation reserves.

Regionally, the Skagit River is a critically important resource. It is one of the largest rivers in Washington State and the only Puget Sound river that supports all five native salmonid species. It provides spawning, incubation, and rearing habitat for three federally listed threatened fish species—Chinook Salmon, steelhead, and Bull Trout—and is well-known for the large numbers of bald eagles that winter along the river and in its floodplain. The floodplain along the lower Skagit River contains rich agricultural land and supports thousands of migrating waterfowl and raptors.

The existing license for the Skagit River Project was issued May 16, 1995 and will expire on April 30, 2025. City Light is utilizing FERC’s Integrated Licensing Process (ILP) to prepare its license

application. The Federal Power Act requires City Light to file its new license application with FERC by April 30, 2023.

City Light filed a Notice of Intent (NOI) and Pre-Application Document (PAD) with the Commission on April 27, 2020. The PAD proposed 24 studies developed by City Light in consultation with licensing participants (LP) through a voluntary Study Plan Development Process. On June 26, 2020, FERC issued public notice of City Light's NOI and PAD, which kicked off the formal licensing proceeding and started the public comment period on the PAD. Concurrently, FERC issued Scoping Document 1 (SD1) to outline the subject areas to be addressed in its environmental analysis of the Project pursuant to the National Environmental Policy Act. Due to the COVID-19 pandemic, FERC waived public scoping meetings and a site visit, and solicited written comments, recommendations, and information on SD1. Based on comments filed with the Commission in response to the PAD and SD1, and LP study requests, the Commission revised SD1 by issuing Scoping Document 2 (SD2) on December 4, 2020.

Pursuant to 18 CFR § 5.11, City Light filed the Proposed Study Plan (PSP) on December 8, 2020. The PSP included a suite of 28 relicensing studies and responded to study requests from LPs. As required by FERC's ILP regulations at 18 CFR § 5.11(e), City Light held study plan meetings to discuss the PSP on January 6, and 12-14, 2021. These meetings were used to present the background, concepts, and studies described in the PSP and receive feedback from the LPs. In addition, City Light hosted ten additional topic-based meetings, and several one-on-one meetings, with LPs in late January through April 2021 aimed at resolving outstanding differences between City Light's proposed studies and LPs' study requests.

In accordance with 18 CFR § 5.12 and pursuant to the current Process Plan and Schedule (Table 1.3-1), comments on City Light's PSP, including any revised information or study requests, were due to FERC by March 8, 2021. A total of 17 letters providing comments on the PSP and SD2 were filed by federal and state agencies, Indian Tribes, Canadian First Nations, NGOs, and other LPs.

Much of the feedback City Light received on the PSP was critical and reflected many remaining differences over its proposed studies. Many LPs asserted that the study plans included in the PSP would not provide the information necessary for agencies to fulfill their statutory obligations, or to inform the development of license requirements. Others were concerned that City Light's proposed studies were too narrow. They emphasized the need to study potential Project impacts outside the Project Boundary and downstream of the Project. Many LPs noted that City Light did not adequately explain its rationale for rejecting study requests based on the FERC Study Criteria.

Following the PSP meetings and after careful review of LP comments on the PSP, City Light reevaluated its position with respect to relicensing studies, reassessed its longstanding relationships with LPs, and decided to shift its efforts toward resolving outstanding differences concerning the proposed studies. After thoughtful deliberation, City Light has decided to significantly expand and modify its PSP in the Revised Study Plan (RSP) to demonstrate its commitment to working with LPs to accommodate their interests and information needs, even if the revised studies do not precisely adhere to the FERC Study Criteria. These modifications include the addition of five new studies and modification of many proposed studies included in the PSP to resolve these outstanding differences. City Light held additional meetings with LPs

during the month of March to review these proposed changes and obtain feedback to help refine the proposals. City Light hopes that these changes and additional commitments in the RSP will set the stage for further collaboration with LPs as the study implementation phase begins.

Although City Light has agreed to a substantial expansion of its proposed studies under this RSP, there remain areas of differences with the LPs. For example, City Light is not agreeing to study the possible ecological and social economic effects of removing Gorge Dam. As explained in Section 6.3.8 of this RSP, the three Project developments operate as a coordinated system to supply reliable, dispatchable power on demand for City Light's customers, and Gorge Dam plays a critical role in the Project's ability to protect downstream functions (such as aquatic habitat) through storage, flood control, and fine-scale regulation of the river. City Light cannot agree to spend ratepayer dollars to study an action that it has not proposed in the relicensing proceeding. Additionally, with respect to other studies, there remain differences regarding scope and study methodology, as described in Section 6 of this RSP. City Light will continue to engage the LPs to narrow the divide during the study process.

City Light would like to recognize the importance of feedback it has received from Indian Tribes and Canadian First Nations, in particular, on its proposed studies. Their representatives have shared foundational perspectives that the entire Project area occupies a place of profound significance since time immemorial. City Light acknowledges Indian Tribes and Canadian First Nations have ancient and lasting cultural relationships to the place where the Skagit River Project is located and that these relationships are critical to consider during the relicensing process, as well as during ongoing operations and maintenance activities.

City Light also respects the perspective that many study topics, such as those regarding fish, wildlife, plants, water quality, air quality, sound and light, and cosmology have cultural significance to Indian Tribes and Canadian First Nations. City Light appreciates these perspectives and values advancing sustainability through ecosystem stewardship and collaborative relationships. This RSP reflects a thoughtful and substantive science-based approach that incorporates many of the key ideas and contributions originating from the Indian Tribes and Canadian First Nations.

Many of the changes to the study plans are intended to respond to the comments of Indian Tribes and Canadian First Nations. To more specifically address the cultural importance of Project resources, City Light has expanded numerous other studies in this RSP.

This RSP provides a description of the individual studies proposed by City Light to gather additional information needed to adequately analyze the potential effects of continued operation of the Project on developmental and non-developmental resources. As described above, City Light has significantly revised its proposed studies since the filing of the PSP, including but not limited to the following changes:

- (1) **Right of Way Survey.** City Light has added a pedestrian survey in CR-02 Cultural Resources Survey for archaeological and historic built environment resources for the entire Project transmission line right-of-way (ROW) to inventory for historic properties.
- (2) **Expanded Study Buffer.** City Light has added a one-mile study buffer around the Project's area of potential effects (APE) to provide context in the CR-04 Inventory of

- Historic Properties with Traditional Cultural Significance for potential Project-related visual and acoustic effects to those properties.
- (3) **Fish Passage.** City Light expanded its FA-04 Fish Passage Technical Studies Program (Fish Passage Study) to include a comprehensive investigation of upstream and downstream fish passage at all Project dams and added an expert review panel. City Light also has agreed to coordinate with the National Marine Fisheries Service (NMFS) on the study and embed a NMFS engineer into the study team.
  - (4) **Tributary Habitat.** City Light has added the FA-07 Reservoir Tributary Habitat Assessment to evaluate productivity potential of habitat in select tributaries to Project reservoirs to set the stage for population modeling that could be used, along with information provided by the Fish Passage Study, to assess the feasibility of implementing fish passage at the Project.
  - (5) **Native Fish Genetics.** City Light has added the FA-06 Reservoir Native Fish Genetics Baseline Study that analyzes existing data samples in a cohesive way, utilizes an expert genetics panel for review, and includes additional data collection in year two, based on an expert panel review of data gaps.
  - (6) **Entrainment.** City Light has added the FA-08 Fish Entrainment Study to update its desktop analysis to evaluate entrainment and impingement.
  - (7) **Lower Skagit River Synthesis Study.** In consideration of the numerous requests to extend the geographic scope of studies to below the Sauk River confluence, and City Light's interests in watershed-level influences on anadromous fish resources, City Light proposes a new study, SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River, as part of its RSP to develop a comprehensive data synthesis of existing information focused on the reach downstream of the Sauk River confluence to the estuary. This study proposes to: (1) compile, analyze, and summarize relevant available information about the condition of and primary factors affecting life stages of anadromous fish resources in the reach of river extending from the Sauk River confluence to the Skagit River delta and estuary; (2) identify the Project's potential contribution to those factors affecting life stages of anadromous fish resources and identify data gaps related to the evaluation of the Project's effects; and (3) propose studies to be conducted during the second year of study to address those data gaps, if necessary.
  - (8) **Water Quality.** The Washington State Department of Ecology and other LPs requested additional studies related to water quality. Specifically, City Light acknowledges water quality is tied to culturally important resources for Indian tribes and Canadian First Nations. As such, City Light has proposed significant additions to the FA-01 Water Quality Monitoring Study including early data collection that is ongoing, as well as additions based on PSP comments including: an expanded number of sampling sites and extending sampling to two-years for most parameters, the addition of benthic macroinvertebrate sampling, and turbidity sampling.
  - (9) **Geomorphology.** City Light has added a process flow component to GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study, using an Indicator of Hydraulic Alteration (IHA) model and Instream Flow Model to help analyze flows that result in tributary delta and river bar movement and connectivity of side channel and off-

channel habitat. In addition, City Light has added a pilot study and collaborative workshop process to be responsive to NMFS' geomorphology and aquatic habitat and other LPs' study requests.

- (10) **Recreation Assessment.** City Light has significantly expanded the RA-01 Recreation Use and Facility Assessment. The study has been expanded to more than double the number of sites for physical assessments (from 17 to 42 sites), double the visitor survey targets (from 384 to 768 completed surveys), add six additional days to the visitor/observation surveys, and more than double the number of visitor/observation survey locations. In addition, City Light has proposed a new trail accessibility assessment at eight trails and added trail counters as a new study task/method at 13 locations. This was done in part to help inform potential risks to cultural resources sites in the Ross Lake area from trails that originate outside of the Project Boundary.
- (11) **Recreation Flows.** City Light has added RA-05 Lower Skagit River Recreation Flow Study, adopting the approach outlined by American Whitewater to study and address recreation flows in the Skagit River below Gorge Dam.
- (12) **Quality Assurance/Quality Control.** All City Light studies will be implemented in accordance with generally accepted scientific methods and quality control / quality assurance procedures and will be led by technical leads with expertise in the study area. All modeling studies—FA-02 Instream Flow Model Development, FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development, and OM-01 Operations Model—include workshops and training with LPs. And as noted above, the proposed fish passage and genetics studies include expert review panels.

A full description of all the changes to the study plans and responses to PSP comments is included in Section 6 of this RSP. City Light looks forward to working with Commission staff and LPs to finalize the technical details of these studies and begin data collection as soon possible.

## **1.0 INTRODUCTION AND BACKGROUND**

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The Skagit River Hydroelectric Project (Skagit River Project or Project), owned and operated by the City of Seattle, through its publicly-owned power utility Seattle City Light (City Light), is licensed by the Federal Energy Regulatory Commission (FERC or Commission) as Project No. 553. The existing license for the Skagit River Project was issued May 16, 1995 and will expire on April 30, 2025. In accordance with FERC regulations, City Light notified FERC on April 27, 2020 that it intends to apply for a new license for the Project. The Federal Power Act requires City Light to file its new license application with FERC by April 30, 2023.

In accordance with FERC regulations at 18 Code of Federal Regulations (CFR) Part 5, City Light is utilizing FERC’s Integrated Licensing Process (ILP) for preparing its license application. This Revised Study Plan (RSP) is being filed with FERC pursuant to 18 CFR § 5.11 and the Process Plan and Schedule referenced in FERC’s Scoping Document 1 (SD1 – see Table 1.3-1 in this RSP). Notification of availability of this RSP is also being distributed to state and federal agencies, Indian tribes, First Nations, non-governmental organizations (NGO), and other interested parties (collectively, licensing participants, or LPs).

### **1.1 Project Description**

#### **1.1.1 Project Location**

The Skagit River Project is located in northern Washington State, across Whatcom, Skagit and Snohomish counties, and consists of three power generating developments on the Skagit River – Ross, Diablo, and Gorge – and associated lands and facilities (Figure 1.1-1). The Project generating facilities are in the Cascade Mountains of the upper Skagit River watershed, between Project River Miles (PRM) 94.5 and 127.9 (U.S. Geological Survey [USGS] RMs 94 and 127).<sup>1</sup> The Project has a total authorized installed capacity of 700.27 MW.<sup>2</sup> Power from the Project is transmitted via two 230-kilovolt (kV) powerlines that span over 100 miles and end just north of Seattle at the Bothell Substation. The Project also includes two City Light-owned towns (Newhalem and Diablo), the North Cascades Environmental Learning Center (ELC), several recreation facilities, and several parcels of fish and wildlife mitigation lands.

The Project Boundary is extensive, spanning over 133 miles from the Canadian border to the Bothell Substation just north of Seattle, Washington. In addition, there are “islands” of fish and wildlife mitigation lands and recreation facilities within the Skagit, Sauk, and South Fork Nooksack watersheds that are also within the Project Boundary. Project generating facilities are entirely within the Ross Lake National Recreation Area (RLNRA), which is administered by the National Park Service (NPS) as part of the North Cascades National Park Complex. The RLNRA was established in 1968 in the enabling legislation for North Cascades National Park to provide for the “public outdoor recreation use and enjoyment of portions of the Skagit River and Ross,

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<sup>1</sup> City Light has developed a standard Project centerline and river mile system to be used throughout the relicensing process, including the study program, to replace the outdated USGS RM system. Given the long-standing use of the USGS RM system, both it and the Project River Mile (PRM) system are provided throughout this document. For further details see Section 7.0 of this RSP.

<sup>2</sup> Authorized installed capacity values presented herein are those approved by the February 2, 2021 Order Amending License, Approving Revised Exhibits K and M, and Revising Annual Charges (174 FERC ¶ 62,066).



Diablo, and Gorge lakes.” The legislation maintains FERC’s jurisdiction “in the lands and waters within the Skagit River Hydroelectric Project,” as well as hydrologic monitoring stations necessary for the proper operation of the Project (16 United States Code [U.S.C.] § 90d-4; Public Law 90-544. Sec. 505 dated October 2, 1968, as amended by Public Law 100-668. Sec. 202 dated November 16, 1988).

## **1.1.2 Project Facilities**

### **1.1.2.1 Ross Development**

The Ross Development is the furthest upstream of the three Skagit River Project developments; the powerhouse and nearby dam are about 11 miles north of Newhalem. Most of the water used for Skagit River Project power generation originates in high mountain basins surrounding Ross Lake and upstream along the Skagit River in British Columbia.

Ross Powerhouse is about 1,100 feet downstream of Ross Dam, on the left bank at the eastern end of Diablo Lake. There are four Westinghouse generating units (Units 41, 42, 43, and 44), each with a nameplate rating of 112.5 MW. Units 42, 43, and 44 each has an authorized installed capacity of 91.875 MW; and Unit 41 has an authorized installed capacity of 76.875 MW, for a total authorized installed capacity of 352.5 MW at the development. Two concrete-lined power tunnels deliver water from the reservoir to four penstocks and into the powerhouse. There is no surge tank. Diablo Lake backs up to the base of Ross Dam and there is no bypass reach or section of free-flowing river between the two developments.

Ross Dam is just upstream of Ross Powerhouse at PRM 105.7 (USGS RM 105.1). At 540 feet from bedrock to crest, it is the highest of the three Project dams. The dam has two spillways, one on each side and each with six gates operated by an electric hoist. Two of the spill gates can be controlled remotely; the others are operated locally at the dam. In addition to the spillways, Ross Dam has two concrete lined power tunnel intake structures, two butterfly valves at the 1,346.26-foot North American Vertical Datum of 1988 (NAVD 88) (1,340-foot City of Seattle datum [CoSD]) level<sup>3</sup> and two hollow jet valves near the right bank at 1,275.26 and 1,260.26 feet NAVD 88 (1,269 and 1,254 feet CoSD). The two sets of valves can be opened to evacuate the reservoir once water levels drop below the level of the spill gates. On the top of the dam, a shed houses two hoists, one for each of the broome gates that close off the six-foot-diameter water supply pipes to the hollow jet valve. There is also a gantry crane used to raise and lower the broome gates that isolate the six-foot conduits for the butterfly valves. The road on top of the dam is used by City Light and NPS vehicles and is open to pedestrian use by the public.

At nearly 23 miles long, Ross Lake is the largest reservoir in western Washington. It extends into Canada approximately another 1 mile (24 miles total), with about 500 acres in British Columbia.

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<sup>3</sup> City Light is in the process of converting Project information from its older vertical elevation datum (CoSD) to the more current and standardized elevation datum (NAVD 88). As such, elevations are provided relative to both data throughout this RSP. The conversion factor between CoSD and NAVD 88 varies depending on location. A table converting elevation values of common benchmarks, staff gages, and key Project features from CoSD to NAVD 88 and a map of the same features are appended to this RSP, both of which have been updated since the Pre-Application Document (PAD).

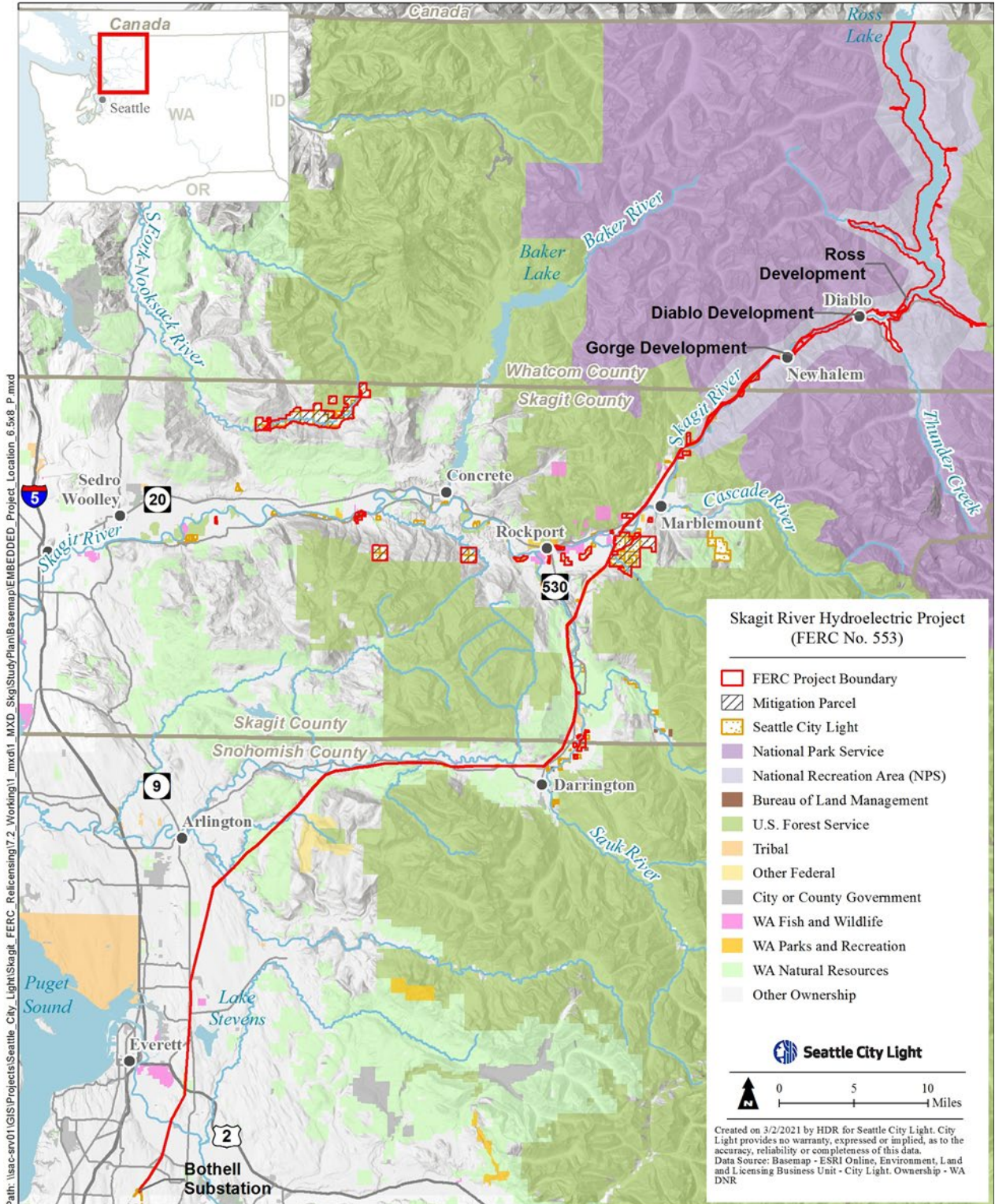


Figure 1.1-1. Location map of the Skagit River Project.

The reservoir has a surface area of 11,680 acres and storage volume of 1,435,000 acre-feet at the normal maximum water surface elevation of 1,608.76 feet NAVD 88 (1,602.5 feet CoSD).

#### 1.1.2.2 Diablo Development

The Diablo Development is between the Ross and Gorge developments and in addition to generating power, it reregulates flows between the other two developments. The powerhouse is on the north side of the Skagit River in the town of Diablo, about 4,000 feet downstream from Diablo Dam. Water from the reservoir to the powerhouse is conveyed by a single concrete lined tunnel for 1,900 feet that leads to four steel-lined penstocks. There is a surge tank located near the bottom end of the tunnel, uphill from the powerhouse.

Diablo Powerhouse holds two Westinghouse generators (Units 31 and 32) and each has a nameplate rating of 90 MW and authorized installed capacity of 78.035 MW. There are also two smaller, house-unit generators (Units 35 and 36), each with nameplate ratings and authorized installed capacities of 1.2 MW. Total authorized installed capacity at the development is 158.47 MW. A reinforced-concrete tailrace on the westerly edge of the powerhouse also serves to support transformers, a switching apparatus, and a crossing for a single-lane road.

Diablo Dam is located at PRM 101.6 (USGS RM 101.2), about five miles upstream of Gorge Dam and four miles downstream of Ross Dam. The concrete arch dam is 389 feet from bedrock to crest and has two spillways, one on each side, and a total of 19 spill gates, seven on the south spillway and 12 on the north. The three southern-most gates are automated via an electric hoist that can be locally or remotely operated. The remaining 16 gates are controlled locally at the dam using the “mule,” an electric motor-driven hydraulic hoist that consists of two hydraulic cylinders to open or close the associated spill gate. The mule runs on rails along the road on top of the dam and is positioned over the desired gate. The lifting chains for the gates are accessed below the deck plates on the dam. A valve house on the face of the dam at elevation 1,053.36 feet NAVD 88 (1,047 feet CoSD) has four outlets—three butterfly valves that can evacuate water from the reservoir at levels below the spill gates—and one Larner Johnson valve that is not used. There are two bifurcated intakes at the dam but only one is in use as the second intake was for planned future expansion of the powerhouse and a second tunnel, which were never constructed. The crest of the dam also serves as a road.

Diablo Lake has a surface area of about 770 acres and gross storage of 50,000 acre-feet at a normal maximum water surface elevation of 1,211.36 feet NAVD 88 (1,205 feet CoSD).

#### 1.1.2.3 Gorge Development

Gorge Powerhouse is on the left bank (facing downstream) of the Skagit River just upstream of the town of Newhalem and is reached via a bridge across the river that connects to SR 20. There are four Westinghouse generating units (Units 21, 22, 23, and 24). Units 21 and 22 each has a nameplate rating of 36.86 MW, and authorized installed capacity of 31.5 MW; Unit 23 has a nameplate rating of 36.86 MW and authorized installed capacity of 30.2 MW. Unit 24 is significantly larger, with a nameplate rating of 97 MW and an authorized installed capacity of 96.1 MW. Total authorized installed capacity at the development is 189.3 MW.

In addition to generating power, Gorge Powerhouse is responsible for regulating flows to the river downstream of the Project for fish protection, as stipulated by the current Project license. Units 21, 22, and 23 are each connected to steel-lined penstocks through 10-foot-diameter, biplane-type butterfly valves equipped with relief valves, which will discharge a maximum of 65 percent of the turbine flow at full-load rejection. Equipment has also been installed to allow these valves to open and stay open for any required period to maintain fish flows after a plant load rejection/shutdown. Unit 24 is connected to the steel-lined penstock through a 15-foot-diameter butterfly valve.

Water from Gorge Lake is conveyed via an intake structure in Gorge Dam into an 11,000-foot-long concrete lined power tunnel to the powerhouse. The power tunnel passes through the solid rock slope that is adjacent to the Skagit River and then splits into four penstocks. A surge tank and riser with restricted orifice is located at the lower end of the tunnel. There are also two adits that provide access to the power tunnel—one about halfway at Devil’s Elbow and the other near Gorge Powerhouse.

Gorge Dam, located at PRM 97.2 (USGS RM 96.6), is about 2.5 miles upstream of Gorge Powerhouse and 4 miles downstream from Diablo Dam near Gorge Creek. The dam is a combination concrete arch and gravity structure that rises 300 feet from bedrock to crest. There are two spillways with gates that are operated by an electric hoist on top of the dam. One gate can be remotely controlled to a limited height; the other must be opened and closed locally at the dam. Training walls on either side of the spillway direct water into the river channel downstream. Two outlet valves on the face of the dam at elevation 770.51 feet NAVD 88 (764 feet CoSD) can be used to evacuate water from Gorge Lake below the spill gate level. There is a log chute which allows wood to be passed downstream of the Project.

Gorge Lake is 4.5 miles long and extends upstream to the base of Diablo Dam. At the normal maximum water surface elevation of 881.51 feet NAVD 88 (875 feet CoSD), the lake has a surface area of 240 acres and gross storage of 8,500 acre-feet. Under normal operations at both the Gorge and Diablo developments there is a short section of free-flowing river between the Diablo tailrace and the upper end of Gorge Lake.

#### 1.1.2.4 Transmission

The Project Boundary includes approximately 351.83 circuit miles of primary transmission lines connecting the Project to the bulk electrical grid. The lines terminate at Bothell Substation, just north of Seattle; the substation is located partially within the Project Boundary. The other substation associated with the lines is North Mountain, outside of the town of Darrington, which is jointly owned by City Light and Snohomish Public Utility District and began operations in 1991. This substation gives City Light the ability to interconnect with other utilities to balance regional supply and demand, if needed. The North Mountain Substation is not a Project facility and is not within the Project Boundary.

The Project transmission lines are primarily on double-circuit steel lattice towers, although a few towers have been replaced with monopoles. The various components of this system are described below:

- From Ross Powerhouse, two 230-kV transmission lines (R1 and R2) run for about 3.8 miles along the west side of Diablo Lake, down the hillside past Diablo Dam to Diablo Switchyard.

- The 230-kV Diablo Switchyard is adjacent to Diablo Powerhouse and serves to connect the Ross, Diablo, and Gorge developments into the Skagit transmission system. The R1 and R2 lines from Ross terminate at the switchyard
- From Diablo Switchyard, one 230-kV line (D4) runs for 5.8 miles and terminates at Gorge Switchyard, located just across the river from Gorge Powerhouse. The other three lines (D1, D2, and D3) run 87.5 miles to the Bothell Switching Substation.
- From the Gorge Switchyard, a single 230-kV line (GO-NM) runs 36.8 miles to the North Mountain Substation.
- From there, the NM-SN line extends for 40.6 miles to Bonneville Power Administration's (BPA) Snohomish Substation and then another 7.6 miles to Bothell as SN-BO#1.

From Gorge Switchyard to North Mountain Substation the D1, D2, D3, and GO-NM lines are mostly within the same right-of-way (ROW), although there are a few sections where the ROW splits, with two lines in each, due to topographical constraints. At the North Mountain Substation, the NN-SN line joins the three lines originating at Diablo (D1, D2 and D3) and runs in the same ROW. Similarly, the SN-BO#1 line joins the ROW from the Snohomish Substation to Bothell. From Ross Powerhouse to Bothell Substation, the ROW is approximately 100 miles long and ranges from 150 to 400 feet wide.

#### 1.1.2.5 Recreation Facilities

City Light operates and maintains several recreation and interpretive facilities at the Project, including:

- (1) North Cascades ELC
- (2) Skagit Tour Dock
- (3) West Ferry Landing
- (4) East Ferry Landing
- (5) Ross Lodge Picnic Shelter
- (6) Gorge Lake Boat Launch
- (7) Ladder Creek Falls Trail and Gardens
- (8) Trail of the Cedars
- (9) Gorge Powerhouse Overlook
- (10) Gorge Powerhouse Visitor Gallery
- (11) Skagit Information Center
- (12) Gorge Inn Museum
- (13) Newhalem Picnic Sites
- (14) Newhalem Parking Areas
- (15) Newhalem Interpretive Displays
- (16) Newhalem Playground

### 1.1.2.6 Fish and Wildlife Mitigation Lands

City Light owns multiple parcels of lands in the Skagit, Sauk, and South Fork Nooksack watersheds managed for wildlife and fish habitat, totaling approximately 10,804 acres. All of the fish and wildlife mitigation lands are within the current Project Boundary.<sup>4</sup>

### 1.1.2.7 Project Boundary

The Skagit River Project Boundary encompasses 32,773 acres and includes all Project facilities, including the dams, powerhouses, reservoirs, power tunnels, switchyards, transmission lines, and the towns of Newhalem and Diablo, as well as all fish and wildlife mitigation lands and Project recreation sites. It terminates in Washington State, at the U.S.-Canada border, and thus does not include all the lands and waters around and within Ross Lake. Most of the City Light-owned fish and wildlife mitigation lands, as well as the U.S. Forest Service (USFS)-managed Marblemount and Sauk River boat launches, are non-continuous features within the Project Boundary and are mapped as “islands”.

The Skagit River Project encompasses 19,233.51 acres of federal lands administered by the NPS and USFS – 19,007.01 acres that are non-transmission related, and 226.5 acres in the transmission line ROW.<sup>5</sup>

The Project Boundary along Diablo and Gorge lakes extends about 200 feet (horizontal measurement) beyond the normal maximum water surface elevation. For Ross Lake, the Project Boundary was established to accommodate potential future development subject to the High Ross Treaty. As a result, the Project Boundary around Ross Lake reaches significantly up several of the major tributaries, including Big Beaver, Little Beaver, Lightning, and Ruby creeks. While included within the Project Boundary, lands associated with the inundation zone of High Ross (5,213.78 acres)<sup>6</sup> are not impacted by Project operations and therefore anticipated generally to be excluded from the geographic scope of relicensing studies.

## 1.1.3 Operations

The three Project developments are hydraulically coordinated to operate as a single project. Project operation under the existing license is designed to meet and prioritize four objectives: (1) flood control; (2) salmon and steelhead protection flows downstream of Gorge Powerhouse; (3) recreation; and (4) power generation. To achieve these goals, City Light must adhere to specific license requirements for Ross Lake levels and for streamflows and ramping rates downstream of Gorge Powerhouse.

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<sup>4</sup> In 2020, City Light amended the Project Boundary to include additional fish and wildlife mitigation lands that were recently acquired under ongoing implementation of the existing license (April 1, 2020 request to amend Exhibit K, as modified in its August 19, 2020 Response to FERC’s May 21, 2020 Additional Information Request). Project Boundary acreage values presented herein are those approved by the February 2, 2021 Order Amending License, Approving Revised Exhibits K and M, and Revising Annual Charges (174 FERC ¶ 62,066).

<sup>5</sup> In response to FERC’s May 21, 2020 Additional Information Request, City Light submitted revised Exhibits K and M, which include updated federal lands values. Federal land acreage values presented herein are those approved by the February 2, 2021 Order Amending License, Approving Revised Exhibits K and M, and Revising Annual Charges (174 FERC ¶ 62,066).

<sup>6</sup> Per February 2, 2021 Order Amending License, Approving Revised Exhibits K and M, and Revising Annual Charges (174 FERC ¶ 62,066).



### 1.1.3.1 Ross Development

Ross Lake, the impoundment created by Ross Dam, is the largest of the three Project reservoirs with a useable storage capacity of 1,052,000 acre-feet. City Light operates Ross Lake to provide storage for energy generation, downstream flood control, and recreation at the lake.

Under existing operations, Ross Lake is drawn down on a yearly basis during winter in order to capture flows from spring runoff and to provide for downstream flood control. The drawdown typically begins after Labor Day and continues until the lake reaches its lowest level in late March or early April. The current license requires City Light to draw down Ross Lake to a level that provides 60,000 acre-feet of storage for flood control by November 15 and 120,000 acre-feet by December 1 and to maintain this available storage through March 15.

Ross Lake levels are also managed to meet recreational needs during the summer months. The current license requires City Light to fill Ross Lake as soon as possible after April 15, achieve normal maximum water surface elevation depth by July 31, and maintain normal maximum water surface elevation depth through Labor Day.

City Light typically operates the Ross Powerhouse continuously to pass flow downstream, although it occasionally increases and decreases generation for short periods to help meet load-following demand or other Project purposes. Spills over Ross Dam are infrequent due to the large reservoir storage capacity. Spill is typically associated with gate testing and is usually short in duration and averages only a few cubic feet per second of flow per event.

### 1.1.3.2 Diablo Development

The Diablo Development is operated primarily to regulate flow between the Ross and Gorge Developments. Under normal operation, the reservoir level typically fluctuates between 4 and 5 feet per day. Because of its limited useable storage (8,820 acre-feet) relative to Ross Lake, the reservoir cannot absorb large fluctuations in flow under normal operations. Therefore, the Diablo Development spills much more frequently than the Ross Development, averaging about 30 days of spill per year. Spill generally occurs during periods of high runoff in the spring or early summer, or when the powerhouse units are offline or additional flow is needed to meet fish protection flows downstream of the Gorge Powerhouse.

Like the Ross Powerhouse, City Light typically operates the Diablo Powerhouse continuously to pass flow downstream, although it occasionally increases and decreases generation for short periods to help meet load-following demand or other Project purposes.

### 1.1.3.3 Gorge Development

The Gorge Development is operated primarily to regulate flows downstream of the powerhouse for salmon and steelhead protection in the upper Skagit River. The fish protection flow requirements are specified in the Revised Fisheries Settlement Agreement (FSA) Flow Plan that was approved by a July 17, 2013 Commission order amending license. The fish protection flows are generally designed to: (1) limit maximum flows when salmon and steelhead are spawning to prevent redd building along the margins of the river where they could be subject to flow fluctuations or dewatering if flows are reduced; (2) maintain minimum flows throughout the

incubation period to prevent desiccation of redds; and (3) limit ramping to protect sensitive life stages of salmon and steelhead from rapid increases or decreases in river flows.

To comply with the requirements of the FSA Flow Plan, City Light operates Gorge Lake and Powerhouse to provide a continuous, stable flow regime in the upper Skagit River. Reservoir fluctuations are limited to about 3 to 5 feet and City Light does not typically operate the powerhouse to meet load-following demand.

The Gorge Development creates a 2.5-mile-long bypassed reach of the Skagit River between the dam and powerhouse. There are no minimum flow requirements in the existing license for the Gorge bypassed reach. Therefore, except during spill events at Gorge Dam, bypassed reach flow is limited to accretion flow, spill-gate seepage, tributary input, and precipitation runoff.

Spill at Gorge Dam into the 2.5-mile-long Gorge bypassed reach occurs any time that inflow exceeds the generating capacity of the powerhouse, or if additional flow is needed to meet fisheries protection flows in the upper Skagit River. These spill events typically occur between 14 and 61 days per year.

#### 1.1.3.4 Gorge Second Power Tunnel

The current Skagit River Project license includes a second power tunnel at the Gorge Development which has not yet been constructed.<sup>7</sup> City Light will update the economic analysis using the market conditions projected over the next license period; results will be used to determine if the second tunnel should continue to be included as part of the Skagit River Project.

### 1.1.4 Proposed New Facilities and Maintenance Projects

As identified in the Pre-Application Document (PAD; City Light 2020a), City Light is considering two new facilities and rehabilitation activities at the Skagit River Project. The environmental impacts associated with these two proposals below will be analyzed during relicensing.

- **Diablo Powerhouse Tailwater Restoration** – The proposed project would involve the dredging of deposits that have accumulated in the main channel downstream of the confluence of Stetattle Creek. Since the cessation of routine dredging prior to the current license, aggradation at the mouth of Stetattle Creek has raised the Diablo Powerhouse tailwater elevation approximately 10 feet, creating both flooding risks and powerplant efficiency degradation. The project would restore hydraulic head and associated hydroelectric generating capacity at the Diablo Powerhouse which has been reduced by approximately three percent since Project construction due to the deposits from Stetattle Creek. The project would restore original design specifications and alleviate operational and physical security (flooding) risks at the powerhouse.
- **Diablo Lake Tour Dock** – This project would involve construction of a new tour dock on the shoreline of Diablo Lake near the ELC, which is where check-ins for the Skagit Tours occur. The existing tour dock is about one-half-mile from the check-in site and requires that tour participants either walk along a narrow road, without a shoulder, or take a shuttle bus. A dock

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<sup>7</sup> A second power tunnel at the Gorge Development was authorized in a license amendment issued by FERC July 17, 2013 (144 FERC ¶ 62,044).



near the ELC would improve pedestrian safety, the visitor experience, and access for the elderly and participants with disabilities. The new tour dock facility would consist of a float attached to the shoreline by stiff arms, as well as a gangway and pier. Approximately 100 feet of the existing peninsula trail leading to the facility would require improvements for Americans with Disabilities Act access. The existing tour dock would be removed and the site would be repurposed by the NPS or restored.

### **1.1.5 Update on Status of Potential Pump-Back Facility**

City Light is not proposing to include a pump-back project at the Ross Development (originally described as “pumped storage” in the PAD (City Light 2020a)) as part of the current relicensing proposal. This conceptual project would store surplus energy during intra-day periods of low demand by utilizing the existing low-level outlet in Ross Dam and new pumps to move water from Diablo Lake back up to Ross Lake. During periods of high energy demand, the pumped water stored in Ross Lake would again be used to generate electricity at Ross Powerhouse. A pump-back project at the Ross Development could provide additional flexibility to City Light, the regional power grid, and the Skagit River, particularly as the climate changes. City Light is currently conducting a preliminary engineering and economic feasibility analysis of a pump-back project at the Ross Development. If City Light opts to pursue this project in the future, it will notify LPs and propose appropriate studies to evaluate operational changes and potential impacts on environmental resources associated with the project at that time.

## **1.2 Initiation of ILP**

Pursuant to 18 CFR § 5.5(a), City Light filed a Notice of Intent (NOI) to relicense the Project and a PAD with FERC on April 27, 2020 (City Light 2020a). Copies of the NOI and PAD can be accessed through FERC’s e-library [www.ferc.gov/docs-filing/elibrary.asp](http://www.ferc.gov/docs-filing/elibrary.asp) or the Skagit Relicensing Public Document Library on City Light’s website at <http://www.seattle.gov/light/skagit/Relicensing/default.htm>.

## **1.3 ILP Process Plan and Schedule**

Following City Light’s filing of its NOI and PAD, several parties requested a modification of the ILP process plan and schedule presented in the PAD. FERC granted the extension request, in part, on June 25, 2020, in response to extension request letters by several agencies and Indian tribes, City Light’s June 16, 2020 support letter, and in light of extenuating circumstances of the Novel Coronavirus (COVID-19) pandemic on LP participation in the study planning phase of the ILP. As a result, FERC issued a modified ILP Process Plan and Schedule waiving the timing requirements of 18 CFR §§ 5.10, 5.11, 5.12, and 5.13 and extending the due dates for each milestone up to the Director’s study plan determination, by 60 days, and maintaining the original deadlines for Initial and Updated Study Reports (ISR/USR) of March 8, 2022 and March 8, 2023, respectively. Table 1.3-1 details the current Process Plan and Schedule as established by FERC.

**Table 1.3-1. ILP milestones for the Skagit River Project through filing of the Final License Application (FLA).**

<b>Significant Pre-filing Milestones</b>	<b>Responsible Party</b>	<b>Timeframe</b>	<b>Date <sup>1</sup></b>	<b>FERC Regulation</b>
Filing of NOI and PAD	City Light	As early as 5.5 years, but no later than 5 years prior to license expiration	4/27/2020	18 CFR § 5.5 and §5.6
Initial Tribal Consultation Meeting(s)	FERC	No later than 30 days after filing NOI and PAD	5/27/2020	18 CFR § 5.7
Notice of NOI/PAD and Issuance of Scoping Document 1 (SD1)	FERC	Within 60 days of filing NOI and PAD	6/26/2020	18 CFR § 5.8
Scoping Meeting/Site Visit	FERC	Within 30 days of NOI/PAD notice and issuance of SD1	N/A Waived <sup>2</sup>	18 CFR § 5.8(b)(viii)
Comments on PAD, SD1, and Study Requests	FERC, LPs	Within 60 days of NOI/PAD notice and issuance of SD1	10/24/2020	18 CFR § 5.9
Issuance of Scoping Document 2 (SD2), if necessary	FERC	Within 45 days of deadline for filing comments on SD1	12/8/2020	18 CFR § 5.10
File Proposed Study Plan (PSP)	City Light	Within 45 days of deadline for filing comments on PAD	12/8/2020	18 CFR § 5.11(a)
Study Plan Meeting(s)	City Light	Initial meeting to be held within 30 days of filing PSP	1/7/2021	18 CFR § 5.11(e)
Comments on PSP	FERC, LPs	Within 90 days after PSP is filed	3/8/2021	18 CFR § 5.12
File Revised Study Plan (RSP)	City Light	Within 30 days of deadline for comments on PSP	4/7/2021	18 CFR § 5.13(a)
Comments on RSP	LPs	Within 15 days following RSP	5/6/2021 <sup>3</sup>	18 CFR § 5.13(b)
Issuance of Study Plan Determination	FERC	Within 30 days of RSP	5/21/2021	18 CFR § 5.13(c)
Formal Study Dispute Resolution Process if requested <sup>4</sup>	Agencies with mandatory conditioning authority	Within 30 days of Study Plan Determination	6/10/2021	18 CFR § 5.14(a)
Select Third Dispute Resolution Panel Member, if necessary	Dispute Resolution Panel	Within 15 days of notice of study dispute	6/25/2021	18 CFR § 5.14(d)(3)
Dispute Resolution Panel convenes	Dispute Resolution Panel	Within 20 days of notice of study dispute	6/30/2021	18 CFR § 5.14(d)
Comments on Study Plan disputes	City Light	Within 25 days of notice of study dispute	7/5/2021	18 CFR § 5.14(i)
Dispute Resolution Panel technical conference	Dispute Resolution Panel, City Light, LPs	Prior to engaging in deliberative meetings	7/10/2021	18 CFR § 5.14(j)

<b>Significant Pre-filing Milestones</b>	<b>Responsible Party</b>	<b>Timeframe</b>	<b>Date <sup>1</sup></b>	<b>FERC Regulation</b>
Dispute Resolution Panel findings and recommendations	Dispute Resolution Panel	No later than 50 days after notice of dispute	7/30/2021	18 CFR § 5.14(k)
Study Dispute Determination	FERC	No later than 70 days after notice of dispute	8/19/2021	18 CFR § 5.14(1)
Conduct First Season of Studies	City Light		2021	18 CFR § 5.15(a)
Initial Study Report (ISR)	City Light	Pursuant to the Commission-approved study plan and schedule provided in §5.13 or no later than 1 year after Commission approval of the study plan	3/8/2022	18 CFR § 5.15(c)(1)
ISR meeting	City Light and LPs	Within 15 days of filing the Initial Study Report	3/23/2022	18 CFR § 5.15(c)(2)
File ISR Meeting Summary	City Light	Within 15 days of study results meeting	4/7/2022	18 CFR § 5.15(c)(3)
File Meeting Summary disagreements <sup>4</sup>	LPs	Within 30 days of study results Meeting Summary	5/7/2022	18 CFR § 5.15(c)(4)
File responses to Meeting Summary disagreements	City Light	Within 30 days of filing Meeting Summary disagreements	6/6/2022	18 CFR § 5.15(c)(5)
Study Dispute Determination	FERC	Within 30 days of filing responses to disagreements	7/6/2022	18 CFR § 5.15(c)(6)
Conduct Second Season of Studies	City Light		2022	18 CFR § 5.15(a)
File Preliminary Licensing Proposal (PLP) or Draft License Application (DLA)	City Light	No later than 150 days prior to the deadline for filing a new or subsequent license application	12/1/2022	18 CFR § 5.16(a)-(c)
Comments on PLP or DLA	LPs	Within 90 days of filing DLA	3/1/2023	18 CFR § 5.16(e)
File Updated Study Report (USR)	City Light	Pursuant to the Commission-approved study plan and schedule provided in §5.13 or no later than 2 years after Commission approval	3/11/2023	18 CFR § 5.15(f)
USR meeting	City Light and LPs	Within 15 days of USR	3/26/2023	18 CFR § 5.15(f)
File USR Meeting Summary	City Light	Within 15 days of USR meeting	4/10/2023	18 CFR § 5.15(f)
File Meeting Summary Disagreements <sup>4</sup>	LPs	Within 30 days of study results meeting summary	5/7/2023	18 CFR § 5.15(f)
File Responses to Meeting Summary Disagreements	City Light	Within 30 days of filing meeting summary disagreements	6/6/2023	18 CFR § 5.15(f)(5)
Study Dispute Determination	FERC	Within 30 days of filing responses to disagreements	7/6/2023	18 CFR § 5.15(f)

<b>Significant Pre-filing Milestones</b>	<b>Responsible Party</b>	<b>Timeframe</b>	<b>Date <sup>1</sup></b>	<b>FERC Regulation</b>
File FLA	City Light	No later than 24 months before the existing license expires	4/30/2023	18 CFR § 5.17

- 1 If the due date falls on a weekend or holiday, the deadline is the following business day.
- 2 Due to the proclamation declaring a National Emergency concerning COVID-19, issued by the President March 13, 2020, FERC waived § 5.8(b)(viii) of its regulations and does not intend to conduct a public scoping meeting.
- 3 In accordance with the Commission's process plan and schedule included in SD2, as amended by the Commission's order dated April 6, 2021, LPs have until May 6, 2021 to file comments on the RSP, after which the Commission will issue its study plan determination by May 21, 2021.
- 4 Shaded actions are not necessary if there are no study or meeting summary disputes.

## **1.4 Study Program Schedule Overview**

### **1.4.1 Environmental Scoping**

On June 26, 2020, FERC issued public notice of the PAD and NOI and commencement of the relicensing pre-filing process. FERC's June 26, 2020 notice also designated City Light as FERC's non-federal representative for carrying out informal consultation pursuant to Section 7 of the Endangered Species Act (ESA) and to fulfill its responsibilities under Section 106 of the National Historic Preservation Act (NHPA). In addition, the notice requested that LPs provide comments regarding the PAD and provide study requests. Concurrently, FERC issued SD1 to outline the subject areas to be addressed in its environmental analysis of the Project pursuant to the National Environmental Policy Act (NEPA).

Due to the proclamation declaring a National Emergency concerning COVID-19, issued by the President on March 13, 2020, FERC waived 18 CFR § 5.8(b)(viii) and notified the public that it does not intend to conduct a public scoping meeting or site visit to the Skagit River Project. Instead, FERC solicited written comments, recommendations, and information, on the SD1. If needed, a site visit may be held later in the study plan development and review process.

On December 4, 2020, FERC issued its SD2 for the relicensing of the Project.

### **1.4.2 PAD and SD1 Comments and Study Requests**

Pursuant to the current Process Plan and Schedule (Table 1.3-1), comments on the PAD and SD1 and study requests were due to FERC by October 24, 2020. See Sections 4.3 and 6 of this RSP for details regarding comments and study requests provided by LPs.

### **1.4.3 PSP**

In accordance with 18 CFR § 5.11(a) and pursuant to the current Process Plan and Schedule (Table 1.3-1), City Light filed its PSP within 45 days after deadline for filing comments on the PAD and SD1 and study requests, on December 8, 2020.

### **1.4.4 PSP Meeting**

In accordance with 18 CFR § 5.11(e) and pursuant to the current Process Plan and Schedule (Table 1.3-1), City Light was required to hold a Study Plan Meeting(s) within 30 days after

deadline of filing the PSP (no later than January 7, 2021). The purpose was to clarify the intent and content of City Light's PSP and identify any outstanding issues or information needed with respect to the proposed studies. City Light held four days of meetings January 6 and 12-14, 2021. Due to the Novel Coronavirus Disease (COVID-19) public health emergency, the meetings were held virtually. The background, concepts, and studies described in the PSP were presented during the Study Plan Meetings.

In addition, City Light hosted ten additional topic-based meetings in late January through February 2021 in coordination with LPs aimed at resolving outstanding differences between City Light's proposed studies and LPs' study requests. The agenda for those meetings were developed by the LPs at their request. In response to feedback on the PSP received during the fourteen meetings with the LPs in January and early February 2021, City Light developed 15 issue resolution forms proposing compromises and providing additional information and modifications to a number of study requests and circulated them to the LPs prior to the deadline for PSP comments. The commitments reflected in these issue resolution forms have been incorporated into the RSP.

#### **1.4.5 Comments on the PSP**

In accordance with 18 CFR § 5.12 and pursuant to the current Process Plan and Schedule (Table 1.3-1), comments on City Light's PSP, including any revised information or study requests, were due to FERC within 90 days of the PSP being filed (no later than March 8, 2021). Commentors were requested to include an explanation of any study plan concerns and any agreements reached with City Light regarding those concerns. Proposed modifications to the PSP were requested to address the requisite Study Criteria described in Section 4. See Sections 4.4, 5, and 6 of this RSP for details regarding PSP comments and study requests provided by FERC and LPs.

#### **1.4.6 RSP**

In accordance with 18 CFR § 5.13(a) and pursuant to the current Process Plan and Schedule (Table 1.3-1), City Light is filing this RSP within 30 days of the due date for comments on the PSP. This RSP specifically addresses all comments received on the PSP. This RSP also includes a description of the efforts made to resolve differences over study requests. For any requested study not adopted in full or in part in this RSP, City Light provides the rationale for its decision based on FERC Study Criteria.

#### **1.4.7 Early Study Implementation**

The ILP schedule extension provides a challenge for timely commencement of field studies if study teams do not begin pre-field preparations, data review, and permitting prior to FERC's Study Plan Determination. City Light is committed to gathering information necessary for the relicensing. Several of the study schedules in the PSP projected that study plan implementation would start in late winter or spring of 2021. As applicable, study schedules have been updated in this RSP to reflect challenges with early field implementation during the COVID-19 pandemic and to allow for discussions with LPs regarding modifications to many study plans between the PSP and RSP. Where City Light and LPs were not able to fully resolve differences on study requests, schedules in this RSP may be modified further to allow for resolution of these disagreements. Nonetheless, City Light is making every effort to prepare for field work to be implemented in 2021 as soon as practicable following FERC's determination and any subsequent formal study disputes.

In addition, several studies were initiated in late 2020 and early 2021 to provide additional information requested by LPs, to capture important seasonal information needs, and to inform the development of the study plans included in this RSP. Early study implementation activities initiated to date are summarized in Section 3.2.3.

#### **1.4.8 Study Plan Determination**

FERC will issue its Study Plan Determination by May 7, 2021, within 30 days of City Light's filing of this RSP. If any portions of the Study Plan Determination are formally disputed by federal agencies with Section 4(e) and Section 18 authority or the Washington State Department of Ecology (Ecology) with respect to its water quality certification for the Project, a formal dispute resolution process can be initiated, as provided for under 18 CFR § 5.14. A final Study Dispute Determination for the disputed study components (serving as an amendment to the Study Plan Determination) would be issued in early August 2021.

#### **1.4.9 Study Reporting and Study Plan Modification**

As required by 18 CFR § 5.15, City Light will provide periodic progress updates as study work progresses. The updates will be provided during Resource Work Group (RWG) meetings. City Light will work with RWG members to determine the frequency and format of these meetings to accommodate LP interests in study plan progress updates related to the study program.

In accordance with 18 CFR § 5.15(f) and pursuant to the current Process Plan and Schedule (Table 1.3-1), at the conclusion of each study season, City Light will file an ISR and USR, and hold a meeting with LPs and FERC staff to discuss the initial and updated study results (ISR meeting and USR meeting), respectively. City Light will submit all study documents that must be filed with FERC via FERC's e-library system [www.ferc.gov/docs-filing/elibrary.asp](http://www.ferc.gov/docs-filing/elibrary.asp) as well as through the Skagit Relicensing Public Document Library on City Light's website at <http://www.seattle.gov/light/skagit/Relicensing/default.htm>.

Following each study report meeting, the FERC ILP regulations provide the opportunity for City Light and/or LPs to request modifications to the study plan in light of progress of the study program and results to date (18 CFR §§ 5.15(c)(3) and (4)).

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## **2.0 CONTEXT OF RSP WITHIN LICENSING PROCESS**

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As outlined in Section 1 of this RSP, City Light is using the default ILP for relicensing the Project. In addition to the regulatory requirements of the ILP, City Light has engaged in voluntary work group meetings to provide a structure for consultation with LPs. City Light intends to continue these work groups. To date during discussions with LPs, many questions have arisen regarding the process of consultation and its relationship to the study program, and ultimately development of a Project proposal for the next license term. In addition to the regulatory requirements for each document in the ILP described in Section 1 of this RSP, this section outlines more general information on how each of the documents will be used to build an information base that will ultimately inform the Project proposal to be included in the license application.

### **2.1 Role of PAD**

Over the course of the current license term, substantive background information on resources within the Project Boundary and surrounding watershed was developed. The PAD serves as the first document in a phased process to provide the information necessary to both review existing conditions and inform development of a comprehensive proposal for operation, inclusive of resource measures, over the term of the next license. The ILP provides LPs opportunities to comment to both City Light and FERC regarding available background information the parties would like considered in the licensing process, and additional information needs.

In order to facilitate the development of a shared information base, the PAD provides an extensive description of Project facilities and operations and the resource information presented is intended to summarize available information and incorporate references into the Project record that are relevant to understanding the existing environment. The PAD also provides a preliminary assessment of known Project effects and proposed resource measures that may be implemented as a starting point for discussions with LPs. The PAD outlined goals and objectives of 24 studies that have since been further developed and expanded to 28 studies as presented in the PSP, and 33 studies as presented in this RSP.

Comments on the PAD and identification of additional references relevant to the Project have been noted by many LPs in their filings with FERC. This information is incorporated into the record and will be drawn upon in the implementation of studies (as applicable) and new information will be reflected in the study reports. City Light will address comments on the PAD or other comments that some LPs filed, that did not contain a study or information proposal, in future relicensing filings, such as the DLA or FLA.

### **2.2 PSP and RSP**

Building upon the existing information identified and summarized in the PAD and informed by the over 60 work group meetings held prior to filing of the PSP, the PSP Meetings, ten topic-based meetings held prior to filing of this RSP, and written LP and FERC comments and study requests, City Light's proposed study program is comprised of studies to address the following considerations:



- Consistent with FERC’s seven criteria for study plans (described in Section 4.1 of this RSP), in particular, studies that fill data gaps necessary to inform relicensing and that are able to be completed during the relicensing timeframe. Also, proposed studies will provide information related to operations and potential effects of the Project that can be addressed by a license condition.
- Information relevant to a shared resource interest and/or an identified agency, tribal, or City Light Project-related resource management goal or requirement.

City Light has embraced an ecosystem approach where it looks beyond what is required under FERC’s study criteria and has focused its studies to inform decisions on operating the Project over the next 40-50 years. City Light’s process in developing this RSP is described further in Section 4 of this document. Submittal of this RSP provides the basis for FERC’s Study Plan Determination in early May.

### **2.3 Study Implementation**

City Light began implementation of several studies in 2020 that will provide baseline information to supplement the PAD and inform other proposed studies. These early implementation studies are detailed in Section 5 and include the TR-01 Vegetation Mapping Study, TR-02 Wetland Assessment, and the CR-01 Cultural Resources Data Synthesis.

While the ILP allows for up to two years of field studies, City Light has proposed study plan schedules that are front-loaded in an effort to have the initial study results available by early 2022 to allow for robust review of study results with LPs prior to the submittal of the DLA. Fieldwork related to several studies will continue into 2022 and beyond, as appropriate. As proposed in this RSP, 16 of the 33 proposed studies will complete field work in 2021 and preliminary data analysis and study reports will be available by the ISR deadline in March 2022.

City Light anticipates ongoing coordination with LPs in the RWGs on field work and will provide information on field schedules, periodic updates on data collection, and summarize draft results as they become available.

In addition, several studies include designated workshops and model training opportunities at identified milestones during the study implementation to provide specific consultation and feedback opportunities on technical studies in addition to the regular RWG progress updates noted in Section 1.4.9 of this RSP.

- SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River
- OM-01 Operations Model Study
- FA-02 Instream Flow Model Development Study
- FA-04 Fish Passage Technical Studies Program
- FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study
- FA-07 Reservoir Tributary Habitat Assessment

- GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River

## 2.4 ISR and USR

Study reports will be provided to LPs for review and comment. The reporting steps identified in the ILP include the ISR (March 2022) and USR (March 2023) which will describe the progress in implementing the studies at that time. City Light envisions completing all field work for 16 of the 33 proposed studies prior to filing of study reports in the ISR, and progress reports will be filed for the remaining 17 studies. Each report in the ISR will identify variances from the final study plans and will identify any proposed additional data collection based on first year study results, as necessary.

Final study reports will be provided no later than the USR in March 2023. Due to the tight timeframe between the USR and the FLA filing date with FERC, City Light will strive to provide study information from the 2022 field season as it becomes available to LPs.

## 2.5 Coordinated Review of Study Results

Many LPs have raised concerns that results of individual studies (or resource protection measures based on one particular resource issue) will not provide a comprehensive picture of potential Project effects. During reviews of draft study plans, LPs noted the need for “cross-resource” analysis of study results and a process through which parties can work together to identify opportunities for a unified analytical approach and a desire for discussions of a comprehensive, ecologically sound Project proposal. City Light shares LPs interest in a cross-resource, comprehensive review of resource information related to the Project. Another important consideration for development of a Project proposal is the context of study results and proposed resource measures in relationship to other projects and activities in the watershed.

City Light recognizes the complexity of resource issues under discussion in this relicensing process and anticipates structured discussions with LPs through RWG or other venues. Modeling tools proposed in this RSP, including but not limited to the Instream Flow Model (inclusive of the Gorge bypass reach), the Operations Model, and the one-dimensional (1-D) Sediment Transport Model, will be available for LPs to facilitate review of existing conditions and test hypotheses regarding potential future operations, or scenarios.

These flow analysis tools will provide a powerful analytical basis to compare relative changes in resource conditions of interest to LPs and City Light. These tools will provide information on potential direct effects of the Project under different optional scenarios and/or future hydrologic conditions (e.g., climate change).

LPs and City Light have begun discussions regarding potential analytical processes that could be applied to create a shared set of evaluation criteria for parameters of concern in the relicensing. One such approach is structured decision making, an approach for careful and organized analysis of natural resource management decisions. Based in decision theory and risk analysis, structured decision making encompasses a simple set of concepts and helpful steps, rather than a rigidly-prescribed approach for problem solving. City Light anticipates further discussions with LPs on

how this or other analytical tools may be applied in the relicensing process to inform development of resource measures to be included in the DLA and FLA.

## 2.6 Development of Management Plans

Management plans are a typical means for identifying resource management objectives and outlining specific actions to occur over the course of a new license. Resource management plans are a convenient mechanism to outline and commit to what, how, why, and where activities are to occur over the term of a new license. Management plans can contain a range of different activities such as best management practices (BMP), additional investigations needed to support management objectives, or monitoring and adaptive management components. Consultation approaches, schedules for updates to the plans, and other compliance requirements of the plan can be included in management plans. While each plan may differ in the level of detail available and approach based on resource specific needs, City Light intends to work collaboratively with LPs to develop management plans for submittal with the license application to FERC that are in a format consistent with FERC's guidelines regarding development of resource measures and license requirements.

Based on existing information summarized in its PAD filing and later discussion with LPs, City Light identified the need for numerous management plans to detail BMPs, address known ongoing Project effects, and contribute to the shared resource management efforts in the Skagit River over the term of the new license. During early issue identification discussions with LPs, and in review of comments on the PAD and study requests filed with FERC in October 2020, several recommendations for management plan updates and actions were identified. A preliminary list of subject areas that City Light anticipates appropriate for inclusion in management plans may include:

- Cultural Resources
- Invasive Species
- Erosion Control
- Wood Management
- Fish and Aquatic Resources
- Fire
- Mitigation Lands
- Vegetation
- Recreation
- Education and Interpretation
- Avian Protection
- Water Quality

In their PSP comments, several LPs requested additional information and a proposed schedule for the development of these management plans. City Light has included a general schedule for all

management plans and a specific, more detailed timeline as an example approach for development of a mitigation lands management plan (Table 2.6-1). City Light anticipates continuing to discuss the timeline for development of management plans with LPs during RWG meetings in 2021. While general concepts for management plans have been discussed to date, many plans will rely upon review and discussion of draft study results before specific details may be developed. City Light anticipates coordinated discussions regarding management plans with LPs during and following the review of study results that will begin in earnest in late 2021 and early 2022.

City Light will work with LPs to identify planning groups for development of management plans based on the following general schedule and activities:

- Convene planning group for specific management plan to develop purpose statement and goals for the management plan and confirm plan specific schedule (Q3 – Q4 2021)
- Evaluate existing information and draft information from relicensing studies (Q4 2021)
- Develop objectives and types of measures to be included in management plans, review ISR study results, and identify additional information needs (Q1 – Q2 2022)
- Collect and review additional information and complete draft of management plan for inclusion in the DLA (Q3 – Q4 2022)

**Table 2.6-1. Draft mitigation lands management plan development schedule.<sup>8</sup>**

Management Plan Development Step	Timeline
Completion of draft map products showing baseline vegetation and wetlands data on the mitigation lands	Q2-Q3/2021
Field data collection on ILP relicensing studies and periodic updates to RWGs	Q2-Q4/2021
Convene planning group for Mitigation Lands Management Plan(s) <ul style="list-style-type: none"> <li>○ Develop draft goals for management plan</li> </ul> Review and confirm remaining milestones	Q3/2021
Develop annotated outline for Mitigation Lands Management Plan(s)	Q2-Q4/2021
Assemble and evaluate existing information <ul style="list-style-type: none"> <li>○ Complete GIS analysis of access to mitigation lands (habitat maps for each parcel)</li> <li>○ Using existing information, map proximity of other conservation land</li> <li>○ Evaluate land use changes over 30-year period to mitigation lands and adjacent properties</li> <li>○ Collect information available about illegal activities and map where possible</li> <li>○ Assemble information on species of concern on and in the vicinity of mitigation lands</li> </ul>	Q4/2021
Identify desired conditions for habitat and target species for each parcel (i.e., elk forage, mature forests) based on existing information	Q1/2022
Assess data needs based on existing information <ul style="list-style-type: none"> <li>○ Identification of pilot sites for additional data collection, e.g., for elk forage/bird use monitoring</li> <li>○ Develop plans, methods and schedule for additional field data collection</li> <li>○ Other activities as identified by planning group</li> </ul>	Q3/2022
ISR on ILP relicensing studies provided to FERC and LPs	3/8/2022

<sup>8</sup> Timeline subject to revision based on discussions with LPs.

<b>Management Plan Development Step</b>	<b>Timeline</b>
Planning group review/draft management objectives for each parcel Develop conceptual measures to meet objectives for each parcel Identify additional data needs	Q4/2022
Mitigation land planning group reviews annotated outlines and drafts of management plans for DLA	Q3-Q4/2022
Submit draft management plan to FERC as part of Final FLA	4/30/2023
Implement additional data collection at pilot sites	2023-2025

## 2.7 DLA and FLA

The license application will set forth City Light's Project proposal, including any facility operations and associated PME measures. Such measures may be described as proposed license articles or as draft management plans. The license application will include a comprehensive analysis of existing information from the PAD, combined with results from the studies implemented during the relicensing timeframe. It will also include cross-resource analysis of anticipated Project effects and associated PMEs (resource measures) related to the proposed operating proposal. In addition, City Light welcomes any additional documents and data sources from LPs that may inform study implementation and future steps in the relicensing process. It is also City Light's intent to engage in discussions with LPs with a goal of reaching mutual agreement on appropriate PME measures and management plans.

## **3.0 ON-GOING STUDIES AND DATA COLLECTION ACTIVITIES**

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### **3.1 Existing Data Collection Activities**

City Light continues to collect, evaluate, and provide to LPs resource monitoring information from the Project in accordance with the terms of its current license. These study and information gathering activities are summarized in the following reports:

- Annual Project Expenditures Statement (April)
- Semi-annual Flow Compliance Report (April and October)
- Annual Non-flow Program Report (July)
- Steelhead Program
- Chinook Research Program
- Off-Channel Chum Habitat Development and Improvement Program
- Diablo and Gorge Lake Fisheries
- Erosion Control Report (every 2 years; May)
- Wildlife Report (every 5 years; April)
- Archaeological Report (every 5 years; May)
- Historical Report (every 5 years; May)

Further, through discussions with LPs in early study plan development and in response to comments received on the PSP, City Light and LPs have identified several information-gathering activities related to implementation of current license requirements that, while not included in this RSP, will inform current resource management activities and provide information relevant to the relicensing process and future management plans:

- Erosion monitoring at cultural resources sites around Ross Lake – City Light has contracted with NPS to conduct a geomorphology investigation and map erosion patterns in Ross Lake to aid in cultural resources protection. Through this effort, City Light and NPS are coordinating to update archaeological monitoring techniques and this new data will be used to improve efficacy of monitoring and help prioritize recommendations for stabilization of historic properties.
- Sediment deposition and management of historic properties – In response to NPS comments on the PSP, City Light will expand its existing partnership with NPS to evaluate and monitor erosion at cultural sites on Ross Lake to also study deposition in Ross Lake at five locations suggested in comments on the PSP where sedimentation has the potential to impact historic properties. City Light will conduct this work as part of implementation of its existing Archaeological Resources Mitigation and Management Plan (ARMMP) and license compliance activities during 2021 and 2022. The data from this study will be used to inform management actions under the current license and will be integrated into the Historic Properties Management Plan (HPMP) under the new license.
- Reed canary grass control – City Light and NPS are partnering on an inventory of known

occurrences of reed canary grass and exploring treatment options.

- Recording observations of invasive bullfrogs – NPS, BC Parks, and City Light are collaborating on documenting bullfrog occurrences. Distribution information on bullfrogs may inform future partnership management actions.

## 3.2 On-Going Studies

In 2018-2019, City Light initiated two baseline studies resulting from discussions with LPs involved in current license compliance. City Light contracted with NPS to conduct a Landform Mapping Study and with the USGS to conduct a Food Web Study. Results of each of these studies will be available to inform City Light's license application.

In addition, City Light initiated implementation of several study plans in 2020 and early 2021 to facilitate early availability of data to information the relicensing.

### 3.2.1 Landform Mapping

The Memorandum of Agreement (MOA) with NPS for the Landform Mapping Study is appended to the PAD (City Light 2020a). This study will provide a baseline map of land and channel forms within the channel migration zone of the Skagit River and will inform GE-02: Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study and GE-04: Skagit River Geomorphology Between Gorge Dam and the Sauk River Study provided in this RSP. NPS will be continuing work on the area down to the confluence with the Sauk River throughout 2021 and 2022 (targeting completion of reaches 7-10 by end of 2021 and 11-13 by end of 2022).

### 3.2.2 Food Web Study

During 2017-2018, City Light and the Skagit River Project Non-Flow Plan Coordinating Committee (NCC) determined that an evaluation was needed to assess an observed demographic shift and apparent recruitment limitations in the Ross Lake Rainbow Trout population, thought to be related to the introduction of Redside Shiners<sup>9</sup> to the Project reservoirs. In 2018, City Light agreed to fund a comprehensive food web assessment. At City Light's request, the USGS developed a proposed scope of work (SOW) for a comprehensive study, i.e., Factors Limiting Native Salmonids above Skagit River Dams ("Food Web Study").

The goal of the Food Web Study is to identify and quantify factors that limit recruitment or production of native adfluvial salmonids in Project reservoirs and their associated tributaries. The study was designed so that the following objectives would be addressed according to a phased approach:

- Phase 1: (1) data review; (2) analysis of existing samples; (3) tributary assessments; and (4) development of genetic markers to support eDNA assessments.
- Phase 2: (1) quantify seasonal and size-structured food web interactions in the reservoirs based on directed sampling; (2) develop a bioenergetics model for Redside Shiner; (3) explore the

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<sup>9</sup> Redside Shiners are members of the minnow family and are not native to the Upper Skagit River where they have been observed since approximately 2004.

ontogenetic connections of adfluvial salmonids between life stages in tributary and reservoir habitats using water chemistry and elemental analysis or stable isotope analysis of otoliths, scales, or other diagnostic hard parts from char and rainbow trout; (4) expand on the habitat suitability and production capacity of select tributaries; (5) expand on first-year efforts to explore the presence and geographic extent of native and non-native fishes in the basin; and (6) determine the extent of hybridization among char (Bull Trout, Dolly Varden, and Brook Trout) and between Rainbow and Cutthroat Trout.

The schedule for completion of the USGS SOW has been delayed approximately one year by COVID-19, and a draft report will be available for review in March 2022. The complete scope of work for the Food Web Study is appended to the PAD (City Light 2020a). The draft results of these studies will be available concurrent with the ISR and final results will be available prior to the DLA.

As described in FA-07 Reservoir Tributary Habitat Assessment Study Plan, City Light is proposing to expand the Food Web Study to conduct bioenergetic simulations in tributaries that have not already been modeled. In addition, City Light believes that the development of a process to integrate the results of the physical habitat and bioenergetics assessments (as part of the expanded Food Web Study) would be enhanced by consultation with LPs and proposes to schedule a workshop involving the author of the Food Web Study (David Beauchamp, in development) in July 2021. City Light believes the workshop would provide an opportunity to discuss how the Food Web Study results will be used to address reservoir-related issues raised in LP study requests. In the event the workshop identifies data gaps, City Light will consult LPs on the need to adjust the study scope of work to fill these data gaps in the second year of study.

### **3.2.3 Early Implementation of Relicensing Studies**

City Light began implementation of several studies in 2020 that will provide baseline information to supplement the PAD and inform other proposed studies. These early implementation studies are detailed in Section 5 and include the TR-01 Vegetation Mapping Study, TR-02 Wetland Assessment, and the CR-01 Cultural Resources Data Synthesis; draft reports for these studies will be available in summer 2021 and information collected will inform other relicensing studies.

Several studies included in this RSP were initiated in late 2020 and early 2021 to provide additional information requested by LPs, to capture important seasonal information needs, and to inform the development of the study plans included in this RSP. Early study implementation activities related to the following study plans appended to this RSP include:

- FA-01 Water Quality Monitoring Study – equipment placement and data sampling in the bypass reach was initiated in late Fall 2020 to supplement proposed data collection in the RSP.
- FA-02 Instream Flow Model Development Study – transect selection and hydraulic data collection, preliminary delineation of the channel mitigation zone, supplemental bathymetry data collection, and demarcation of the high water line to allow for model development to be completed in 2021.
- FA-03 Reservoir Fish Stranding and Trapping Risk Assessment – initial reconnaissance trips to inform sampling design proposed in the RSP occurred in fall 2020.



- TR-08 Special-status Amphibian Study – breeding surveys were initiated in lower elevation areas in March 2021 per designated sampling protocols.
- GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study – Initial scour monitors were installed in fall 2020 to increase the likelihood of capturing high flows.

Finally, to allow for timely initiation of field studies, permitting and field planning efforts as well as background data gathering will begin for the majority of studies in April 2021. See Section 5 and full study plans appended for details.

## 4.0 DEVELOPMENT OF CITY LIGHT'S RSP

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The purpose of this RSP is to describe City Light's proposed approach for conducting studies and to address LPs' study requests. The studies will yield information that will enable FERC to conduct its NEPA analysis, federal and state resource agencies to fulfill their statutory obligations, and aid in the development of future license requirements. The individual study plans for the proposed studies are provided in an appendix to this RSP.

Following the PSP meetings and after careful review of LP comments on the PSP, City Light reevaluated its position with respect to relicensing studies, reassessed its long-standing relationships with LPs, and decided to shift its efforts toward resolving outstanding differences concerning the proposed studies. After thoughtful deliberation, City Light has decided to significantly expand and modify its PSP in this RSP to demonstrate its commitment to working with LPs to accommodate their information needs, even if the revised studies do not precisely adhere to the FERC Study Criteria. These modifications include the addition of five new studies and modification of many proposed studies included in the PSP to resolve these outstanding differences. City Light held additional meetings with LPs during the month of March to review these proposed changes and obtain feedback to help refine the proposals. City Light hopes that these changes and additional commitments in this RSP will set the stage for further collaboration with LPs as the study implementation phase begins.

### 4.1 FERC's Study Plan Criteria

FERC's ILP regulations at 18 CFR § 5.9 specify required components of study requests to allow City Light, as well as FERC staff, to determine the relevance of the proposed study to the relicensing. The required components (the "Study Criteria") apply to study requests filed in response to the PAD and for any modifications to the PSP requested by parties for this RSP. The Study Criteria are as follows:

- (1) *Describe the goals and objectives of each study and the information to be obtained (§ 5.9(b)(1));*

This section describes why the study is being requested and what the study is intended to accomplish, including the goals, objectives, and specific information to be obtained. The goals of the study should clearly relate to the need to evaluate the effects of the Project on a particular resource. The objectives are the specific information that needs to be gathered to allow achievement of the study goal.

- (2) *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied (§ 5.9(b)(2));*

This section should clearly establish the connection between the study request and management goals or resource of interest. A statement by an agency connecting its study request to a legal, regulatory, or policy mandate needs to be included that thoroughly explains how the mandate relates to the study request, as well as the Project impacts.

- (3) *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study (§ 5.9(b)(3));*

This section is for non-agency requestors or Indian tribes to establish the relationship between the study request and the relevant public interest considerations.

- (4) *Describe existing information concerning the subject of the study proposal, and the need for additional information (§ 5.9(b)(4));*

This section should discuss any gaps in existing data by reviewing the available information presented in the PAD or information relative to the Project that is known from other sources. This section should explain the need for additional information and why the existing information is inadequate.

- (5) *Explain any nexus between Project operation and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements (§ 5.9(b)(5));*

This section should clearly connect Project operations and Project effects on the applicable resource. This section should also explain how the study results would inform the development of PME measures.

- (6) *Explain how any proposed study methodology is consistent with generally accepted practices in the scientific community or, as appropriate, considers relevant tribal values and knowledge. This includes any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration (§ 5.9(b)(6));*

This section should provide a detailed explanation of the study methodology. The methodology may be described by outlining specific methods to be implemented or by referencing an approved and established study protocol and methodology.

- (7) *Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs (§ 5.9(b)(7));*

This section should describe the expected level of cost and effort to conduct the study. If there are proposed alternative studies, this section should address why the alternatives would not meet the stated information needs.

## **4.2 Efforts to Communicate with LPs to Date**

In January 2019, City Light began a voluntary Study Plan Development Process with LPs in preparation for initiating the relicensing process. The purpose of this early process was to provide a forum, a structure, and additional time for discussion with LPs with the goal of identifying resource issues that may warrant study during relicensing. These discussions resulted in the development of a suite of issues and associated studies included in the PAD (City Light 2020a).

Following filing of its PAD, City Light continued meeting with LPs and provided early drafts of study plans for comment and discussion of studies necessary to inform the relicensing process.

The proposed study plans in the PSP included documentation of comments received on these early drafts and City Light's responses, in addition to reflecting responses to study requests filed with FERC by October 24, 2020.

Nearly 40 organizations have participated in the working group discussions regarding study plans to date, which consists of a two-tier working group structure comprised of a policy-level Steering Committee and the following technical RWGs:

- (1) Fish and Aquatic Resources Work Group (FARWG)
- (2) Recreation and Aesthetic Resources Work Group (RARWG)
- (3) Terrestrial Resources and Reservoir Erosion Work Group (TRREWG)
- (4) Cultural Resources Work Group (CRWG)

The RWGs are comprised of LPs with technical expertise in applicable resource areas, while the Steering Committee is comprised of organization representatives focused on policy-level decisions for the organizations. A list of the organizations that participated in RWG and Steering Committee meetings through November 2020 and PSP Meetings and subsequent topic-based discussions through February 2021 is appended to this RSP.

In total, the Study Plan Development Process included nearly 60 meetings through November 2020, as identified in Table 4.2-1.

**Table 4.2-1. Study Plan Development Process meeting dates through November 2020, prior to PSP filing.**

Steering Committee Meeting Dates	CRWG Meeting Dates	FARWG Meeting Dates	RARWG Meeting Dates	TRREWG Meeting Dates	Geomorphology Subgroup Meeting Dates	Fish Passage Subgroup Meeting Dates
2/12/19	1/29/19	1/29/19	1/29/19	1/29/19	4/15/19	10/3/19
4/17/19	3/18/19	3/18/19	3/18/19	3/19/19	5/28/19	10/30/19
6/19/19	5/21/19	4/9/19	5/22/19	5/21/19	6/25/19	
9/4/19	8/7/19	5/20/19	7/31/19	7/30/19		
10/9/19	10/16/19	7/29/19	3/24/20	10/15/19		
11/6/19	3/19/20	3/31/20	5/7/20	3/17/20		
12/5/19	5/4/20	5/5/20	6/25/20	5/6/20		
1/23/20	6/22/20	6/2/20	9/17/20	6/23/20		
3/12/20	9/14/20	6/24/20	11/19/20	9/15/20		
4/8/20	11/16/20	9/16/20		11/17/20		
5/20/20		11/18/20				
7/22/20						
11/10/20						

In addition to the RWG and Steering Committee meetings, City Light requested meetings between senior City of Seattle officials and leadership with Indian tribes and First Nations to discuss their

individual interests. Meetings were held October through March 2021. Additional meetings are planned.

Between the PSP and filing of this RSP, City Light held the requisite PSP Meetings (January 6 and 12-14, 2021) followed by ten topic-based discussion meetings (January 26 and 28, and February 2, 4, 9, 11, 16, 18, 23, and 25, 2021) to continue efforts to resolve outstanding differences between City Light's proposed studies and LPs' study requests. In response to feedback received during the fourteen PSP Meetings with the LPs, City Light developed and circulated 15 issue resolution forms proposing compromises and providing additional information and modifications to its proposed studies in an effort to resolve differences over study requests.

Within 30 days of filing this RSP, FERC will issue its Study Plan Determination, which will identify all studies and information necessary to meet its NEPA obligations and information required under the Federal Power Act. In deciding which studies to require, FERC will apply the seven Study Criteria described in Section 4.1 of this RSP. City Light has reviewed study requests leading up to this RSP and considered both Study Criteria and identified interests of LPs expressed during consultation on early drafts of study plans, and in study requests and comments filed with FERC.

The ILP and FERC's Study Plan Determination do not preclude City Light from gathering additional Project-related information that is of shared interest to LPs and City Light in support of anticipated discussions, or that is required to meet other statutory or regulatory responsibilities of LPs. City Light deeply appreciates the participation of all parties in the interests of robust consultation.

### **4.3 PAD and SD1 Comments and Study Requests Overview**

Pursuant to the current Process Plan and Schedule (Table 1.3-1 of this PSP), comments on the PAD and SD1 and study requests were due to FERC by October 24, 2020. A total of 23 comment letters from federal and state agencies, Indian tribes, First Nations, NGOs, and other LPs were filed with FERC. At least 97 study requests were made by LPs to FERC.<sup>10</sup> City Light took these requests into consideration when preparing the PSP that proposed 28 studies.

City Light will give due consideration and incorporate PAD comments into its Exhibit E Environmental Exhibit of the license application. FERC addressed public comments on SD1 in its SD2, which it issued on December 4, 2020.

### **4.4 PSP Comments and Revised Study Requests Overview**

Pursuant to the current Process Plan and Schedule (Table 1.3-1 of this RSP), comments on the PSP and study requests were due to FERC by March 8, 2021. A total of 17 comment letters from federal and state agencies, Indian tribes, First Nations, NGOs, and other LPs were filed with FERC. As part of the comment letters, at least 2 revised study requests were made by LPs to FERC, which

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<sup>10</sup> On October 26, 2020, the Upper Skagit Indian Tribe filed information with the Commission, which the Tribe designated as privileged and confidential. City Light understands that this filing may contain additional requests for studies or information. City Light is working with the Upper Skagit Indian Tribe through a Protective Agreement to obtain this filing.

City Light has taken into consideration when preparing this RSP. The 33 proposed studies (5 added since PSP) are summarized in Section 5 and full study plans included in an appendix to this RSP. City Light's response to study requests is summarized in Section 6 of this RSP. A table detailing PSP comments received and City Light's response to each is appended to this RSP.

The PAD, SD1 and PSP comment letters and study requests received by LPs are listed in an appendix to this RSP. Comments letters and all documents filed with FERC can be accessed through FERC's eLibrary at [www.ferc.gov/docs-filing/elibrary.asp](http://www.ferc.gov/docs-filing/elibrary.asp) by searching under Docket P-553-235.

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## 5.0 SUMMARY OF CITY LIGHT'S PROPOSED STUDIES

Based on studies proposed in the PAD, working group discussions with LPs, and in response to written study requests and comments received during the scoping period and on the PSP, City Light is proposing 33 studies. Table 5.0-1 lists the proposed studies and identifies which are new or have been substantively modified from the PSP.

**Table 5.0-1. City Light's proposed studies.**

	Study Number and Title	Significantly Modified Since PSP
1.	CR-01 Cultural Resources Data Synthesis	No
2.	CR-02 Cultural Resources Survey	Yes
3.	CR-03 Gorge Bypass Reach Cultural Resources Survey (Bypass Cultural Resources Survey)	Yes
4.	CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study)	Yes
5.	FA-01 Water Quality Monitoring Study (WQ Monitoring Study)	Yes
6.	FA-02 Instream Flow Model Development Study	Yes
7.	FA-03 Reservoir Fish Stranding and Trapping Risk Assessment (Stranding and Trapping Assessment)	Yes
8.	FA-04 Fish Passage Technical Studies Program (Fish Passage Study)	Yes
9.	FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study (Bypass Instream Flow Model Development Study)	Yes
10.	FA-06 Reservoir Native Fish Genetics Baseline Study (Reservoir Fish Genetics Study)	<i>New</i>
11.	FA-07 Reservoir Tributary Habitat Assessment	<i>New</i>
12.	FA-08 Fish Entrainment Study	<i>New</i>
13.	GE-01 Reservoir Shoreline Erosion Study	Yes
14.	GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study (Erosion and Geologic Hazards Study)	Yes
15.	GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study (Sediment Deposition Study)	No
16.	GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study (Geomorphology Study)	Yes
17.	OM-01 Operations Model Study	Yes
18.	RA-01 Recreation Use and Facility Assessment (Recreation Assessment)	Yes
19.	RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study (Bypass Safety and Whitewater Boating Study)	No
20.	RA-03 Project Facility Lighting Inventory	Yes
21.	RA-04 Project Sound Assessment	Yes
22.	RA-05 Lower Skagit River Recreation Flow Study (Recreation Flow Study)	<i>New</i>
23.	SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River (Synthesis Study)	<i>New</i>



	<b>Study Number and Title</b>	<b>Significantly Modified Since PSP</b>
24.	TR-01 Vegetation Mapping Study	Yes
25.	TR-02 Wetland Assessment	Yes
26.	TR-03 Rare, Threatened, and Endangered Plants Study (RTE Plants Study)	No
27.	TR-04 Invasive Plants Study	Yes
28.	TR-05 Marbled Murrelet Study	No
29.	TR-06 Golden Eagle Habitat Analysis	No
30.	TR-07 Northern Goshawk Habitat Analysis	No
31.	TR-08 Special-status Amphibian Study	No
32.	TR-09 Beaver Habitat Assessment	Yes
33.	TR-10 Northern Spotted Owl Habitat Analysis (NSO Habitat Analysis)	No

Table 5.0-2 lists by LP the studies for which specific comments were submitted in response to City Light's PSP.

**Table 5.0-2. Study plan modifications filed by LPs with FERC by March 8, 2021 as part of PSP comments.**

<b>Entity</b>	<b>Date of Comment Letter</b>	<b>Requested Modification to PSP Study Plan</b>
American Rivers / Trout Unlimited	03/05/2021	<ul style="list-style-type: none"> <li>• FA-01, 02, 04</li> <li>• GE-03, 04</li> <li>• RA-01</li> </ul>
American Whitewater	03/08/2021	<ul style="list-style-type: none"> <li>• FA-04, 05</li> <li>• RA-01, 02</li> </ul>
Ecology	03/08/2021	<ul style="list-style-type: none"> <li>• FA-01, 02, 04, 05</li> <li>• GE-04</li> <li>• OM-01</li> </ul>
Nlaka'pamux Nation Tribal Council	03/08/2021	<ul style="list-style-type: none"> <li>• CR-02, 04</li> <li>• RA-01</li> </ul>
NMFS	03/05/2021	<ul style="list-style-type: none"> <li>• FA-01, 02, 04</li> <li>• GE-04</li> </ul>
North Cascades Conservation Council	03/08/2021	<ul style="list-style-type: none"> <li>• None</li> </ul>
North Cascades Institute	03/08/2021	<ul style="list-style-type: none"> <li>• FA-04</li> </ul>
NPS	03/05/2021	<ul style="list-style-type: none"> <li>• FA-01, 02, 04, 06</li> <li>• GE-03, 04</li> <li>• RA-01, 02, 03, 04</li> </ul>
Sauk-Suiattle Indian Tribe	03/08/2021	<ul style="list-style-type: none"> <li>• FA-01, 02, 04</li> <li>• GE-02, 04</li> </ul>
Skagit County Board of Commissioners	03/03/2021	<ul style="list-style-type: none"> <li>• FA-04</li> </ul>

Entity	Date of Comment Letter	Requested Modification to PSP Study Plan
Skagit County Drainage and Irrigation District Consortium / Skagit County Dike and Drainage District Flood Control Partnership	03/04/2021	<ul style="list-style-type: none"> <li>None</li> </ul>
Stillaguamish Tribe of Indians	03/08/2021	<ul style="list-style-type: none"> <li>GE-02</li> <li>TR-01, 02, 04, 09</li> </ul>
Swinomish Indian Tribal Community	03/08/2021	<ul style="list-style-type: none"> <li>FA-01, 04</li> <li>GE-04</li> </ul>
Upper Skagit Indian Tribe	03/08/2021	<ul style="list-style-type: none"> <li>CR-04</li> <li>FA-01, 02, 04, 05, 06</li> <li>GE-01, 02, 03, 04</li> <li>OM-01</li> <li>RA-03, 04</li> <li>TR-01, 02, 09</li> </ul>
USFS	03/08/2021	<ul style="list-style-type: none"> <li>RA-01</li> </ul>
USFWS	03/08/2021	<ul style="list-style-type: none"> <li>FA-01, 02, 03, 04, 05</li> <li>GE-01, 02, 03, 04</li> <li>OM-01</li> <li>TR-01, 02, 05, 06, 10</li> </ul>
WDFW	03/08/2021	<ul style="list-style-type: none"> <li>FA-04, 05, 06</li> <li>TR-08</li> </ul>

City Light continues to consider the potential impacts to cultural resources that could occur as a result of implementing this RSP. City Light will be tracking potential impacts to cultural resources during implementation of all studies by adoption of the following measures:

- Requiring field teams to complete a cultural resources awareness training prior to conducting field activities.
- Requiring field teams to review and adhere to an Unanticipated Discovery Plan (UDP), which is provided herein as an appendix to this RSP.
- Coordinating with City Light's cultural resources team to assess research methodologies of the individual resource study plans included in this RSP to identify the studies that have potential to impact cultural resources.
- Those resource studies that have potential to impact cultural resources (e.g., that involve ground disturbance or that may occur in locations with previously identified cultural resources) will be reviewed in detail with study leads and appropriate cultural resources management measures will be implemented, such as designating avoidance areas or including archaeological and/or tribal monitoring.
- City Light will consult with Indian tribes, First Nations, and land managing agencies regarding cultural resources management measures for those studies where specific measures are necessary.

## 5.1 CR-01 Cultural Resources Data Synthesis

City Light proposes a CR-01 Cultural Resources Data Synthesis as part of this RSP to develop a baseline of cultural resources information. The goal of this study is to develop a baseline dataset for known cultural resources within the study area. This information will facilitate the design of other relicensing studies, an assessment of effects, and inform cultural resource management plans in compliance with Section 106 of the NHPA and other applicable federal and state laws and regulations, executive orders (EO), and FERC guidelines. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests were filed with FERC related to this study. However, this study will provide information requested as part of the following study requests: Nlaka'pamux Nation Tribal Council (NNTC)-01 Completion of Traditional Cultural Property Survey, NNTC-02 Evaluation of Identified Sites, NNTC-04 Traditional Cultural Properties Mitigation and Management Study, Swinomish Indian Tribal Community (SITC)-03 Cultural Resources Study, Sauk-Suiattle Indian Tribe (SSIT)-04 Cultural Resources Transmission Line Study, SSIT-05 Cultural Resources Battle Site Study, and Stillaguamish Tribe of Indians (STI)-01 Comprehensive Ethnographic Study.

No PSP comments to the study plan were filed with FERC. Modifications made to the study plan since the PSP include a slight update to the study schedule to reflect that the study is still ongoing and is in the reporting stage. Tasks associated with the study include:

- (1) Compiling a list of available resources and repositories for the study area (Summer – Autumn 2020);
- (2) Working with NPS to identify and gather documents not available through other repositories (Summer – Autumn 2020);
- (3) Conducting outreach to Indian tribes and First Nations to solicit existing information (Summer 2020);
- (4) Compiling a list of all materials gathered (Autumn 2020);
- (5) Adding materials not already available through City Light's Digital Management System (DMS) to this system, with appropriate restrictions for confidential items; and
- (6) Conducting a review of existing cultural resources requirements and compliance work that has been or should be conducted under the existing license.

Results from the Cultural Resources Data Synthesis will provide initial data on cultural resources and data gaps within the study area to inform the CR-02 Cultural Resources Survey, CR-03 Gorge Bypass Reach Cultural Resources Survey, and CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study.

City Light will prepare a study report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including tables listing resources and studies relevant to the study area, along with an overview of cosmography and worldview system for each participating Indian tribe and First Nation, as well as known geographical areas, historic properties, and resources of concern for each Indian tribe and First Nation; (4) discussion, including

identification of data gaps of information or types of studies; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. This study is currently under implementation and is expected to be completed in 2021. Steps 1-6 above have been completed and reporting is underway.

## 5.2 CR-02 Cultural Resources Survey

City Light proposes a CR-02 Cultural Resources Survey as part of this RSP in partial fulfillment of Section 106 of the NHPA requirements to identify historic properties and assess potential Project-related effects to historic properties within the area of potential effect (APE) that may be affected by the continued O&M of the Project under a new FERC license. This information will inform cultural resource management plans in compliance with Section 106 of the NHPA and other applicable federal and state laws and regulations, EOs, and FERC guidelines. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The following study requests pertaining to cultural resources covered under CR-02 Cultural Resources Survey (archaeological and historical resources) were submitted: SITC-03 Cultural Resources Study, SSIT-04 Cultural Resources Transmission Line Study, STI-02 Historic Properties Study, and STI-03 Study of Specific Sites as Archaeological District. The Cultural Resources Survey Study Plan addresses some of the elements identified in these study requests, as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by the Nlaka'pamux Nation Tribal Council. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments include the addition of a draft research design as an attachment to this study plan for review and further development by the CRWG. Additionally, the methodology of the study has been updated to reflect conducting a reconnaissance level survey (i.e., pedestrian survey only) along the entire Project transmission line APE corridor. This excludes areas that are too steep or too vegetated to safely survey or are inundated, and excludes areas where City Light does not conduct any activities (i.e., areas where the transmission line spans rivers or ravines).

Tasks associated with the study include:

- (1) Developing a research design and establishing survey areas with the CRWG (Winter – Spring 2021);
- (2) Conducting field survey:
  - a. June – October 2021 (first field season)
  - b. March – September 2022 (second field season); and
- (3) Post-field documentation and analysis (September 2021 – December 2022).

The Cultural Resources Survey will be informed by the results from the CR-01 Cultural Resources Data Synthesis, which will provide initial data on cultural resources and data gaps within the study

area. The Cultural Resources Survey will also be informed by the GE-01 Reservoir Shoreline Erosion Study, GE-03 Sediment Disposition in Reservoirs Affecting Resource Areas of Concern Study, and the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study, both of which may inform high priority areas for cultural resources survey.

City Light will prepare one or more reports that include the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion, including assessment of potential Project-related effects to historic properties; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final study results will be reported in the USR.

### **5.3 CR-03 Gorge Bypass Cultural Resources Survey**

City Light proposes a CR-03 Gorge Bypass Reach Cultural Resources Survey (Bypass Cultural Resources Survey) as part of this RSP to identify historic properties and assess potential Project-related effects to historic properties within the Gorge bypass reach study area. The goal of this study is to assess the potential effects of the Project's O&M on historic properties in partial compliance with Section 106 of the NHPA. This information will inform cultural resource management plans in compliance with Section 106 of the NHPA and other applicable federal and state laws and regulations, EOs, and FERC guidelines. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

City Light consulted with agencies, Indian tribes, and First Nations to develop this proposal. No formal study requests related to this study were filed with FERC.

No PSP comments to the study plan were filed with FERC. Modifications made to the study plan since the PSP include the inclusion of a draft research design as an attachment to the study plan for review and further development by the CRWG (the details of the study methodology have been moved into the research design).

Tasks associated with the study include:

- (1) Reviewing Gorge bypass reach study area (January – April 2021);
- (2) Developing a research design (March – May 2021);
- (3) Conducting field survey (June – July 2021); and
- (4) Post-field documentation and analysis.

The Bypass Cultural Resources Survey will be informed by the results from the CR-01 Cultural Resources Data Synthesis, which will provide initial data on cultural resources and data gaps within the study area. The results of the Bypass Cultural Resources Survey will inform the RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study by providing cultural resources concerns that could affect whitewater boating in the Gorge bypass reach.

City Light will prepare one or more reports that include the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion, including assessment of potential Project-

related effects to historic properties; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR.

#### **5.4 CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study**

City Light proposes a CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study) as part of this RSP to identify historic properties with traditional cultural significance within the study area, and preliminarily assess potential Project-related adverse effects on them. The primary goals of this study are to ensure historic properties with traditional cultural significance to Indian tribes and First Nations are identified and assessed for potential adverse effects on them. The objective is to assist FERC in meeting its compliance requirements under Section 106 of the NHPA. This information will inform cultural resource management plans in compliance with Section 106 of the NHPA and other applicable federal and state laws and regulations, EOs, and FERC guidelines. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The following study requests pertaining to cultural resources covered under the Properties with Traditional Cultural Significance Study were submitted: NNTC-01 Completion of Traditional Cultural Property Survey, NNTC-02 Evaluation of Identified Sites, NNTC-04 Traditional Cultural Properties Mitigation and Management Study, SITC-03 Cultural Resources Study, SSIT-04 Cultural Resources Transmission Line Study, SSIT-05 Cultural Resources Battle Site Study, and STI-01 Comprehensive Ethnographic Study. Several parties also noted interests related to the study plan in outreach meetings associated with implementation of the CR-01 Cultural Resources Data Synthesis. The Properties with Traditional Cultural Significance Study Plan, with modification, addresses some of the elements identified in these study requests, as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by the Nlaka'pamux Nation Tribal Council and Upper Skagit Indian Tribe. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments and since the PSP include adding language regarding the treatment of unevaluated resources and stating that City Light understands and supports Indian tribes' and First Nations' efforts to provide context for locations of traditional cultural importance. This resulted in City Light agreeing to review and assess any such contextual information shared by the Indian tribes or First Nations up to one mile beyond the APE (in the U.S.) as part of the scope of this study.

Tasks associated with the study include:

- (1) Selecting ethnographers (January – April 2021);
- (2) Indian tribes and First Nations outreach and development of research design (April – June 2021);

- (3) Ethnohistorical and ethnographic data and information gathering (May 2021 – May 2022);
- (4) Properties with traditional cultural significance documentation and NRHP evaluation (December 2021 – June 2022); and
- (5) Assessment of potential Project-related adverse effects on historic properties with traditional cultural significance (April – August 2022).

The Properties with Traditional Cultural Significance Study will be informed by the results from the CR-01 Cultural Resources Data Synthesis, which will provide initial data on cultural resources and data gaps within the study area.

City Light will prepare one or more reports documenting the activities and the results of the study. The report will summarize what historic properties with traditional cultural significance have been identified through the course of the study. The report will also preliminarily identify Project-related adverse effects to such properties, and any potential treatment identified by individual Indian tribe and First Nation communities. It is anticipated that the report(s) will include multiple components with varying protocols for access and availability to Section 106 consulting parties. However, it is expected that a summary report outlining completed efforts and conclusions of this study will be provided to participating Indian tribes and First Nations, FERC, and other agencies for review and comment, and subsequent submission to the State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officers (THPO), as appropriate, for review and concurrence on any assessments of NRHP eligibility and Project effects. The summary report will then be filed with FERC as privileged (i.e., confidential).

This study is intended to be a 2-year study. Final field results will be reported in the USR.

## **5.5 FA-01 Water Quality Monitoring Study**

City Light proposes a FA-01 Water Quality Monitoring Study (WQ Monitoring Study) as part of this RSP to collect water quality data, which along with existing water quality information, is intended to support Ecology's certification of the Project under Section 401 of the Clean Water Act (CWA), and the data needs of FERC, while also addressing other data needs of resource agencies, Indian tribes, First Nations, and other LPs in the context of FERC relicensing. The goal of the study is to monitor water quality parameters for which existing information is insufficient to characterize conditions within the study area. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The WQ Monitoring Study Plan addresses, with modifications, elements of the following study requests, as explained in Section 6 of this RSP: Ecology-01 Water Quality Study, National Marine Fisheries Service (NMFS)-01 Water Quality, NPS-02 Skagit Project Water Quality Assessment and Modeling, U.S. Fish and Wildlife Service (USFWS)-03 Skagit Project Water Quality Assessment and Modeling, Upper Skagit Indian Tribe (USIT)-07 Water Quality Impacts above and below SCL Project Infrastructure, and Washington Department of Fish and Wildlife (WDFW)-17 Water Quality Impacts above and below SCL Project Infrastructure.

PSP comments to the study plan were submitted by American Rivers/Trout Unlimited, Ecology, NMFS, NPS, Sauk-Suiattle Indian Tribe, Swinomish Indian Tribal Community, USFWS, and

Upper Skagit Indian Tribe. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments and since the PSP include adding a total of 13 water quality monitoring locations, which include additional temperature, dissolved oxygen, pH, turbidity, total suspended solids, fecal coliform, total dissolved gas, and benthic macroinvertebrate sampling). Parameters measured at the new locations vary and are detailed in Table 2.6-1 of the study plan and shown in a mapbook attached to the study plan. Additionally, sampling periods for some monitoring locations were extended so that all sampling occurs over a two-year period—though the water quality monitoring record for some of these locations covers many parameters studied extensively prior to this formal FERC study period.

Tasks associated with the study include:

- (1) Providing a summary and analysis of all relevant existing water quality information identified in Table 2.3-1 of the study plan other City Light data (e.g., ongoing data collection in tributaries), and data obtained from the NPS and other reputable sources;
- (2) Characterizing background levels of turbidity and total suspended solids (TSS) in Ross, Diablo, and Gorge lakes;
- (3) Measuring temperature, dissolved oxygen, and pH turbidity, and TSS at one location in the Skagit River upstream of Ross Lake;
- (4) Measuring turbidity and TSS at the mouths of select tributaries to Ross (Big Beaver and Ruby creeks) and Diablo (Thunder Creek) lakes to characterize conditions during periods of reservoir drawdown;
- (5) Measuring turbidity and TSS at transects positioned parallel to the shoreline at three locations in Ross Lake to characterize conditions adjacent to areas of shoreline erosion during reservoir drawdown when erosional faces of the littoral fringe are exposed;
- (6) Measuring fecal coliform levels at targeted location in Ross and Diablo lakes;
- (7) Measuring temperature, dissolved oxygen, and pH in Diablo and Gorge lakes;
- (8) Continuously measuring total dissolved gas (TDG) in the Diablo Dam tailrace and Gorge Lake forebay;
- (9) Continuously monitoring temperature, dissolved oxygen, TDG, and turbidity at three locations in the Gorge bypass reach;
- (10) Continuously measuring temperature, dissolved oxygen, pH, TDG, and turbidity below Gorge Powerhouse; sample TSS during periods when turbidity levels below Gorge Powerhouse are considered elevated;
- (11) Continuously measuring temperature by installing probes at six locations in the Skagit River between Gorge Powerhouse and downstream of the Baker River confluence; and
- (12) Sampling benthic macroinvertebrates in riffle habitat at six locations in the Skagit River between Gorge Powerhouse and downstream of the Baker River confluence.
- (13) Continuously measure temperature at one location in the lower Sauk River.
- (14) Sample benthic macroinvertebrates in riffle habitat at one location in the lower Sauk River.



Field work associated with the tasks above will be conducted from June 2021 through May 2023, with the period of data collection varying by parameter and location.

Results from the WQ Monitoring Study are not expected to directly inform other studies.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) maps showing all data collection locations; (4) a summary and analysis of existing reservoir data, reservoir tributary data, and Skagit River tributary data; (5) results and analysis of data collected during the relicensing study period; (6) parameter-specific evaluation of results against Ecology's numeric and narrative criteria; (7) discussion; and (8) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. It is recognized that data collected after December 2022 are not likely to be included in the USR. All data from the June 2012 – May 2023 period will be made available to Ecology and other LPs and incorporated to the extent possible into the application for Section 401 certification of the Project.

## **5.6 FA-02 Instream Flow Model Development Study**

City Light proposes a FA-02 Instream Flow Model Development Study as part of this RSP to develop an updated flow-habitat evaluation tool for the Skagit River between the Gorge Powerhouse and the confluence with the Sauk River. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Instream Flow Model Study Plan addresses, with modifications, elements of the following study requests, as explained in Section 6 of this RSP: Ecology-02 Instream Flow Study, NMFS-02 Geomorphology and Aquatic Habitat, NPS-13 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment Below Gorge Dam, USFWS-13 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood, and Sediment below Gorge Dam, USFWS-15 Geomorphology and Aquatic Habitat Complexity Study, USIT-08 Geomorphology and Anadromous Salmonid Habitat, WDFW-05 Geomorphology and Anadromous Salmonid Habitat, and WDFW-08 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment Below Gorge Dam.

PSP comments to the study plan were submitted by American Rivers/Trout Unlimited, Ecology, NMFS, NPS, Sauk-Suiattle Indian Tribe, Upper Skagit Indian Tribe, and USFWS. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments and since the PSP include updating details regarding fieldwork that has been completed, updating the fish species list, and providing details for a process to identify and evaluate alternative flow management scenarios.

Tasks associated with the study include:

- (1) Developing an instream flow model for the reach of the Skagit River from Gorge Powerhouse to the Sauk River confluence;
- (2) Developing model topographic data for the river reach;

- (3) Developing model geometry;
- (4) Specifying model boundary conditions;
- (5) Conducting field monitoring including acquisition of water level and concurrent discharge data, mapping substrate and cover, and collecting depth, velocity, and discharge data at agreed-upon transects (August 2020 – July 2021);
- (6) Calibrating and validating the model (May – November 2021);
- (7) Developing habitat suitability criteria (HSC) (April – July 2021); and
- (8) Conducting five consultation workshops with LPs during model development to solicit input and report results (April – November 2021).

Results from the Instream Flow Model Development Study will provide data to assist with verifying aquatic habitat and to extrapolate measured substrate movement as part of the GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study and be used to assess hydrologic and geomorphologic conditions at the constructed Chum off-channel sites for TR-09 Beaver Habitat Assessment. The OM-01 Operations Model Study will be developed in conjunction with the Instream Flow Model Development Study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) evaluation of existing information; (4) field data collection; (5) model calibration and validation; (6) development and integration of biological/physical inputs; (7) discussion; and (8) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final field results will be reported in the ISR. Reporting of any scenario evaluations would be included in the USR.

### **5.7 FA-03 Reservoir Fish Stranding and Trapping Risk Assessment**

City Light proposes a FA-03 Reservoir Fish Stranding and Trapping Risk Assessment (Stranding and Trapping Assessment) as part of this RSP to assess the risk of native fish species stranding and trapping within the study area under normal Project operations. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC.

PSP comments to the study plan were submitted by USFWS. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments and since the PSP include changes to the schedule based on availability of bathymetry data collection.

Tasks associated with the study include:

- (1) Conducting reconnaissance level field surveys of Ross Lake in 2020-2021 during the drawdown cycle;
- (2) Collecting bathymetry data gaps for Gorge and Diablo lakes (July to August 2021);

- (3) Performing a desktop analysis consisting of the following actions:
  - a. Assembling and analyzing digital elevation models (DEM) (August to September 2021);
  - b. Inventorying areas presenting stranding and trapping risk;
  - c. Analyzing DEMs for stranding and trapping risk;
  - d. Analyzing reservoir drawdown rates; and
  - e. Performing a native species life stage and periodicity analysis;
- (4) Performing field surveys (September 2021 – April 2022) and desktop analysis updates; and
- (5) Post fieldwork analysis (May-June 2022).

Studies that may ultimately be linked, either directly or indirectly, to the findings of this study include FA-02 Instream Flow Model Development Study, OM-01 Operations Model Study, and sediment deposition and erosion studies. Results from the Stranding and Trapping Assessment may provide habitat data for TR-08 Special-status Amphibians Study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) field conditions at the time of survey (to include a summary of reservoir elevations and drawdown rates in the periods preceding each field survey); (4) summary of the empirical data collected in field surveys on fish stranding and trapping; (5) summary text and figures of the areas presenting a high, medium, and/or low stranding and trapping risk by species and life stage, as estimated from the DEM and field survey validation; (6) discussion; and (7) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final field results will be reported in the USR.

## **5.8 FA-04 Fish Passage Technical Studies Program**

City Light proposes a FA-04 Fish Passage Technical Studies Program (Fish Passage Study) as part of this RSP to investigate biological, physical, operational, and engineering factors involved when considering the potential to provide safe, timely, and effective fish passage at any or all of the three Project developments. The study will include the development of concept-level upstream and downstream passage strategies that may involve alternatives at each development and/or for the system of all three developments as a whole. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Fish Passage Study Plan addresses, with modifications, elements of the following study requests, as explained in Section 6 of this RSP: (1) assessment of potential upstream fish passage barriers in the Gorge bypass reach (WDFW-01 Evaluation of Fish Barriers and Fish Species in the Bypass Reach); (2) feasibility analysis of anadromous and resident fish passage facilities (NMFS-04 Feasibility Analysis of Fish Passage, NPS-01 Feasibility Analysis of Anadromous and Resident Fish Passage, USFWS-01 Feasibility Analysis of Fish Passage at the Skagit River Hydroelectric Project, USIT-01 Feasibility Analysis of Fish Passage at the Skagit River Hydroelectric Project, and WDFW-02 Feasibility Analysis of Fish Passage at the Skagit River Hydroelectric Project); and (3) evaluating fish habitat and potential fish productivity upstream of Gorge Dam, with

emphasis on ESA-listed salmonids (NMFS-03 Quantifying Habitat and Production Potential of Chinook and Coho Salmon and Steelhead above Ross Dam, NPS-08 Quantifying the Productivity Potential of Reservoir Tributary Habitat, USFWS-02 Quantifying the Habitat and Production Potential of ESA-Listed Salmon, Steelhead, and Bull Trout above Dams, USIT-02 Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon, and Sockeye Salmon above Gorge Dam, and WDFW-03 Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon, and Sockeye Salmon above Gorge Dam).

PSP comments to the study plan were submitted by American Rivers/Trout Unlimited, American Whitewater, Ecology, NMFS, North Cascades Institute, NPS, Sauk-Suiattle Indian Tribe, Skagit County Board of Commissioners, Swinomish Indian Tribe of Indians, Upper Skagit Indian Tribe, USFWS, and WDFW. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments and since the PSP include eliminating the phased approach to studying fish passage (i.e., the barrier assessment is now being conducted in parallel with the engineering component of the study), relocating the tributary habitat assessment to FA-07 Reservoir Tributary Habitat Assessment, expanding the study to all three developments, and adding technical workshops.

The purpose of the Fish Passage Study is to investigate biological, physical, operational, and engineering factors involved when considering the potential to provide safe, timely, and effective fish passage at any or all of the three Project developments. The study will include the development of concept-level upstream and downstream passage facilities that may involve alternatives at each development and/or for the system of all three developments as a whole. Planning-level concepts will consider both volitional (non-directive) and directive fish passage strategies where applicable. Passage concepts will be configured to accommodate physical, operational, and site constraints of the existing facilities and overall Project reach. Other factors affecting technical viability, Project modifications, and/or potential biological limitations of each alternative will be identified. Upon completion of concept-level fish passage facility options, planning level opinions of probable construction costs will be completed.

The study will also include a field investigation to characterize potential upstream passage barriers in the Gorge bypass reach as requested by WDFW. The field investigation will be supplemented by hydraulic modeling<sup>11</sup> to evaluate potential ranges of flow under which potential barriers in the bypass reach may be passable by adult salmonids. Five target species have provisionally been identified for evaluation: steelhead; Chinook, Coho, and Sockeye salmon; and Bull Trout. Consideration will also be given to other species, if they are identified by the fish management agencies and Indian tribes.

Results of the Fish Passage Study will be integrated with results of the Reservoir Tributary Habitat Assessment (see Section 5.9 of this RSP) and, as appropriate, other studies conducted during

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<sup>11</sup> A hydraulic model is being developed per the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development (Bypass Instream Flow Model Development) Study Plan. The hydraulic model will provide input to this study, as described in this plan.

relicensing to identify constraints and assess benefits and risks of providing fish passage and access to habitats upstream of the Project dams.

The study is intended to include a rigorous assessment of the technical factors influencing the viability and potential effectiveness of fish passage at the Project developments. To this end, the study plan includes five Technical Workshops that will include active involvement of resource agency and tribal biologists and engineers who have specific fish passage or related experience.

To further ensure scientific and engineering rigor, City Light is proposing the formation of a three-member Fish Passage Independent Expert Panel (Expert Panel), which would be available to review reports and provide advisory opinions when deemed appropriate by the LPs. The makeup of the Expert Panel will be determined in collaboration with LPs.

A fish passage engineer from NMFS will be invited to participate as an integral member of the team executing the Fish Passage Study. The NMFS engineer will be included in study-related meetings or teleconferences with City Light and its consultants as an integral part of study plan implementation. The NMFS fish passage engineer will directly participate in the early review of all plans and reports. Feedback obtained from the NMFS fish passage engineer will be incorporated into each of the study elements.

This study will be conducted concurrently with the FA-05 Bypass Instream Flow Model Development Study. City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final results will be reported in the USR.

## **5.9 FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study**

City Light proposes a FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study (Bypass Instream Flow Model Development Study) as part of this RSP to develop a flow-habitat evaluation tool for the Gorge bypass reach (defined as the reach between Gorge Dam to Gorge Powerhouse). The model will be used to support evaluation of instream flows for the Skagit River between Gorge Dam and the Sauk River and to develop hydraulic data necessary for the evaluation of fish passage, particularly at two previously identified potential upstream passage barriers (Envirosphere 1989) within the Gorge bypass reach. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Bypass Instream Flow Model Development Study Plan addresses, with modifications, elements of the Evaluation of Fish Barriers and Fish Species in the Bypass Reach Study request submitted by WDFW (WDFW-01) and also addresses, with modifications, elements of the Instream Flow Study request submitted by Ecology (Ecology-02), as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by American Whitewater, Ecology, Upper Skagit Indian Tribe, USFWS, and WDFW. City Light has addressed the specific comments and suggested

edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments and since the PSP include updating the fish species list and providing details for a process to identify and evaluate alternative flow management scenarios. Language conditioning the monitoring and detailed hydraulic modeling of fish passage barriers on a determination of fish passage potential has also been removed.

Tasks associated with the study include:

- (1) Developing model topographic data for the Gorge bypass reach;
- (2) Developing model geometry;
- (3) Specifying model boundary conditions;
- (4) Conducting field monitoring, including acquisition of water level and concurrent discharge data and mapping substrate and cover (June – September 2021);
- (5) Developing and calibrating the model (May – September 2021);
- (6) Modeling to identify the flow ranges under which steelhead, Chinook Salmon, Coho Salmon, Sockeye Salmon, and Bull Trout in the Skagit River could pass potential upstream passage barriers (November 2021 – February 2022); and
- (7) Conducting five consultation workshops with LPs during model development to solicit input and report results (April – November 2021).

Studies that may ultimately be linked, either directly or indirectly, to the findings of this study include: (1) FA-04 Fish Passage Technical Studies Program (Fish Passage Study); (2) FA-01 Water Quality Monitoring Study (i.e., the relationship between water quality and flows with respect to fish habitat suitability); (3) GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study)(e.g., substrate mapping, etc.); (4) OM-01 Operations Model Study (i.e., upstream hydraulic boundary condition); (5) FA-02 Instream Flow Model Development (i.e., for the reach between Gorge Powerhouse and the Sauk River confluence); (6) RA-02 Gorge Bypass Reach Safety and Whitewater Boating Assessment; and (7) CR-03 Gorge Bypass Reach Cultural Resources Survey.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final field results will be reported in the ISR. Reporting of any scenario evaluations would be included in the USR.

### **5.10 FA-06 Reservoir Native Fish Genetics Baseline Study**

In response to comments received on the PSP and recognizing the LPs' interest in developing a more in-depth genetics baseline for native fish species in Project reservoirs for the purpose of informing longer-term fish management objectives, City Light proposes a new study, FA-06 Reservoir Native Fish Genetic Baseline Study (Reservoir Fish Genetics Study), as part of this RSP to characterize baseline population genetic structure for three native salmonid species; Bull Trout,

Rainbow Trout, and Dolly Varden (target species) in Project reservoirs, and provide the basis necessary to inform the planning of long-term (i.e., over the next Project license term) reservoir fish management objectives. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Reservoir Fish Genetic Study Plan addresses, with modifications, elements of NPS-05 Population Structure of Native Fish in the Project Area, USFWS-06 Population Structure of Native Fish in the Project Area, and WDFW-15 Habitat Use and Population Dynamics of Reservoir Fish as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by NPS, Upper Skagit Indian Tribe, and WDFW. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments and since the PSP include clarification of study goals and analyses and field data collection.

Tasks associated with the study include:

### **Year 1**

- (1) Convening an Expert Panel in consultation with LPs;
- (2) Reviewing, compiling, and analyzing target species genetics data collected by multiple researchers in the Project reservoirs;
  - a. Acquiring and consolidating existing genetics data<sup>12</sup> for Bull Trout, Rainbow Trout, and Dolly Varden.
  - b. Creating a single, standardized datafile for each species that compiles genotypes from existing studies.
- (3) Using the standardized datafiles to evaluate baseline genetics metrics for Bull Trout and Rainbow Trout.
  - a. Calculating within- and among-population summary statistics using consistent methods for Bull Trout and Rainbow Trout.
  - b. Estimating relatedness for Bull Trout and Rainbow Trout and report the statistical distribution of this metric by species and reservoir.
  - c. Estimating the power (false detection rate) of genetic markers currently in use to identify relationships (e.g., parent-offspring pairs, full-sibling-unrelated pairs).
- (4) Identifying the availability of relevant existing genetic samples and coordinate target fish species sampling being conducted opportunistically by other relicensing studies and current license field activities.
- (5) Expert Panel review of Year 1 study results and assistance in development of Year 2 study program.

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<sup>12</sup> Small et al. 2013, 2016, 2020b; Smith 2010; Pflug et al. 2013.

## **Year 2**

- (6) Continuing data collection to address heterozygosity, within- and among-population variance, and relatedness for Dolly Varden in Project reservoirs; and
- (7) Gathering additional data needed to estimate effective population size ( $N_e$ ) for each population of Bull Trout, Rainbow Trout, and Dolly Varden.
  - a. Gathering age metadata needed to estimate  $N_e$ , either from existing scale samples or from fish collected during the ILP study period.

Results from other studies are not needed to complete this study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final results will be reported in the USR.

### **5.11 FA-07 Reservoir Tributary Habitat Assessment**

In response to comments received on the PSP and recognizing LPs' interest in assessing habitat and production potential for anadromous fish upstream of Project dams, City Light proposes a new study, FA-07 Reservoir Tributary Habitat Assessment, as part of this RSP to evaluate productivity potential for Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*O. kisutch*), Sockeye Salmon (*O. nerka*), and steelhead (*O. mykiss*) (collectively the target species) in select tributaries to Project reservoirs. Results of the Reservoir Tributary Habitat Assessment will be integrated with results of the Factors Limiting Native Salmonids above Skagit River Dams study (Food Web Study), the FA-04 Fish Passage Technical Studies Program and, as appropriate, other studies conducted during relicensing to identify constraints and assess benefits and risks of providing fish passage and access to habitats upstream of the Project dams. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Reservoir Tributary Habitat Assessment Study Plan addresses, with modifications, elements of NMFS-03 Quantifying Habitat and Production Potential of Chinook and Coho Salmon and Steelhead above Ross Dam, NPS-08 Quantifying the Productivity Potential of Reservoir Tributary Habitat, USFWS-02 Quantifying the Habitat and Production Potential of ESA-Listed Salmon, Steelhead, and Bull Trout above Dams, USIT-02 Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon, and Sockeye Salmon above Gorge Dam, and WDFW-03 Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon, and Sockeye Salmon above Gorge Dam as explained in Section 6 of this RSP.

Because this is the first draft of the study plan, there are no relevant PSP comments.



Tasks associated with the study include:

- (1) Apply the NetMap Intrinsic Potential model to map and characterize the extent of potential spawning and rearing habitat for the target species within tributaries based on geomorphic habitat suitability measures;
- (2) Use physical habitat variables to estimate juvenile rearing habitat capacity, i.e., productivity potential, for the target species within potentially suitable reaches identified by Intrinsic Potential modeling; and
- (3) Evaluate the results of Objective 2 in the context of results from the Food Web Study.

The results of the Intrinsic Potential model and assessment of production potential can be interpreted in tandem with bioenergetics results conducted as part of the Food Web Study, which is currently being conducted in the Project vicinity, outside the context of FERC relicensing. The physical habitat assessment will generate the template upon which thermal and biotic factors can be overlaid to account for the influences of temperature variability and food supply on salmonid production potential.

City Light will prepare a draft report that contains the results of Intrinsic Potential modeling, a description of plans for conducting habitat assessments in tributaries, and a summary of the process to be used to integrate the results of the physical habitat and bioenergetics (i.e., Food Web Study) assessments. A final report will integrate production estimates from tributaries and relevant bioenergetics study results to develop a synthesis, which will include potential production estimates and constraints on target species' productivity.

Potential future efforts could include, among other studies, parameterization and use of a Cost-Distance Meta-POPulation (CDMetaPOP) model (or other comparable modeling tool) for the target species. CDMetaPOP can simulate a range of spatially explicit processes and accommodate simulations involving up to hundreds of thousands of individuals to support assessment of population genetic responses to simulated fish introduction scenarios.

This study is intended to be a 2-year study. Final results will be reported in the USR.

## **5.12 FA-08 Fish Entrainment Study**

In response to comments received on the PSP, City Light proposes a new study, FA-08 Fish Entrainment Study, as part of this RSP to evaluate fish entrainment and impingement at the Ross, Diablo, and Gorge developments and the potential effect on the Skagit River fish community. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Fish Entrainment Study Plan addresses, with modifications, elements of the following study requests, as explained in Section 6 of this RSP: NPS-07 Evaluating Existing Fish Passage and Entrainment, USFWS-08 Evaluating Existing Fish Passage and Entrainment through the Skagit Hydroelectric Project Dams and Appurtenant Facilities, Upper Skagit Indian Tribe USIT-03 Evaluating Existing Fish Passage: Spill and Entrainment through Ross, Diablo, Gorge Dams and Appurtenant Facilities through the Project Area at the Skagit River Hydroelectric Project, and

WDFW-04 Evaluating Existing Fish Passage: Spill and Entrainment through Ross, Diablo, Gorge Dams and Appurtenant Facilities through the Project Area at the Skagit River Hydroelectric Project.

Because this is the first draft of the study plan, there are no relevant PSP comments.

Tasks associated with the study include:

- (1) Describing the physical characteristics of the Project powerhouses and intake structures, including locations, dimensions, turbine specifications, and trash rack spacing;
- (2) Summarizing water quality characteristics in the vicinity of the Project intake structures using existing data or data being collected as part of the FA-01 Water Quality Monitoring Study;
- (3) Estimating intake velocities at each of the intake structures at Ross, Diablo, and Gorge dams;
- (4) Describing the fish community and compiling a target species list for entrainment and impingement analyses;
- (5) Characterizing the risk of impingement to target species based on Project development intake velocities, trash rack bar spacing, and target species life history information and estimated swim speeds;
- (6) Characterizing the risk of turbine and non-turbine (e.g., spillway or bypass) entrainment to target species based on body size, life stage, periodicity, habitat requirements, and Project operations (i.e., velocities, spill versus generation);
- (7) Conducting a literature review and desktop analysis of historical turbine entrainment and entrainment survival studies to estimate turbine entrainment and entrainment survival at Project developments;
- (8) Characterizing probability of passage and survival for target species at the Project developments (turbine and spillway passage) using site-specific physical and operational parameters, estimated non-turbine (spillway) entrainment mortality rates, and the USFWS Turbine Blade Strike Analysis Model (USFWS 2020); and
- (9) Providing a qualitative summary of entrainment and impingement potential for target species at the Project developments based on physical and operational information, turbine and non-turbine entrainment and mortality rates, comparison of burst swim speeds to intake velocity, body size exclusion, and species and life stage periodicity.

The FA-04 Fish Passage Technical Studies Program may ultimately be linked, either directly or indirectly, to the findings of this study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final results will be reported in the USR.

### **5.13 GE-01 Reservoir Shoreline Erosion Study**

City Light proposes a GE-01 Reservoir Shoreline Erosion Study as part of this RSP to characterize existing areas of erosion along Project reservoir shorelines and identify any Project-related factors resulting in erosion at each locale. The goal of the study is to provide information to determine whether and the extent to which certain Project O&M activities may have potential to cause erosion that affects resources of concern. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC.

PSP comments to the study plan were submitted by the Upper Skagit Indian Tribe and USFWS. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments include adding reference to the Skagit ARMMP and clarification of the area assessed.

Tasks associated with the study include:

- (1) Analyzing existing information;
- (2) Conducting field inventory (June – August 2021); and
- (3) Conducting data analysis.

A field inventory and assessment of existing erosion control measures will also be conducted.

Results from the Reservoir Shoreline Erosion Study will inform the CR-02 Cultural Resources Survey. Rockfall and mass wasting features identified as part of the Reservoir Shoreline Erosion Study will be analyzed in more detail as part of the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of erosion locations; (4) discussion, including a narrative describing the geologic, soil, and landform setting relevant to shoreline erosion, an overview of Project-related lake surface elevation fluctuations, and information on areas of reservoir shoreline erosion and erosion control measures; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR.

### **5.14 GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study**

City Light proposes a GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study (Erosion and Geologic Hazards Study) as part of this RSP to evaluate how Project O&M activities affects slope stability and erosion, and how resources may be affected. The goals of the study are to characterize where Project O&M activities are affecting erosion, channel migration, mass wasting, and runoff that could impact terrestrial, aquatic, fisheries,

riparian, rare, threatened and endangered (RTE) plants, or cultural resources; and to determine where existing erosion, mass wasting, and channel migration/bank erosion have the potential to affect Project facilities. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Sauk-Suiattle Indian Tribe submitted the following study request pertaining to aquatic habitat and riparian zone within the transmission line ROW: SSIT-03 Impacts of Transmission Line Right of Way (ROW) on Aquatic Habitat and Riparian Zone for the Skagit River Hydroelectric Project. The Erosion and Geologic Hazards Study Plan addresses some of the elements identified in this study request, with modifications, as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by the Sauk-Suiattle Indian Tribe, Stillaguamish Tribe of Indians, Upper Skagit Indian Tribe, and USFWS. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments include updating methods for study road-stream crossing culvert assessments.

Tasks associated with the study include:

- (1) Compiling and reviewing existing information;
- (2) Inventorying and analyzing data via desktop pre-field (January – June 2021);
- (3) Verifying and inventorying data in the field (April – November 2021); and
- (4) Analyzing data post-field.

Methods specific to the type of erosion or geohazard (mass wasting hazards; erosion and runoff associated with Project-related roads and townsites; and channel migration and stream crossings) are detailed further in the study plan.

Results from the TR-01 Vegetation Mapping Study, TR-02 Wetland Assessment, and GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study, specifically on aquatic habitat, bank conditions, and riparian habitat, will be used to inform inventories of erosion and geohazards. Rockfall and mass wasting features identified as part of the GE-01 Reservoir Shoreline Erosion Study will be analyzed in more detail as part of the Erosion and Geologic Hazards Study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of erosion and geohazard locations; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final field results will be reported in the USR.

### **5.15 GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study**

City Light proposes a GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study (Sediment Deposition Study) as part of this RSP to evaluate the effects of

deposition on four specific locations within Ross, Diablo, and Gorge lakes with identified resources and/or Project operations impacts. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

Three LPs submitted study requests related to potential backwater effects on tributaries to Project reservoirs: NPS-10 Impact of the Operation of Skagit Hydroelectric Project (#553) Backwater on Major Streams and its Influence on Habitat Quality, USFWS-09 Impact of the Operation of Skagit Hydroelectric Project (#553) Backwater on Major Streams and its Influence on Habitat Quality, and WDFW-11 Impact of the Operation of Skagit Hydroelectric Project (#553) Backwater on Six Major Streams Tributary to Ross Lake and its Influence on Habitat Quality. The LPs requested information on eight tributaries entering Project reservoirs: Big Beaver, Little Beaver, Skagit River, Lightning Creek, Devils Creek, and Ruby Creek that enter Ross Lake; Thunder Creek that enters Diablo Lake; and Stetattle Creek that enters Gorge Lake. The Sediment Deposition Study Plan addresses, with modifications, elements of the study requests, as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by American Rivers/Trout Unlimited, NPS, Upper Skagit Indian Tribe, and USFWS. City Light responded to comments in the PSP comment/response table appended to this RSP. No modifications were made to the study plan in response to comments.

Tasks associated with the study include:

- (1) Compiling and assessing existing information;
- (2) Collecting field data including bathymetry and distribution and grain size of inlet and delta deposits (March – September 2021); and
- (3) Mapping of inlet area deposits.

Results from other studies are not needed to complete this study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR.

### **5.16 GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study**

City Light proposes a GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study) as part of this RSP to characterize the current condition of aquatic habitat in the reach, and to characterize how Project-related changes in peak flows affect geomorphic processes, which will be used to evaluate the Project's contribution to cumulative effects in the reach. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

Six LPs submitted a total of 14 study requests related to geomorphology and aquatic habitat in the Skagit River and Project effects on sediment, instream large wood, process flows, and/or floodplain connectivity/off-channel aquatic habitat: Ecology-02 Instream Flow Study, NMFS-02 Geomorphology and Aquatic Habitat, NPS-11 Impact of Operations of Skagit Hydroelectric Project (#553) on Sediment Capture Within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat, NPS-12 Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Storage, Stability and Transport on Skagit River and its Influence on Endangered Species Habitat, NPS-13 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment Below Gorge Dam, USFWS-11 Impact of Operations of Skagit Hydroelectric Project (#553) on Sediment Capture Within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat, USFWS-12 Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Storage, Stability and Transport on Skagit River and its Influence on Endangered Species Habitat, USFWS-13 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood, and Sediment below Gorge Dam, USFWS-15 Geomorphology and Aquatic Habitat Complexity Study, USIT-08 Geomorphology and Anadromous Salmonid Habitat, WDFW-05 Geomorphology and Anadromous Salmonid Habitat, WDFW-08 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment Below Gorge Dam, WDFW-09 Wood Budget, Inventory and Assessment, and WDFW-10 Impact of Operations of Skagit Hydroelectric Project (#553) on Sediment Capture Within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat.

The Geomorphology Study Plan addresses, with modifications, many of the elements identified in the study requests listed above, as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by American Rivers/Trout Unlimited, Ecology, NMFS, NPS, Sauk-Suiattle Indian Tribe, Swinomish Indian Tribal Community, Upper Skagit Indian Tribe, and USFWS. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments and since PSP include investigating flows that result in geomorphic /habitat changes (process flows), using Indicators of Hydraulic Alteration (IHA) software package to investigate the timing and duration of different types of high flow events, assessing the potential for fish passage blockages at tributary junctions due to shallow water conditions, and analyzing sediment and large wood transport between Gorge Dam and the Sauk River confluence.

Tasks associated with the study include:

- (1) Collecting existing information;
- (2) Analyzing geomorphic change using two primary metrics (channel migration and channel incision);
- (3) Inventorying the status of aquatic habitat in the Skagit River between Gorge Dam and the Sauk River;
- (4) Inventorying the status of side channels and off-channel habitat in the Skagit River floodplain between Gorge Dam and the Sauk River;

- (5) Inventorying the status of substrate in the Skagit River, side channels, tributary junctions, and unvegetated bars between Gorge Dam and the Sauk River;
- (6) Inventorying the status of large wood in the Skagit River between Gorge Dam and the Sauk River, including tributary mouths;
- (7) Investigating process flows;
- (8) Developing a 1-D Sediment Transport Model between Gorge Dam and the Sauk River;
- (9) Developing a two-dimensional (2-D) Sediment Transport Model of select focus areas in the Skagit River;
- (10) Monitor movement of gravel/cobble deposits and added large wood; and
- (11) Collect and synthesize existing geomorphology and aquatic habitat studies, reports, and data for the Skagit River downstream of the Sauk River confluence.

Field work associated with the tasks above will be conducted from January through September 2021 (depending on flows). In addition, field work for the bedload transport monitoring and scour monitoring portion of the study will extend from August 2019 through August 2022.

Results from the TR-01 Vegetation Mapping Study will provide riparian vegetation type and size to assist with evaluating the potential for future large wood loading. The FA-02 Instream Flow Model Development Study and the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study results will be used to estimate average bankfull width and depth and existing substrate conditions. Results from TR-02 Wetland Assessment will provide habitat-related data to inform the Geomorphology Study. The Geomorphology Study may provide data for GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study and TR-09 Beaver Habitat Assessment, and may inform high priority areas for CR-02 Cultural Resources Survey.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including a summary of geomorphic change and GIS-based maps, summary tables and analyses of aquatic habitat, side channels, substrate, and large wood; (4) analysis of current side channel conditions and side channel formation/maintenance processes; (5) analysis to evaluate current amount and quality of spawning and rearing habitat for all salmonid species within the study area; (6) estimate of potential future loading of large wood and gravel/cobble in the Skagit River between Gorge Dam and the Sauk River confluence; (7) synthesis of the interaction among flow, sediment loading, large wood input, channel migration/side channel formation, floodplain connectivity and aquatic habitat; (8) discussion of process flows; (9) the development and results of Sediment Transport Modeling and sediment/wood movement monitoring; (10) a summary of geomorphic and aquatic habitat conditions downstream of the Sauk River confluence; and (11) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final field results will be reported in the USR.

### 5.17 OM-01 Operations Model Study

City Light proposes an OM-01 Operations Model Study as part of this RSP to develop an Operations Model that represents existing Project operations with reasonable accuracy for purposes of relicensing, and which can be used to simulate potential future operations under a variety of operating scenarios. The goal of the study is to develop a Base Case scenario representation of Project operations. For purposes of Operations Model development, the Base Case represents the Project's operations under the current FERC license. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Skagit County Drainage and Irrigation Special Purpose Districts represented by the Skagit County Drainage and Irrigation District Consortium LLC (SDIDC) and the Skagit County Dike and Drainage District Flood Control Partnership, submitted the study request SDIDC-01 Flood Storage Timing: Study Plan Seattle City Light Skagit River Hydroelectric Project FERC No. 553. SDIDC also submitted the study request SDIDC-02 Irrigation Water Supply: Study Plan Seattle City Light Skagit River Hydroelectric Project FERC No. 553.

SDIDC-01 and SDIDC-02 request the simulation of alternative operating scenarios under varying hydrologic conditions. City Light recognizes the need to model a range of alternative operating scenarios for the Project as part of relicensing, many of which will be identified by LPs. However, the OM-01 Operations Model Study Plan is aimed at describing how the model will be developed and applied. Identifying and evaluating specific alternative operating scenarios, such as those identified by SDIDC, will take place later in the relicensing process. Although the study plan was not revised to address these study requests, the requests will be accommodated by the overall process, as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by Ecology, Upper Skagit Indian Tribe, and USFWS. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments and since the PSP include adding a fourth technical workshop, clarifying that the Operations Model will be integrated with both Instream Flow Models (FA-02 Instream Flow Model and FA-05 Gorge Bypass Reach Hydraulic and Instream Flow Model), and providing details for a process to identify and evaluate alternative flow management scenarios.

Tasks associated with the study include:

- (1) Developing the Operations Model;
- (2) Validating the Operations Model and establishing a Base Case – January 2021 to May 2021;
- (3) Consultation workshops (April/May, May, June, and August); and
- (4) Preparing an Operations Model Logic and Validation Report, as well as a Scenario Documentation Report.



The results of the Operations Model will be integrated with the Instream Flow Models (FA-02 Instream Flow Model Development Study and FA-05 Gorge Bypass Reach Hydraulic and Instream Flow Model).

City Light will prepare a report that includes the following sections: (1) Project introduction and background; (2) study area; (3) methodology; (4) discussion of the hydrologic data review, and inflows utilized in the Operations Model; (5) discussion of Operations Model setup, operating rules for each development and downstream modeled nodes, validation of input parameters, and definition of modeled Base Case and Current Operations Baseline scenarios; (6) results provided in graphical and tabular format compared to historical reservoir elevation and flow release data including discussions of Operations Model validation; (7) any LP correspondence and/or consultation; (8) literature cited; and (9) description of variances from the FERC-approved study plan, if any.

After the scenario modeling is completed, it is anticipated that a Scenario Documentation Report will be prepared and included in the USR, with addendum reports as necessary if modeling continues beyond the USR. This report will incorporate results from other applicable models to provide a comprehensive report out on each scenario that is analyzed. This report will include the following elements: (1) scenario inputs incorporated into each of the analyzed scenarios; (2) modeled results provided in graphical and tabular format; (3) modeled results from other models applicable to the scenario (e.g., Instream Flow Models); and (4) a comparison of results as relative differences between scenarios and the baseline scenarios.

This study is intended to be a 2-year study. Final study results will be reported in the ISR. Reporting of scenario evaluations will be included in the USR.

### **5.18 RA-01 Recreation Use and Facility Assessment**

City Light proposes a RA-01 Recreation Use and Facility Assessment (Recreation Assessment) as part of this RSP to evaluate existing study area recreation facilities, opportunities, preferences, and uses potentially affected by continued O&M of the Project. The goals of the study are to determine: (1) the condition, accessibility, and use impacts of the study area's recreation facilities; (2) the preferences, attitudes, and characteristics of the study area's recreation users; (3) current study area recreation use and activities; and (4) future demand for study area recreation facilities and opportunities. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The following study requests pertaining to recreation facilities and visitor use were submitted: USFS-01 Recreation Facility and Use Study, and NPS-15 Recreation Facilities and Visitor Use Study. The NPS and USFS study requests were substantially identical. The Recreation Assessment Study Plan addresses, with significant modifications, many of the elements identified in the study requests listed above, as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by American Rivers/Trout Unlimited, American Whitewater, Nlaka'pamux Nation Tribal Council, NPS, and USFS. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. City Light has made several modifications to the

PSP based on these comments and further discussion with LPs. In particular, City Light has added 47 non-Project recreation facilities to the study area for a variety of different study elements, increased the target number of visitor surveys, increased the number of survey days, added new trail accessibility evaluations and trail counters, and made modifications to the visitor survey instrument.

Tasks associated with the study include:

- (1) Conducting an inventory and evaluating the condition, accessibility, and use impacts of the existing study area recreation facilities (June-October 2021);
- (2) Assessing the usable periods of the Project's developed boat launch;
- (3) Identifying recreation uses and visitor attitudes, beliefs, and preferences via field observation and visitor surveys (April-October 2022);
- (4) Estimating current recreation use at study area recreation resource areas; and
- (5) Identifying future use and demand opportunities.

Information obtained from RA-05 Lower Skagit River Recreation Flow Study will be considered in the study analysis.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final field results will be reported in the USR.

### **5.19 RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study**

City Light proposes a RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study (Bypass Safety and Whitewater Boating Study) as part of this RSP to evaluate the safety and whitewater boating opportunities of the Skagit River in the Gorge bypass reach under current and future conditions. The goal of this study is to evaluate the suitability of the Skagit River in the Gorge bypass reach for whitewater boating under current conditions, inform future operational scenarios that include the range of instream flow measures that may be included in a future license, and assess potential constraints such as Project operations and safety concerns. The study is designed to investigate whitewater suitability for expert paddlers only and not commercial whitewater boating opportunities. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests specific to this study in the Gorge bypass reach were filed with FERC. However, Ecology provided a study request (Ecology-02 Instream Flow Study) related to instream flow that included recreation flow components below the Gorge bypass reach. In response to this request, City Light proposes a new study, RA-05 Lower Skagit River Recreation Flow Study (Recreation Flow Study), to address river segments on the Skagit River downstream of the Project related to recreation flows. The study is summarized in Section 5.22 of this RSP and the Recreation Flow Study Plan with further details on overall study and methodology is included in an appendix to this RSP.

PSP comments to the Bypass Safety and Whitewater Boating Study Plan were submitted by American Whitewater and NPS. No modifications were made to this study plan in response to comments.

Tasks associated with the study include:

- (1) Conducting a Level 1 desktop analysis, including literature reviews, structured interviews, hydrology summary, Gorge Dam spill gate operation summary, physical river channel description, of existing river access description, and a summary of regulatory agency resource management goals and tribal interests (Spring – Summer 2021);
- (2) Conducting a Level 2 field reconnaissance, including opportunistic shore-based observation of flow in the Gorge bypass reach during a spill event (Spring – Fall 2021); and
- (3) Conducting a Level 3 multiple flow evaluation using a team of boaters paddling two to four flows based on volumes from the Level 2 field reconnaissance (Summer – Fall 2022).

The study consists of a three-phased sequential investigation referred to as Levels 1, 2, and 3. The phased sequential approach is designed to increase study resolution as investigations progress from one level to the next, as well as share interim results earlier in the relicensing process across resource disciplines. Advancing to more intensive study levels is dependent on results and recommendations in the prior study level.

Information obtained from other studies examining resources in the Gorge bypass reach, such as FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study (Bypass Instream Flow Model Development Study), will be considered in the Bypass Safety and Whitewater Boating Study analysis.

City Light will prepare a report that includes the following sections: (1) description of the observed whitewater boating opportunity in the Gorge bypass reach; (2) description of the existing access to the Gorge bypass reach; (3) public safety concerns; (4) summary of natural and cultural resources and operations that could be affected by providing whitewater opportunities; (5) a comparative analysis of multiple flow evaluations (if the Level 3 investigation is warranted); and (6) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final field results will be reported in the USR.

## **5.20 RA-03 Project Facility Lighting Inventory**

City Light proposes a RA-03 Project Facility Lighting Inventory as part of this RSP to conduct an inventory and map the locations of outdoor lighting equipment installed at Project facilities and identify the current use and need for lighting at Project facilities. The goal of this study is to inventory Project facilities located within the Project Boundary and within the RLNRA that utilize lighting at night. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC.

PSP comments to the study plan were submitted by NPS and Upper Skagit Indian Tribe. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments include edits for additional field data collection/documentation related to the “As Found” lighting documentation.

Tasks associated with the study include:

- (1) Conducting a site survey to catalog the physical characteristics of existing lighting for lights that do not have existing documented information (May to September 2021); and
- (2) Documenting the purpose and parameters of each Project facility lighting source (e.g., quantity, locations, voltage, luminaires, type, wattage, etc.).

Results from other studies are not needed to complete this study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR.

### **5.21 RA-04 Project Sound Assessment**

City Light proposes a RA-04 Project Sound Assessment as part of this RSP to characterize the existing outdoor soundscape near Project facilities and define the extent of Project-related noise emitting from Project facilities, equipment, or activities within the Project Boundary. The goal of this study is to develop estimates of Project-related noise to facilitate analysis of how Project-related noise may affect other resources (e.g., wildlife, cultural resources, recreation resources, etc.). The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC.

PSP comments to the study plan were submitted by NPS and Upper Skagit Indian Tribe. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments include the addition of a spring long-term measurement period, and modeling springtime and summertime Project-related noise levels to the point at which they attenuate to the noise level exceeded 90 percent of the time (L90) which is considered inaudible.

Tasks associated with the study include:

- (1) Conducting an inventory and assessing noise-emitting Project facilities and activities (June – September 2021);
- (2) Assessing the land use to identify areas where Project-related noise may have a potential adverse effect on Project resources;

- (3) Selecting sites and performing long-term spring and summer ambient field noise measurements and short-term Project-related noise measurements (June-September 2021, May-June 2022);
- (4) Processing and analyzing the 7-day noise measurement results to characterize the hourly ambient noise; and
- (5) Performing noise modeling to evaluate transmission line noise (corona noise) and noise from other Project features and activities.

Results from other studies are not needed to complete this study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion, and (5) a description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final field results will be reported in the USR.

## **5.22 RA-05 Lower Skagit River Recreation Flow Study**

City Light proposes a new study, RA-05 Lower Skagit River Recreation Flow Study (Recreation Flow Study), as part of this RSP to evaluate boatable flows for recreation under current operating conditions to better inform potential future operational scenarios and assess potential constraints and opportunities for recreation flows such as potential effects to natural, cultural, and other Project resources from increased public access as well as Project operations and safety concerns. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

This study plan addresses the elements identified in the Ecology-02 Instream Flow study request and subsequent comments on the PSP, as explained in Section 6 of the RSP.

American Whitewater filed PSP comments to include this new study plan in the RSP. By proposing this new study, City Light has addressed American Whitewater's comments.

Tasks associated with the study include:

- (1) Reviewing existing information sources describing the river recreation opportunities and boatable flows on this reach of the Skagit River (June – August 2021);
- (2) Conducting an Internet-based survey focused on boatable flow needs for recreation and visitor preferences and uses related to these river access sites on this reach (July – October 2021);
- (3) Conducting structured interviews with individuals in the recreation boating community with knowledge of the river segments on this reach of the Skagit River (September – November 2021);
- (4) Analyzing the Skagit River hydrology downstream of Gorge Powerhouse using boatable flow ranges developed in this study (i.e., Internet-based survey and structured interviews); and

- (5) Assessment of current condition of the portage trail including trail width relative to watercraft being portaged, tread surface, and access to the portage trail from the river (July 2021).

Information obtained from FA-02 Instream Flow Model Development Study will be considered in the study analysis. Information developed as part of this study will also be utilized in RA-01 Recreation Use and Facilities Assessment Study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final results will be reported in the ISR.

### **5.23 SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River**

In consideration of the numerous study requests to extend the geographic scope of studies to below the Sauk River confluence, and City Light's interests in watershed-level influences on anadromous fish resources, City Light proposes a new study, SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River (Synthesis Study), as part of its RSP to develop a comprehensive data synthesis of existing information focused on the reach downstream of the Sauk River confluence to the estuary. This study proposes to: (1) compile, analyze, and summarize relevant available information about the condition of and primary factors affecting life stages of anadromous fish resources in the reach of river extending from the Sauk River confluence to the Skagit River delta and estuary; (2) identify the Project's potential contribution to those factors affecting life stages of anadromous fish resources and identify data gaps related to the evaluation of the Project's effects; and (3) propose studies to be conducted during the second year of study to address those data gaps, if necessary. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Synthesis Study Plan addresses, with modifications, elements of the following study requests, as explained in Section 6 of the RSP: five LPs (NMFS, NPS, USFWS, Upper Skagit Indian Tribe, Ecology, and WDFW) submitted a total of 16 study requests to extend the geographic scope of resource studies downstream of the Sauk River confluence: NMFS-01 Water Quality; NPS-11 Impact of the Operations of Project on Sediment Capture within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat, NPS-13 Impact of Operations of Project on Process Flows of Water, Wood, and Sediment Below Gorge Dam; USFWS-03 Skagit Project Water Quality Assessment and Modeling, USFWS-11 Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Capture within Reservoirs and Sediment Recovery below Gorge Dam and its Influence on Endangered Species Habitat, USFWS-13 Impact of Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood, and Sediment below Gorge Dam, USFWS-16 The impacts of Project Operations on Aquatic and Riparian Biological Productivity Downstream of Gorge Dam; USIT-07 Water Quality Impacts Above and Below SCL Project Infrastructure (Water Quality), USIT-09 The Impacts of Project Operations on Aquatic & Riparian Biological Productivity Downstream of Gorge Dam (Littoral and Riparian Productivity), USIT-10 Efficiency of Engineered Spawning Channels as Mitigation

to Loss of Off Channel Habitats Downstream of the Skagit Project (#553); Ecology-01 Water Quality Study; WDFW-06 The Impacts of Project Operations on Aquatic & Riparian Biological Productivity Downstream of Gorge Dam (Littoral and Riparian Productivity); WDFW-07 Efficiency of Engineered Spawning Channels as Mitigation to Loss of Off Channel Habitats Downstream of the Skagit Project (#553), WDFW-09 Wood Budget Inventory and Assessment, WDFW-10 Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Capture Within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat, and WDFW-17 Water Quality Impacts Above and Below SCL Project Infrastructure (Water Quality).

Because this is the first draft of the study plan, there are no relevant PSP comments.

Tasks associated with the study include:

- (1) Assemble and review relevant and available information to characterize the status of each target species and physical and ecological attributes of important habitats for individual salmonid life stages of these target species in the lower Skagit River system;
- (2) Analyze data compiled in Step 1 to develop life-history-based conceptual models of each of the Skagit River target anadromous species using the lower river, delta, and estuary;
- (3) Using a life-history framework, hypotheses about key in-river and delta/estuary factors thought to be of greatest importance to each of the target anadromous fish populations in the Skagit River watershed will be derived based on the work conducted in the data compilation and data analysis steps. Potential relationships between these key factors affecting anadromous fish resources in the Skagit River below the Sauk River confluence and Project operations will be identified and verified based on the work conducted in Steps 1 and 2; and
- (4) Identify areas where further data is necessary to understand the key mechanisms and Project operations affecting species and their respective in-river, delta, and estuary life stages. Where large uncertainties and/or data gaps exist related to analyzing Project effects on key factors affecting anadromous fish resources, identify specific studies to reduce uncertainties and/or fill data gaps.

The results of this study will be updated and integrated with the results of other relicensing studies to determine the major factors affecting each target species which may further inform preferred watershed-based measures and/or longer-term adaptive management processes for protecting and enhancing target anadromous fish populations in the Skagit River.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 2-year study. Final results will be reported in the USR.

## 5.24 TR-01 Vegetation Mapping Study

City Light proposes a TR-01 Vegetation Mapping Study as part of this RSP to develop a complete and systematic vegetation mapping geographic information system (GIS) database. The goal of the study is to describe existing conditions, assess potential Project-related habitat effects, and inform development of terrestrial resource management plans and, as needed, PME measures. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC. However, this study will provide information requested as part of the following study requests: SSIT-03 Impacts of Transmission Line Right of Way (ROW) on Aquatic Habitat and Riparian Zone for the Skagit River Hydroelectric Project, STI-06 Spotted Owl Habitat Map, and USFWS-19 Impact of the Operations of Skagit Hydroelectric Project (#553) on Northern Spotted Owl.

PSP comments to the study plan were submitted by Stillaguamish Tribe of Indians, Upper Skagit Indian Tribe, and USFWS. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments include revising objectives to include relevance of study results to fish and aquatic resources and clarifying field surveys prioritization based on accessible transitional habitats.

Tasks associated with the study include:

- (1) Compiling and reviewing of existing information;
- (2) Validating field and remote sensing methods;
- (3) Pre-processing geospatial resources;
- (4) Assessing NPS vegetation mapping and classification;
- (5) Applying field and remote sensing methodology;
- (6) Testing input datasets;
- (7) Developing preliminary model;
- (8) Collecting of model training and verification data (Summer – Autumn 2020);
- (9) Developing draft and final vegetation map; and
- (10) Conducting accuracy assessment.

Results from the Vegetation Mapping Study will provide initial data on wetland communities within the study area to inform the TR-02 Wetland Assessment; information on potential occurrences and suitable habitats for the TR-03 Rare, Threatened, and Endangered Plants Study and the TR-04 Invasive Plants Study; information for assessing wildlife habitat for the TR-05 Marbled Murrelet Study, TR-06 Golden Eagle Habitat Analysis, TR-07 Northern Goshawk Habitat Analysis, TR-08 Special-status Amphibian Study, and TR-09 Beaver Habitat Assessment; and information on the large woody debris (LWD) component of the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study. The vegetation mapping data



will also be available for the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of vegetation at group or cultural group level within the study area; (4) discussion, including accuracy assessment; and (5) a description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. This study is currently under implementation and is expected to be completed in 2021. Steps 1–7 above have been implemented and final verification data collection, vegetation map development, accuracy assessment, and reporting, are underway.

### **5.25 TR-02 Wetland Assessment**

City Light proposes a TR-02 Wetland Assessment as part of this RSP to map and describe wetlands within the study area that may be affected by Project operations. The goal of the study is to map and rate the capability of these wetlands to provide water quality, hydrologic, and habitat functions and evaluate the overall condition and existing sources of impairment. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC. However, this study will provide information requested as part of the following study requests: NMFS-02 Geomorphology and Aquatic Habitat, SSIT-03 Impacts of Transmission Line Right of Way (ROW) on Aquatic Habitat and Riparian Zone for the Skagit River Hydroelectric Project, USFWS-15 Geomorphology and Aquatic Habitat Complexity Study, USIT-08 Geomorphology and Anadromous Salmonid Habitat, and WDFW-05 Geomorphology and Anadromous Salmonid Habitat.

PSP comments to the study plan were submitted by Stillaguamish Tribe of Indians, Upper Skagit Indian Tribe, and USFWS. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications were made to the study plan in response to comments and include clarification of criteria for potential Project-related disturbances and revisions to the schedule.

Tasks associated with the study include:

- (1) Compiling and reviewing existing information;
- (2) Collecting model training data (Summer–Autumn 2020);
- (3) Conducting wetland remote-sensing analysis;
- (4) Developing disturbance potential overlay for study area;
- (5) Conducting field data collection of wetlands potentially affected by the Project in the study area (Summer – Autumn 2020; 2021 as needed); and
- (6) Conducting data analysis.

Results from the TR-01 Vegetation Mapping Study will provide data on wetland communities for the Wetland Assessment. Results from the Wetland Assessment will provide habitat and occurrence information relevant to the TR-03 Rare, Threatened, and Endangered Plants Study, TR-04 Invasive Plants Study, TR-05 Marbled Murrelet Study, TR-06 Golden Eagle Habitat Analysis, TR-08 Special-status Amphibian Study, and TR-09 Beaver Habitat Assessment. The wetland data will also be available for the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study, GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study, and other fish and aquatics studies.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of wetlands within the study area and wetland classifications, functions, and impairments; (4) discussion; and (5) a description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. This study is currently under implementation and is expected to be completed in 2021. Steps 1–5 above have been implemented and final data analysis and reporting, are underway. Supplemental data collection will occur as needed in 2021 in conjunction with other terrestrial studies.

## **5.26 TR-03 Rare, Threatened, and Endangered Plants Study**

City Light proposes a TR-03 Rare, Threatened, and Endangered (RTE) Plants Study as part of this RSP to identify existing RTE plant species and populations in areas potentially affected by ongoing Project activities. The goal of the study is to provide information to determine whether and to what extent certain Project O&M activities may have potential to adversely affect RTE plant species. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC.

No PSP comments to the study plan were filed with FERC. No modifications were made to the study plan since the PSP.

Tasks associated with the study include:

- (1) Developing a list of RTE plant species that may occur in areas affected by the Project;
- (2) Determining survey locations;
- (3) Preparing for field effort;
- (4) Conducting field surveys (April–November 2021);
- (5) Compiling data; and
- (6) Conducting a threats assessment.

It is expected that this study will be conducted concurrently with the TR-04 Invasive Plants Study.

Results from the TR-01 Vegetation Mapping Study and TR-02 Wetland Assessment, specifically on species habitat associations, will be used to inform survey locations for the target RTE species.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of RTE plant occurrences; (4) discussion, including threats assessment; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR.

### **5.27 TR-04 Invasive Plants Study**

City Light proposes a TR-04 Invasive Plants Study as part of this RSP to document occurrences of a target list of plant species designated as invasive. The goal of the study is to provide information to determine locations of invasive plant occurrences, which could potentially be spread by Project O&M and Project-related recreation activities, and to assess impacts. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC. However, this study will provide information requested as part of the following study request: SSIT-03 Impacts of Transmission Line Right of Way (ROW) on Aquatic Habitat and Riparian Zone for the Skagit River Hydroelectric Project.

PSP comments to the study plan were submitted by the Stillaguamish Tribe of Indians. City Light has responded to comments in the PSP comment/response table appended to this RSP. In response to comments, City Light added a dataset to the list of existing information to be reviewed and a clarifying bullet point to the list of survey locations.

Tasks associated with the study include:

- (1) Compiling and reviewing of existing information;
- (2) Developing a target invasive plant species list;
- (3) Prioritizing survey locations;
- (4) Gathering data and preparing for field efforts;
- (5) Conducting field surveys (April-November 2021); and
- (6) Processing data.

It is expected that this study will be conducted concurrently with the TR-03 Rare, Threatened, and Endangered Plants Study.

Results from the TR-01 Vegetation Mapping Study and TR-02 Wetland Assessment, specifically on invasive plant species occurrences will inform the Invasive Plants Study. Invasive plant species presence will also be noted incidentally during fieldwork for other studies.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of invasive plant occurrences, a list of observed ubiquitous or widespread species, and likely disturbance or pathways for the target

invasive plant occurrences; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR.

### **5.28 TR-05 Marbled Murrelet Study**

City Light proposes a TR-05 Marbled Murrelet Study as part of this RSP to provide information needed to characterize potential Project effects on the marbled murrelet. The goal of the study is to map potentially suitable marbled murrelet nesting habitat within the study area and assess likelihood of marbled murrelet nesting. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC.

PSP comments to this study plan were submitted by USFWS. City Light has responded to comments in the PSP comment/response table appended to this RSP. No modifications were made to the study plan in response to comments.

Tasks associated with the study include:

- (1) Mapping potential marbled murrelet nesting habitat;
- (2) Conducting limited ground surveys to verify accuracy of habitat mapping (April-May 2021);
- (3) Conducting radar and audio-visual surveys (May-July 2021); and
- (4) Analyzing data.

Results from the TR-01 Vegetation Mapping Study and TR-02 Wetland Assessment, specifically on species habitat associations, will be used to map potential murrelet habitat and provide information on the availability of suitable limb nesting platforms to help refine location of surveys.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of potentially-suitable marbled murrelet habitat; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR. If 2021 is deemed a poor nesting season for marbled murrelets in Washington State, an additional year of radar and audio-visual surveys may be necessary in 2022.

### **5.29 TR-06 Golden Eagle Habitat Analysis**

City Light proposes a TR-06 Golden Eagle Habitat Analysis as part of this RSP to assess the potential effects of continued O&M of the Project with respect to collision risk of golden eagles with transmission lines and inform BMP and elements of City Light's Avian Protection Plan. The goal of the study is to use existing information to map habitat for golden eagle nesting, foraging, and movement corridors in the study area and conduct a geospatial risk assessment (GRA) to

identify potential risk associated with collision with Project transmission lines. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC.

PSP comments to this study plan were submitted by USFWS. City Light has responded to comments in the PSP comment/response table appended to this RSP. No modifications were made to the study plan in response to comments.

Tasks associated with the study include:

- (1) Compiling and reviewing of existing information;
- (2) Mapping observations and potential nesting and foraging habitat; and
- (3) Developing golden eagle geospatial risk assessment (Summer 2021).

Results from the TR-01 Vegetation Mapping Study and TR-02 Wetland Assessment, specifically landscape level cover types, will be used to characterize areas of potentially suitable golden eagle habitat for nesting, foraging, and movement corridors near the Project.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of potentially suitable eagle habitat; (4) discussion, including threats assessment; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR.

### **5.30 TR-07 Northern Goshawk Habitat Analysis**

City Light proposes a TR-07 Northern Goshawk Habitat Analysis as part of this RSP to identify suitable goshawk habitat within and near areas potentially affected by ongoing Project activities. The goal of the study is to develop a map of suitable goshawk nesting habitat within the study area. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC.

No PSP comments to the study plan were filed with FERC. No modifications were made to the study plan since the PSP.

Tasks associated with the study include:

- (1) Reviewing scientific literature; and
- (2) Identifying and mapping potentially suitable habitat (Summer 2021).

Results from the TR-01 Vegetation Mapping Study will be used to define the extent of potential goshawk nesting habitat in the study area.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of potential suitable northern goshawk habitat; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR.

### **5.31 TR-08 Special-status Amphibian Study**

City Light proposes a TR-08 Special-status Amphibian Study as part of this RSP to collect information on special-status amphibians in areas potentially affected by ongoing Project activities. The goals of the study are to identify areas of potentially suitable breeding habitat for the special-status amphibians, Columbia spotted frog and Oregon spotted frog, within the study area; assess the likelihood that either species occurs in areas where there is activity related to Project O&M; document occurrences of a third special-status species, western toad, and the locations and types of habitats used around the Project reservoirs; and collect relevant information on populations where these species are found, including numbers, life stages, habitat, and locations. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

No formal study requests related to this study were filed with FERC.

PSP comments to the study plan were submitted by WDFW. City Light has responded to comments in the PSP comment/response table appended to this RSP. No modifications were made to the study plan in response to comments.

Tasks associated with the study include:

- (1) Identifying and mapping potentially suitable habitat;
- (2) Conducting reconnaissance and incidental observations; and
- (3) Conducting amphibian surveys (March-July 2021).

Field activities will adhere to accepted field-gear cleaning and disinfection procedures to prevent the spread of amphibian pathogens.

Results from the TR-01 Vegetation Mapping Study and TR-02 Wetland Assessment will provide information to identify potential habitats and incidental observations of amphibians. The FA-03 Reservoir Fish Stranding and Trapping Risk Assessment will also identify potential habitats within drawdown zones on Ross, Diablo, and Gorge lakes that could be used by special-status amphibians.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including a narrative description of reconnaissance and survey habitat characteristics; and GIS-based maps of survey areas and amphibian observations; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR.

### 5.32 TR-09 Beaver Habitat Assessment

City Light proposes a TR-09 Beaver Habitat Assessment as part of this RSP to summarize the ongoing beaver conflicts at the Project's Chum Salmon off-channel sites and assess beaver habitat suitability in the study area. The goals of the study are to summarize beaver conflicts at the City Light Chum off-channel habitat sites, summarize results of aquatic relicensing studies to assess hydrologic and geomorphologic conditions at the constructed Chum channels, identify beaver habitat and active beaver territories, and assess beaver habitat in the study area using Beaver Intrinsic Potential (BIP) model to assess ongoing Project effects and inform potential PME measures. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The Stillaguamish Tribe of Indians submitted a study request pertaining to beaver (STI-04 Beaver Project). The Beaver Habitat Assessment Study Plan addresses some of the elements identified in this study request, as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by the Stillaguamish Tribe of Indians and Upper Skagit Indian Tribe. City Light has addressed the specific comments and suggested edits in the study plan and responded to comments in the PSP comment/response table appended to this RSP. Modifications made to the study plan in response to comments include: clarifications to the study area, clarifications on the locations and studies where beaver observations will be documented, updated resource management goals, clarifying available historic data from Indian tribes, adding information about beaver dam analogs (BDA), adding discussion of potential operations and maintenance (O&M) effects on beaver habitat, clarifying that other relicensing studies' results will be included in assessment of beaver habitat, updating goals and objectives and related methods, and adding reference to previous habitat evaluation procedure study.

Tasks associated with the study include:

- (1) Assessing existing conditions and management activities at off-channel habitat areas (April – September 2021);
- (2) Verifying field mapping (May – September 2021);
- (3) Mapping beaver occurrence in Project Boundary (incidental observations gathered during fieldwork for all studies); and
- (4) Assessing beaver habitat.

Results from the TR-01 Vegetation Mapping Study and TR-02 Wetland Assessment, specifically on wetland/riparian vegetation mapping, plant species occurrence, and vegetation suitability, will be used to supplement BIP mapping classification. Results from GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study and FA-02 Instream Flow Model Development Study will be used to assess hydrologic and geomorphologic conditions at the constructed Chum off-channel sites for use in assessing management options.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of beaver occurrences and habitat

suitability in the study area; (4) discussion; and (5) description of variances from the FERC-approved study plan, if any.

This study is intended to be a 1-year study. Final field results will be reported in the ISR. As some relicensing studies will continue fieldwork and potentially document additional beaver or beaver habitat occurrences during the 2022 field season, an addendum report with any additional beaver observations would be issued in late 2022.

### **5.33 TR-10 Northern Spotted Owl Habitat Analysis**

City Light proposes a TR-10 Northern Spotted Owl Habitat Analysis as part of this RSP to identify and map suitable northern spotted owl (NSO) nesting, roosting, and foraging (NRF) habitat within the Project Boundary and a 0.5-mile buffer. The goal of the study is to provide information to supplement existing NSO survey data in order to determine whether and the extent to which certain Project O&M activities may have potential to affect NSO. The full study plan with further details on overall study and methodology is included in an appendix to this RSP.

The NSO Habitat Analysis Study Plan is in response to study requests made by USFWS (USFWS-19 Impact of the Operations of Skagit Hydroelectric Project (#553) on Northern Spotted Owl) and the Stillaguamish Tribe of Indians (STI-06 Spotted Owl Habitat Map). In its study request, the USFWS requested more information on Project effects to NSO and whether NSO could successfully establish around Project reservoirs and mitigation lands. USFWS states if Project activities from operations are located near NSO NRF habitat, or tree clearing or other modifications to suitable habitat are planned, then there is potential for disturbing nesting NSO. In its study request, the Stillaguamish Tribe of Indians requested City Light add a NSO habitat map. While existing information does not show a demonstrated effect of the Project on NSO populations, City Light has a mutual natural resource management interest in providing habitat information to inform potential NSO conservation measures and best management practices and has proposed this study in its RSP. The study plan addresses some of the elements identified in the study requests, as explained in Section 6 of this RSP.

PSP comments to the study plan were submitted by USFWS. City Light has responded to comments in the PSP comment/response table appended to this RSP. No modifications were made to the study plan in response to comments.

Tasks associated with the study include:

- (1) Review scientific literature; and
- (2) Identify and map potentially suitable habitat (Spring to Summer 2021).

Results from the TR-01 Vegetation Mapping Study will be used to inform the extent of potential NSO NRF habitat in the study area.

City Light will prepare a report that includes the following sections: (1) study goals and objectives; (2) methodology; (3) results, including GIS-based maps of potential suitable NSO habitat; (4) discussion; and (5) description of variances from study plan from the FERC-approved study plan, if any. This study is intended to be a 1-year study. Final field results will be reported in the ISR.



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## **6.0 RESPONSE TO STUDY REQUESTS**

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As noted above, City Light received 97 study requests submitted by federal and state agencies, Indian tribes, First Nations, NGOs, and other LPs for the scoping comment deadline of October 24, 2020. Subsequently, City Light received at least 2 revised study requests for the PSP comment deadline of March 8, 2021. The correspondence from LPs requesting studies and providing comments is listed in an appendix to this RSP. A table detailing PSP comments received and City Light's response to each is also appended to this RSP.

City Light has carefully reviewed all study requests submitted by LPs, considered feedback provided by LPs during the PSP Meetings and subsequent topic-based discussion meetings, and reexamined its approach to the relicensing study process. In response to recommendations from the LPs and in the spirit of collaboration, City Light has added five additional studies and expanded a number of previously proposed studies in this RSP. In some cases, these studies do not necessarily fall within the FERC Study Criteria, and City Light does not believe these studies are required for the relicensing. Rather, City Light has proposed to expand its study plan program to take an ecosystem approach and to demonstrate its commitment to working with LPs and to compromise with its partners to accommodate their information needs beyond the relicensing process.

Pursuant to 18 CFR § 5.11(b)(4), if City Light was unable to adopt an LP study request whole or in part, it provides an explanation that references FERC Study Criteria. City Light acknowledges comments received by certain LPs on the PSP that for studies it did not adopt, City Light did not include a sufficient explanation based on FERC Study Criteria in each instance. City Light has made every effort in the RSP to address this concern. Table 6.0-1 summarizes City Light's review of the formal study requests and its determination. Where possible, City Light consolidated common themes and elements expressed in the study requests (Table 6.0-2).

**Table 6.0-1. Summary of formal study requests and City Light’s responses.**

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
1.	SDIDC-01	Flood Storage Timing	Skagit County Drainage and Irrigation District Consortium / Skagit County Dike and Drainage District Flood Control Partnership	9/21/20; 03/04/21	✓		OM-01 Operations Model Study  See Section 6.2.18 of this RSP for response to the study request
2.	SDIDC-02	Irrigation Water Supply	Skagit County Drainage and Irrigation District Consortium	10/19/20; 03/04/21	✓		OM-01 Operations Model Study  See Section 6.2.19 of this RSP for response to the study request
3.	NMFS-01	Water Quality	NMFS	10/22/20; 03/05/21	✓		FA-01 WQ Monitoring Study  SY-01 Synthesis Study  See Section 6.2.9 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
4.	NMFS-02	Geomorphology and Aquatic Habitat	NMFS	10/22/20; 03/05/21	✓		GE-04 Geomorphology Study  FA-02 Instream Flow Model Development Study  TR-02 Wetland Assessment  See Sections 6.2.13, 6.2.14, 6.2.15, and 6.2.16 of this RSP for responses to the study request
5.	NMFS-03	Quantifying Habitat and Production Potential of Chinook and Coho salmon and steelhead above Ross Dam	NMFS	10/22/20; 03/05/21	✓		FA-04 Fish Passage Study  FA-07 Reservoir Tributary Habitat Assessment  See Section 6.2.10 of this RSP for response to the study request
6.	NMFS-04	Feasibility Analysis of Fish Passage	NMFS	10/22/20; 03/05/21	✓		FA-04 Fish Passage Study  See Section 6.2.10 of this RSP for response to the study request
7.	Ecology-01	Water Quality Study	Ecology	10/23/20; 03/08/21	✓		FA-01 WQ Monitoring Study  SY-01 Synthesis Study  See Section 6.2.9 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
8.	Ecology-02	Instream/Recreation Flow Study	Ecology	10/23/20; 03/08/21	✓		FA-02 Instream Flow Model Development Study  FA-05 Bypass Instream Flow Model Development Study  GE-04 Geomorphology Study  RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study  RA-05 Recreation Flow Study  See Sections 6.1.4, 6.2.11, and 6.2.15 of this RSP for responses to the study request
9.	NPS-01	Feasibility Analysis of Anadromous and Resident Fish Passage	NPS	10/23/20; 03/05/21	✓		FA-04 Fish Passage Study  See Section 6.2.10 of this RSP for response to the study request
10.	NPS-02	Skagit Project Water Quality Assessment and Modeling	NPS	10/23/20; 03/05/21	✓		FA-01 WQ Monitoring Study  See Section 6.2.9 of this RSP for response to the study request
11.	NPS-03	Assessing the Impacts of Project Operations on Secondary Productivity	NPS	10/23/20; 03/05/21		✓	See Section 6.3.3 of this RSP for response to the study request
12.	NPS-04	Skagit Project Recreational Fishing (Creel) Survey	NPS	10/23/20; 03/05/21		✓	See Section 6.3.6 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
13.	NPS-05	Population Structure of Native Fish in the Project Area	NPS	10/23/20; 03/05/21	✓		FA-06 Reservoir Fish Genetics Study  See Section 6.2.17 of this RSP for response to the study request
14.	NPS-06	Determine the Suitability and Productive Potential of Littoral and Riparian Habitat for Resident and Anadromous Fish in the Project Area	NPS	10/23/20; 03/05/21		✓	See Section 6.3.4 of this RSP for response to the study request
15.	NPS-07	Evaluating Existing Fish Passage and Entrainment	NPS	10/23/20; 03/05/21	✓		FA-08 Fish Entrainment Study  See Section 6.2.23 of this RSP for response to the study request
16.	NPS-08	Quantifying the Productivity Potential of Reservoir Tributary Habitat	NPS	10/23/20; 03/05/21	✓		FA-04 Fish Passage Study  FA-07 Reservoir Tributary Habitat Assessment  See Section 6.2.10 of this RSP for response to the study request
17.	NPS-09	Quantifying the Productivity Potential of Reservoir Fish	NPS	10/23/20; 03/05/21		✓	See Section 6.3.4 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
18.	NPS-10	Impact of Operations of Project Backwater on Major Streams and its Influence on Habitat Quality	NPS	10/23/20; 03/05/21	✓		GE-03 Sediment Deposition Study  See Section 6.2.12 of this RSP for response to the study request
19.	NPS-11	Impact of the Operations of Project on Sediment Capture within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat	NPS	10/23/20; 03/05/21	✓		GE-04 Geomorphology Study  SY-01 Synthesis Study  See Section 6.2.14 of this RSP for response to the study request
20.	NPS-12	Impact of Operations of Project on Sediment Storage, Stability and Transport on Skagit River and its Influence on Endangered Species Habitat	NPS	10/23/20; 03/05/21	✓		GE-04 Geomorphology Study  See Section 6.2.14 of this RSP for response to the study request
21.	NPS-13	Impact of Operations of Project on Process Flows of Water, Wood, and Sediment Below Gorge Dam	NPS	10/23/20; 03/05/21	✓		FA-02 Instream Flow Model Development Study  GE-04 Geomorphology Study  SY-01 Synthesis Study  See Section 6.2.15 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
22.	NPS-14	Impact of Changing Hydrologic Regime on Operations of Project	NPS	10/23/20; 03/05/21		✓	See Section 6.3.7 of this RSP for response to the study request
23.	NPS-15	Recreation Facilities and Visitor Use Study	NPS	10/23/20; 03/05/21	✓		RA-01 Recreation Assessment  See Section 6.2.20 of this RSP for response to the study request
24.	SC-01	Siren Warning Study	Skagit County	10/23/20; 03/03/21		✓	See Section 6.3.15 of this RSP for response to the study request
25.	SC-02	Mitigation Lands Study	Skagit County	10/23/20; 03/03/21		✓	See Section 6.3.10 of this RSP for response to the study request
26.	USFS-01	Recreation Facility and Use Study	United States Forest Service (USFS)	10/23/20; 03/08/21	✓		RA-01 Recreation Assessment  See Section 6.2.20 of this RSP for response to the study request
27.	AFWCC-01	Climbing Resources Study	Access Fund and Washington Climbers Coalition	10/26/20		✓	See Section 6.3.9 of this RSP for response to the study request



	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
28.	NNTC-01	Completion of the Traditional Cultural Properties Survey	Nlaka’pamux Nation Tribal Council (NNTC)	10/26/20; 03/08/21	✓		CR-01 Cultural Resources Data Synthesis  CR-04 Properties with Traditional Cultural Significance Study  See Section 6.2.1 of this RSP for response to the study request
						✓	Chert analysis component is not proposed; see Section 6.3.1 of this RSP for response to the study request
29.	NNTC-02	Evaluation of Identified Sites	NNTC	10/26/20; 03/08/21	✓		CR-01 Cultural Resources Data Synthesis  CR-04 Properties with Traditional Cultural Significance Study  See Section 6.2.2 of this RSP for response to the study request
30.	NNTC-03	Chert Analysis	NNTC	10/26/20; 03/08/21		✓	See Section 6.3.1 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
31.	NNTC-04	Traditional Cultural Properties Mitigation and Management Study	NNTC	10/26/20; 03/08/21	✓		CR-01 Cultural Resources Data Synthesis  CR-04 Properties with Traditional Cultural Significance Study  See Section 6.2.3 of this RSP for response to the study request
32.	SITC-01	Reservoir Operation Impacts on Terrestrial Wildlife Study	Swinomish Indian Tribal Community (SITC)	10/26/20; 03/08/21		✓	See Section 6.3.12 of this RSP for response to the study request
33.	SITC-02	Fish and Wildlife Mitigation Land Access, Stewardship, and Habitat Assessment	SITC	10/26/20; 03/08/21		✓	See Section 6.3.11 of this RSP for response to the study request
34.	SITC-03	Cultural Resources Study	SITC	10/26/20; 03/08/21	✓		CR-01 Cultural Resources Data Synthesis  CR-02 Cultural Resource Survey  CR-04 Properties with Traditional Cultural Significance Study  See Section 6.1.2 of this RSP for response to the study request
35.	SSIT-01	Ethnographic Study	Sauk-Suiattle Indian Tribe (SSIT)	10/26/20; 03/08/21		✓	See Section 6.3.2 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
36.	SSIT-02	Impacts of Transmission Line Corridor Right-of-Way (ROW) on Terrestrial Wildlife/Habitat and Native Plant Species	SSIT	10/26/20; 03/08/21		✓	See Section 6.3.14 of this RSP for response to the study request
37.	SSIT-03	Impacts of Transmission Line Right of Way (ROW) on Aquatic Habitat and Riparian Zone for the Skagit River Hydroelectric Project	SSIT	10/26/20; 03/08/21	✓		GE-02 Erosion and Geologic Hazards Study  TR-01 Vegetation Mapping Study  TR-02 Wetland Assessment  TR-04 Invasive Plants Study  See Section 6.2.22 of this RSP for response to the study request
38.	SSIT-04	Cultural Resources Transmission Line Study	SSIT	10/26/20; 03/08/21	✓		CR-01 Cultural Resources Data Synthesis  CR-02 Cultural Resource Survey  CR-04 Properties with Traditional Cultural Significance Study  See Section 6.2.4 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
39.	SSIT-05	Cultural Resources Battle Site Study	SSIT	10/26/20; 03/08/21	✓		CR-01 Cultural Resources Data Synthesis  CR-04 Properties with Traditional Cultural Significance Study  See Section 6.2.5 of this RSP for response to the study request
40.	USFWS-01	Feasibility Analysis of Fish Passage at the Skagit River Hydroelectric Project	USFWS	10/26/20; 03/08/21	✓		FA-04 Fish Passage Study  See Section 6.2.10 of this RSP for response to the study request
41.	USFWS-02	Quantifying the Habitat and Production Potential of ESA-Listed Salmon, Steelhead, and Bull Trout above Dams	USFWS	10/26/20; 03/08/21	✓		FA-04 Fish Passage Study  FA-07 Reservoir Tributary Habitat Assessment  See Section 6.2.10 of this RSP for response to the study request
42.	USFWS-03	Skagit Project Water Quality Assessment and Modeling	USFWS	10/26/20; 03/08/21	✓		FA-01 WQ Monitoring Study  SY-01 Synthesis Study  See Section 6.2.9 of this RSP for response to the study request
43.	USFWS-04	Skagit Project Reservoir Secondary Productivity Study	USFWS	10/26/20; 03/08/21		✓	See Section 6.3.3 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
44.	USFWS-05	Skagit Project Recreational Fishing (Creel) Survey	USFWS	10/26/20; 03/08/21		✓	See Section 6.3.6 of this RSP for response to the study request
45.	USFWS-06	Population Structure of Native Fish in the Project Area	USFWS	10/26/20; 03/08/21	✓		FA-06 Reservoir Fish Genetics Study  See Section 6.2.17 of this RSP for response to the study request
46.	USFWS-07	Determine the Suitability and Productive Potential of Littoral and Riparian Habitat for Resident and Anadromous Fish in the Project Area	USFWS	10/26/20; 03/08/21		✓	See Section 6.3.4 of this RSP for response to the study request
47.	USFWS-08	Evaluating Existing Fish Passage and Entrainment through the Skagit Hydroelectric Project Dams and Appurtenant Facilities	USFWS	10/26/20; 03/08/21	✓		FA-08 Fish Entrainment Study  See Section 6.2.23 of this RSP for response to the study request
48.	USFWS-09	Impact of the Operations of Skagit Hydroelectric Project (#553) Backwater on Major Tributaries to Reservoirs and its Influence on Habitat Quality	USFWS	10/26/20; 03/08/21	✓		GE-03 Sediment Deposition Study  See Section 6.2.12 of this RSP for response to the study request
49.	USFWS-10	Habitat Use and Population Dynamics of Reservoir Fish	USFWS	10/26/20; 03/08/21		✓	See Section 6.3.4 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
50.	USFWS-11	Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Capture within Reservoirs and Sediment Recovery below Gorge Dam and its Influence on Endangered Species Habitat	USFWS	10/26/20; 03/08/21	✓		GE-04 Geomorphology Study  SY-01 Synthesis Study  See Section 6.2.14 of this RSP for response to the study request
51.	USFWS-12	Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Storage, Stability and Transport on Skagit River and its Influence on Endangered Species Habitat	USFWS	10/26/20; 03/08/21	✓		GE-04 Geomorphology Study  See Section 6.2.14 of this RSP for response to the study request
52.	USFWS-13	Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood, and Sediment below Gorge Dam	USFWS	10/26/20; 03/08/21	✓		FA-02 Instream Flow Model Development Study  GE-04 Geomorphology Study  SY-01 Synthesis Study  See Sections 6.2.14 and 6.2.15 of this RSP for responses to the study request
53.	USFWS-14	Impact of a Changing Hydrologic Regime on the Operations of the Skagit Hydroelectric Project (#553)	USFWS	10/26/20; 03/08/21		✓	See Section 6.3.7 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
54.	USFWS-15	Geomorphology and Aquatic Habitat Complexity Study	USFWS	10/26/20; 03/08/21	✓		GE-04 Geomorphology Study  FA-02 Instream Flow Model Development Study  TR-02 Wetland Assessment  See Sections 6.2.13, 6.2.14, 6.2.15, and 6.2.16 of this RSP for responses to the study request
55.	USFWS-16	The impacts of Project operations on aquatic & riparian biological productivity downstream of Gorge Dam	USFWS	10/26/20; 03/08/21		✓	See Section 6.3.3 of this RSP for response to the study request
56.	USFWS-17	Impact of Operations of the Skagit Hydroelectric Project on Terrestrial Wildlife Connectivity	USFWS	10/26/20; 03/08/21		✓	See Sections 6.3.12 and 6.3.14 of this RSP for responses to the study request
57.	USFWS-18	Assessment of Fish and Wildlife Conservation Lands: Access, Stewardship, and Habitat Use	USFWS	10/26/20; 03/08/21		✓	See Section 6.3.11 of this RSP for response to the study request
58.	USFWS-19	Impact of the Operations of Skagit Hydroelectric Project (#553) on Northern Spotted Owl	USFWS	10/26/20; 03/08/21	✓		TR-01 Vegetation Mapping Study  TR-10 North Spotted Owl Habitat Analysis  See Section 6.2.21 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
59.	USIT-01	Feasibility Analysis of Fish Passage at the Skagit River Hydroelectric Project (Fish Passage Feasibility)	Upper Skagit Indian Tribe (USIT)	10/26/20; 03/08/21	✓		FA-04 Fish Passage Study  See Section 6.2.10 of this RSP for response to the study request
60.	USIT-02	Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon, and Sockeye Salmon above Gorge Dam (Tributary Habitat Productivity)	USIT	10/26/20; 03/08/21	✓		FA-04 Fish Passage Study  FA-07 Reservoir Tributary Habitat Assessment  See Section 6.2.10 of this RSP for response to the study request
61.	USIT-03	Evaluating Existing Fish Passage: Spill and Entrainment Through Ross, Diablo, Gorge Dams and Appurtenant Facilities Through the Project Area at the Skagit River Hydroelectric Project (Spill and Entrainment)	USIT	10/26/20; 03/08/21	✓		FA-08 Fish Entrainment Study  See Section 6.2.23 of this RSP for response to the study request
62.	USIT-04	Assessment of Gorge Dam Removal	USIT	10/26/20; 03/08/21		✓	See Section 6.3.8 of this RSP for response to the study request
63.	USIT-05	Reservoir Littoral, Benthic, and Pelagic Invertebrate Productivity (Reservoir Secondary Productivity)	USIT	10/26/20; 03/08/21		✓	See Section 6.3.3 of this RSP for response to the study request
64.	USIT-06	Littoral and Riparian Habitat Quality	USIT	10/26/20; 03/08/21		✓	See Section 6.3.4 of this RSP for response to the study request



	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
65.	USIT-07	Water Quality Impacts Above and Below SCL Project Infrastructure (Water Quality)	USIT	10/26/20; 03/08/21	✓		FA-01 WQ Monitoring Study  SY-01 Synthesis Study  See Section 6.2.9 of this RSP for response to the study request
66.	USIT-08	Geomorphology and Anadromous Salmonid Habitat	USIT	10/26/20; 03/08/21	✓		GE-04 Geomorphology Study  FA-02 Instream Flow Model Development Study  TR-02 Wetland Assessment  See Sections 6.2.13, 6.2.14, 6.2.15, and 6.2.16 of this RSP for responses to the study request
67.	USIT-09	The Impacts of Project Operations on Aquatic & Riparian Biological Productivity Downstream of Gorge Dam (Littoral and Riparian Productivity)	USIT	10/26/20; 03/08/21		✓	See Section 6.3.3 of this RSP for response to the study request
68.	USIT-10	Efficiency of Engineered Spawning Channels as Mitigation to Loss of Off Channel Habitats Downstream of the Skagit Project (#553)	USIT	10/26/20; 03/08/21		✓	See Section 6.3.5 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
69.	USIT-11	Impact of a Changing Hydrologic Regime on the Operations of the Skagit Hydroelectric Project (#553)	USIT	10/26/20; 03/08/21		✓	See Section 6.3.7 of this RSP for response to the study request
70.	USIT-12	Fish and Wildlife Mitigation Land Access, Stewardship and Habitat Assessment	USIT	10/26/20; 03/08/21		✓	See Section 6.3.11 of this RSP for response to the study request
71.	USIT-13	Impacts of Transmission Line Right-of-Way (ROW) on Terrestrial Wildlife/Habitat and Native Plant Species	USIT	10/26/20; 03/08/21		✓	See Section 6.3.14 of this RSP for response to the study request
72.	USIT-14	Impact of the Operations of Skagit Hydroelectric Project (#553) on Terrestrial Wildlife (Wildlife Connectivity)	USIT	10/26/20; 03/08/21		✓	See Section 6.3.12 of this RSP for response to the study request
73.	WDFW-01	Evaluation of Fish Barriers and Fish Species in the Bypass Reach  <i>Revised:</i> Identification of Passage Flows at Partial Fish Barriers and Fish Species in the Bypass Reach	WDFW	10/26/20; 03/08/21	✓		FA-04 Fish Passage Study  FA-05 Bypass Instream Flow Model Development Study  See Sections 6.2.10 of this RSP for responses to the study request
74.	WDFW-02	Feasibility Analysis of Fish Passage at the Skagit River Hydroelectric Project (Fish Passage Feasibility)	WDFW	10/26/20; 03/08/21	✓		FA-04 Fish Passage Study  See Section 6.2.10 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
75.	WDFW-03	Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon, and Sockeye Salmon above Gorge Dam	WDFW	10/26/20; 03/08/21	✓		FA-04 Fish Passage Study  FA-07 Reservoir Tributary Habitat Assessment  See Section 6.2.10 of this RSP for response to the study request
76.	WDFW-04	Evaluating Existing Fish Passage: Spill and Entrainment Through Ross, Diablo, Gorge Dams and Appurtenant Facilities Through the Project Area at the Skagit River Hydroelectric Project (Spill and Entrainment)	WDFW	10/26/20; 03/08/21	✓		FA-08 Fish Entrainment Study  See Section 6.2.23 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
77.	WDFW-05	Geomorphology and Anadromous Salmonid Habitat	WDFW	10/26/20; 03/08/21	✓		GE-04 Geomorphology Study  FA-02 Instream Flow Model Development Study  TR-02 Wetland Assessment  See Sections 6.2.13, 6.2.14, 6.2.15, and 6.2.16 of this RSP for responses to the study request
78.	WDFW-06	The Impacts of Project Operations on Aquatic & Riparian Biological Productivity Downstream of Gorge Dam (Littoral and Riparian Productivity)	WDFW	10/26/20; 03/08/21		✓	See Section 6.3.3 of this RSP for response to the study request
79.	WDFW-07	Efficiency of Engineered Spawning Channels as Mitigation to Loss of Off Channel Habitats Downstream of the Skagit Project (#553)	WDFW	10/26/20; 03/08/21		✓	See Section 6.3.5 of this RSP for response to the study request
80.	WDFW-08	Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment Below Gorge Dam	WDFW	10/26/20; 03/08/21	✓		GE-04 Geomorphology Study  FA-02 Instream Flow Model Development Study  See Sections 6.2.14 and 6.2.15 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
81.	WDFW-09	Wood Budget Inventory and Assessment	WDFW	10/26/20; 03/08/21	✓		GE-04 Geomorphology Study  SY-01 Synthesis Study  See Section 6.2.13 of this RSP for response to the study request
82.	WDFW-10	Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Capture Within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat  <i>Revised:</i> Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Erosion, Transport, and Deposition on the Skagit River and its Influence on Endangered Species Habitat	WDFW	10/26/20; 03/08/21	✓		GE-04 Geomorphology Study  SY-01 Synthesis Study  See Section 6.2.14 of this RSP for response to the study request
83.	WDFW-11	Impact of the Operations of Skagit Hydroelectric Project (#553) Backwater on Six Major Streams Tributary to Ross Lake and its Influence on Habitat Quality	WDFW	10/26/20; 03/08/21	✓		GE-03 Sediment Deposition Study  See Section 6.2.12 of this RSP for response to the study request
84.	WDFW-12	Impact of a Changing Hydrologic Regime on the Operations of the Skagit Hydroelectric Project (#553)	WDFW	10/26/20; 03/08/21		✓	See Section 6.3.7 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
85.	WDFW-13	Reservoir Littoral, Benthic, and Pelagic Invertebrate Productivity (Reservoir Secondary Productivity)	WDFW	10/26/20; 03/08/21		✓	See Section 6.3.3 of this RSP for response to the study request
86.	WDFW-14	Littoral and Riparian Habitat Quality	WDFW	10/26/20; 03/08/21		✓	See Section 6.3.4 of this RSP for response to the study request
87.	WDFW-15	Habitat Use and Population Dynamics of Reservoir Fish	WDFW	10/26/20; 03/08/21	✓		FA-06 Reservoir Fish Genetics Study  See Section 6.2.17 of this RSP for response to the study request
						✓	Habitat use and population dynamics component is not proposed; see Section 6.3.4 of this RSP for response to the study request
88.	WDFW-16	Recreational Fishing (Creel) Survey	WDFW	10/26/20; 03/08/21		✓	See Section 6.3.6 of this RSP for response to the study request
89.	WDFW-17	Water Quality impacts above and below SCL Project infrastructure (Water Quality)	WDFW	10/26/20; 03/08/21	✓		FA-01 WQ Monitoring Study  SY-01 Synthesis Study  See Section 6.2.9 of this RSP for response to the study request
90.	WDFW-18	Impacts of Transmission Line Corridor Right-of-Way (ROW) on Terrestrial Wildlife/Habitat and Native Plant Species	WDFW	10/26/20; 03/08/21		✓	See Section 6.3.14 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
91.	WDFW-19	Impact of the Operations of Skagit Hydroelectric Project (#553) on Terrestrial Wildlife (Wildlife Connectivity)	WDFW	10/26/20; 03/08/21		✓	See Section 6.3.12 of this RSP for response to the study request
92.	STI-01	Comprehensive Ethnographic Study	Stillaguamish Tribe of Indians (STI)	10/26/20; 03/08/21	✓		CR-01 Cultural Resources Data Synthesis  CR-04 Properties with Traditional Cultural Significance Study  See Section 6.2.6 of this RSP for response to the study request
93.	STI-02	Historic Properties Study	STI	10/26/20; 03/08/21	✓		CR-02 Cultural Resources Survey  See Section 6.2.7 of this RSP for response to the study request
94.	STI-03	Study of Specific Sites as Archaeological District	STI	10/26/20; 03/08/21	✓		CR-02 Cultural Resources Survey  See Section 6.2.8 of this RSP for response to the study request
95.	STI-04	Beaver Project	STI	11/4/20 (dated 10/30); 03/08/21	✓		TR-09 Beaver Habitat Assessment  See Section 6.1.3 of this RSP for response to the study request

	Study Request		Entity	Date (scoping comments; PSP comments)	Proposed for Study / Proposed for Study with Modifications	Not Proposed for Study	Correlation to City Light Study
	ID #	Title					
96.	STI-05	Harlequin Duck Breeding Habitat Analysis	STI	11/4/20 (dated 10/30); 03/08/21		✓	See Section 6.3.13 of this RSP for response to the study request
97.	STI-06	Spotted Owl Habitat Map	STI	11/4/20 (dated 10/30); 03/08/21	✓		TR-01 Vegetation Mapping Study  TR-10 North Spotted Owl Habitat Analysis  See Section 6.2.21 of this RSP for response to the study request

**Table 6.0-2. City Light’s consolidation of common themes of study requests filed with FERC.**

Section 6	Study Requested Category # = Submitted Study Request by ID#	AF / WCC	Ecology	NMFS	NNTC	NPS	SDIDC	SITC	Skagit County	SSIT	STI	USFS	USIT	USFWS	WDFW
6.1.2	Cultural Resource Study							03							
6.1.3	Wildlife Studies – Beaver										04				
6.1.4	Recreation Flow Study		02												
6.2.1	Completion of TCP Survey				01										
6.2.2	Evaluation of Sites				02										
6.2.3	TCP Mitigation and Management				04										
6.2.4	Cultural Resources Transmission Line Study									04					
6.2.5	Cultural Resources Battle Site Study									05					
6.2.6	Comprehensive Ethnographic Study										01				
6.2.7	Historic Properties Study										02				



Section 6	Study Requested Category # = Submitted Study Request by ID#	AF / WCC	Ecology	NMFS	NNTC	NPS	SDIDC	SITC	Skagit County	SSIT	STI	USFS	USIT	USFWS	WDFW
6.2.8	Study of Specific Sites as Archaeological District										03				
6.2.9	Water Quality Monitoring		01	01		02							07	03	17
6.2.10	Fish Passage			03 04		01 08							01 02	01 02	01 02 03
6.2.11	Instream Flow Study		02												
6.2.12	Reservoir Tributary Backwater Effect					10								09	11
6.2.13	Instream Large Wood			02									08	15	05 09
6.2.14	Sediment Budget and Sediment Transport Modeling			02		11 12							08	11 12 13 15	05 08 10
6.2.15	Process Flows		02	02		13							08	13 15	05 08
6.2.16	Potential Floodplain Connectivity of Off-Channel Aquatic Habitat			02									08	15	05
6.2.17	Native Fish Genetics Baseline					05								06	15
6.2.18	Flood Storage Timing						01								
6.2.19	Modeling Irrigation Water Supply						02								
6.2.20	Recreation Facilities and Visitor Use Study					15						01			
6.2.21	Wildlife Studies – Northern Spotted Owl										06			19	
6.2.22	Transmission Line Right of Way Aquatic Habitat									03					
6.2.23	Reservoir Entrainment					07							03	08	04
6.3.1	Chert Analysis				01 03										
6.3.2	Ethnographic Study									01					
6.3.3	Aquatic Productivity					03							05 09	04 16	06 13

Section 6	Study Requested Category # = Submitted Study Request by ID#	AF / WCC	Ecology	NMFS	NNTC	NPS	SDIDC	SITC	Skagit County	SSIT	STI	USFS	USIT	USFWS	WDFW
6.3.4	Reservoir Habitat and Fish Populations					06 09							06	07 10	14 15
6.3.5	Engineered Spawning Channels												10		07
6.3.6	Creel Survey					04								05	16
6.3.7	Effects of Climate Change on Hydrology and Project Operations					14							11	14	12
6.3.8	Gorge Dam Removal												04		
6.3.9	Climbing Study	01													
6.3.10	Mitigation Lands – Cost-Benefit Analysis								02						
6.3.11	Mitigation Lands – Habitat							02					12	18	
6.3.12	Wildlife Studies – Connectivity							01					14	17	19
6.3.13	Wildlife Studies – Harlequin Duck										05				
6.3.14	Transmission Line									02			13	17	18
6.3.15	Siren Warning System								01						

## **6.1 Study Requests Included in City Light's RSP**

### **6.1.1 Inventory of Historic Properties of Traditional Cultural Significance**

During ethnographic outreach for the CR-01 Cultural Resources Data Synthesis and planning meetings, several Indian tribes and two First Nations identified geographic areas of interest within the APE, or one-mile literature review buffer surrounding the APE, and noted the need to further research and verify locations of traditional cultural places to determine which could potentially be affected by the Project activities. Some participants also identified particular areas where NRHP evaluations would likely need to be completed. Others identified broader geographic zones and suggested using a landscape/waterways and migratory pathways approach to conduct research through ethnographic and historic records, genealogical connections, language/place names, and the archaeological record to identify the specific areas within the Project where traditional cultural places may be at risk. These places would need to be verified through on-the-ground surveys and site visits. Additional concerns included protection of culturally-sensitive information from public view or disclosure and issues around potential storage and methods for protecting information.

Concerns identified by Indian tribes and First Nations about potential Project-related effects to cultural resources include ground disturbance, flooding, vegetation clearing, deforestation, visual, sound, and atmospheric impacts to these areas from vehicles, recreational users, and energy emissions as well as access limitations to reach properties for traditional gathering and cultural practices. They also had concerns about direct, indirect, and cumulative impacts due to increased recreational uses. While not all the potential effects identified appear to be Project-dependent or Project related, they are viewed as interconnected issues which require a thoughtful, holistic, and multi-disciplinary approach.

These and other comments through CRWG meetings led City Light to develop the CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study), which is intended to build upon existing data compiled in the Cultural Resources Data Synthesis, and support the ethnographic study, survey and field visits specific to the APE. Several participants have already noted important places and ethnographic resources to refer to when evaluating nexus to the Project and potential Project effects. The Properties with Traditional Cultural Significance Study Plan is appended to this RSP and study goals are summarized in Section 5.4 of this RSP.

### **6.1.2 Cultural Resources Study**

The Swinomish Indian Tribal Community submitted a study request regarding cultural resources (SITC-03 Cultural Resources Study). The study request proposes to outline, identify, evaluate, and assess potential adverse effects on and impacts to resources, places, and properties of traditional religious and cultural importance to the Swinomish Indian Tribal Community associated with the Project. This would include historic properties and natural-cultural resources considered under the NHPA, NEPA, and FERC Indian Policy. The results of the study would serve as the informational basis of government-to-government consultation and land/water management associated with the Project to ensure Swinomish Indian Tribal Community perspectives, values, beliefs, and ongoing cultural and religious practices properly inform and pragmatically guide historic property and cultural and treaty resource treatment, preservation, protection, avoidance, and/or mitigation measures and considerations.

City Light proposes to adopt this study request. City Light believes that its proposed studies, CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study) and CR-02 Cultural Resources Survey, will collect the information requested in SITC-03 within the APE where Project effects are occurring or are reasonably foreseeable. The Properties with Traditional Cultural Significance Study includes an inventory of properties with traditional cultural significance that are within, intersect, or encompass the APE. The Properties with Traditional Cultural Significance Study is designed to identify and document historic properties pursuant to Section 106 of the NHPA. The proposed methodology in the Properties with Traditional Cultural Significance Study includes a step (Step 2) for City Light to work with individual Indian tribes and First Nations to develop research designs to outline the specific protocols that will work for each individual community during implementation of the study. City Light has amended its Properties with Traditional Cultural Significance Study Plan in response to comments requesting a one-mile buffer beyond the APE be added to the study area for this study. City Light understands and supports Indian tribes' and First Nations' efforts to provide context for locations of traditional cultural importance. City Light will review and assess any such contextual information shared by Indian tribes or First Nations up to one mile beyond the APE as part of the scope of the Properties with Traditional Cultural Significance Study. Such reviews will aid in evaluation of potential visual and acoustic effects to historic properties. The Properties with Traditional Cultural Significance Study Plan has been modified to incorporate this statement.

The Cultural Resources Survey includes an inventory of historic properties represented by archaeological and built environment resources. Management measures for historic properties will also be considered under the HPMP that City Light anticipates being developed and implemented under a programmatic agreement (PA) to conclude the Section 106 of the NHPA process for the FERC relicensing. The HPMP will be the mechanism under the new FERC license for considering potential Project-related effects to historic properties.

### **6.1.3 Wildlife Studies – Beaver**

Stillaguamish Tribe of Indians has requested a Beaver Project Study (STI-04) to identify current occupied sites, historically occupied sites, locations for beaver release or BDA construction and incorporate options to manage problem beavers in place using beaver deceivers or pond levelers when possible.

City Light will be conducting the TR-09 Beaver Habitat Assessment to address information requests from LPs. The goals of the Beaver Habitat Assessment are to provide information that can be used to address the ongoing beaver conflicts at the Project's Chum Salmon off-channel sites and to characterize beaver habitat conditions in the study area to inform Project effects assessment and to inform the development of PME measures. Although the study request did not address the FERC Study Criteria, City Light has amended its Beaver Habitat Assessment in response to comments provided by LPs following submittal of the PSP. City Light proposes to identify beaver habitat and active beaver territories in the study area based on a combination of existing information from City Light, LPs, and field observations by biologists. Additionally, the Beaver Habitat Assessment will map the suitability of aquatic habitats in the study area for beaver. City Light's goal is to also evaluate how the Project's management activities may affect habitat for beaver.

#### **6.1.4 Recreation Flow Study**

Ecology filed a study request (Ecology-02 Instream/Recreation Flow Study) focused on instream flows in the Skagit River downstream of the Project; elements not related to recreation are addressed in Section 6.2.11 of this RSP. Study objective A(6) in Ecology’s request stated the need to “Determine the flows suitable for recreation and other beneficial uses and if necessary, develop a flow regime(s) for those beneficial uses.”

City Light acknowledges that Ecology will evaluate recreation flows as a beneficial use in its consideration of instream flows. Ecology’s request did not propose study methods for identifying recreation flows in the mainstem Skagit but instead suggests a subcommittee with direct input from the recreation community develop the study plan. To date in discussions in the RARWG meetings, LPs did not identify a Project effect on or the need for a recreation flow study in the mainstem Skagit River. However, Ecology and American Whitewater provided additional comments on the need for a recreation flow study as part of their PSP comments. While City Light believes existing information is available, it proposes to adopt this study request as part of RA-05 Lower Skagit River Recreation Flow Study. This study will document the boatable flows in the Skagit River from the Goodell Creek Boat Launch to the Howard Miller Steelhead Park near Rockport, Washington.

### **6.2 Study Requests Partially Included in City Light’s RSP**

#### **6.2.1 Completion of TCP Survey**

The Nlaka’pamux Nation Tribal Council submitted a study request for completion of a traditional cultural property (TCP) survey in the drawdown of Ross Lake reservoir and higher elevation areas surrounding the reservoir (NNTC-01 Completion of TCP Survey). As part of the current license, the Nlaka’pamux Nation Tribal Council entered into a MOA with City Light to conduct a TCP study which included ethnographic and archival research, interviews with elders, and on-the-ground survey in Ross Lake. The Nlaka’pamux Nation Tribal Council conducted this TCP study under the current license and prepared a confidential report documenting their findings (NNTC 2020). A result of that study was recommended additional work to document and mitigate effects to the TCPs the Nlaka’pamux Nation Tribal Council identified. A key concern of Nlaka’pamux Nation Tribal Council is that these important and culturally-sensitive resources could be affected by a number of activities – some of which are potentially Project-related, such as shoreline and reservoir erosion, while others are not clearly Project-related, like recreation and trail maintenance in higher elevations above the drawdown and outside of the APE on land managed by the NPS. A collaborative effort that crosses jurisdictional and agency boundaries is desired in order to protect the resources over the long term and mitigate effects resulting from City Light activities caused by power generation, recreation, and maintenance of recreation facilities.

NNTC-01 Completion of TCP Survey would build upon findings in their prior work and investigate new areas where data had not yet been collected. The methods in their proposal would include pedestrian survey of the Ross Lake drawdown and nearshore on both the east and west banks and inside and outside of the APE, additional ethnographic interviews and archival research, examination of artifacts at the British Columbia Royal Museum which may link to toolstone sources in Ross Lake, development of a training video for environmental workers including City Light and NPS employees to facilitate awareness and proper respectful treatment for the protection

of sensitive cultural resources, and discussions (i.e., travel/meetings) with other Indian tribes and First Nations.

The Nlaka’pamux Nation Tribal Council proposed to conduct the study themselves. However, in a subsequent meeting with City Light on October 29, 2020, Nlaka’pamux Nation Tribal Council had reviewed City Light’s draft study plan for the CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study) and stated a willingness to work with City Light as participants in that study if it could be revised to include the following: (1) adjust study schedule to enable fieldwork in the Ross Lake drawdown in April of the first year; (2) add language to the methods to make the pedestrian survey component clear; and (3) meet and collaborate with the Nlaka’pamux Nation Tribal Council and NPS on planning for management strategies where the resources continue outside of the Project Boundary and APE.

NNTC-01 Completion of TCP Survey contains substantial detail suitable for a research design and meets most of the FERC Study Criteria. However, it does not demonstrate nexus between Project operations and effects on the resources to be studied (18 CFR § 5.9(b)(5)) outside of the APE; some identified areas in the study request are located outside of the Project Boundary and the request did not demonstrate a potential Project effect on those areas outside the APE. Accordingly, City Light proposes to adopt a portion of this study request where nexus with Project operations is demonstrated. Specifically, City Light incorporates the study request where it falls within the APE and will complete it as part of its Properties with Traditional Cultural Significance Study. Of note and as stated in the Properties with Traditional Cultural Significance Study Plan, City Light understands and supports Indian tribes’ and First Nations’ efforts to provide context for locations of traditional cultural importance. City Light will review and assess any such contextual information shared by Indian tribes or First Nations up to one mile beyond the APE as part of the scope of the Inventory of Historic Properties with Traditional Cultural Significance. Such reviews will aid in evaluation of potential visual and acoustic effects to historic properties. City Light has provided work schedules in the Properties with Traditional Cultural Significance Study Plan which allow for survey during two drawdown periods and outlined report deadlines to fit within the overall ILP schedule. Additionally, City Light will work with the Nlaka’pamux Nation Tribal Council to confirm a research design considering the methods provided in NNTC-01 Completion of TCP Survey for work with the Nlaka’pamux Nation Tribal Council community during implementation of Step 2 of City Light’s Properties with Traditional Cultural Significance Study. Further, City Light agrees to work with the Nlaka’pamux Nation Tribal Council and NPS on cross-agency coordination for the purpose of reducing threats to resources through trainings and best management strategies and planning potential management plans or agreements, as needed.

Finally, City Light’s APE does not include areas within Canada. Although Project operations potentially could affect cultural resources in Canada (e.g., fluctuation of Ross Lake water surface elevations), cultural sites in Canada are not eligible for listing in the NRHP (54 U.S.C. § 302102 [requiring the NRHP to include “districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture”]; *id.* § 306108 [requiring consultation for “a proposed Federal or federally assisted undertaking in any State”]). The undertaking, in this instance, is FERC’s relicensing of the Project, which is located entirely in the United States, in the State of Washington. City Light will, however, be evaluating whether FERC’s

relicensing of the Project affects any properties in Canada that are formally listed on either the World Heritage List or the Canadian Register of Historic Places.

City Light supports the Nlaka'pamux Nation Tribal Council's concept of developing a training program by relying on the expertise of elders and creating videos. However, implementation of a training program is not appropriate as a relicensing study. Instead, City Light is in the process of developing a cultural resource awareness training program and commits to working collaboratively with the Nlaka'pamux Nation Tribal Council and other Indian tribes and First Nations to develop this training content.

### **6.2.2 Evaluation of Sites**

The Nlaka'pamux Nation Tribal Council submitted a study request to evaluate all identified Nlaka'pamux Nation Tribal Council's cultural sites for eligibility for the NRHP based upon the information and experience of Nlaka'pamux Nation Tribal Council elders and shamans (NNTC-02 Evaluation of Sites). These members of the Nlaka'pamux Nation Tribal Council would provide their expertise to assess which of the traditional cultural places may be eligible for the National Register of Historic Places.

NNTC-02 Evaluation of Sites meets most of the FERC Study Criteria. However, it does not demonstrate nexus between Project operations and effects on the resources to be studied (18 CFR § 5.9(b)(5)) outside of the APE. Accordingly, City Light proposes to adopt a portion of this study request where nexus with Project operations is demonstrated. Specifically, City Light incorporates the study request where it falls within the APE and will complete it as part of CR-04 Inventory of Historic Properties with Traditional Cultural Significance (Properties with Traditional Cultural Significance Study), which states that should Project-related effects be identified outside the APE, the APE will be expanded to incorporate those areas. Of note and as stated in the Properties with Traditional Cultural Significance Study Plan, City Light understands and supports Indian tribes' and First Nations' efforts to provide context for locations of traditional cultural importance. City Light will review and assess any such contextual information shared by Indian tribes or First Nations up to one mile beyond the APE as part of the scope of the Inventory of Historic Properties with Traditional Cultural Significance. Such reviews will aid in evaluation of potential visual and acoustic effects to historic properties. While City Light's APE does not extend into Canada (see Section 6.2.1), City Light will be evaluating whether FERC's relicensing of the Project affects any properties in Canada that are formally listed on either the World Heritage List or the Canadian Register of Historic Places.

### **6.2.3 TCP Mitigation and Management**

The Nlaka'pamux Nation Tribal Council submitted a study request proposing a comprehensive examination of all management practices that may be damaging to traditional cultural properties, including activities associated with relicensing studies, ongoing hydroelectric operations, erosion related to the reservoir and its annual drawdown, recreation practices in the RLNRA, and NPS management and maintenance (NNTC-04 TCP Mitigation and Management). This study request states that City Light should complete a management plan identifying these effects cooperatively with NPS, and with full participation from the Nlaka'pamux Nation Tribal Council. The study request states that Nlaka'pamux Nation Tribal Council cultural sites are being damaged by trail clearing and maintenance, construction, disturbance of trees or rocks; human activities associated

with recreation trails, boat docks, and other recreation amenities; environmental survey practices; and erosion associated with landscape modifications and the annual reservoir drawdown.

NNTC-04 TCP Mitigation and Management does not meet a majority of the FERC Study Criteria. It does not provide clear goals and objectives of the study, a study methodology, or level of effort and cost (18 CFR §§ 5.9(b)(1), (6), and (7)). Although NNTC-04 suggests nexus between Project operations and effects on the resources, it does not demonstrate nexus between Project operations and effects on the resources/locations to be studied (18 CFR § 5.9(b)(5)). Accordingly, City Light proposes to adopt a portion of this study request where nexus with Project operations is demonstrated as part of its CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study). The Properties with Traditional Cultural Significance Study will identify Project effects on cultural sites in the APE. These effects will be managed under a management plan for the new license. City Light agrees to work collaboratively with the Nlaka'pamux Nation Tribal Council and NPS on cross-agency coordination for the purpose of managing Project effects on Nlaka'pamux Nation Tribal Council cultural sites. It is City Light's understanding that the NPS would be the lead on NPS-managed lands and perceived threats to cultural resources outside the APE.

#### **6.2.4 Cultural Resources Transmission Line Study**

The Sauk-Suiattle Indian Tribe submitted a study request for completing a cultural resources survey of the entirety of the Project transmission line ROWs, including a 250-foot buffer to either side of the Project transmission lines (SSIT-04 Cultural Resources Transmission Line Study). The study request states that the Sauk-Suiattle Indian Tribe's qualified staff members, in cooperation with other tribal entities, if they chose to participate, would conduct this survey. In a follow up meeting on October 28, 2020, City Light confirmed that this study would include survey of places of traditional cultural importance and archaeological resources.

SSIT-04 Cultural Resources Transmission Line Study does not meet a majority of the FERC Study Criteria. While the Sauk-Suiattle Indian Tribe provided some details in its PSP comments on the goals and objectives of the study, the study request does not provide a study methodology or level of effort and cost, and does not demonstrate nexus between Project operations and effects on the resources/locations to be studied (18 CFR §§ 5.9(b)(5), (6), and (7)). City Light proposes to adopt a portion of this study request under the CR-02 Cultural Resources Survey and CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study).

City Light has amended its proposed Cultural Resources Survey in response to comments provided by LPs following submittal of the PSP. The Cultural Resources Survey has been revised to include cultural resources reconnaissance level survey (i.e., pedestrian survey only) along the entire Project transmission line APE corridor (excluding areas that are too steep or too vegetated to safely survey or are inundated, and excluding areas where City Light does not conduct any activities [i.e., areas where the transmission line spans rivers or ravines]). During the reconnaissance level survey, locations suitable for subsequent intensive level survey (i.e., shovel probing) will be identified. The intensive level survey will be completed along the transmission line APE corridor within the APE where Project-related effects are occurring, or are likely to occur, and as time allows during the study period. In particular, intensive level survey would focus on locations of proposed or anticipated Project-related activities, such as road repairs or anticipated transmission line tower



relocations. If intensive level survey is unable to be completed during the study period, in these targeted areas, further intensive level survey will be provided for in the HPMP. City Light anticipates a HPMP being developed and implemented under a PA to conclude the NHPA Section 106 process for the FERC relicensing. The HPMP will be the mechanism under the new FERC license for considering potential Project-related effects to historic properties.

Implementation of the Cultural Resources Survey will include inviting Indian tribes and First Nation representatives to participate in field survey efforts, however, City Light intends to contract directly with an independent cultural resources management consultant to coordinate and execute this work.

This study request is also partially adopted under the Properties with Traditional Cultural Significance Study. City Light's approach to this study is to consult and engage with Indian tribes and First Nations and work with each group that wants to participate to develop the detailed approaches, methods, and sensitivities required by each individual group. This approach is taken in order to (1) respect Indian tribal and First Nation knowledge sovereignty; (2) honor the requirements of 36 CFR § 800.4(c)(1); and (3) apply the guidance of NR Bulletin 38 as well as incorporate confidentiality protocols designed in coordination with the communities who participate. As such, while SSIT-04 Cultural Resources Transmission Line Study was focused on conducting research and field survey themselves and had concerns about confidentiality of sensitive information, City Light believes that the same opportunities and protections are afforded in the Cultural Resources Survey and Properties with Traditional Cultural Significance Study.

### **6.2.5 Cultural Resources Battle Site Study**

The Sauk-Suiattle Indian Tribe submitted a study request to determine and commemorate the location of the currently submerged XIXc battle site (SSIT-05 Cultural Resources Battle Site Study). The site is reportedly at Diablo Lake and according to the historical account, marks the battlegrounds between the people of the Sauk-Suiattle Indian Tribe, Upper Skagit Indian Tribe, and Nlaka'pamux Nation Tribal Council.

SSIT-05 Cultural Resources Battle Site Study does not meet a majority of the FERC Study Criteria. It does not provide clear goals and objectives of the study, a study methodology, level of effort or cost, and does not demonstrate nexus between Project operations and effects on the resources/locations to be studied (18 CFR §§ 5.9(b)(1), (5), (6), and (7)). City Light proposes to incorporate the study request where it falls within the APE and will complete it as part of the CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study). The Properties with Traditional Cultural Significance Study includes an inventory of properties with traditional cultural significance that are within, intersect, or encompass the APE. Of note and as stated in the Properties with Traditional Cultural Significance Study Plan, City Light understands and supports Indian tribes' and First Nations' efforts to provide context for locations of traditional cultural importance. City Light will review and assess any such contextual information shared by Indian tribes or First Nations up to one mile beyond the APE as part of the scope of the Inventory of Historic Properties with Traditional Cultural Significance Study. Such reviews will aid in evaluation of potential visual and acoustic effects to historic properties. This study is designed to identify and document places like the battle site referenced in the study request. Though any physical remnants of the battle site may not be discoverable, the importance of the location and significance of it to the Sauk-Suiattle Indian Tribe

can be documented during the Properties with Traditional Cultural Significance Study. Additional management measures for the history of this place can also be considered under the HPMP that City Light anticipates being developed and implemented under a PA to conclude the NHPA Section 106 process for the FERC relicensing. The HPMP will be the mechanism under the new FERC license for considering potential Project-related effects to historic properties.

### **6.2.6 Comprehensive Ethnographic Study**

The Stillaguamish Tribe of Indians submitted a study request for a comprehensive ethnographic study of the local mountains, including but not limited to Mt. Higgins, Mt. Whitehorse, and Round Mountain (STI-01 Comprehensive Ethnographic Study). This study is requested to fully evaluate the impact of the transmission lines on a traditional cultural landscape (TCL), which the Stillaguamish Tribe of Indians is in the process of documenting around Mt. Higgins and the town of Darrington.

STI-01 Comprehensive Ethnographic Study proposes the documentation and evaluation of resources with traditional cultural significance, which is already being conducted under the CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study). The study request does not meet a majority of the FERC Study Criteria. It does not provide clear goals and objectives of the study, a study methodology, or level of effort and cost, and does not demonstrate nexus between Project operations and effects on the resources/locations to be studied (18 CFR §§ 5.9(b)(1), (5), (6), and (7)). Accordingly, City Light proposes to adopt a portion of this study request where nexus with Project operations is demonstrated. Specifically, City Light incorporates the study request where it falls within the APE and will complete it as part of the Properties with Traditional Cultural Significance Study. Of note and as stated in the Properties with Traditional Cultural Significance Study Plan, City Light understands and supports Indian tribes' and First Nations' efforts to provide context for locations of traditional cultural importance. City Light will review and assess any such contextual information shared by Indian tribes or First Nations up to one mile beyond the APE as part of the scope of the Inventory of Historic Properties with Traditional Cultural Significance. Such reviews will aid in evaluation of potential visual and acoustic effects to historic properties. The Properties with Traditional Cultural Significance Study allows for collaborative development of a research design to identify areas and places important to the Stillaguamish Indian Tribe that are within the APE.

### **6.2.7 Historic Properties Study**

The Stillaguamish Tribe of Indians submitted a study request for documentation of tribal-affiliated houses in the town of Oso while they are still standing (STI-02 Historic Properties Study). The town of Oso is located less than a mile to the north of the Project transmission line ROW and the APE. In the town, there are many small (1 room) houses that were initially constructed for logging workers but became tribal housing over time. Many of these houses are no longer in existence, but a few remain.

STI-02 Historic Properties Study proposes the documentation and evaluation of archaeological and historic built environment resources, which will be done in City Light's proposed CR-02 Cultural Resources Survey for resources within the APE. The study request does not meet a majority of the FERC Study Criteria. It does not provide clear goals and objectives of the study, a

study methodology, level of effort or cost, and does not demonstrate nexus between Project operations and effects on the resources/locations to be studied (18 CFR §§ 5.9(b)(1), (5), (6), and (7)). However, City Light has proposed to incorporate the study request where it falls within the APE and will complete it as part of the Cultural Resources Survey. City Light is proposing to focus its study efforts where Project-related effects are occurring. If Project effects are known or anticipated at the location of the tribal houses, then they will be documented and evaluated in accordance with the Cultural Resources Survey.

### **6.2.8 Study of Specific Sites as Archaeological District**

The Stillaguamish Tribe of Indians submitted a study request for recordation of an Archaeological District consisting of previously recorded sites within the portion of Jim Creek from where it is crossed by the Project transmission line to the confluence with the South Fork Stillaguamish River (STI-03 Study of Specific Sites as Archaeological District). As noted in the request, “SCL’s transmission lines turn south at the precontact Stillaguamish village of Sk’balco, down the South Fork Stillaguamish in an area known as Achalitch.” According to the study request, this stretch of Jim Creek contains a concentration of unique and important archaeological resources, several of which buffer or intersect the APE for the relicensing, where the APE follows City Light’s transmission line.

STI-03 Study of Specific Sites as Archaeological District proposes the documentation and evaluation of archaeological resources, which is proposed in CR-02 Cultural Resources Survey for resources within the APE. The study request does not meet a majority of the FERC Study Criteria. It does not provide clear goals and objectives of the study, a study methodology, level of effort or cost, and does not demonstrate nexus between Project operations and effects on the resources/locations to be studied (18 CFR §§ 5.9(b)(1), (5), (6), and (7)). However, City Light proposes to incorporate the study request where it falls within the APE and will complete it as part of the Cultural Resources Survey. City Light is proposing to focus its study efforts where Project-related effects are occurring. If Project effects are known or anticipated in the locations of the sites/district along Jim Creek in the APE, then these resources will be documented and evaluated in accordance with the Cultural Resources Survey methodology.

### **6.2.9 Water Quality Monitoring**

Six LPs submitted study requests related to water quality: Ecology-01 Water Quality Study, NMFS-01 Water Quality, NPS-02 Skagit Project Water Quality Assessment and Modeling, USFWS-03 Skagit Project Water Quality Assessment and Modeling, USIT-07 Water Quality Impacts above and below SCL Project Infrastructure, WDFW-17 Water Quality Impacts above and below SCL Project Infrastructure. In response, City Light has adopted the LPs’ study requests, with modifications, as part of its FA-01 Water Quality Monitoring Study (WQ Monitoring Study) Plan.

#### **6.2.9.1 Water Quality Monitoring Parameters and Duration**

In response to comments on the PSP, and through consultation with LPs, the WQ Monitoring Study Plan has been revised to include a two-year sampling program for water quality parameters. City Light’s WQ Monitoring Study Plan has also been revised to include additional monitoring sites. Modifications include: (1) an additional monitoring site in the Skagit River upstream of Ross Lake; (2) turbidity and TSS monitoring at the mouths of select tributaries in Ross and Diablo lakes

and at transects in Ross Lake adjacent to areas of shoreline erosion during periods of reservoir drawdown; (3) an additional sampling site in the Gorge Bypass Reach; (4) fecal coliform monitoring in Diablo Lake; and (5) additional temperature and benthic macroinvertebrate monitoring sites below Gorge Dam (downstream to just below the Baker River) and in the Lower Sauk River.<sup>13</sup> Data derived from the proposed sampling plan, in combination with extensive existing data (as summarized in Section 2.3 of City Light’s WQ Monitoring Study Plan), will be used to assess Project effects. Existing water quality data will be reviewed for quality, summarized, and analyzed in the ISR.

#### 6.2.9.2 Water Quality Monitoring in the Gorge Bypass Reach

In its comments on the PSP, Ecology requested that water quality monitoring be conducted at four locations in the Gorge bypass reach, rather than the two sites proposed by City Light. City Light has partially adopted this request in its revised WQ Monitoring Study Plan to monitor parameters at three locations (near Gorge Dam, near the midpoint of the bypass, and just upstream of Gorge Powerhouse) in the Gorge bypass reach for two years. City Light believes that three locations will be sufficient to detect trends in the 2.5-mile-long bypass reach. Continuous monitoring for two years in the bypass reach will allow for measurement of conditions during a range of flows, including any spills released at Gorge Dam as part of Project operations and during controlled flow releases from Gorge Dam of about 50, 500, and 1,200 cfs (i.e., flow releases for the development of the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study as described in Section 6.2.11 of this RSP), subject to discussions with LPs.

#### 6.2.9.3 Water Quality Modeling

The six LPs who filed water quality study requests asked for some form of water quality modeling, mostly with the use of the CE-QUAL-W2 model. LPs are concerned that the temperature of water withdrawn through the deep intake in Ross Lake may be adversely affecting fisheries resources downstream of the Project, i.e., having “sub-lethal” effects in the form of reduced productivity or influences on the timing of life-history events. City Light believes that any potential temperature effects on fish can be evaluated based on abundant existing information and that a water quality model is not necessary. City Light has continuously measured temperature (or funded temperature measurement) for many years in tributaries to the reservoirs and more recently in tributaries flowing into the Skagit River downstream of the Project. NPS has also collected temperature data in tributaries to Project reservoirs. As part of the WQ Monitoring Study, City Light will assess all reliable existing data to evaluate thermal regimes above and below the Project. Temperature data will be evaluated in tandem with abundant fish-related information, including size-at-age data and data pertaining to the timing of life-history events. These data will form the basis of an assessment of potential sublethal effects on fish downstream of the Project. In light of this alternative approach, City Light does not believe a costly CE-QUAL-W2 model is necessary to inform license requirements.

#### 6.2.9.4 Potential Effects of Toxic Compounds on Water Quality

The six LPs who filed water quality study requests identified concerns about the potential effects of toxic compounds, particularly heavy metals, on biota in the Project vicinity. The study requests

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<sup>13</sup> Please see FA-01 WQ Monitoring Study Plan appended to this RSP for a full list of parameters to be measured or sampled.

do not explain the need for additional information or demonstrate nexus between Project operations and effects on the resources to be studied (18 CFR §§ 5.9(b)(4) and (7)). Existing information shows that there are no issues of concern associated with bioaccumulation of metals or other toxic substances in the Project reservoirs. Ecology stated in its study request that it is open to “utilizing existing credible fish tissue studies.” Seiders and Deligeannis (2018) reported on contaminant concentrations in fish tissue collected in Ross Lake as part of Ecology’s Freshwater Fish Contaminant Monitoring Program. The authors state that contaminant concentrations are low in fish from Ross Lake, with concentrations of metals in fish tissue similar to those found across Washington State. Seiders and Deligeannis (2018) state that previous analyses of Bull and Rainbow trout tissue collected from Ross Lake (in 2007 and 2012) showed that polychlorinated biphenyls (PCB), 4,4’- dichlorodiphenyldichloroethylene (DDE), polybrominated diphenyl ethers (PBDE), and polychlorinated dibenzodioxins/ dibenzofurans (PCDD/F) were present at low levels, and concentrations of chromium, copper, selenium, and zinc were detected at levels typically seen in fish fillet tissues across Washington (Seiders and Deligeannis, 2009; Seiders et al., 2014, as cited in Seiders and Deligeannis 2018). Seiders and Deligeannis (2018) reported that 2015 results show that contaminant concentrations in Ross Lake remained low. The 2015 results were derived from tissue taken from 70 Rainbow Trout and native char collected by the NPS, which were analyzed for chlorinated pesticides, PCBs, PBDEs, and metals. Concentrations of chlorinated pesticides and PCBs were low “and comparable to levels seen in waterbodies deemed to have little apparent human impact (Johnson et al, 2010, 2013, as cited in Seiders and Deligeannis 2018).” Also, the current Environmental Protection Agency (EPA) water quality assessment for Water Resource Inventory Area (WRIA) 4 (Upper Skagit) includes 2014 category listings for toxic substances (based on fish tissue data) in Ross Lake. Ecology assigned a Category 1 (i.e., “water quality criteria are being met”) value to all evaluated toxins; Ecology’s website states “Fish tissue data from the most recent year showed that the [fish tissue equivalent concentration] FTEC was met; therefore the Assessment Unit [i.e., Ross Lake] meets the requirements for a Category 1 determination.”

In addition to the findings outlined above, City Light is working with USGS to acquire data being collected in the Skagit River near the US-Canada border (data collected by USGS, Washington Water Science Center). Samples for dissolved and whole metals are being collected periodically, and Rainbow Trout liver and fillet metals data are collected annually. City Light will incorporate information from the USGS study into its analysis of existing information.

#### 6.2.9.5 Assessment of Productive Potential in the Gorge Bypass Reach

Ecology, NPS, USFWS, Upper Skagit Indian Tribe, and WDFW requested assessment of productive potential in the Gorge bypass reach. The bypass reach, as noted by Ecology, is currently largely dewatered, and watered areas consist mainly of slow-water habitats. Productivity throughout much of the bypass reach is undoubtedly impaired compared to a free-flowing reach. Assessment of productivity in the bypass reach would yield better information after decisions are made about future flow releases. City Light proposes to address portions of the study requests related to fish habitat suitability in the Gorge bypass reach with the proposed bypass reach modeling study (i.e., the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study Plan) as described in Section 6.2.11 of this RSP.

#### 6.2.9.6 Assessment of Nutrient Dynamics in and downstream of Project Reservoirs

Related to studies of productivity, all LPs that submitted water quality study requests asked that City Light assess nutrient dynamics in and downstream of Project reservoirs. These study requests do not explain the proposed study methodology or the need for additional information, describe considerations of level of effort and cost, or demonstrate nexus between Project operations and effects on the resources to be studied (18 CFR §§ 5.9(b)(4), (5), (6), and (7)). Ross Lake and the downstream Project reservoirs constitute an oligotrophic system, and measurements reveal low concentrations of nutrients. These conditions are the result of nutrient-poor inflows, which are a characteristic of ambient conditions and do not constitute a Project effect. Nutrient dynamics and trends, i.e., the uptake, cycling, and fates of nutrients, constitute a complex issue, one that could not be reasonably addressed within the context and timeframe of the ILP. Notwithstanding USGS data cited by LPs, tributary inflows are naturally low in nutrients and the reservoir is oligotrophic because of this. There is no evidence of an adverse Project effect on resources. Moreover, no party has provided any additional evidence of adverse Project effects on nutrients or nutrient-related influences on reservoir fish, nor is City Light aware of such evidence.<sup>14</sup> Nevertheless, the USGS, Washington Water Science Center, is periodically collecting nutrient data in the Skagit River Basin at the U.S.-Canada border, and City Light will provide a summary of these data in its WQ Monitoring Study report. Also, the ongoing Food Web Study (as described in Section 3.2.2) being conducted by USGS in the Project vicinity (City Light 2019b) will address productivity-related topics, i.e., trophic relationships in reservoirs and bioenergetics, which are linked to nutrient availability. Finally, City Light is collecting benthic macroinvertebrate data at six locations in the Skagit River between Gorge Powerhouse and just downstream of the Baker River. These data will serve as an index of productivity at these locations.

#### 6.2.9.7 Sediment Retention

Some LPs requested information on the effects of sediment retention by Project reservoirs as part of their water quality study requests. Sediment retention is addressed in Section 6.2.14 of this RSP.

#### 6.2.9.8 Evaluation of Potential PME

LPs requested identification and evaluation of potential PMEs (e.g., selective water withdrawal in the Ross Lake forebay and “temperature conditioning”). Although City Light is open to assessing a range of potential PMEs as part of the ILP, i.e., when studies are complete and potential management actions are being explored, it is too early to identify such measures at this point in the relicensing process.

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<sup>14</sup> Potential limiting factors identified by the USFWS (2015a) for the Bull Trout core population upstream of Gorge Dam include forest management practices, mining, fish passage issues, and hybridization. Nutrient levels were not identified as a limiting factor. Formal estimates of native char abundance have not been computed, but available data suggest that there are at least several thousand adult individuals of each species (Bull Trout and Dolly Varden) in Ross Lake and its tributaries (Triton 2017). Bull Trout in the Skagit River upstream of Gorge Dam (within the United States) form the Upper Skagit River Core Area. The USFWS (2015b) determined that this core area likely contains one of the most robust Bull Trout populations, with some of the most intact habitat, within the Bull Trout Coastal Recovery Unit.

### 6.2.9.9 Measurement of Parameters Downstream to the Skagit River Estuary

Some proposed study objectives included the measurement of parameters, for example benthic macroinvertebrates, downstream to the Skagit River estuary. In general, these study requests seek to more fully understand the extent of downstream influence of Project operations on salmonid resources below the Sauk River confluence and the potential for Project operations to affect salmonid fish species that may use the reach of the Skagit River extending from the Sauk River to the Skagit River delta and estuary. While none of the study requests describe why existing information is not adequate (18 CFR § 5.9(b)(4)), or demonstrate with scientific rigor a connection between Project operations and a specific resource impact (18 CFR § 5.9(b)(5)), study requests raise hypotheses that Project operations may detrimentally affect conditions in the lower river and estuary related to water quality, habitat availability, food availability, wood and sediment transport, riparian and floodplain conditions, and other factors that may impact the life stages of salmonid species using the lower river and the estuary.

In response to these study requests, City Light's RSP includes modifications to the WQ Monitoring Study Plan to include additional measurement locations for temperature and benthic macroinvertebrates in the lower Sauk River and below the Project to just below the Baker River confluence. In addition, City Light proposes a new study, SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River (Synthesis Study), as part of its RSP to develop a comprehensive data synthesis of existing information focused on the reach downstream of the Sauk River confluence to the estuary. This study proposes to: (1) compile, analyze, and summarize relevant available information about the condition of and primary factors affecting life stages of anadromous fish resources in the reach of river extending from the Sauk River confluence to the Skagit River delta and estuary; (2) identify the Project's potential contribution to those factors affecting life stages of anadromous fish resources and identify data gaps related to the evaluation of the Project's effects; and (3) propose studies to be conducted during the second year of study to address those data gaps, if necessary. Regarding, for example, benthic macroinvertebrates, a substantial body of studies and literature exists that will provide useful information on such parameters (e.g., Davis et al. 2020; Gamble et al. 2018; Lowery and Beauchamp 2015; and Thompson and Beauchamp 2016). By compiling and analyzing the large body of scientific studies relevant to anadromous fish resources in the Skagit River below the Sauk River, extending to the delta and estuary, evidence of specific impacts and/or significant data gaps may be identified that may require additional study. The Synthesis Study Plan is appended to this RSP.

### 6.2.10 Fish Passage

LP study requests related to fish passage fall into three related categories: (1) feasibility analysis of anadromous and resident fish passage facilities (NMFS-04 Feasibility Analysis of Fish Passage, NPS-01 Feasibility Analysis of Anadromous and Resident Fish Passage, USFWS-01 Feasibility Analysis of Fish Passage at the Skagit River Hydroelectric Project, USIT-01 Feasibility Analysis of Fish Passage at the Skagit River Hydroelectric Project, and WDFW-02 Feasibility Analysis of Fish Passage at the Skagit River Hydroelectric Project); (2) evaluating fish habitat and potential fish productivity upstream of Gorge Dam, with emphasis on ESA-listed salmonids (NMFS-03 Quantifying Habitat and Production Potential of Chinook and Coho Salmon and Steelhead above Ross Dam, NPS-08 Quantifying the Productivity Potential of Reservoir Tributary Habitat, USFWS-02 Quantifying the Habitat and Production Potential of ESA-Listed Salmon, Steelhead,

and Bull Trout above Dams, USIT-02 Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon, and Sockeye Salmon above Gorge Dam, and WDFW-03 Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon, and Sockeye Salmon above Gorge Dam); and (3) assessment of potential upstream fish passage barriers in the Gorge bypass reach (WDFW-01 Evaluation of Fish Barriers and Fish Species in the Bypass Reach).

In the PSP, City Light proposed to adopt the LPs' study requests, with modifications, by implementing the FA-04 Fish Passage Technical Studies Program (Fish Passage Study). The PSP proposed a phased approach to assessing the feasibility of providing upstream and downstream fish passage at Gorge Dam and as appropriate, assessing habitat and production potential only in Gorge Lake and associated tributaries. A number of LPs filed comments expressing the importance of analyzing fish passage feasibility at all three Project dams and evaluating habitat and production potential at select tributaries to all three reservoirs. In response to these concerns and in recognition of the importance of the issue to both City Light and LPs, City Light has expanded the Fish Passage Study in this RSP to undertake an investigation of upstream and downstream fish passage feasibility at all Skagit Project dams, as described below. City Light has also developed a new FA-07 Reservoir Tributary Habitat Assessment included in this RSP to address requests made by LPs regarding habitat and production potential upstream of Gorge Dam.

#### 6.2.10.1 Feasibility Analysis of Fish Passage Facilities

City Light has amended its proposed Fish Passage Study in response to comments provided by LPs following submittal of the PSP. The Fish Passage Study, while continuing to include the PSP's assessment of the bypass reach as a potential barrier to adult migratory fish species (as requested by WDFW) and the investigation of upstream and downstream fish passage at Gorge Dam, is expanded to include the development and study of fish passage alternatives at Diablo and Ross dams. The Fish Passage Study has also been amended to remove any phasing of study activities. In Year 1, City Light will conduct both the barrier assessment/hydraulic model work and the first year of the fish passage investigations at all three dams. The Fish Passage Study Plan, as contained in the PSP, included the evaluation of habitat suitability for the target species upstream of Gorge Dam but only within Gorge Lake and associated tributaries; that is, Stetattle Creek, Gorge Creek, and Gorge Lake. With the expansion of the Fish Passage Study scope to incorporate Diablo and Ross dams, the study of tributary habitat suitability has also significantly expanded to include Thunder Creek upstream of Diablo Dam, eight streams that enter into Ross Lake, as well as the mainstem Skagit River in Canada. For the RSP, the scope of the tributary habitat assessment is now described in the Reservoir Tributary Habitat Assessment Study Plan. The purpose and scope of the revised Fish Passage Study is summarized below, and the full study plan is appended to this RSP.

The purpose of the Fish Passage Study is to investigate biological, physical, operational, and engineering factors involved when considering the potential to provide safe, timely and effective fish passage at any or all of the Project developments. To promote collaboration on all aspects of the fish passage assessment, the study plan envisions a stepwise approach supplemented by a series of Technical Workshops throughout the study, as described in the study plan. Five target species have been provisionally identified for evaluation: Steelhead; Chinook, Coho, and Sockeye salmon; and Bull Trout. Consideration may also be given to other species, if determined in collaboration



with fish management agencies and Indian tribes at Workshop 1 meeting to be held at the beginning of the study. The Fish Passage Study will include the development of concept-level upstream and downstream passage strategies that may involve alternatives at each development and/or for the system of all three developments as a whole. Planning-level concepts will consider both volitional (non-directive) and directive passage strategies where applicable. Upstream and downstream passage concepts will be configured to accommodate unique physical, operational, and biological constraints exhibited through the existing facilities and overall Project reach. All concepts will be developed consistent with the engineering principles, criteria, and guidelines contained in NMFS (2011), WDFW (2000a, 2000b), and Bell (1991), to the extent practicable. Other factors affecting technical feasibility, Project modifications, and/or biological limitations of each alternative will be identified. Upon completion of concept-level fish passage facility options, planning level opinions of probable construction cost will be completed consistent with the AACE Cost Estimate Classification System, Class 5 standardized guidelines (AACE 2003). The fish passage evaluations included in the study will proceed through a sequence of steps from Fish Passage Conceptual Design Criteria development, Fish Passage Concept Development, and Final Fish Passage Assessment. A collaborative program is envisioned, supported by a series of workshops, agreement at each step, and use of an independent Expert Panel. City Light also has agreed to coordinate with NMFS on the study and embed a NMFS fish passage engineer into the study team. The study will include and be supplemented by a robust assessment of factors affecting and the performance of similar fish passage facilities in place at other high-head dams in the Pacific Northwest.

Results from the Fish Passage Study will be integrated with results from the Reservoir Tributary Habitat Assessment and other studies conducted during relicensing to assess the overall benefits, risks and constraints of providing fish passage and access to riverine and reservoir habitats upstream of the Project dams, consistent with the approach recommended in Anderson et al. (2014). The results of the Fish Passage Study and/or the Reservoir Tributary Habitat Assessment may include the identification of next steps or additional studies that may be warranted to further evaluate the feasibility of providing safe, timely and effective fish passage (e.g., reservoir transit and predation) and to address the metapopulation sink/source concerns raised in Anderson et al. (2014).

#### 6.2.10.2 Evaluating Fish Habitat and Potential Fish Productivity Upstream of Gorge Dam

NMFS, NPS, USFWS, Upper Skagit Indian Tribe, and WDFW all requested studies aimed at evaluating fish habitat and potential fish productivity upstream of Gorge Dam. While City Light does not believe that study requests for collection of fish habitat and productivity data in tributaries upstream of the Project Boundary (i.e., outside the influence of the Project's effects) meet FERC Study Criteria, in light of the importance of this information to LPs, City Light proposes to conduct the Reservoir Tributary Habitat Assessment in support of these requests. The Reservoir Tributary Habitat Assessment will map the extent of potential spawning and rearing habitat for Chinook Salmon, Coho Salmon, Sockeye Salmon, and steelhead within tributaries to the Project reservoirs, use physical habitat variables to estimate juvenile production potential, and refine productivity estimates using bioenergetics data derived from the Food Web Study (as described in section 3.2.2). Study results will provide a foundation for potential subsequent studies needed to assess the feasibility of fish passage, such as life cycle/population modeling, evaluation of predation risk,

and assessment of genetic consequences. Please see the Reservoir Tributary Habitat Assessment Study Plan appended to this RSP for more details.

### 6.2.10.3 Assessment of Barriers in the Gorge Bypass Reach

WDFW requested an evaluation be conducted of fish barriers in the Gorge bypass reach. As part of its comments on the PSP, WDFW revised this study request to include an evaluation of which anadromous and resident fish species use different parts of the bypass reach in order to better identify the range of flows for study in the bypass reach. WDFW identified six objectives, which City Light is addressing as described below. WDFW's Objectives 1, 3, and 5 are concerned with the fish species to be evaluated with the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study. As part of the proposed modeling workshops, City Light will collaborate with LPs regarding the species and life-stages to be modeled. All available information on fish use of the bypass reach will be considered when deciding on species' HSC to be used in the modeling. City Light is not proposing limits to the number of species/life-stages to be considered. WDFW's Objectives 2 and 6 are requests relating to the assessment of habitat availability in the bypass reach. WDFW proposes that the bypass reach be divided into four segments for analysis to ensure that conditions are simulated throughout the bypass reach. City Light's proposed transect placement (i.e., transects used to construct and calibrate the model) will represent conditions throughout the reach, and results of the 2-D model will provide a map of habitat suitability, by species and life-stage, through the entire reach under alternative flow scenarios. WDFW's Objective 4 requests that City Light identify the "flow windows needed [by anadromous fish species] to pass" partial barriers in the bypass reach. City Light's proposed Fish Passage Study includes an assessment of the extent to which channel features in the bypass reach constitute barriers to upstream fish passage and the hydraulic modeling to identify the flow ranges under which target fish species may potentially pass the barriers.

### 6.2.11 Instream Flow Study

Ecology submitted a request for an Instream Flow Study (Ecology-02), which City Light is adopting with modifications.

City Light is proposing two study plans that together will provide for the development of instream flow models needed to assess relationships between flow and fish habitat downstream of Gorge Dam: (1) the FA-02 Instream Flow Model Development Study Plan, which addresses the reach of the Skagit River between the Gorge Powerhouse and the Sauk River confluence; and (2) the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development (Bypass Instream Flow Model Development) Study Plan, which addresses conditions between Gorge Dam and Gorge Powerhouse. To assess relationships between fish habitat and flow, City Light proposes to develop, in consultation with LPs, HSC for each of the fish species and associated life stages to be addressed by the models.

Several study requests included elements that are closely associated with City Light's Instream Flow Models being developed as part of the Instream Flow Model Development Study and Bypass Instream Flow Model Development Study. These elements are addressed in sections 6.2.9 Water Quality Monitoring, 6.2.10 Fish Passage, 6.2.13 Instream Large Wood, 6.2.14 Sediment Budget and Sediment Transport Modeling, 6.2.15 Process Flows, and 6.2.16 Potential Floodplain Connectivity of Off-Channel Aquatic Habitat.

Together, these two modeling study plans address the objectives identified by Ecology in its study request, with two exceptions. Ecology requests that City Light “Determine the extent of anadromy of various fish species in the basin ‘identified by the Instream Flow Subcommittee.’” Ecology has not demonstrated the need for additional information on this issue (18 CFR § 5.9(b)(4)). City Light has been monitoring anadromous fish species’ use of the upper Skagit River over decades and, as evidenced by the large number of citations provided in the various study requests put forward by LPs, the use of different reaches of the Skagit River by anadromous species is well documented. City Light believes that available information on the historical extent of anadromy is adequate for determining which species’ habitat should be modeled below and above partial fish passage barriers in the Gorge bypass reach. The ability of anadromous fish to ascend the Gorge bypass reach will be investigated as part of City Light’s Bypass Instream Flow Model Development Study Plan and FA-04 Fish Passage Technical Studies Program Study Plan. As part of implementation of the instream flow studies in 2021, LP workshops are included in the study plan to allow City Light to work with LPs to develop the models. The workshops will both apprise LPs of the status of the work and solicit input and feedback from the LPs. Workshop topics will include details of model development (such as model resolution, model geometry and model boundary conditions), model calibration, development of biological and aquatic habitat data, and integration with hydraulic model results to develop flow-habitat relationships. City Light believes coordination with LPs in preparation of the Instream Flow Model Development Study Plan regarding flow-habitat modeling has been productive. In addition to the workshops, City Light is proposing additional technical engagements, as outlined in the study plans.

Ecology requests that City Light “Conduct a hydrologic and stage analysis on process flows associated with natural (unmanaged) functioning of the Skagit River system for habitat maintenance, sediment transport, woody debris transport, side channel and riparian wetland connection, and groundwater recharge.” Please see Section 6.2.15 for City Light’s response on Process Flows. City Light’s Operations Model (OM-01 Operations Model Study) will be capable of evaluating the hydrologic effects of such an alternative, or any other alternative involving defined geomorphic process flows. In addition, City Light has revised GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study Plan to further investigate flows that result in sustaining geomorphic processes, included flows that mobilize deposits at tributary mouths along the mainstem Skagit River, mobilize river bed and bars, erode river banks and result in channel migration, instigate side channel development/maintenance, and hydraulically connect side channel and off-channel habitat. City Light proposes to use the IHA software package to identify initial concepts to investigate the timing and duration of high flow events under unmanaged conditions that may inform the development of potential process flow scenarios. Ecology also states that City Light should “Determine the flows suitable for recreation...” Like process flows, recreation flows in the Skagit River downstream of the Project can be evaluated using outputs of the instream flow model and existing information on recreation uses in the lower River (see Section 6.1.4 of this RSP in response to recreation flows and City Light’s proposed RA-05 Lower Skagit River Recreation Flow Study Plan).

### **6.2.12 Reservoir Tributary Backwater Effects**

Three LPs submitted study requests related to potential backwater effects on tributaries to Project reservoirs: NPS-10 Impact of the Operation of Skagit Hydroelectric Project (#553) Backwater on Major Streams and its Influence on Habitat Quality, USFWS-09 Impact of the Operation of Skagit

Hydroelectric Project (#553) Backwater on Major Streams and its Influence on Habitat Quality, and WDFW-11 Impact of the Operation of Skagit Hydroelectric Project (#553) Backwater on Six Major Streams Tributary to Ross Lake and its Influence on Habitat Quality.

In the study requests, LPs requested information on eight tributaries entering Project reservoirs: Big Beaver, Little Beaver, Skagit River, Lightning Creek, Devils Creek, and Ruby Creek that enter Ross Lake; Thunder Creek that enters Diablo Lake; and Stetattle Creek that enters Gorge Lake. The requests consist of data gathering to obtain baseline information on the streams, modeling to determine if there are reservoir backwater effects on the tributaries, and geomorphic and habitat surveys to identify possible blockages and opportunities for mitigation or enhancement, particularly for Bull Trout.

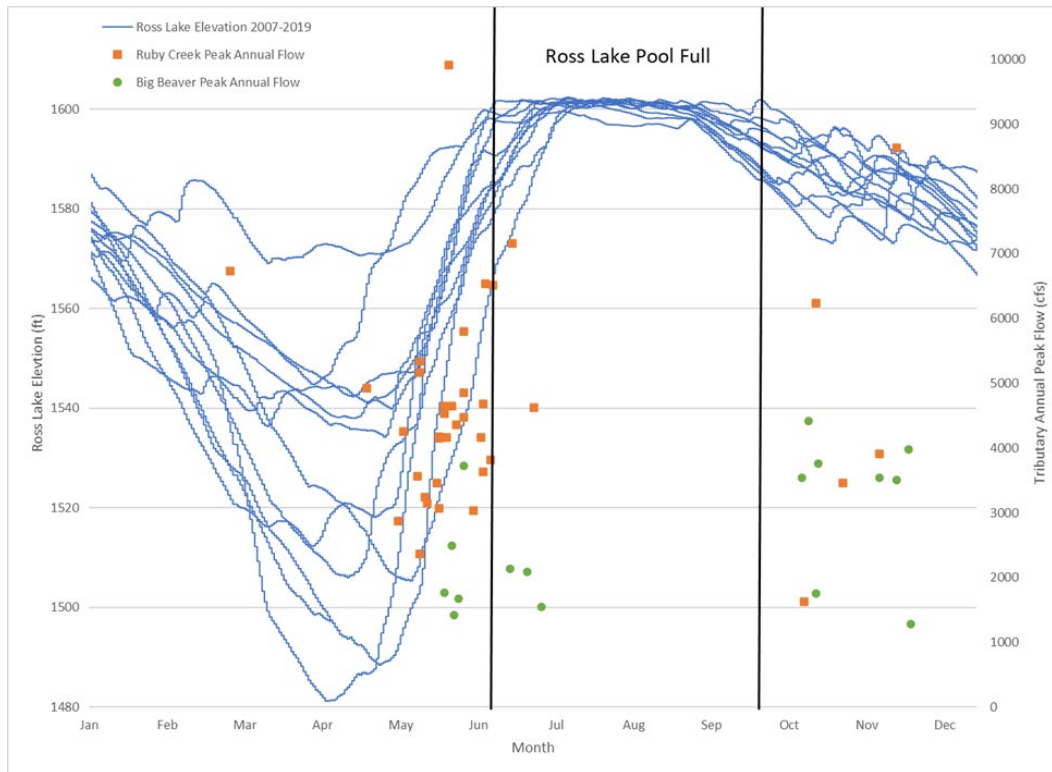
City Light is proposing to study sediment accumulations and backwater effects in three of the tributaries requested by the LPs (Skagit River where it enters Ross Lake, Thunder Creek on Diablo Lake, and Stetattle Creek on Gorge Lake) as part of the GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study (Sediment Deposition Study) because these are locations where there are known and documented effects due to deposition on recreation and/or power generation resources within the reservoir delta deposits. The Sediment Deposition Study will include collecting information on deposition within the reservoirs at the identified tributary mouths as well as surveys of the streams upstream of the reservoir to determine if and how far sediment accumulations resulting from backwater effects extend.

City Light does not propose to conduct field surveys at the remaining five tributaries (Big Beaver, Little Beaver, Lightning Creek, Devils Creek, and Ruby Creek) that enter Ross Lake as a part of the Sediment Deposition Study. These study requests do not explain the need for additional information or demonstrate nexus between Project operations and effects on the resources to be studied (18 CFR §§ 5.9(b)(4) and (5)). This is because:

- City Light surveys and corrects any sediment/wood accumulations within the reservoir drawdown zone annually, with plans to expand these surveys to spring and fall;
- The USFWS recovery plan (USFWS 2015b) states that the Upper Skagit and Lower Skagit Core Areas represent population strongholds for Bull Trout; and
- The timing of Ross Lake tributary peak flows that have the ability to transport large quantities of bedload and instream wood primarily coincides with times when Ross Lake is not at normal maximum water surface elevation (see Figure 6.2-1 for a comparison of Ross Lake elevation with available tributary peak flow timing). Since the majority of tributary peak flows occur when the reservoir level is below normal maximum water surface elevation, there are only limited opportunities for backwater effects during peak flows that could result in accumulations of wood or sediment in the tributaries upstream from Ross Lake as a result of Project operations.

As part of its existing license Transitory Barrier Removal Program, City Light performs annual surveys of all reservoir tributaries to identify and remove any accumulations of wood/sediment within the reservoir drawdown zone up to normal maximum water surface elevation. In response to comments on the PSP and additional discussions with LPs, City Light committed to expanding these surveys to both spring and fall to look for and correct any wood or sediment accumulations

and to survey upstream of normal maximum water surface elevation in seven of the eight reservoir tributaries following conditions which could result in a backwater effect. City Light will include a summary of 2021-2022 field observations during the Transitory Barrier Removal Program in the ISR and USR. Note that the Skagit River where it enters Ross Lake is the only location not included because it is within Canada and blockages due to sediment and wood deposition have not been observed at this location.



**Figure 6.2-1. Ross Lake water surface elevation (in CoSD) in relation to peak flow timing in Ruby Creek and Big Beaver.**

### 6.2.13 Instream Large Wood

Four LPs submitted five study requests related to instream large wood in the Skagit River and effects on geomorphology and aquatic habitat: NMFS-02 Geomorphology and Aquatic Habitat, USFWS-15 Geomorphology and Aquatic Habitat Complexity Study, USIT-08 Geomorphology and Anadromous Salmonid Habitat, WDFW-05 Geomorphology and Anadromous Salmonid Habitat, and WDFW-09 Wood Budget, Inventory and Assessment.

The LPs requested that City Light collect and analyze large wood and its contribution to aquatic habitat in the Skagit River downstream of Gorge Dam. They requested the following information be collected/analyzed:

- (1) Estimate wood input to the three Project reservoirs.
- (2) Inventory wood stored in Project reservoirs.

- (3) Inventory and characterize wood currently transported by City Light from the reservoirs that is placed in the Skagit River downstream from the reservoirs; determine fate of wood removed from the reservoirs.
- (4) Inventory instream wood and log jams from Gorge Dam to the Skagit River delta in Puget Sound.
- (5) Estimate wood input from tributaries downstream from Gorge Dam.
- (6) Estimate wood input from bank erosion and landslides downstream from Gorge Dam.
- (7) Assess wood transport dynamics (with 2-D hydraulic wood transport model) and changes to instream wood downstream from Gorge Dam.
- (8) Compare existing wood loading to past conditions or reference reach to identify where wood augmentation would benefit fish habitat and aquatic resources.
- (9) Assess the feasibility and potential risks of wood augmentation downstream from Gorge Dam.

City Light proposes to adopt some aspects of the LP requests to determine the current amount and distribution of instream large wood and aquatic habitat in the Skagit River between Gorge Dam and the Sauk River as part of its GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study). City Light also proposes to document current methods used to collect and transport large wood from Project reservoirs into the Skagit River downstream from the reservoirs to help determine if current methods are working or if alternative methods may be feasible and more appropriate as part of a Project wood management plan. City Light has collected information on woody debris annually in Ross Lake and Diablo Lake as part of the current wood management program and plans to include this information in the ISR and provide to LPs prior to. Therefore, sufficient information on large wood entering Ross and Diablo lakes is available to estimate recent capture rates.

The Geomorphology Study will collect information on instream large wood (single logs and log jams) using current and historical aerial photographs and a field inventory; and estimate wood input from tributaries, bank erosion, and landslides in the Skagit River between Gorge Dam and the Sauk River confluence. In addition, City Light will tag and track the movement of large wood added at the current wood augmentation location (near PRM 91) and digitize large wood identified as part of new aerial photographs (proposed for fall 2021) for comparison with 2017/18 and earlier aerials to track changes in large wood movement and loading. City Light proposed to use the large wood information, along with aquatic habitat data, sediment data, peak flow data, and fish use information to determine the best methods to enhance aquatic habitat in the Skagit River downstream from Gorge Dam. This empirical approach of in-river collection of data and observations is more likely to result in developing well-founded PME for river enhancements.

LP study requests proposing field surveys of large wood in the Skagit River downstream of the Sauk River confluence do not explain the need for this additional information or demonstrate nexus between Project operations and effects on the resources to be studied (18 CFR §§ 5.9(b)(4) and (5)). However, City Light will compile, analyze, and summarize available peer-reviewed and gray literature on factors, including large wood, influencing salmonids use of the lower Skagit River,

delta and estuary as part of SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River (Synthesis Study).

City Light does not believe that a 2-D hydraulic wood transport model is an appropriate technology to use since 2-D wood transport modeling is in the theoretical and experimental stage as shown from detailed reading of the study referenced by LPs (Ruiz-Villanueva et al. 2014). The referenced study used experimental small-scale flume data to develop a theoretical 2-D hydraulic model of wood transport based on wooden dowels in the flume and does not meet FERC criterion for generally accepted practice in the scientific community (18 CFR § 5.9(b)(6)).

#### **6.2.14 Sediment Budget and Sediment Transport Modeling**

Five LPs submitted a total of 11 study requests related to sediment in the Skagit River and effects on geomorphology and aquatic habitat: NMFS-02 Geomorphology and Aquatic Habitat, NPS-11 Impact of Operations of Skagit Hydroelectric Project (#553) on Sediment Capture Within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat, NPS-12 Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Storage, Stability and Transport on Skagit River and its Influence on Endangered Species Habitat, USFWS-11 Impact of Operations of Skagit Hydroelectric Project (#553) on Sediment Capture Within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat, USFWS-12 Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Storage, Stability and Transport on Skagit River and its Influence on Endangered Species Habitat, USFWS-13 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood, and Sediment below Gorge Dam, USFWS-15 Geomorphology and Aquatic Habitat Complexity Study; USIT-08 Geomorphology and Anadromous Salmonid Habitat, WDFW-05 Geomorphology and Anadromous Salmonid Habitat, WDFW-08 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment below Gorge Dam, and WDFW-10 Impact of Operations of Skagit Hydroelectric Project (#553) on Sediment Capture Within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat. Several of these study requests are duplicates, submitted by multiple LPs.

The LPs requested that City Light collect and analyze information on sediment input and storage and instream substrate conditions and the influence on aquatic habitat in the Skagit River downstream of Gorge Dam. They requested the following information be collected/analyzed:

- (1) Measure volume, texture and location of sediment accumulations in each reservoir and average annual sediment load into the reservoirs.
- (2) Develop a sediment budget for tributaries from Gorge Dam to the estuary.
- (3) Develop a sediment budget for bank erosion inputs using a bank migration model from Gorge Dam to the estuary.
- (4) Determine if sediment deposits at tributary junctions with the Skagit River are impeding fish passage.
- (5) Monitor suspended sediment in the Skagit River to help understand how Project-related reductions in fine sediment may be affecting anadromous salmonid habitat in the Skagit River Delta.

- (6) Use the information to develop a sediment budget for the entire Skagit River watershed.
- (7) Monitor bedload transport (volume and grain size) and sediment mobilized as a function of discharge, depth, and velocity to develop bedload rating curves at key locations including tributary junctions.
- (8) Develop and calibrate a 2-D Sediment Transport Model of the Skagit River downstream from Gorge Dam.
- (9) Monitor changes in bed elevation and bank erosion at key cross sections to develop a bank erosion model to supplement the 2-D Sediment Transport Model.
- (10) Use the model to analyze the fate of any sediment added as part of PME measures.
- (11) Assess the feasibility and potential risks of sediment augmentation downstream from Gorge Dam.
- (12) Develop a geomorphic/habitat monitoring plan.

City Light proposes to adopt some aspects of the LP requests to determine the current input of sediment and status of aquatic habitat, develop a 1-D and a 2-D Sediment Transport Models (in focus areas), make field measurements to assess fish passage at tributary junctions, and develop sediment budgets for tributaries and bank erosion in the Skagit River between Gorge Dam and the Sauk River as part of proposed study GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study). The Geomorphology Study proposes a series of workshops with LPs to work out details of methodology and select specific focus areas for more detailed study. In addition, current substrate data will be collected for the same reach of the Skagit River as part of City Light's FA-02 Instream Flow Model Development Study.

The proposed Instream Flow Model Development Study Plan will collect information on current substrate conditions in the Skagit River between Gorge Dam and the Sauk River confluence using current aerial photographs and a field inventory. The Geomorphology Study will estimate sediment input from tributaries and bank erosion in the Skagit River between Gorge Dam and the Sauk River confluence. City Light proposes to use the substrate and sediment budget information, along with aquatic habitat data, instream large wood data, peak flow data, and fish use information to determine the best methods to enhance aquatic habitat in the Skagit River downstream from Gorge Dam in a forward-looking approach to developing PMEs for the Project. This forward-looking approach will provide accurate and reliable information necessary to inform license requirements by considering current conditions of flow, large wood, and sediment input in the river, current aquatic habitat limitations, and potential ways to enhance limiting habitat. It is anticipated that part of the approach will include monitoring of geomorphic/habitat conditions to help guide enhancement measures over the course of the new license.

In comments to City Light's PSP, a number of LPs have continued to request that City Light estimate the amount of sediment accumulation that has occurred in the Project reservoirs. LPs have stated that this information is needed for two reasons: (1) to compute the current volume of the reservoir; and (2) to estimate the amount of sediment that has been captured by the reservoir and therefore not transported downstream to the Skagit River below the Project. LPs assert the first of the two requests is needed to determine if Project operations, including generation and flood control, are being impeded or otherwise affected by sediment accumulation. The second of the two



requests is said to be needed to determine the amount of sediment (e.g., spawning gravel) has been prevented from being transported downstream to replenish the coarse sediment supply to the Skagit River below the Project and fine sediment supply to the Skagit River estuary.

To address these study requests, it is important to evaluate if estimating the amount of sediment that has accumulated in Ross Lake can be accomplished with sufficient scientific rigor to be useful. Multiple methods are available to perform bathymetric surveys, including multi-beam and single-beam surveys, acoustic Doppler current profilers (ADCP), subbottom profilers, and underwater vehicles. For reservoir surveys, hydroacoustic survey methods are frequently used as described, for example, in Cross and Moore (2014). Precision levels (repeatability, reproducibility) are generally very good with such devices, but accuracy depends on a number of factors including transect spacing, depth of reservoir, and shape of reservoir. Transect spacing of 50 meters provides improved accuracy over say 100 meter or 300 meter spacing, and higher resolution in near-shore areas may be necessary for reliable estimates. Deep reservoirs with rugged and steep topography can lead to significant sources of error. Cross and Moore (2014) report accuracies of 4 to 9 percent lower than modeled volume with 300 meter transects and with and without near-shore high resolution survey, respectively. Ross Lake is 24 miles long and at 300-meter spacing would still require 127 individual transects. At 50-meters transect spacing, almost 800 transects would be required to be within 5 percent of the true reservoir volume without intense near-shore measurements, or no closer than within 70,000 acre-feet of the reservoir volume.

Developing the bathymetric surface, assuming the reservoir was at and remained at normal maximum water surface elevation for the entire survey (otherwise, additional mapping with its own precision and accuracy levels would have to be obtained of the drawdown zone) involves doing the bathymetry and then breaking down the millions of data points obtained into a reservoir surface, with adequate data checking and validation. The total cost would be no less than \$500,000 to obtain the level of accuracy discussed above.

However, this is not the end of the task. In order to answer the question of either loss of storage or quantity of accumulated storage over the life of Ross Lake (~70 years), the amount of the original storage must be known. The estimated total storage volume of Ross Lake is reported in the PAD to be approximately 1.4 million acre-feet. This volume was estimated using USGS quadrangle maps available at the time (circa 1940s) with what is believed to be a 20-ft contour interval (although 40-ft contour in remote areas were more common at the time). USGS contour maps are reported to be accurate to within half a contour (USGS Fact Sheet 171-99, Nov 1999). If the 20-ft contour interval quadrangle was used, instead of a 40-ft contour interval map, the accuracy of the reservoir volume would be +/- 140,000 acre-feet. It is worth mentioning that the pre-Project reservoir area was steep, rugged, and heavily wooded.

In June 2008, the US Army Corps of Engineers (USACE), Seattle District prepared a report entitled Skagit River Flood Damage Reduction Feasibility Study, Skagit River Basin, Sediment Budget and Fluvial Geomorphology (Skagit Sediment Report). In the report, the USACE provided estimates of the sediment yield of various subbasins in the Skagit River watershed. Applying a sediment budget methodology to estimate sediment yield for the Skagit River upstream of the Cascade River, and adjusting for glaciated area, the estimated sediment yield into Ross Lake would be about 340 cubic yards/square-mile/year. At a total watershed of 1,159 sq.mi., the estimated annual sediment yield to Ross Lake would be on the order of about 400,000 cubic yards/year. Over

70 years, the accumulated sediment would be about 17,000 acre-feet. Even if the requested new bathymetry survey was of perfect accuracy, it would take 500 years for the accumulated sediment to become within the bounds of error of the original reservoir storage estimate of 1.4 million acre-feet, and sufficiently reliable to inform the development of PME measures. The USACE (2008) report also points out a number of significant data gaps that would need to be addressed to define with reasonable accuracy the Skagit River's sediment budget. At a cost of at least \$500,000, the requested study is not justified, nor would it be at a lower cost, because of its inability to provide an estimate that could be relied upon (18 CFR § 5.9(b)(7)).

Study requests have indicated that there is a need to know the amount of sediment captured by Ross Lake because this relates directly to the loss of sediment supply, especially coarse sediment supply, to the Skagit River below Gorge Dam. The USACE report also makes it clear that the estimates of sediment yield developed in the 2008 report consider suspended sediment only, and not bedload transport. Bedload is the portion of the sediment load that contributes to anadromous fish spawning habitat and changes in such geomorphic traits as bed and bar movement and formation. Bedload is generally considered to be about 10 percent of the sediment budget (Snyder et al. 2004). In this case, that would amount to roughly 40,000 cubic yards/year at the entry to Ross Lake, an even more unreliable number than the suspended sediment yield estimate.

To estimate coarse sediment needs below the Project, City Light proposes to rely on specific measurements of coarse sediment in the Skagit River. Aside from being of much greater accuracy, reach specific coarse sediment needs in the river will be determined using precise and accurate measurement techniques as outlined in the Geomorphology Study. Furthermore, these measurements will form the basis for updating gravel/cobble reach-specific gravel losses over time and further inform long-term coarse sediment management.

Bathymetry-based estimates of sediment capture are unreliable based on the limitations identified above, and therefore would not inform the development of license requirements (18 CFR § 5.9(b)(5)). The methodology employed to measure the reservoir capture of sediment, especially bedload, fall short of the scientific rigor to be considered an acceptable practice, especially in the case of the Skagit River Project given the apparent accuracy bounds of the original volume estimates (18 CFR § 5.9(b)(6)). Direct measurements and observations of the actual river coarse sediment conditions as proposed in the Geomorphology Study have much greater reliability when developing coarse sediment augmentation needs.

### **6.2.15 Process Flows**

Six LPs submitted study requests related to analyzing process flows on the Skagit River: Ecology-02 Instream Flow Study, NMFS-02 Geomorphology and Aquatic Habitat, NPS-13 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment Below Gorge Dam, USFWS-13 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment Below Gorge Dam, USIT-08 Geomorphology and Anadromous Salmonid Habitat WDFW-05 Geomorphology and Anadromous Salmonid Habitat, and WDFW-08 Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment below Gorge Dam. Note that some of these study requests are similar.

The LPs requested that City Light determine the combination of flow releases, sediment entrainment, and large wood needed to protect, enhance, or mitigate Project impacts to aquatic habitat in the Skagit River. Some of these objectives are included in other study requests and discussed in Sections 6.2.13, 6.2.14 and 6.3.4 of this RSP. LPs requested the following related to geomorphic process flows:

- (1) Define the frequency, duration, and magnitude of Project alteration to flows for three process flow types (flushing flows, channel maintenance flows, process flows) at locations along the main channel from Gorge Dam to the estuary.
- (2) Examine the combination of flow and sediment transport to design process flows for mitigation efforts and determine how far downstream project flow alterations are effective based on experimental flow releases (initiate gravel transport, habitat and side channel effects).

In the PSP, City Light proposed to examine the current status of peak flows (duration, magnitude, timing) in the Skagit River downstream from the Project. City Light proposed to use information collected in the GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study) to understand gravel movement and depth of scour/fill in redds along with the 2-D hydraulic model (FA-02 Instream Flow Model Development Study/FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study) to examine the relationship between flow and substrate movement as part of analyses to inform license requirements to improve aquatic habitat under alternative flow, sediment, and large wood measures.

In response to comments on the PSP, City Light has revised the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan to further investigate flows that result in sustaining geomorphic processes, included flows that mobilize deposits at tributary mouths along the mainstem Skagit River, mobilize river bed and bars, erode river banks and result in channel migration, instigate side channel development/maintenance, and hydraulically connect side channel and off-channel habitat. City Light proposes to develop a 1-D Sediment Transport Model of the Skagit River between the Gorge Dam and the Sauk River and 2-D Sediment Transport Models at select focus areas to help analyze routing of sediment along the river and the potential for changes to geomorphic process and aquatic habitat characteristics at focus areas. City Light proposes to use the IHA software package to identify the timing and duration of high flow events under unmanaged conditions that may inform the development of potential process flow scenarios. These study plan modifications, in addition to information provided as part of the 2-D hydraulic model (FA-02 Instream Flow Model Development Study/FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study) and Operations Model (OM-01 Operations Model Study), will allow City Light and LPs the opportunity to examine the process flows and their potential to improve aquatic habitat for salmonid species.

### **6.2.16 Potential Floodplain Connectivity of Off-Channel Aquatic Habitat**

Four LPs submitted study requests related to floodplain connectivity and off-channel aquatic habitat: NMFS-02 Geomorphology and Aquatic Habitat, USFWS-15 Geomorphology and Aquatic Habitat Complexity Study, USIT-08 Geomorphology and Anadromous Salmonid Habitat, and WDFW-05 Geomorphology and Anadromous Salmonid Habitat.

The LPs requested that City Light collect and analyze information related to floodplain connectivity of off-channel habitat in the Skagit River downstream of Gorge Dam. They requested the following:

- (1) Deploy a network of piezometers in off-channel floodplain habitats and calibrate groundwater inundation associated with various flows below the dams.
- (2) Model flows that develop and maintain aquatic floodplain habitat features (wetlands, side channels and delta marshes).
- (3) Improve side channel mapping proposed by City Light by conducting field reconnaissance in floodplains (including behind hydromodifications) or developing a digital elevation model in the floodplain and associating those habitats with flows to fully describe side channel habitat restoration opportunities.

City Light does not believe that deploying a large network of piezometers in off-channel floodplain habitats or an analysis of groundwater inundation across the entire Skagit River floodplain are necessary because the request lacks nexus to Project operation and effects, as groundwater levels are dependent upon a variety of non-Project factors that are beyond control of the Project ((18 CFR § 5.9(b)(5), and the level of effort required to try to determine Project vs. non-Project factors would be very high compared to the likely usefulness of the data (18 CFR § 5.9(b)(7)). City Light believes that alternatively, if particular side channel or off channel areas are proposed for specific mitigation measures that require groundwater information, more detail on groundwater at those locations could be collected as part of detailed planning efforts. GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study and TR-02 Wetland Assessment will help determine the current location and condition of off-channel habitat and wetlands in the Skagit River floodplain between Gorge Dam and the Sauk River. An inventory of the current status of side channels and off-channel habitat in the Skagit River floodplain between Gorge Dam and the Sauk River will be completed using a combination of remote sensing and field methods.

The focus of the hydraulic model being developed as part of the FA-02 Instream Flow Model Development Study will be on the in-channel portion of the mainstem Skagit River to inform mainstem flow management. City Light does not propose to conduct field reconnaissance of side channels in the floodplain. Field reconnaissance of side channels, including collection of substrate and cover data, will be restricted to significant side channels directly connected to the mainstem and whose hydraulic conditions are determined by mainstem flows. However, the model will include significant side channels directly connected to the mainstem and whose hydraulic conditions are determined by mainstem flows. The model will also include, in lesser detail, the overbank floodplain out to the valley side walls. The model will be able to simulate floodplain inundation, but the accuracy of such simulations will be limited by lack of calibration data at flows greater than those collected during the study monitoring period and by the resolution of the floodplain component of the model. The model will also be able to provide information on the potential for off-channel connectivity through simulation of mainstem water surface profiles at a range of discharges. The model will be developed in such a way that it can be refined in areas of particular interest at a later date as the need arises.

### **6.2.17 Native Fish Genetics Baseline**

LPs submitted the following study requests aimed at collecting baseline genetics information in Project reservoirs: NPS-05 Population Structure of Native Fish in the Project Area, USFWS-06 Population Structure of Native Fish in the Project Area, and WDFW-15 Habitat Use and Population Dynamics of Reservoir Fish. City Light proposes to adopt these study requests, with modification, for the reasons discussed below.

While City Light believes there is adequate existing information for characterizing fish genetics for purposes of relicensing, it acknowledges a shared interest in developing a more in-depth genetics baseline for native fish species in Project reservoirs for the purpose of informing long-term reservoir fish management objectives. For this reason, City Light proposes a new study, FA-06 Reservoir Native Fish Genetics Baseline (Reservoir Fish Genetics) Study Plan, which adopts, with some modifications, elements of LPs' study requests. The purpose of the study is to characterize population genetic structure for Bull Trout, Rainbow Trout, and Dolly Varden (target species) in Project reservoirs and provide the basis necessary to inform the planning of long-term reservoir management objectives. Specific goals of the study include determining the population genetic structure of within- and among target species populations and assess whether management actions are necessary for genetic sustainability; determine the number of fish populations, for each target species, within and among the Project reservoirs; estimate the effective population size for each target species and reservoir; and identify topics and/or management objectives to be considered in a reservoir fish and aquatics management plan. The study will include acquiring and analyzing existing genetics data for target species, creation of a single, standardized datafile for each species that compiles genotypes from existing data, identification of data gaps and additional field data collection, and genetic analyses to address study goals. The study will also be conducted in consultation with a Salmonid Genetics Expert Panel.

City Light did not adopt elements of the LPs study request related to expanding genetics work to below the reservoirs or providing funding for single nucleotide polymorphism genetic baseline information from the Cascade River upstream to the Project. The study requests do not provide a clear statement of how the results would be used to inform the development of license requirements (18 CFR § 5.9(b)(5)). Additional fish genetics analyses and potential PME's may be identified as part of a reservoir fish and aquatics management plan, which will be informed by the process outlined by City Light in its Reservoir Fish Genetics Study Plan.

### **6.2.18 Flood Storage Timing**

The Skagit County Drainage and Irrigation Special Purpose Districts represented by the Skagit County Drainage and Irrigation District Consortium LLC (SDIDC) submitted the proposed study request SDIDC-01 Flood Storage Timing: Study Plan Seattle City Light Skagit River Hydroelectric Project FERC No. 553.

The goals of this study request are to ensure City Light's proposed OM-01 Operations Model Study Plan includes: (1) a trend analysis of recent hydrologic inputs to the hydropower project; (2) an evaluation of potential impacts to flood storage availability and imminent pre-event drawdown protocols based on that trend analysis; (3) that operation scenarios evaluated as part of the Operations Model Study Plan evaluate potential changes in the timing, frequency, and magnitude of hydrologic inputs to the Project over the lifespan of the Project; and (4) that changes to storage

timing and drawdown protocols that optimize flood storage are considered.

Specific objectives of this study request are to:

- (1) Evaluate scenarios to optimize flood storage and draw-down protocols to reduce flood risks and impacts for downstream communities;
- (2) Evaluate potential changes in hydrologic inputs to the Project based on recent data and trends in seasonal precipitation and runoff patterns, snow-pack and snow-moisture content, changes in glacial ice mass, and changes in the timing of snow melt and how these changes affect operations and flood storage availability; and
- (3) Evaluate potential benefits or impacts to competing resource and recreational needs.

SDIDC-01 requests the simulation of alternative operating scenarios under varying hydrologic conditions. City Light recognizes the need to model a range of alternative operating scenarios for the Project as part of relicensing, many of which will be identified by LPs. However, the Operations Model Study Plan is aimed at describing how the model will be developed and applied. Identifying and evaluating specific alternative operating scenarios, such as those identified by SDIDC, will take place later in the relicensing process. City Light revised the Operations Model Study Plan in response to comments on the PSP to provide more detail on the schedule and process for scenario evaluations, including the addition of a half-day workshop with LPs to discuss scenario development and execution, as well as providing an example scenario request form.

As previously outlined, the Operations Model to be developed under City Light's Operations Model Study Plan will document and define current Project operations including the Base Case, Current Operations Baseline. As part of City Light's Operations Model Study, a contiguous long-term hydrologic period based on historical hydrology will be selected to ensure the evaluation of wet, dry, and normal conditions; including extended multi-year conditions, such as multi-year droughts. The influence of glaciers and groundwater is embedded within this historical streamflow data.

City Light's Operations Model will be capable of projecting the effects of alternative operating scenarios on available water storage, flow releases and release rates, lake levels and fluctuations, and relevant issues associated with or dependent upon water availability under different water year types and hydrologic regimes. As outlined in the Operation Model Study Plan, once City Light's Operations Model study is complete (i.e., development, calibration, and validation of an Operations Model), City Light plans to develop a framework to work with LPs to identify and evaluate individual scenario requests, such as those included in SDIDC-01. Typically, scenario requests from different LPs overlap and, in some cases, may be outside the physical capability of the system. Each scenario request will require a detailed review and will be discussed with LPs for the most efficient assessment of requested scenarios. Additionally, scenarios can be simulated with alternate hydrologic conditions to represent potential climate change conditions. City Light has developed a Distributed Hydrology Soil Vegetation Model (DHSVM) model (see Section 6.3.7) using recent regional climate projections to inform the model, and updates the model periodically as needed to inform hydroelectric operations. This is outlined in the Operations Model Study Plan, which summarizes the study, Hydrology, Stream Temperature, and Sediment Impacts of Climate Change in the Sauk River Basin (Bandaragoda et al. 2020); and has been identified as a source of

alternative future hydrology under various potential climatic conditions that could be applied to simulate Skagit Operations Model scenarios with potential climate change conditions. Development and implementation of the framework to identify and evaluate scenarios will occur following model development.

Scenarios will look at flows that are practicable and compatible with legal requirements including City Light's non-consumptive and storage water rights.

### **6.2.19 Modeling Irrigation Water Supply**

The Skagit County Drainage and Irrigation Special Purpose Districts represented by the Skagit County Drainage and Irrigation District Consortium LLC. (SDIDC), submitted the proposed study plan SDIDC-02; Irrigation Water Supply: Study Plan Seattle City Light Skagit River Hydroelectric Project FERC No. 553.

SDIDC-02 requests an alternative operations scenario(s) to evaluate storage and release of water for supplemental irrigation water supply. The Operations Model to be developed under City Light's OM-01 Operations Model Study Plan will document and define current Project operations including the Base Case, Current Operations Baseline. This Operations Model will be capable of projecting the effects of alternative operating scenarios on available water storage, flow releases and release rates, lake levels and fluctuations, and relevant issues associated with or dependent upon water availability under different water year types and hydrologic regimes.

Modeling scenarios will be consistent with City Light's non-consumptive and storage water rights.

### **6.2.20 Recreation Facilities and Visitor Use Study**

The NPS and USFS collaborated on and filed substantially identical study requests (NPS-15 and USFS-01) for City Light to evaluate recreation sites managed by City Light, NPS, and USFS that are within the Project Boundary or in the vicinity of the Project Boundary. In its PAD and subsequent draft study plan reviewed with LPs, City Light proposed RA-01 Recreation Use and Facility Assessment (Recreation Assessment) Study Plan, which is included in this RSP with a number of significant modifications in response to LP comments on the PSP. NPS and USFS requested several modifications and expansions upon the scope proposed by City Light in the PSP:

- Expanding the number of recreation sites where data are collected to include NPS and USFS projects in the Project vicinity.
- Expanding the use count, survey methodology, and use impact assessment at each Recreation Area including utilizing trail counters to measure use at representative trails within or partially within the Project Boundary.
- Modifying some specific questions and adding questions in the survey instrument (Attachment 3 to the NPS and USFS study request letters).
- Characterizing future use by considering the changing demographics of visitors and communities and analyzing opportunities within the Project vicinity to address Project related recreation use and known facility needs identified in previous plans.

City Light proposes to adopt the study request proposed by NPS and USFS, with modifications, in its Recreation Assessment Study Plan. Each of the four requested modifications are addressed by City Light individually below.

#### 6.2.20.1 Expansion of Recreation Study Sites

City Light's original Recreation Assessment Study Plan focused on FERC-approved/jurisdictional and City Light-managed recreation facilities, plus non-Project recreation facilities on Ross and Diablo lakes that provide direct access to Project reservoirs (i.e., Hozomeen Boat Launch, Winnebago Flats Boat Launch, and Ross Lake Resort dock at Ross Lake; and Colonial Creek Boat Launch and Fishing Pier at Diablo Lake). The NPS and USFS requested City Light expand the recreation sites addressed in City Light's original Recreation Assessment Study Plan to include data collection (i.e., facility inventory, observations, and visitor surveys) and analysis at additional recreation sites associated with NPS' RLNRA or USFS' Mt. Baker-Snoqualmie and Okanogan-Wenatchee National Forests. City Light recognizes LPs' calls for compromise on this issue and understands the need for information at many of these additional recreational sites. In response to these requests, City Light has significantly expanded its Recreation Assessment Study Plan to include the majority of additional recreation sites requested by the LPs. City Light acknowledges that both the Project and the surrounding RLNRA/North Cascades National Park attract visitors to the area and that both FERC and the NPS have responsibilities for managing this use. While City Light does not concede that all of the locations included in the study experience Project-induced use, City Light has expanded its recreation assessment study to accommodate the LPs' requests and provide information to aid in the long-term management of these sites. City Light has not included several of the requested recreation sites, including sites in USFS' Mt. Baker-Snoqualmie and Okanogan-Wenatchee National Forests, due to their distance from Project features. Geographic distance from the Project weakens Project nexus and Project-inducement arguments for inclusion. Also, the visitor survey instrument includes a question designed to collect information on what areas respondents are visiting during their trips. Additionally, inclusion of these distant and multiple sites would potentially result in an increase of the number of survey areas and surveys to be collected. These additions cumulatively would tax logistic resources and potentially compromise study success.

#### 6.2.20.2 Visitor Survey, Use Count, and Impact Assessment Methodology Expansion

##### **Sample Size**

In its study requests, the NPS and USFS requested a recreation visitor survey sample size target of 2,304 completed surveys based on a study area divided into six sub-sections or resource areas. These LPs repeated this request in their PSP comments. In response to LP concerns and to reflect the expanded geographic scope of this study as described above, City Light has amended its Recreation Assessment Study Plan to reflect two survey areas based on two, distinct recreation settings (i.e., Ross Lake and SR 20 corridor settings) with a sample size of 384 surveys in each area/setting, for a total of 768 surveys.

In the RSP, City Light proposes to divide the study into two survey settings: (1) Ross Lake; and (2) the SR 20 corridor (i.e., Diablo Lake, Gorge Lake, Newhalem, and the Skagit River). A key objective of the visitor survey element of City Light's Recreation Assessment is to identify the recreation use, preferences, attitudes, and characteristics of the recreation users in these two survey areas/settings. While study results may be used to summarize attributes by type of facility and



develop Project recreation use summaries, the overall purpose is to characterize these attributes for each of the two survey areas. Information from the visitor surveys and observation counts will provide insight into individual areas and facilities, however, it is not intended to have a statistically valid sample size for each facility. The NPS and USFS request to divide the study area into six resource areas and to study each area individually includes areas distant from the Project (refer to Section 6.2.20.1 of this RSP) and would impose onerous burdens on study logistics and success. City Light's Recreation Assessment sample populations are focused on two sample populations (i.e., Ross Lake and the SR 20 corridor). City Light selected two sample populations to collect information from recreationists at Project recreation facilities and in recognition of LPs' requests for information about recreationists at NPS and USFS recreation facilities in the vicinity of the Project.

In addition to the sample size request, the NPS and USFS also requested that City Light assign three survey teams to implement the visitor and observation surveys on two consecutive days to cover all of the NPS and USFS requested sites in six study site areas for each required sampling day (i.e., weekday, weekend day, and holiday day). City Light did not adopt this request. City Light anticipates utilizing multiple survey teams to conduct the surveys on each survey day. The final survey team/staff approach will be determined based on field testing and logistics prior to starting the surveys.

### **Sampling Frequency**

The peak and off-peak season sampling frequencies included in City Light's Recreation Assessment have been revised to include additional observation and survey days on weekends and weekdays during the peak season to capture a broader range of use when use is highest (i.e., from 14 to 18 days during the roughly 2-month-long peak season from July through Labor Day). These increases are intended to address NPS and USFS concerns that City Light's observational data collection methods do not provide data of high enough resolution to provide estimates of use. Sampling frequencies are proposed as follows:

#### *Peak Season Sampling Frequency (18 survey days total)*

- Four randomly selected weekday days per month in July and August (separated by at least one week)
- Four randomly selected weekend days (Saturday or Sunday) per month in July and August (non-consecutive)
- One holiday day (Saturday or Sunday) for each three-day holiday weekend (Independence Day and Labor Day holiday weekends) (two survey days total)

#### *Off-Peak Season Sampling Frequency (17 survey days total)*

- Two randomly selected weekday days per month (separated by at least one week)
- Two randomly selected weekend days (Saturday or Sunday) per month (non-consecutive)
- One pre-selected holiday day (Saturday or Sunday) for the three-day Memorial Day holiday weekend

### **Observational Data Collection**

The NPS and USFS requested that City Light record observational use data at 15-minute intervals for an 8-hour period at each study site during each scheduled sampling day. The NPS and USFS stated that “this will provide enough resolution to report hourly results, and a long enough duration at each site, and will provide a robust set of data for subsequent tasks that rely on these data (i.e., estimates of visitor use).” City Light did not adopt the NPS’ observational count methods (8-hour counts at 15-minute intervals) as City Light’s revised observational spot count methods are consistent with many FERC recreation studies with similar geographic survey areas and Project layout. Further, the NPS’ requested observational methods are overly burdensome and logistically fraught (i.e., requires staff stationed at each study site for a full day). City Light will conduct two (2) point-in-time observations or use spot counts during each visit to a study site – one count upon arrival and one count prior to departing the site each survey day. City Light surveyors will collect numerous visitor surveys in the time in between the arrival and departure spot counts during each visit. This method will provide two observation/spot counts for each sampling day, which will be stratified across an 8-hour period over the course of the study season by visiting each study site on a shifting visitation pattern (i.e., spot counts will occur at a variety of times during the typical 8- to 10-hour sampling day over the survey season). City Light believes the observation count methods in the Recreation Assessment Study Plan will effectively provide adequate data for City Light, NPS, and USFS to identify where potential use levels are approaching or at capacity. Adverse use impacts, site capacity, or other management issues identified during the assessment can be flagged for further study under management programs anticipated to be developed for future recreation management at the Project and vicinity. However, applying such an intensive use monitoring methodology as part of the Recreation Assessment is overly burdensome and not needed to meet the goals of the study and inform management plan decision making.

In addition, the NPS and USFS also requested specific data/use parameters be collected during each observation survey. City Light’s Recreation Assessment Study Plan is consistent with the NPS and USFS request.

### **Trail Use Counts**

The NPS and USFS requested that City Light estimate trail use at 13 non-Project trails and two (2) FERC-approved Project trails using automated pedestrian trail counters by installing and then maintaining, downloading, and calibrating trail counting equipment during each sampling period.

In response to these requests, City Light has expanded its Recreation Assessment Study Plan to install and maintain trail counter devices on thirteen trails. While some of the trails are not Project recreation facilities, do not directly access the reservoirs and do not connect FERC-approved Project recreation facilities, City Light has included them in its study as a compromise and to accommodate the LPs’ desire for additional information on recreation in the Project region.

The Recreation Assessment now includes trail use counts at the two FERC-approved Project trails located entirely within the Project Boundary (i.e., 0.4-mile-long Ladder Creek Falls Trail and Garden and 0.3-mile-long Trail of the Cedars) and eleven trails located on NPS-administered lands and extending outside the Project Boundary. City Light proposes to install and maintain trail counter devices at these thirteen trails for the duration of the study season (May-October).

### **Qualitative Trail Accessibility Assessment**

The NPS and USFS requested City Light conduct accessibility assessments at eight trails. City Light and NPS have identified eight trails in the study area, including two Project trails and six non-Project trails where additional information is needed to understand the potential to provide enhanced accessible access. City Light will qualitatively assess the eight developed recreation trails on both NPS and City Light owned lands to characterize the general opportunities and constraints to making future accessibility improvements. This assessment is designed to inform City Light and the NPS on potential trail accessibility improvement options and is not meant as an engineering or universal trail accessibility assessment.

### **Recreation Use Impact Assessment Methodology Expansion**

In their study requests, the NPS and USFS requested City Light conduct a secondary or second stage recreation use impact assessment beyond what City Light proposes in its Recreation Assessment Study Plan. Subsequently, in their PSP comments, the NPS and USFS removed this request for the secondary assessment, but did ask for several additional parameters be included in the use impact site assessments (i.e., counting parking outside defined parking areas and any public safety considerations). In its Recreation Assessment Study Plan, City Light proposes to conduct a qualitative assessment of recreation use impacts following accepted methods (Whittaker and Shelby 2001). City Light will collect data on parking or use outside designated parking areas as part of the observational spot count study methods and not the use impact study methods. Further, the use impact assessment methods are focused on observed physical use impacts and not subjective assessments of public safety considerations.

#### **6.2.20.3 Visitor Survey Instrument Modifications**

The NPS and USFS study request includes a proposed visitor survey instrument. City Light's survey instrument in its Recreation Assessment Study Plan includes much of the same or similar questions as proposed by the NPS and USFS, including questions designed to learn where visitors have visited and where they plan to visit. As described in Section 6.2.20.1 of this RSP, the study has been expanded to include numerous recreation sites in the vicinity of the Project. However, City Light has not included a map with the survey instrument due to concerns over the length and burden of the survey, unwieldiness in the field setting, and accuracy of the information received. City Light survey staff will have large-scale maps of the study area to help respondents orient themselves and improve responses, but it is not intended for respondents to mark up. Rather, City Light's survey instrument includes a question that asks respondents what other general areas they have visited or may visit, including the eleven location response options (Ross Lake, Diablo Lake, Gorge Lake, Town of Newhalem, Town of Diablo, RLNRA, North Cascades National Park, Lake Chelan Recreation Area, Okanogan-Wenatchee National Forest, Mt. Baker-Snoqualmie National Forest, and Skagit River downstream of Newhalem). City Light believes this question and the response options provide adequate information on where respondents have visited or plan to visit while containing the extensive possible data points provided by respondents when given a full map to mark up. Regarding administration of the survey, City Light intends to intercept the majority of survey respondents on-site/in-person, and mail-back windshield surveys with return envelopes will only be used as necessary to meet the target number of surveys. City Light will review progress toward targets and the ratio of on-site to mail-back surveys during the course of the study and consider revising on-site survey administration methods as necessary to achieve high rates of on-

site survey. City Light will also be logging and tracking response rates for the on-site and mail-back visitor surveys administered in the field.

#### 6.2.20.4 Future Use Assessment Methodology Modifications

In their study requests, the NPS and USFS recommend three changes to the methodology related to future use and demand assessment:

- (1) Expand the study to include facilities and use in the Project vicinity as defined in Table 1 of their study requests.
- (2) Evaluate the changing demographics in the communities that the Project is drawing from and what changes to the facilities may be needed due to cultural changes and consider other potential barriers to visitor use that could be addressed in license implementation.
- (3) Recreation Needs Assessment: Synthesize adequacy of existing recreational access and the adequacy and capacity of existing recreational facilities to meet the future demand, including the following site-specific analyses per the RLNRA General Management Plan:
  - a. Conduct a site analysis and alternative locations for the Colonial Creek campground, boat launch, and day-use area. Conduct a site analysis to explore alternative locations to provide similar amenities to the public.
  - b. Conduct site design analysis to explore conceptual design alternatives for re-designing the Ross Dam Trailhead parking lot and Hozomeen Campground to better meet visitor needs.
  - c. Investigate feasible locations for new camping and trails near Diablo Lake, Gorge Lake, Newhalem, and the Skagit River area.

The Recreation Assessment study plan has been revised to include facilities and use in the Project vicinity.

Regarding evaluating the changing demographics in the communities the Project is drawing from, City Light believes the methods for estimating future use and demand in City Light's Recreation Assessment adequately address the NPS and USFS recommendations. As noted in City Light's Recreation Assessment Study Plan, City Light will estimate Project recreation use and Project recreation facility utilization over the term of the new license based on historical trends, future growth projections, and likely foreseeable events in the watershed. City Light will utilize readily available, existing information on current and future population rates from the State of Washington Office of Financial Management Department of Finance website (<https://www.ofm.wa.gov/washington-data-research>) for the counties where the majority of the Project visitors originate from (based on completed visitor surveys) to project the overall Project recreation use estimate over the term of a new license period (i.e., 30 to 50 years). These population projections incorporate age and race demographics and, thus, City Light's methods will incorporate the changing demographics in the communities that the Project is drawing from, as requested by the NPS and USFS. The population growth rates are the best method of capturing what future population growth and Project recreation use may look like over the term of the new license. This type of future use and demand assessment is considered very speculative due to the uncertainties of projecting preferences and behaviors far into the future, but it will provide a

general indication of how recreation use is expected to change over the license period. Further, assessing future recreation demand through an evaluation of existing use, demographic data, and participation trends and projections in the region (as proposed by City Light) is common practice (Kelly and Warnick 1999) and has been successfully applied in other FERC relicensing proceedings.

Regarding the request for a recreation needs analysis, this request is beyond the scope of a recreation study in FERC's relicensing process. City Light will synthesize existing data and data collected as part of City Light's Recreation Assessment and other relicensing studies to inform a recreation needs analysis in City Light's license application. Further, it is premature to conduct recreation facility site and feasibility analyses until City Light completes its proposed relicensing studies and all data are available as a basis for consultation with the NPS and USFS to develop PME related to recreation resources.

### **6.2.21 Wildlife Studies – Northern Spotted Owl**

Two LPs submitted study requests related to NSO: USFWS-19 Impact of the Operations of Skagit Hydroelectric Project (#553) on Northern Spotted Owl, and STI-06 Spotted Owl Habitat Map. USFWS has requested a study to assess impacts of Project operations on NSO and if NSO could successfully establish around Project reservoirs and mitigation lands.

City Light is proposing TR-10 Northern Spotted Owl Habitat Analysis (NSO Habitat Analysis) to compile and refine existing information on the distribution of potentially suitable NSO habitat. The existing NSO habitat suitability model (originally created in 2005 [Davis and Lint 2005] as part of the Northwest Forest Plan, and updated in 2016 [Davis et al. 2016]), has not been accurately applied at the local scale in the Skagit River watershed due to the lack of locally available NSO habitat and detection data. A more detailed and refined map of suitable NSO habitat will be used to characterize baseline conditions, assess potential ongoing Project effects, and inform conservation measures, if warranted, under a new license. This study will map potential NRF habitat of the NSO within the FERC Boundary and a 0.5-mile buffer. The study will use data from the TR-01 Vegetation Mapping Study and data from agencies including USFS, NPS, USFWS, Washington Department of Natural Resources (DNR), and others and will provide information needed to identify the presence and distribution of potentially suitable habitat for NSO in the study area.

USFWS identified concerns regarding habitat loss and fragmentation associated with ongoing Project operations and increased human activity associated with visitation and recreation potentially causing wildlife stress/mortality and habitat degradation that may encourage barred owl, an invasive competitor to NSO. As currently proposed, the relicensing of the Project will not increase habitat fragmentation relative to current conditions and City Light is not proposing changes in Project operations or activities which would create new edge or early-seral habitats.

USFWS has confirmed multiple times, as recently as 2011, that continued operation of the Project is "not likely to adversely affect" the NSO (letter from D. Frederick, State Supervisor, USFWS, Olympia, WA, to J. Clement, Acting Director, FERC, Washington D.C., August 10, 1994; and letter from K. Berg, Manager, Washington Fish and Wildlife Office, Lacey, WA to K. Bose, Secretary FERC, Washington D.C., December 30, 2011). Nevertheless, in its study request, USFWS requested intensive inventory surveys (protocol-level) for NSO within RLNRA, areas with Project-related activities (including helicopter flights), and mitigation lands. Existing

information indicates that NSO has not been recently observed near the Project. As noted in the PAD, City Light has no recent records of documented pairs of NSOs near the Project Boundary. Siegel et al. (2012) conducted extensive NSO surveys in North Cascades National Park, in particular, near reservoirs. Surveys at five historical NSO activity centers (all 1 mi or further from Project reservoirs) and along 74 survey transects in 2009 and 2010 by Siegel et al. (2012) yielded a NSO response only at Newhalem Creek in 2009 (but not in 2010); the Newhalem Creek drainage subsequently burned extensively (more than 5,000 acres) in the 2015 Goodell Creek Fire.

City Light does not believe it is necessary to conduct costly surveys for NSO in advance of assessing the presence and distribution of potentially suitable NSO habitat in the Project and evaluating where potential effects (direct habitat modification or increases in Project-related sound) of existing or proposed Project O&M or capital improvements overlap with potentially suitable habitat. Consistent with current practices, City Light consults with USFWS on unique capital projects and conducts surveys for NSOs in affected areas, as necessary.

The study requests do not meet the FERC Study Criteria. While USFWS states that continued Project operations may impact NSO, USFWS does not demonstrate nexus to Project effects, the need for additional information or explain why the continued implementation of requirements of the current license are not adequate for the new license term (18 CFR §§ 5.9(b)(4) and (5)). The Stillaguamish Tribe of Indians' request did not address any of the FERC Study Criteria.

During early discussions regarding City Light's proposed study program with LPs in 2019–2020, LPs identified questions regarding potential impacts of sound and light from Project operations on NSO and other species. As noted in the PAD, City Light consults with the NPS and USFWS to determine potential noise impacts on ESA-listed species and/or wildlife species of special significance if helicopter use, heavy equipment use, or blasting is needed for maintenance or major projects outside the winter season. There is no evidence that current operations result in noise or light levels that affect NSOs. City Light's RA-03 Project Facility Lighting Inventory and RA-04 Project Sound Assessment studies will inventory and map outdoor Project lighting and identify Project-related noise. These studies will provide information on the locations where certain types of future Project activities could warrant pre-construction assessment or BMPs to minimize effects on NSOs based on proximity to suitable nesting habitat and disturbance thresholds in the literature.

USFWS requested information on NSO habitat indicators on mitigation lands including: "trees/acre, density of snags with requisite height and diameter, understory coverage, down woody debris, etc." The mitigation lands are managed for habitat conservation and City Light is not proposing any activities that would impact habitat. The proposed information to be collected in the NSO Habitat Analysis will adequately inform management plan development for the license. City Light will consider the USFWS additional information requests as a part of management plan implementation for the new license if consistent with the parcel-specific management plan goals developed with LPs. Study results (from the Vegetation Mapping Study and NSO Habitat Analysis) may be used to identify locations warranting more detailed habitat assessment to inform management goals related to NSO habitat in the development of mitigation lands management.

City Light currently implements an Avian Protection Plan (City Light 2014a) that follows USFWS (2005) guidelines. City Light will continue to implement its Avian Protection Plan under the new

license. Information from the NSO Habitat Analysis could be used to inform updates to the plan by providing additional site-specific information for the Project Boundary.

### **6.2.22 Transmission Line Right of Way Aquatic Habitat**

The Sauk-Suiattle Indian Tribe submitted a study request related to aquatic habitat (SSIT-03 Impacts of Transmission Line Right of Way (ROW) on Aquatic Habitat and Riparian Zone for the Skagit River Hydroelectric Project). The request is for a study to assess restoration needs within the transmission line ROW including locations where the transmission line crosses or is adjacent to streams, road network stream crossings, and transmission towers in the channel migration zone (CMZ).

In response to this study request, City Light proposed to adopt the study request, with modifications, as part of its GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study (Erosion and Geologic Hazards Study), TR-01 Vegetation Mapping Study, TR-02 Wetland Assessment, and TR-04 Invasive Plants Study. These proposed studies will identify and map locations of all stream riparian zones in the transmission line ROW within the Project Boundary; document occurrences of invasive species; identify and map locations where roads cross streams (including fish-bearing streams); and assess culverts, fords, and bridges at fish-bearing stream crossings. The study will not include development of “restoration plans” as the Sauk-Suiattle Indian Tribe did not demonstrate a need for restoration plans (18 CFR § 5.9(b)(4)) and it is premature to identify PME at this time in the ILP. Resource management plans to be developed by City Light in support of the new license and informed by the proposed studies may inform identification of needs for specific actions recommended by requesters, such as restoration, revegetation, potential supplementation of LWD in streams, culvert or bridge replacement actions, riparian buffer protection and/or enhancement measures, and erosion control.

The Sauk-Suiattle Indian Tribe requested assessment of fish passage at all road stream crossings within the ROW and assessment of fish assemblage at crossings where infrastructure additions are being considered. In collaboration with LPs, and in responses to PSP comments, City Light has revised the Erosion and Geologic Hazards Study to include an assessment of fish passage suitability at all stream crossings within the Project Boundary including the transmission line ROW. In addition, the modified Erosion and Geologic Hazards Study Plan includes: (1) an inventory of road crossings, including updated GPS locations; (2) field verifying fish-use potential; (3) compiling available maintenance records for crossings; (4) updating fish passage data older than 5 years; (5) assessments following WDFW 2019 guidelines for Level B culvert analysis, as appropriate; and (6) non-culvert crossings and miscellaneous obstructions.

The Sauk-Suiattle Indian Tribe requested identification of transmission tower locations in the CMZ and exploration of tower relocation options, including development of alternative tower locations as bank armoring at towers in the CMZ reduces habitat complexity for salmonids. City Light will identify, map, and characterize areas of erosion, runoff, mass wasting, and culvert conditions that are affected by transmission towers as part of the Erosion and Geologic Hazards Study. City Light does not believe the request to explore relocation options and develop alternative tower locations is timely or warrants a study in relicensing. City Light is currently reviewing and reprioritizing actions required under the existing tower maintenance program including evaluation of potential relocation (assessments, studies required, etc.) on a routine basis. The current Settlement Agreement on Visual Quality requires a number of actions yet to be completed under

the current license, a schedule for which is forthcoming in early 2021. The proposed Erosion and Geologic Hazards Study will provide information that will be used in the assessment of management of towers and bank armoring; these and alternatives can also be part of the development of City Light's long-term asset management plan. City Light will add identification of transmission towers that may be affected by erosion or geologic hazards and any bank armoring associated with the Project to the Erosion and Geologic Hazards Study to inform the tower maintenance program. City Light does not currently know future tower locations; these locations would be developed as part of planning efforts at the time that any tower relocation is needed.

### **6.2.23 Reservoir Entrainment**

Four LPs submitted study requests related to turbine and spillway fish entrainment: NPS-07 Evaluating Existing Fish Passage and Entrainment, USFWS-08 Evaluating Existing Fish Passage and Entrainment through the Skagit Hydroelectric Project Dams and Appurtenant Facilities, USIT-03 Evaluating Existing Fish Passage: Spill and Entrainment through Ross, Diablo, Gorge Dams and Appurtenant Facilities through the Project Area at the Skagit River Hydroelectric Project, and WDFW-04 Evaluating Existing Fish Passage: Spill and Entrainment through Ross, Diablo, Gorge Dams and Appurtenant Facilities through the Project Area at the Skagit River Hydroelectric Project.

Existing information shows that turbine and spillway entrainment rates are low and unlikely to result in population-level effects on reservoir fish species. The turbine intake depth at Ross, Diablo, and Gorge dams is approximately 110, 88, and 52 ft, respectively, and entrainment of smaller species and early life-stages of salmonids is unlikely because they do not occupy these depths and because they are resident species which do not sound in an attempt to exit the reservoirs. Larger species and life-stages are strong enough to avoid being entrained into the turbines.

Spillway passage at Ross Dam is relatively rare given the low frequency of spill events at this facility. Spills are infrequent due to the reservoir's large storage capacity. These spills are typically associated with gate testing, are usually of short duration, and average a few cfs per event. Spill is more common at Diablo and Gorge dams, although only one acoustic-tagged Bull Trout passed over the Gorge Dam spillway during the six-year study period, 2013–2018. No tagged Bull Trout passed over the Diablo Dam spillway. Spill occurs at Diablo Dam about 30 days per year, on average, typically during periods of high runoff in spring and early summer or when powerhouse units are offline or additional flow is needed to meet fish protection flows downstream of Gorge Powerhouse. Spill at Gorge dam occurs when inflow exceeds the generating capacity of the powerhouse or if flow is needed to meet fisheries protection flows downstream of Gorge Powerhouse. Based on recent records, spills occur between 14 and 61 days per year.

As a component of its Biological Opinion associated with the addition of the second power tunnel at the Gorge Development, USFWS (2013) analyzed the potential effects of entrainment on Bull Trout in the Project reservoirs. Annual entrainment is summarized in City Light's incidental take reports (City Light 2014b–2018 and 2019a). Between 2013 and 2018, two tagged Bull Trout were entrained at the Diablo Dam intakes, but both fish (each of which was greater than 500 mm long) survived turbine passage, as evidenced by their continued downstream movements detected via their acoustic tags). City Light also calculated Bull Trout spillway mortality from 2013–2018 based on: (1) annual spill duration at each dam; (2) time acoustically-tagged Bull Trout spent near the spillways at each dam; (3) assumed adult Bull Trout population abundance in each reservoir;



and (4) assumed spillway mortality rates of 100 percent at Ross Dam, 55 percent at Diablo Dam, and 10 percent at Gorge Dam, as stipulated in USFWS (2013). Based on this formula, estimated average annual Bull Trout spillway mortality rates for the three Project developments (averaged over the 2013–2018 period) are as follows: Ross Dam, 0.8/yr; Diablo Dam, 24.2/yr; Gorge Dam 4.3/yr.

City Light also conducted a desktop risk assessment (City Light 2011) as part of its license amendment to add the second power tunnel at the Gorge Development. The desktop risk assessment was not fish species specific and modeled entrainment related mortality risk based upon fish size. The assessment indicated probable entrainment related injury rates are well below what would result in population-level effects for fish in the reservoirs.

Although entrainment rates for other species are unknown, Rainbow Trout have survived entrainment and downstream passage at the Project in the past (City Light 2011). Also, under its current license, City Light has received approval<sup>15</sup> to tag Bull Trout, Rainbow Trout, Dolly Varden, and Brook Trout in Project reservoirs. Tracking of these tagged fish may provide additional information on entrainment of these species.

Implementing a mark-recapture study of the magnitude identified by the LPs would likely not inform the development of license requirements (18 CFR § 5.9(b)(4)) and the level of effort and cost required for the study would be very high compared to the likely usefulness of the data (18 CFR § 5.9(b)(7)). The fish species of interest vary among the LP's study requests, with the most expansive request being provided by the NPS, i.e., "...assess the amount of passage and survival through entrainment and spill for all size classes of native and nonnative fish at each of the dams and powerhouses..." Marking and recapturing sufficient numbers of fish of all size classes and species, including non-native fishes, would not only require more time than is available but would also be unjustified when comparing the cost of such a study to the relatively low risk of population-level effects due to entrainment (as noted above, fish occupying the reservoirs are residents and not actively attempting to migrate downstream). City Light considers the level of effort and study costs developed by the LPs to be underestimated (total cost of \$400,000 estimated by NPS, Upper Skagit Indian Tribe, and WDFW and \$500,000/year estimated by USFWS).

While City Light believes: (1) existing information is sufficient for the purposes of relicensing the Project so there is no need for additional information (18 CFR § 5.9(b)(4)); (2) the proposed methods result in an extensive scope of work that could not meaningfully be completed within the timeframe allowed by the ILP and therefore would not inform the development of license requirements (18 CFR § 5.9(b)(5)); and (3) cost and level of effort to complete the study are underestimated (18 CFR § 5.9(b)(7)), City Light has developed FA-08 Fish Entrainment Study included in this RSP in an effort to be responsive to LP requests. The goals of this desktop study are to evaluate fish entrainment and impingement at the Ross, Diablo, and Gorge developments and the potential effect on the Skagit River fish community. Desktop analysis of entrainment and impingement at hydroelectric facilities is an approach that has been widely accepted by state and federal agencies and is considered a useful predictive tool in lieu of field studies (USFWS 2019).

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<sup>15</sup> USDI NPS Animal Research Protocol Approval Long-term, Ongoing Research Project WA\_NOCA\_Fisher\_BullTrout\_2020.A3.

### **6.3 Study Requests not Included in City Light's RSP**

#### **6.3.1 Chert Analysis**

The Nlaka'pamux Nation Tribal Council submitted a study request that proposes technological sourcing of Hozomeen chert in the Skagit area (NNTC-03 Chert Analysis). Hozomeen chert is a toolstone of particular importance in the RLNRA due to presence of raw source material within the RLNRA as well as archaeological evidence of this toolstone use within and outside of the RLNRA. The purpose of the study is to get a geochemical fingerprint to compare chert samples from the Project vicinity with artifacts/manuports passed down by Nlaka'pamux Nation Tribal Council families and artifacts that are now curated at the Royal British Columbia Museum and the American Museum of Natural History believed to be Nlaka'pamux Nation Tribal Council artifacts. The Nlaka'pamux Nation Tribal Council identify this research as important to the evaluation of the TCP mid-montane (mountain slope) trail resources because it would provide information regarding the travels and resource collection strategies of Nlaka'pamux Nation Tribal Council people and could provide important background information for the development of a TCP nomination.

Examination of chert artifacts at the British Columbia Royal Museum was also included in study request NNTC-01 Completion of Traditional Cultural Property Survey. The chert analyses proposed in NNTC-01 and NNTC-03 do not meet the FERC Study Criteria. They do not provide clear goals and objectives of the study, a study methodology, or level of effort and cost, and do not demonstrate nexus between Project operations and effects on the resources/locations to be studied (18 CFR §§ 5.9(b)(1), (5), (6), and (7)). Therefore, City Light has not adopted these chert analyses in NNTC-01 and NNTC-03 as a study.

#### **6.3.2 Ethnographic Study**

The Sauk-Suiattle Indian Tribe submitted a study request for a social science study on how the agencies, consultants, Indian tribes, and First Nations are communicating for the relicensing process (SSIT-01 Ethnographic Study). In a follow up meeting with the Sauk-Suiattle Indian Tribe on October 28, 2020, City Light confirmed that the intent of the study would be to investigate biases, ways of communicating that are more effective and inclusive of different views and are more collaborative and open minded.

SSIT-01 Ethnographic Study does not meet the FERC Study Criteria. It does not provide clear goals and objectives of the study, a study methodology, or level of effort and cost, and does not demonstrate nexus between Project operations and effects on the resources/locations to be studied (18 CFR §§ 5.9(b)(1), (5), (6), and (7)). Therefore, City Light has not adopted the request as a study. However, City Light will endeavor to continue open, honest, and transparent communications with all parties participating in the relicensing process and will look for new ways to engage participants in a fair and consistent manner that allows for all views to be heard.

#### **6.3.3 Aquatic Productivity**

LPs submitted study requests aimed at assessing productivity within and downstream of the Project vicinity. NPS-03 Assessing the Impacts of Project Operations on Secondary Productivity, included objectives aimed at assessing productivity both above and below Gorge Dam. Three LPs requested assessments of secondary productivity upstream of Gorge Dam: USFWS-04 Skagit Project

Reservoir Secondary Productivity Study, USIT-05 Reservoir Littoral, Benthic, and Pelagic Invertebrate Productivity, and WDFW-13 Reservoir Littoral, Benthic, and Pelagic Invertebrate Productivity. Study requests focused solely on productivity in the Skagit River downstream of Gorge Dam include USFWS-16 The Impacts of Project Operations on Aquatic and Riparian Biological Productivity Downstream of Gorge Dam, USIT-09 The Impacts of Project Operations on Aquatic & Riparian Biological Productivity Downstream of Gorge Dam, and WDFW-06 The Impacts of Project Operations on Aquatic & Riparian Biological Productivity Downstream of Gorge Dam. City Light has not adopted these study requests for the reasons discussed below.

The LPs' study requests do not meet a majority of the FERC Study Criteria. City Light believes: (1) although goals and objectives are identified, they are not well linked to the proposed methodologies (18 CFR § 5.9(b)(6)); (2) there is no clear justification for why additional information is needed (18 CFR § 5.9(b)(4)), and there is no explicit statement of how the results would be used to inform the development of license requirements (18 CFR § 5.9(b)(5)); (3) proposed study costs appear to be underestimated (18 CFR § 5.9(b)(7)).

The study requests do not provide evidence of an adverse Project effect on nutrients and productivity. Ross Lake and the downstream Project reservoirs constitute an oligotrophic system, and previous measurements reveal very low concentrations of nutrients in Ross Lake. Moreover, tributary inflows are nutrient-poor, which is a characteristic of ambient conditions and not a Project effect. The USGS, Washington Water Science Center, is periodically collecting nutrient data in the Skagit River Basin at the U.S.-Canada border, and it is City Light's intent to provide a summary of these data in its FA-01 Water Quality Monitoring Study report (see Section 6.2.9 of this RSP).

All the study requests identified above constitute extensive baseline data gathering efforts that could not be meaningfully addressed within the confines of the ILP study timeframe. City Light believes, however, that several of the proposed study objectives are being addressed by the ongoing Food Web Study (as described in Section 3.2.2) being conducted by USGS in the Project vicinity (City Light 2019b). The Food Web Study, which was developed in coordination with and approved by the NCC (of which the LPs are members), can be used to address elements of the study requests (e.g., trophic relationships, bioenergetics) at an appropriate scale and according to a phased approach. Also, although not a productivity study, per se, City Light is proposing to collect benthic macroinvertebrates (an objective of the riverine study proposals) at several locations downstream of Gorge Powerhouse (see Section 6.2.9 of this RSP). Benthic macroinvertebrate community metrics provide an index of productivity and locating sampling sites at multiple locations downstream of the Project will shed light on any longitudinal trends. City Light also has zooplankton abundance and taxonomic composition data for Ross Lake, which City Light believes adequately characterize existing conditions.

The proposed methods in the study requests are not clearly linked to the stated objectives, and the study requests do not provide explanation of how the information gathered would enable an assessment of the potential effects of Project operations or inform potential license requirements. Further, it appears the scope of the studies may preclude them from being completed within the two allotted study seasons. An example of this is contained in the NPS's Assessing the Impacts of Project Operations on Secondary Productivity study proposal, which includes an objective (Objective 5) that states, "Identify monitoring locations and develop quantitative performance metrics to evaluate..." This study request does not provide clear consideration of how information

requested would be derived and applied. The open-ended nature of the request, the lack of methodological specificity, including how the information would be used to assess effects due to Project operations, and the expansiveness of the scope make the proposed undertaking more suitable as an effort for which City Light and the LPs might be able to develop a management plan to be implemented after license issuance, once specific management objectives and appropriate metrics can be identified. Finally, the basis for cost estimates is unclear as the extent of sampling is not specified and without such basic structure, it is not possible to accurately estimate costs.

#### **6.3.4 Reservoir Habitat and Fish Populations**

LPs requested assessments of habitat in Project reservoirs, which fall into two categories: those focused on fish habitat use and population dynamics and those aimed at assessing littoral and riparian habitat along the reservoirs' shorelines.

The following study requests pertaining to habitat use and population dynamics were submitted: NPS-09 Quantifying the Productivity Potential of Reservoir Fish, USFWS-10 Habitat Use and Population Dynamics of Reservoir Fish, and WDFW-15 Habitat Use and Population Dynamics of Reservoir Fish. City Light has not adopted these study requests for the reasons discussed below.<sup>16</sup>

The studies requested to address habitat use and fish population dynamics constitute significant baseline information requests that could not be completed within the study program timeframe associated with the ILP. These study requests involve gathering data with the intent of identifying a Project effect that has not been documented to exist (18 CFR § 5.9(b)(5)).

Overall, it appears that the objectives of the study requests constitute an unnecessary expansion of activities being conducted or proposed by City Light. City Light believes that existing knowledge, data from ongoing efforts conducted in coordination with members of the NCC, along with data from its proposed studies, will provide information sufficient to address the LPs' concerns as reflected in the fish habitat use and population dynamics study requests. City Light has developed FA-06 Reservoir Native Fish Genetics Baseline Study to expand upon the existing baseline genetics data to make discernments regarding the three native salmonid species in Project reservoirs. The Food Web Study (as described in Section 3.2.2) being conducted by USGS in the Project vicinity (City Light 2019b) is structured to address a range of fish population-level phenomena (see also City Light's response in Section 6.3.3 of this RSP). City Light has provided LPs with a detailed account (City Light 2020b) of how the Food Web Study will provide the information being sought by the LPs. City Light is exploring, in collaboration with the USGS, methods for estimating the size of the Redside Shiner population in Ross Lake. The objectives of City Light's proposed FA-03 Reservoir Fish Stranding and Trapping Risk Assessment include desktop mapping of stranding and trapping risk locations for native fish species and a field-based step to ground-truth the mapping. City Light already has a Transitory Barrier Removal Program in place to ensure that reservoir fish are not precluded from accessing tributaries at critical times during their life-histories and has committed to expanding these surveys to both spring and fall.

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<sup>16</sup> Although City Light has concluded that these studies do not meet the FERC Study Criteria under section 5.9(b) of its regulations, 18 CFR § 5.9(b), and are not needed to analyze any Project-related effects, City Light believes that there is shared interest with the LPs in the long-term management of fish populations in Project reservoirs. Such matters can be properly addressed in a reservoir fisheries management plan to be developed during relicensing and implemented over the next license term.

City Light has agreed to FA-08 Fish Entrainment Study as part of the RSP (see Section 6.2.23 of this RSP). The NPS conducts ongoing spawning surveys, and an extensive water quality dataset, which will be augmented by City Light's proposed FA-01 Water Quality Monitoring Study (see Section 6.2.9 of this RSP) will provide information that can be used to assess the influence of ambient conditions on reservoir fish populations.

LPs submitted four study requests related to assessing shoreline habitat: NPS-06 Determine the Suitability and Productive Potential of Littoral and Riparian Habitat for Resident and Anadromous Fish in the Project Area, USFWS-07 Determine the Suitability and Productive Potential of Littoral and Riparian Habitat for Resident and Anadromous Fish in the Project Area, USIT-06 Littoral and Riparian Habitat Quality, and WDFW-14 Littoral and Riparian Habitat Quality. City Light has not adopted these study requests for the reasons discussed below.

The studies requested to address near-shore habitat quality are requests for baseline data gathering that could not be adequately completed within the ILP study timeframe. City Light believes that the LPs' proposals represent extensive data gathering exercises aimed at detecting a Project effect where none is indicated by existing information (18 CFR § 5.9(b)(5)). Reservoir water surface elevations fluctuate as the result of Project and non-Project (e.g., flood-control related operations stipulated by the USACE) actions, and this variation affects the shoreline. However, LPs point to no specific adverse effects demonstrated by the wealth of data already collected within the Project vicinity (18 CFR § 5.9(b)(4)).

Overall, the LPs' requests do not meet a majority of the FERC Study Criteria. City Light believes: (1) although goals and objectives are identified, they are not well linked to the proposed methodologies (18 CFR § 5.9(b)(6)); (2) there is no clear justification for why additional information is needed (18 CFR § 5.9(b)(4)); (3) although Project nexus is presumed by LPs, no evidence is provided of a site-specific Project effect, and there is little explanation of how the results would be used to inform the development of license requirements (18 CFR § 5.9(b)(5)); and (4) proposed study costs appear to be underestimates; in some cases it is unclear if one or two years of effort is being proposed (18 CFR § 5.9(b)(7)).

The proposed studies comprise a variety of shoreline surveys, such as woody debris inventories and shoreline erosion assessment. Much of the information sought by LPs is available as existing information or will be available as the result of studies proposed by City Light, and some will be derived, if appropriate, in the context of management plans that arise out of the relicensing. City Light's proposed GE-01 Reservoir Shoreline Erosion Study includes objectives to: (1) identify ongoing areas of erosion along the reservoirs' shorelines; (2) assess the contribution of Project and non-Project related factors to areas of erosion; (3) estimate shoreline erosion rates at representative unmonitored sites; (4) correlate existing erosion rates with erosion site characteristics (e.g., underlying geology, slope, aspect, shoreline height) to help estimate ongoing erosion rates; and (5) evaluate the condition and effectiveness of existing shoreline erosion control measures. City Light estimates the volume of woody debris entering Ross Lake and transports large wood downstream for release into the Skagit River below Gorge Powerhouse to benefit downstream aquatic habitat. The future monitoring and management of large wood, including its transport to the lower river and its use to enhance shoreline habitat in the Project reservoirs, will be a topic of discussion during the collaborative identification of PMEs for the next license term.

The study requests also contain management objectives or PME requests and as such do not constitute appropriate actions for this stage of the ILP. Examples of these include: (1) “Facilitate management objectives, including fish passage around the Skagit Dams, that would preserve the reproductive potential for genetically unique Bull Trout and other fish populations in Skagit Basin above the Cascade River;” (2) “Identify restoration opportunities to enhance habitat for native fish, amphibians, and wildlife and ameliorate turbidity;” (3) “Provide a means to assess the health and viability of populations in each reservoir and predict long-term persistence in the face of changing flow and temperature regimes and project operations.”

### 6.3.5 Engineered Spawning Channels

The Upper Skagit Indian Tribe (USIT-10) and WDFW (WDFW-07) each submitted a study request titled, Efficiency of Engineered Spawning Channels as Mitigation to Loss of Off Channel Habitats Downstream of the Skagit Project. As stated in the Upper Skagit Indian Tribe’s study request, “The goals of this study are to understand the engineered channels efficacy to salmonids, assess function and longevity of enhancement structures, identify the rate and root causes of their degradation, to inform the basis for long term enhancement, maintenance or alternative strategies.” Given the uncertainty regarding the eventual suite of PMEs for the Project (as discussed below), it is not prudent to allocate effort during the study period to the assessment of these channels, and as a result City Light has not adopted this study request.

Chum Salmon in the reach downstream of the Project are limited by the availability of spawning habitat. As a result, the FSA established the Off-Channel Chum Habitat Development and Improvement Program, i.e., the engineered spawning channels.<sup>17</sup> Although the channels functioned as intended to provide spawning habitat for Chum Salmon, they are nearing the end of their functional design life, and it is unclear whether their restoration and future use would constitute a potential PME during the next license term. As stated by the Upper Skagit Indian Tribe in its request, “...it will be important to assess whether improved channel forming processes offer a new management approach that is more inclusive and beneficial to other salmonids that use floodplain and off channel habitats.”

City Light is proposing to conduct studies to better understand fluvial geomorphologic conditions, riparian and aquatic habitat in the Skagit River reach downstream of Gorge Dam to the Sauk River. Some desired data identified in these study requests will be collected as part of GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study) and FA-02 Instream Flow Model Development Study. Hydraulic modeling (see Section 6.2.11 of this RSP), conducted to assess conditions between Gorge Powerhouse and the Sauk River confluence, will map substrate and cover and can evaluate the connectivity between mainstem flows and side channels considered to have significant habitat value. In its Geomorphology Study (see Section 6.2.15 of this RSP), City Light proposes to conduct scour monitoring and examine process flows in the Skagit River downstream of the Project. Information from the proposed study will also be used to evaluate the relationship between flow and substrate movement. Other potentially relevant information will be derived from the TR-01 Vegetation Mapping Study, which will involve systematic vegetation mapping that may be useful in describing existing riparian conditions and assessing potential Project-related habitat effects, and TR-02 Wetland Assessment. Potential PME

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<sup>17</sup> Engineered spawning channels for Chum Salmon include Park Slough, Newhalem Ponds, County Line Ponds, Taylor Channel, Powerline Channel, and Illabot Channels.

measures arising out of these analyses could include management of flow releases in combination with augmentation of coarse sediment and large wood to improve downstream habitat conditions.

City Light acknowledges that engineered channels may continue as part of the overall suite of PME for the Project, but before investing time and effort in assessing existing channels near the end of their functional design life it would be beneficial to first understand the potential role of these features in the context of other potential measures and actions in creating and maintaining functional mitigation habitat where it is most needed and effective. If engineered side channels are identified as a PME for the next license term, City Light will work with LPs to develop appropriate designs that provide multi-species benefits and identify implementation and performance monitoring metrics that will allow for the ongoing appraisal of the channels' effectiveness and any need for their maintenance or modification.

### **6.3.6 Creel Survey**

LPs submitted the following study requests for a creel survey in the Project reservoirs: NPS-04 Skagit Project Recreational Fishing (Creel) Survey, USFWS-05 Skagit Project Recreational Fishing (Creel) Survey, and WDFW-16 Recreational Fishing (Creel) Survey. City Light has not adopted these study requests for the reasons discussed below.

LPs request that City Light estimate fishing pressure and angling related morality, characterize the species, size, age, and parasite load of fishes caught, conduct an economic analysis of the fishery, assess angler knowledge of regulations, identify impacts to Bull Trout related to angling, and assess the effectiveness of fishing regulations. The objectives of these study requests (i.e., fisheries management, enforcement, and regulation) relate to the responsibilities of resource management agencies and are not appropriate to study as part of relicensing because of the lack of Project nexus and the information resulting from this study would not inform the development of license requirements appropriate for a licensee. As a standard practice, creel surveys are conducted by the state and federal agencies responsible for the management of these fisheries. Evidence of this fact is that at the Project, creel surveys have been conducted in Ross Lake in 1985, 1986, 1994, and in 2011. All of these surveys were conducted by WDFW (1980's and 1994) or the NPS (2011).

City Light is proposing FA-06 Reservoir Native Fish Genetics Baseline Study, and as part of current license implementation, is conducting a Reservoir Food Web Study and an Acoustic Telemetry Monitoring Project that has recently been expanded to include tagging and monitoring of Rainbow Trout and Dolly Varden in addition to Bull Trout. Information derived from these studies will provide a greater understanding of the population genetic structure, behavior, habitat preferences, and reservoir trophic dynamics of reservoir native fishes which may support LP fisheries management and regulatory objectives.

### **6.3.7 Effects of Climate Change on Hydrology and Project Operations**

LPs submitted study requests related to analyzing the effects of climate change on Project operations: NPS-14 Impact of a Changing Hydrologic Regime on the Operations of the Skagit Hydroelectric Project (#553), USFWS-14 Impact of a Changing Hydrologic Regime on the Operations of the Skagit Hydroelectric Project (#553), USIT-11 Impact of a Changing Hydrologic Regime on the Operations of the Skagit Hydroelectric Project (#553), and WDFW-12 Impact of a Changing Hydrologic Regime on the Operations of the Skagit Hydroelectric Project (#553).

The LPs requested that City Light analyze the effects of climate change on streamflows input to the Project and resulting effects on Project operations. They requested the following:

- (1) Seek updated regional projections on change in the region's hydrology.
- (2) Improve the existing DHSVM model by including new regional projects, reducing grid size, developing a snow transport and deposition capability at the landscape scale, and improving the groundwater component.

City Light has not adopted these study requests. City Light has already developed a DHSVM model using recent regional climate projects to inform the model and updates the model periodically as needed to inform hydroelectric operations. City Light plans to continue updating its model to inform Project operations during the new license; this will provide sufficient information to address LP concerns.

City Light is also developing an Operations Model (OM-01 Operations Model Study). The Operations Model will be capable of projecting the effects of alternative operating scenarios on available water storage, flow releases and release rates, lake levels and fluctuations, and relevant issues associated with or dependent upon water availability under different water year types and hydrologic regimes. Scenarios could be simulated in the Operations Model with alternate hydrologic conditions, such as the simulated stream flows from the DHSVM model. As part of the hydrologic data compilation, City Light will request input from LPs to make sure all relevant hydrologic information is considered. Typically, a contiguous long-term hydrologic period is selected to ensure the evaluation of wet, dry, and normal conditions, including extended multi-year conditions, such as multi-year droughts. Additional model sensitivities relative to changes in inflow hydrology due to potential climatic conditions can be employed in the modeling process as needed. These sensitivities analyses would be simulated with the Operations Model by modifying the hydrologic input data utilized by the model. In addition, and in response to comments on the PSP, City Light revised the Operations Model Study Plan to provide more detail on the schedule and process for scenario evaluations, including the addition of a half-day workshop with LPs to discuss scenario development and execution, as well as providing an example scenario request form. Typically, scenario requests from different LPs may overlap with one another or be outside the physical capability of the system. Each scenario request requires a detailed review and will be discussed with LPs on the most efficient application of requested scenarios.

### **6.3.8 Gorge Dam Removal**

The Upper Skagit Indian Tribe submitted a request to study the removal of Gorge Dam (USIT-04 Gorge Dam Removal). The goal of the requested study is “to examine the ongoing impacts of Gorge Dam on anadromous salmonid habitat productivity, and viable salmonid populations while exploring the possible ecological and social economic effects of Gorge Dam removal.” Individual components of the study request include investigating the degree to which Gorge Dam blocks anadromous fish passage, impairs habitat in the Gorge bypass reach and tributary habitat above the impoundment, and alters anadromous salmonid productivity below the impoundment. To the degree the study request of Gorge Dam removal includes these stated components, City Light has adopted this study request, in part, as City Light is proposing to undertake a number of fish and aquatics, and geomorphology studies to investigate these potential effects of the Skagit River Project on the resources identified in the study request. However, to the extent the study request



includes an exploration of the “possible ecological and social economic effects of Gorge Dam removal,” City Light has not adopted the study request for the reasons discussed below.

First, the request constitutes a study of a specific mitigation measure, dam removal, which has not been shown to be necessary or warranted. Under the ILP, the development of proposals for mitigation measures necessarily must occur after appropriate studies of potential Project effects have undergone rigorous scientific investigation, a step which has yet to occur in the relicensing process for the Skagit River Project. In SD1, FERC determined that decommissioning was not an alternative to be considered in the Skagit River Project relicensing and reiterated the Commission’s long-held policy that “decommissioning is not a reasonable alternative to relicensing in most cases.” SD1 went further to explain that for a variety of reasons:

*“.. the Commission does not speculate about possible decommissioning measures at the time of relicensing, but rather waits until an applicant actually proposes to decommission a project, or a participant in a relicensing proceeding demonstrates that there are serious resource concerns that cannot be addressed with appropriate license measures and that make decommissioning a reasonable alternative. City Light does not propose decommissioning, nor does the record to date demonstrate there are serious resource concerns that cannot be mitigated if the project is relicensed; as such, there is no reason, at this time, to include decommissioning as a reasonable alternative to be evaluated and studied as part of staff’s NEPA analysis.”*

Therefore, for FERC to consider a proposal to decommission the Gorge Dam or even a proposal to study such a measure, the request to conduct such a study needs to demonstrate that a resource concern exists that cannot be addressed through other measures. While the Upper Skagit Indian Tribe’s study request identifies possible resource concerns, concerns which City Light has already proposed to study, the requested study does not demonstrate that there are significant resource impacts which cannot be addressed by other measures, nor does it demonstrate that these impacts are occurring. Indeed, the study request itself asks for “exploring the possible ecological and social economic effects of Gorge Dam removal.”

City Light acknowledges that the extent to which a serious resource impact should be clearly demonstrated may be proportional to the overall benefits and importance of a project. For example, a 500-kW project that impairs the migration of an ESA-listed fish may require less of a showing of impacts than a much larger project. At 200 MW, the Gorge Development must be considered a large generating facility. However, size alone is not its only significance, as this goes well beyond its generating capability. The Skagit Hydroelectric Project provides approximately 20 percent of Seattle’s energy needs. The Gorge Development provides 40 percent of the energy produced by the Skagit River Project. The Gorge Development is an essential energy resource for City Light customers and the region as a whole.

The Gorge Development operates as part of the Ross-Diablo-Gorge integrated system of operations. Removing any part of the system and the system as a whole is materially reduced in operational value beyond the loss of the single component. The Gorge Development, working in conjunction with Ross and Diablo, is vital for delivery of ancillary services to the electrical grid, including voltage and frequency control, operating reserves, and overall control area functions. These services bring stability, reliability, and resiliency to City Light’s system and the electrical grid as a whole, all of this with a renewable energy source. The Gorge Development produces

needed clean, renewable energy and capacity, and this renewable energy is essential to combatting climate change. The Gorge Development system benefits of reliability will become even more valuable as non-renewable, carbon dioxide emitting base load resources are decommissioned. Gorge operations allow greater ability for City Light to incorporate intermittent renewable energy for City Light customers and the region at large, and its loss would restrict City Light's further integration of solar and wind energy.

Beyond its role and benefits to the electrical system, Gorge operations bring considerable value to the Skagit River resources and environment. In its role as an afterbay for Diablo and Ross, Gorge operations allow precise control of downstream flows and associated river stage to benefit and enhance fish life stages of spawning and egg incubation. The Gorge Development also plays a role in the flood control operations of the Skagit River Project for protection of Skagit Valley infrastructure and lands, a role the Gorge Development played just recently by enabling regulation of river stage by controlling potential flow fluctuations in downstream reaches due to tributary inflows below Diablo Dam. With four turbine-generators, the Gorge Development has a high degree of flexibility to optimize downstream flows for fishery resources, to limit scour, while allowing response to rapid changes in system disturbances and downstream resource needs.

Given its size and overall significance to the electrical system and Skagit River resources, the need for an actual demonstration—that is, proof—of the existence of a serious resource impact is required to demonstrate the requested study, but is absent in the study request.

Moreover, the study request does not meet the FERC Study Criteria for the following reasons: (1) the study request does not provide clear goals and objectives (18 CFR § 5.9(b)(1)); (2) it does not demonstrate a nexus between Project operations and the resource to be studied (18 CFR § 5.9(b)(5)); (3) the study does not conform to generally accepted practice in FERC relicensings (18 CFR § 5.9(b)(6)); and (4) the level of effort and cost would be excessive (18 CFR § 5.9(b)(7)). The study request to “explore” the possible effects of such a mitigation measure is insufficient rationale to undertake such a costly study. A reasonable connection between Project operations and effects on anadromous fish has not been shown in the study request. Moreover, the great majority of the study request consists of study components already requested in other study requests, studies which City Light is proposing to undertake. The dam removal portion of the study request is a request for FERC to consider a specific PME measure that lacks any evidentiary foundation.

For these reasons, City Light has not adopted the dam removal portion of this study request.

### **6.3.9 Climbing Study**

The Access Fund (AF) and Washington Climbers Coalition (WCC) filed a study request (AFWCC-01 Climbing Resources Study) designed to investigate rock climbing opportunities and conduct the requisite botanical, cultural and wildlife studies needed to establish new climbing management areas (CMA). The four proposed CMAs include three CMAs on lands managed by NPS (the Space Wall, Canoehalem, and Gorge Bypass Reach CMAs) and one CMA (comprised of Maintenance Wall, After Hours Crag, and Wu Tang Wall) on City Light-owned lands adjacent to the existing Town Crags CMA on lands managed by NPS located near Newhalem. All of these proposed CMAs are located outside the Project Boundary. The AF/WCC request states the natural resource data collected from the field studies could be used by the NPS to complete their NEPA review of the

proposed CMAs on lands managed by NPS. City Light has not adopted the AFWCC-01 Climbing Resources Study request for the reasons described below.

First, the study request does not demonstrate any nexus between Project operations and effects on climbing resources (18 CFR § 5.9(b)(5)). City Light, as the licensee, must provide adequate access for recreation on Project lands and waters, however, the proposed CMA locations are not within the Project Boundary. The proposed Space Wall CMA is located 1.2 miles east of Newhalem above Highway 20 to the north of the Project Boundary. Canohalem is located on the southern side of Gorge Lake and while access to the CMA is via Gorge Lake from State Route (SR) 20 on the north side, the actual climbing area is located outside the Project Boundary to the south of the Project. The Project does not restrict access to the area of Gorge Lake where the proposed new CMA would be located. The proposed Gorge Bypass Reach CMA would utilize boulders for climbing within the Gorge bypass reach, which is also outside the Project Boundary. The fourth proposed CMA is abutting the existing Town Crags CMA outside of and to the north of the Project Boundary at Newhalem on City Light-owned lands.

Second, the NPS, not City Light, is responsible for designating and managing CMAs on land within the RLNRA managed by NPS. The NPS only allows rock climbing in designated CMAs within the RLNRA, per the 2012 RLNRA General Management Plan. The NPS process for establishing new climbing areas in the RLNRA includes a NEPA process supported by the requisite botanical, cultural and wildlife studies to assess potential impacts. There are currently four approved CMAs in RLNRA, including Town Crags, Newhalem East, Newhalem West, and Diablo. Three of the four new CMAs proposed by AF and WCC are located on lands managed by NPS, and therefore fall under the NPS's jurisdiction. For these reasons, City Light does not propose to include the AF and WCC study request in City Light's PSP.

### **6.3.10 Mitigation Lands – Cost-Benefit Analysis**

One LP submitted study requests related to its characterization of a tax shift burden arising from City Light's acquisition of mitigation lands (SC-02 Mitigation Lands). City Light has not adopted this study request for the reasons discussed below.

In its study request, Skagit County requested a cost-benefit assessment of City Light's mitigation lands program to assess merits of future mitigation land acquisition, including an assessment of the shifted tax burden to Skagit County taxpayers. This proposed study plan is not included in this RSP because such an investigation will not inform the development of license requirements (18 CFR § 5.9(b)(5)). It is well settled that FERC has no authority to award damages, including the assessment of payments in lieu of taxes, or to fund local governmental functions.<sup>18</sup>

The LP's identified concerns include limitations of the acquired mitigation lands to improve salmonid populations (including a request for smolt production and outmigrant survival count), and ongoing management and stewardship actions related to mitigation lands. The LP also specifically cites a concern about proliferation of illegal activities and impacts on local law enforcement. This is a statement on proper or desired methods for selection and management of

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<sup>18</sup> *E.g., S. Carolina Pub. Serv. Co. v. FERC*, 850 F.2d 788 (D.C. Cir. 1988); *County of Butte v. Cal. Dep't of Water Resources*, 128 FERC ¶ 61,068, *reh'g denied*, 129 FERC ¶ 61,133 (2009); *Confederated Salish and Kootenai Tribes*, 153 FERC ¶ 61,217, at P 21 (2015); *N.Y. Power Auth.*, 120 FERC ¶ 61,266, at PP 31-33 (2007).

mitigation lands rather than a study request. City Light is aware of very few instances when Skagit County has had to respond to City Light mitigation lands for law enforcement issues. Skagit County has assisted with eviction at a few non-license conservation lands, but City Light directly paid the Sheriff in those events. More than 10,300 acres of the City Light mitigation lands in Skagit County were acquired pursuant to the Wildlife Settlement Agreement. These lands primarily address wildlife mitigation purposes/services, although many have a secondary direct or indirect benefit for salmonids. It would not be possible to quantify the number of salmon produced associated with each acquisition. The Skagit Mitigation Land Management Plan (City Light 2006) summarizes habitat acreages for key wildlife species in parcels owned at that time. The new management plan will update this information for current priority species and all of the lands owned. At least seven proposed studies (GE-02, TR-01, TR-02, TR-04, TR-05, TR-07, and TR-09) include information gathering on mitigation lands which will serve as the information base for management plans in the new license.

City Light notes that Skagit County states that the mitigation lands "...provides additional hunting land for tribal members". It is policy that City Light mitigation lands be open to all tribal members and the non-tribal public for hunting, fishing, and non-motorized daytime recreation if the activities are consistent with wildlife resource management objectives and abide by state and tribal laws. This is stated in the 2006 Management Plan and on the City Light website with the public use policy.<sup>19</sup>

### **6.3.11 Mitigation Lands – Habitat**

Three LPs submitted study requests related to mitigation lands habitat: SITC-02 Fish and Wildlife Mitigation Land Access, Stewardship and Habitat Assessment; USIT-12 Fish and Wildlife Mitigation Land Access, Stewardship and Habitat Assessment (Mitigation Lands); and USFWS-18 Assessment of Fish and Wildlife Conservation Lands: Access, Stewardship, and Habitat Use.

In their study requests, Swinomish Indian Tribal Community, Upper Skagit Indian Tribe, and USFWS requested that City Light assess access to mitigation lands and evaluate the potential for these lands to support culturally significant and special-status species.

The LPs' study requests do not meet FERC Study Criteria, as the study requests do not demonstrate nexus between Project operations and effects on mitigation land habitat (18 CFR §§ 5.9(b)(5)). Although City Light has concluded that these studies do not meet the FERC Study Criteria and are not needed to analyze Project-related effects, City Light believes that there is shared interest with the LPs in managing mitigation lands for habitats and species. City Light believes that such matters would best be addressed in a management plan and, as described below, City Light has proposed to develop a new management plan for mitigation lands in consultation with LPs.

Every parcel acquired for wildlife mitigation was approved by all members of the Wildlife Management Review Committee (WMRC) comprised of representatives from Settlement Agreement signatories, including the Swinomish Indian Tribal Community, Upper Skagit Indian Tribe, and Sauk-Suiattle Indian Tribe. The primary purpose of the mitigation land is to protect and enhance habitat for wildlife. For this reason, the WMRC focused on acquisition of properties that are adjacent to federal, WDFW, and conservation organization lands to maximize habitat

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<sup>19</sup> [http://www.seattle.gov/light/skagit/docs/SCL\\_Conservation\\_Lands\\_Public\\_Use\\_Policy\\_20180619.pdf](http://www.seattle.gov/light/skagit/docs/SCL_Conservation_Lands_Public_Use_Policy_20180619.pdf)

connectivity and protection. However, there are some parcels that are adjacent to private properties. In these areas City Light works to form partnerships with willing neighbors to steward the area but also occasionally needs to install signage and gates and, in a few cases, pursue law enforcement actions to address issues of illegal activity. Public usage (hunting, fishing, gathering, recreation, etc.) is secondary to habitat protection and sometimes limited, which is beneficial for many wildlife species. Access to mitigation lands is allowed for anyone.

LPs also identify concerns regarding impacts of illegal activities and the need to evaluate the potential for mitigation lands to support species of concern. City Light has successfully reduced impacts at the limited locations where trespass has impacted habitat (City Light notes that this is one reason more isolated properties afford greater protection of habitat). Each parcel has unique set of habitat conditions, adjoining land uses, and issues, and thus unique opportunities and constraints for habitat management for target species. City Light's current management funds have been mostly used to remove culverts, bridges, roads and riprap, prevent illegal activities, and improve elk forage habitat at sites selected in coordination with the Indian tribes. As identified in the current Settlement Agreement and directed by the WMRC, the funding for wildlife habitat was to be focused on land acquisition. Management was to be relatively passive, with the intent of allowing forests to mature.

City Light recognizes that additional habitat enhancement actions can be implemented in some areas and looks forward to working with LPs to develop updated management plans. City Light has proposed to develop a new management plan for mitigation lands in consultation with LPs after proposed TR-01 Vegetation Mapping Study, TR-02 Wetland Assessment, TR-04 Invasive Plants Study, GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study, TR-05 Marbled Murrelet Study, TR-09 Beaver Habitat Assessment, and TR-10 NSO Habitat Analysis are completed during relicensing. Information on benefits to fish and wildlife, habitat conditions of the mitigation lands, instances of illegal activity, access issues and land use changes near mitigation lands would be included in the assessment of each parcel. This assessment will provide a basis for developing parcel-specific management objectives and actions and would be compiled into an updated management plan for mitigation lands. The plan could also include identification of additional data collection needed to determine or refine management actions (e.g., access, where to focus elk forage enhancement; habitat for murrelets, spotted owls, and forest carnivores; wetland-dependent species; stream/riparian habitat, etc.).

### **6.3.12 Wildlife Studies – Connectivity**

Four LPs submitted study requests related to wildlife connectivity: SITC-01 Reservoir Operation Impacts on Terrestrial Wildlife, USIT-14 Impact of the Operations of Skagit Hydroelectric Project (#553) on Terrestrial Wildlife (Wildlife Connectivity), USFWS-17 Impact of Operations of the Skagit Hydroelectric Project on Terrestrial Wildlife Connectivity; and WDFW-19 Impact of the Operations of Skagit Hydroelectric Project (#553) on Terrestrial Wildlife (Wildlife Connectivity). The Upper Skagit Indian Tribe, Swinomish Indian Tribal Community, USFWS, and WDFW have requested a study to assess the impacts of the reservoirs, Project infrastructure, SR 20, and recreation on the ability of wildlife to move around the region and maintain healthy populations, or for ESA-listed species to recover. Species of concern are identified as follows: mountain goat, pine marten, Pacific fisher, gray wolf, Grizzly bear, Canada lynx and wolverine. Additionally, the

request includes generating a population estimate for mountain goats in North Cascades National Park, RLNRA, and the surrounding area.

The study requests do not provide information to demonstrate the need for a study based on the FERC Study Criteria as outlined below.

All the study requests identified above requested a study examining the impacts of the Project on wildlife connectivity; the presumed need is adverse effect. There is no evidence for of such an adverse effect. There is no evidence provided in the request (18 CFR § 5.9(b)(5)) that the Project isolates wildlife populations or hinders movement, to any significant degree, of mountain goat or other wildlife populations, including the species of concern. Mountain goat population suppression is an issue throughout the North Cascades and is not limited to the Project. Welch et al. (1997) surveyed large portions of RLNRA and surrounding North Cascades National Park and found very few goats. They hypothesized that this could be due to lower habitat quality (large patches of open subalpine meadows [the preferred foraging habitat] situated near escape terrain seems to be lacking compared to the terrain to the east and west), lack of natural salt licks, or lack of satisfactory winter habitat nearby. While Parks et al. (2015) found that freeways, highways, water, agriculture, and urban landcover limit gene flow in mountain goat populations in Washington and British Columbia, the study does not provide evidence that the Project affects goat movement, and other studies suggest that patterns are poorly understood. The Washington Wildlife Habitat Connectivity Working Group found low- and moderate-cost linkages between mountain goat habitat concentration areas, but I-90 and Fraser River Valley are the most substantial restrictions. In a study that encompassed the North Cascades, Shirk et al. (2010) found that I-90 has a major effect on north-south movement and suggested "...water bodies like those found within the study area are not major impediments to gene flow. Indeed, mountain goats are capable swimmers and have been observed crossing major lakes and rivers."

The study requests do not demonstrate nexus between Project operations and wildlife movement in the Project vicinity (18 CFR § 5.9(b)(5)).

There have been some recent research projects on forest carnivores relevant to this connectivity. Aubry et al. (2012) documented extensive wolverine movement east and north of Ross Lake and into British Columbia where core populations occur. Long et al. (2013) found north and south black bear genetic population segments with a steep gradient near Highway 2, but no evidence of structuring within the vicinity of the Project. They also found no evidence of genetic structuring for marten populations (but sample sizes were small). Previous concurrence letters from USFWS determined that continued routine operation of the Project was "likely to affect, not likely to adversely affect" the grizzly bear and gray wolf (letter from D. Frederick, State Supervisor, USFWS, Olympia, WA, to J. Clement, Acting Director, FERC, Washington D.C., August 10, 1994).

City Light is not responsible for potential impacts of SR 20 on wildlife movement in the region as it is not a Project facility. Additionally, SR 20 is not comparable to I-90, which research has identified as a barrier to wildlife movement. SR 20 is a much narrower road with far less traffic and is closed for five months out of the year. A regional study focusing on connectivity would require a multi-year regional effort and would have severe limitations in its ability to isolate the effects of the Project from other factors influencing wildlife movement and connectivity. City

Light does not believe a relicensing study is warranted as the study requests did not provide evidence that the Project has an adverse effect on wildlife movement in the region (18 CFR § 5.9(b)(5)).

City Light understands the LPs' desire for more information on wildlife in the vicinity of the Project to assist with management decisions. City Light will continue to fund relevant research under its Wildlife Grant Program in the current license. Data from those studies will be integrated into the relicensing process, as appropriate.

City Light understands the general interest in mountain goat populations and the absence of recent data for the North Cascades. City Light commits to helping with funding for a helicopter survey of mountain goats in cooperation with the NPS and WDFW. This survey would be conducted in 2021 or 2022. The data would be made available to the Indian tribes and others for management purposes. City Light believes that this can be accomplished outside the relicensing study program.

### **6.3.13 Wildlife Studies – Harlequin Duck**

The Stillaguamish Tribe of Indians submitted a study request related to harlequin duck (STI-05 Harlequin Duck Breeding Habitat Analysis). City Light has not adopted this study request for the reasons discussed below.

The study request does not address the FERC Study Criteria. The study request does not provide evidence of a Project effect on harlequin duck populations. City Light does not believe a Harlequin Duck Breeding Habitat Analysis is warranted as the request does not attempt to demonstrate nexus between the Project and harlequin duck populations (18 CFR § 5.9(b)(5)). Harlequin ducks nest near fast-flowing water with loafing sites nearby; typically nesting on the ground but also in tree cavities. WDFW data indicate the presence of harlequin duck in tributaries to the Skagit River outside of the North Cascades National Park Complex, and surveys in the park have documented its presence (Hoffman et al. 2015), however, there are fewer than 10 observations of harlequin duck posted on eBird in the park (Hoffman et al. 2015) and all are associated with creeks and rivers that are not near the Project. Harlequin duck population numbers in the Project vicinity are unknown and occurrence within the Project Boundary has not been documented.

### **6.3.14 Transmission Line**

Four LPs submitted study requests related to the transmission line and impacts on wildlife and plant species: SSIT-02 Impacts of Transmission Line Corridor Right-of-Way (ROW) on Terrestrial Wildlife/Habitat and Native Plant Species, USIT-13 Impacts of Transmission Line Right-of-Way (ROW) on Terrestrial Wildlife/Habitat and Native Plant Species, USFWS-17 Impact of Operations of the Skagit Hydroelectric Project on Terrestrial Wildlife connectivity, and WDFW-18 Impacts of Transmission Line Corridor Right-of-Way (ROW) on Terrestrial Wildlife/Habitat and Native Plant Species. The Sauk-Suiattle Indian Tribe, Upper Skagit Indian Tribe, USFWS, and WDFW have requested a study to assess the impact of the transmission line ROW on plant and wildlife species and inform the development of updated management plans and site-specific management activities to enhance terrestrial wildlife habitat. The study requests include surveys for deer and elk, avian species, and vegetation surveys to provide a quantitative analysis of species presence and abundance, availability, and inform how the Project may be

affecting habitat and resource quality and availability. The study request also includes forage species energy assessment and visual screening quality assessment along roads.

City Light has not adopted these study requests for the reasons discussed below. Although City Light has concluded that these studies do not meet FERC Study Criteria and are not needed to analyze Project-related effects, City Light believes that there is shared interest with the LPs in understanding appropriate management actions and their effectiveness over time in the transmission line ROW. These matters can be properly addressed in a transmission line vegetation management plan to be developed during relicensing and implemented over the next license term.

The study requests do not provide information to demonstrate how the information would be used to inform license requirements or provide evidence of a Project effect (18 CFR § 5.9(b)(5)).

City Light believes its proposed studies including GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study (Erosion and Geologic Hazards Study), TR-01 Vegetation Mapping Study, TR-02 Wetland Assessment, and TR-04 Invasive Plants Study are adequate to assess the Project effects related to the transmission line ROW for relicensing in the ILP.

City Light recognizes that the ROW provides habitat benefits for some wildlife species as an early successional habitat corridor through agricultural and second-growth forested areas and that vegetation management plays a major role in habitat quality. During 2020, City Light has been collecting data on plant communities, species, and general structure as part of its Vegetation Mapping Study and Wetland Assessment, and will be collecting data on invasive plant species (Invasive Plants Study) in 2021. The results of these studies along with data from the Erosion and Geologic Hazards Study will be used to inform the development of a vegetation management plan for the transmission line ROW. City Light's proposed approach is to use the data collected during relicensing studies to identify sections of ROW that have different types and general qualities of habitat and identify locations where City Light can improve habitat.

City Light is committed to considering more focused data collection in areas where it is feasible to impact management by expanding upon the vegetation mapping study once management objectives in the transmission line ROW are further developed. City Light is considering the following data needs to inform management actions: dominant plant species composition, vegetation height, percent cover; and qualitative assessment of plant species diversity, patchiness, and vegetation structure. City Light will consider information including (but not limited to) the following to determine where to focus habitat improvement efforts: results of proposed relicensing studies on wildlife, vegetation mapping, and invasive species; land ownership; adjacent vegetation communities; topographic and landscape position; proximity to roads; habitat connectivity; cover measurements of screening vegetation along roads; and soil types (to inform drainage patterns). City Light will assess and determine appropriate management methods once locations have been determined.

These data will be used during collaborative development of the management plan with LPs to select specific areas of the ROW that should be prioritized for habitat improvements. The management plan may include additional studies or surveys to further refine habitat improvement activities, locations, site-specific objectives, and methods; as well as implementation and



effectiveness monitoring, and adaptation management as needed. This could include data on forage species abundance and nutritional value in treatment areas to document baseline conditions. Management plans will include BMPs to protect natural and cultural resources from direct and indirect effects from ROW O&M activities as well as indirect effects due to recreational use of City Light roads and trails.

In their study requests, LPs requested that City Light conduct deer, elk, and bird surveys to quantify species presence and abundance in the ROW. City Light agrees that vegetation management can affect deer and elk habitat and bird use of the ROW, however, spotlight surveys for ungulates and bird surveys are not likely to add significant relevant information that will be used for the formulation of license requirements. These surveys would also be very difficult to implement except in a few segments of the line. There are additional limiting factors are not related to the Project that impact deer, elk and avian use of the area; therefore City Light believes its proposed relicensing studies that focus on vegetation should be used to develop actions in the ROW management plan that would improve habitat at select sites for these species.

### **6.3.15 Siren Warning System**

Skagit County submitted the proposed study request, SC-01 Skagit County Siren Warning Study.

The goals of this study request are to identify and memorialize effective emergency communication strategies between Seattle City Light and Eastern Skagit County. Specific objectives of this study request are:

- (1) For Seattle City Light to define and implement the necessary attributes of a safe and effective dam failure early warning system in Eastern Skagit County; and
- (2) For Seattle City Light to define emergency communication protocols for Eastern Skagit County for events outside a dam failure, including imminent flooding and wildfire response.

Skagit County's request states that the system relies largely on a continuous ringing of the local fire district's sirens, which ring numerous times a day on most days for other reasons, inuring citizens to an actual alert of potential dam failure. The study request proposes a literature review on BMPs for siren notifications, developing a project to implement those practices, and identifying upgrades to be distributed to Eastern Skagit County emergency responders for additional input.

City Light does not propose to study the siren warning system for several reasons. The Project's siren warning system was updated in 2010. The system reliably functions as intended and reaches all of the populations in close proximity to the Project. The next area of population downstream from the siren's audibility has approximately 1 hour and 5 minutes before the front edge of a worst-case scenario dam failure flood wave would reach that population. According to FERC guidelines, this is enough time to be alerted by Skagit County's alert and warning procedures, and the Wireless Emergency Alert, for a dam failure flash flood that would be sent out by the National Weather Service. City Light proposes to continue to work with Skagit County on identifying improvements in the siren warning system and communications with local populations. City Light believes this topic is appropriate to be addressed outside of relicensing and does not require a relicensing study.

## 7.0 PROJECT INFORMATION

City Light has established a standard Project centerline and PRM for use throughout the Skagit River Project relicensing process. The common and static RM system will allow for study data and information to be collected, organized, analyzed, and shared in a consistent and standardized manner. The Project centerline extent is from the mouth of the mainstem Skagit River in Skagit Bay to approximately 5 miles upstream from the Canadian border. The centerline was delineated based on a combination of various available information sources: riverbed topography from recent bathymetric LiDAR data, ESRI World and Google Earth aerial imagery, and the USACE’s Skagit & Baker Projects Corps Water Management System.

Table 7.0-1 provides a cross-reference of USGS RM and PRM values for common Project and riverine features.

**Table 7.0-1. USGS RM and PRM system crosswalk.**

<b>Project Component</b>	<b>USGS River Mile<sup>1</sup></b>	<b>Project River Mile (PRM)</b>
Sauk River confluence with the Skagit River	66.6	66.7
Marblemount (town)	78	78.3
Marblemount USGS gage 12181000	78.7	79
Newhalem USGS gage 12178000	93.7	94.3
Newhalem (town)	94	94.5
Gorge Powerhouse	94.2	94.7
Gorge Dam	96.6	97.2
Upstream end of Gorge Lake	99.8	100.4
Diablo (town)	100	100.6
Diablo Powerhouse	100.2	100.8
Diablo Dam	101.2	101.6
Upstream end of Diablo Lake	105	105.6
Ross Powerhouse	104.9	105.5
Ross Dam	105.1	105.7
Upstream end of Ross Lake in U.S.	127	127.9

<sup>1</sup> River miles are approximate.

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**REVISED STUDY PLAN**

**APPENDICES**

**REVISED STUDY PLAN**

**APPENDIX A**

**CONVERSION TABLE OF CITY OF SEATTLE DATUM TO NAVD 88 DATUM**

## Skagit River Project Elevation Transformation Table

City Light As-Built to NAVD 88 Datum  
Last Revised 10/8/2020

SPU was tasked to densify the elevations on the Skagit River Hydroelectric Project from the established NAVD 88 benchmarks that was done in 2015 for the Height Modernization. These benchmarks were published by the NGS (National Geodetic Survey). SPU used these published benchmarks to establish NAVD 88 elevations on a number of existing City Light benchmarks, staff gages, and elevations of powerhouses and top of dam elevations to obtain a comparison between the existing City of Seattle datum (CoSD) elevations from as-built drawings and the NAVD 88 datum. Below is the comparison of elevations of these items at each site on the Skagit River Hydroelectric Project.

### Notes:

- (1) All elevations are in US Survey Feet.
- (2) Refer to Geodetic Control Tables for each of the below networks.
- (3) No guarantees are made for adjustment of feature elevations not listed in this table and additional survey may be required to determine current elevation of the feature in question.
- (4) Above features are not to be used for survey control. All surveys shall use NGS benchmarks shown on Drawings D-44743 through D-44746.

PtNo / Station	Control Network and Feature	Reference	As-Built CoSD El. (feet)	Surveyed El. in NAVD-88 (feet)	Delta (feet)	Notes
<b>Newhalem</b>						
910	Gorge Powerhouse Finish Floor	D-44944	515.75	521.97	+6.22	
911	Gorge Powerhouse Tailrace Staff Gage (Physical)	Physical Gage	501.00	507.34	+6.34	Survey is to physical gage.
912	Gorge Powerhouse Tailrace Staff Gage (Electronic)	Electronic Reading	492.02	498.50	+6.48	SPU Survey indicates Water El. 498.5 ft NAVD-88 at 1:19 PM on 9/30/2019. Lake water surface elevation electronically recorded at 492.02 ft City Light per PI data from Don Tinker.

PtNo / Station	Control Network and Feature	Reference	As-Built CoSD El. (feet)	Surveyed El. in NAVD-88 (feet)	Delta (feet)	Notes
905	Newhalem Skagit River Gage USGS Gage 12178000	Physical Gage USGS 12178000	488.00	494.20	+6.20	Datum of Gage is 407.7 ft above NAVD-88. 3 measurements made at 488.0 ft, 484.0 ft on gage, and benchmark on river gage building resulting in deltas of 6.20, 6.21, and 6.20 ft, respectively. 6.20 ft selected.
<b>Gorge Dam</b>						
1002	Top of Gorge Dam	D-49941	880.67	886.97	+6.30	SCL brass disc in concrete 2.5 ft east of D/S parapet wall
GWTR	Gorge Lake Staff Gage	Electronic Reading USGS 12177700	871.26	877.77	+6.51	Datum of Gage is 6.51 feet above NAVD-88. 871.26 is electronic reading from powerhouse. Physical gage matched reading as of 5/21/2018.
<b>Diablo (Powerhouse/Hollywood Townsite)</b>						
2030	Diablo Powerhouse	RR Map El., FB 49A, PG10	892.39	898.77	+6.38	Finish floor elevation surveyed 897.42 (+6.42 ft). 6.38 feet selected based on brass cap.
WTR	Diablo Tailrace Elevation	Electronic Reading	876.22	882.48	+6.26	El. 876.22 is electronic reading from powerhouse. Physical gage matched (+6.30).
2027	Stetattle Creek Bridge	RR Map	890.78	897.16	+6.38	Based off of SCL Survey Field Book 49A, Page 9 using the Railroad (RR) Map Elevation.
<b>Diablo Dam</b>						
3008	Top of Dam (0+00 level pegging station)	D-44947	1218.00	1224.72	+6.72	Use +6.65 for Diablo Dam
3009	Top of Dam (2+00 level pegging station)	D-44947	1218.00	1224.59	+6.59	Use +6.65 for Diablo Dam

PtNo / Station	Control Network and Feature	Reference	As-Built CoSD El. (feet)	Surveyed El. in NAVD-88 (feet)	Delta (feet)	Notes
3007	SCL Benchmark NE end of bathrooms	Benchmark	1219.69	1226.01	+6.32	
3011	Diablo Lake Staff Gage (physical)	Physical Gage	1209.00	1215.37	+6.37	Upper panel replaced September 2020 and surveyed again by SPU 9/29/20.
3012	Diablo Lake Staff Gage (electronic)	Electronic Reading	1201.20	1207.56	+6.36	SPU Survey indicates Water El. 1207.56 ft NAVD-88 at 12:20 PM on 10/01/2019. Lake water surface elevation electronically recorded at 1201.20 ft SCL per PI data from Don Tinker.
	Diablo Intake	D-16717	1208.00			As surveyed on 9/29/20 by SPU, matched with staff gage (within a couple hundreths, actual value forthcoming in SPU report).
	Diablo Surge Tank					Placeholder - estimate of conversion values forthcoming in following SPU report.
<b>Ross Dam (and Powerhouse)</b>						
4009	Top of Dam at toe of D/S parapet wall	D-44952	1615.25	1621.45	+6.20	Upstream wall also had delta of +6.20 ft.
4017	Ross Powerhouse Finish Floor	D-44954	1236.50	1242.65	+6.15	
4011	Ross Lake Staff Gage	Physical Gage	1615.10	1621.36	+6.26	Survey is to physical gage. Electronic gage not verified and reportedly fluctuates.
4015	Ross Powerhouse Tailrace Staff Gage	Physical Gage	1205.00	1210.96	+5.96	Survey is to physical staff gage.

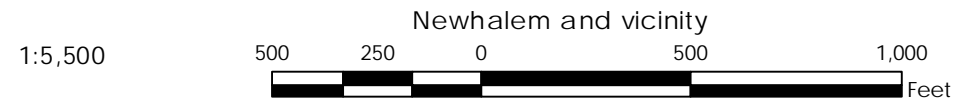
PtNo / Station	Control Network and Feature	Reference	As-Built CoSD El. (feet)	Surveyed El. in NAVD-88 (feet)	Delta (feet)	Notes
4016	Ross Powerhouse Tailrace Staff Gage	Electronic Reading	1203.71	1209.67	+5.96	<p>SPU Survey indicates Water El. El.1209.67 ft NAVD88 at 11:06 AM on 10/03/2019. Tailrace water surface elevation electronically recorded to be 1203.67 ft City Light per PI data from D. Tinker. B. Vavrek verified that powerhouse reading matched with Operator Bob See and PI data per D. Tinker 9/28/20 @ 2:08 PM (1200.38 visual, 1200.38 powerhouse, ~1200.36 PI). Value matched to physical gage based on powerhouse reading and visual water level matching within 0.01 ft.</p>



PLEASE NOTE:  
 1. All elevations are in US Survey Feet.  
 2. Refer to Geodetic Control Tables for each network.  
 3. Please contact SCL Technical Resources or SPU Surver for a densification in an area not referenced in this map.  
 4. All surveys shall use NGS benchmarks shown on Drawings D-44743 through D-44746.  
 5. Refer to 'Skagit Project Elevation Transformation Table' Rev. 10/08/2020 for Datum Conversion details. The following equation is used to convert between the City of Seattle (COS) Datum and NAVD-88 Datum:  
 COS Datum Elevation + Delta = NAVD-88.  
 6. No guarantees are made for adjustment of feature elevations not listed in above table and additional survey may be required to determine current elevation of the feature in question.  
 7. The survey reading for physical gage(s) was taken at a mark on the physical gage(s) and should NOT be used for the actual water surface elevation. As of 10/08/2020, SCL has not surveyed any water surface elevations.



### NAVD-88 Survey Elevations



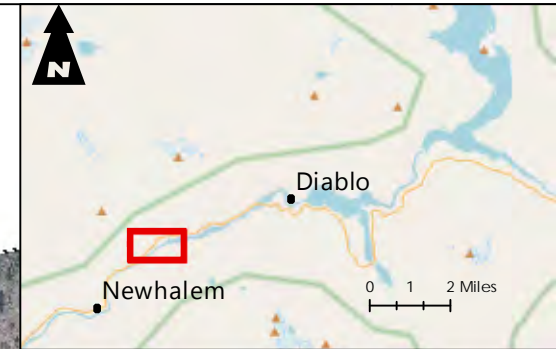
All elevations in this map are current as of October 8, 2020.

Note: This map is intended to compliment to but not to replace the following reports.  
 • Skagit Project Elevation Transformation Table' Rev. 10/08/2020  
 • Geodetic Control Reports for each network.

**Non NGS Benchmarks have not been horizontally surveyed.**  
 Created 10/8/2020 by Seattle City Light,  
 Environment, Land and Licensing Business Unit.  
 SCL provides no warranty, expressed or implied,  
 as to the accuracy, reliability or completeness of this data.



PLEASE NOTE:  
 1. All elevations are in US Survey Feet.  
 2. Refer to Geodetic Control Tables for each network.  
 3. Please contact SCL Technical Resources or SPU Surver for a densification in an area not referenced in this map.  
 4. All surveys shall use NGS benchmarks shown on Drawings D-44743 through D-44746.  
 5. Refer to 'Skagit Project Elevation Transformation Table' Rev. 10/08/2020 for Datum Conversion details. The following equation is used to convert between the City of Seattle (COS) Datum and NAVD-88 Datum:  
 COS Datum Elevation + Delta = NAVD-88.  
 6. No guarantees are made for adjustment of feature elevations not listed in above table and additional survey may be required to determine current elevation of the feature in question.  
 7. The survey reading for physical gage(s) was taken at a mark on the physical gage(s) and should NOT be used for the actual water surface elevation. As of 10/08/2020, SCL has not surveyed any water surface elevations.



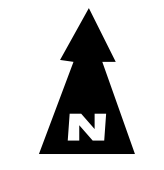
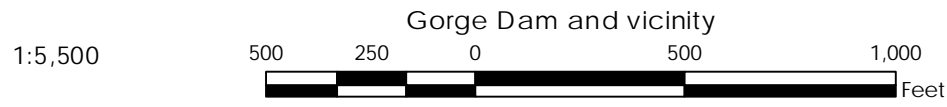
**Legend**

- NGS BM
- Non NGS BM
- Datum Conversion Available

COS = City of Seattle



### NAVD-88 Survey Elevations



**Note: This map is intended to compliment to but not to replace the following reports.**

- Skagit Project Elevation Transformation Table' Rev. 10/08/2020
- Geodetic Control Reports for each network.

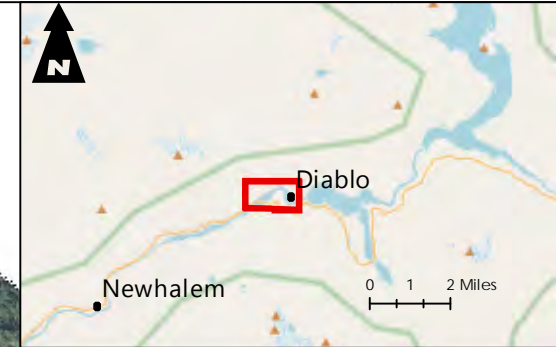
**Non NGS Benchmarks have not been horizontally surveyed.**  
 Created 10/8/2020 by Seattle City Light,  
 Environment, Land and Licensing Business Unit.  
 SCL provides no warranty, expressed or implied,  
 as to the accuracy, reliability or completeness of this data.

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All elevations in this map are current as of October 8, 2020.



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 2. Refer to Geodetic Control Tables for each network.  
 3. Please contact SCL Technical Resources or SPU Server for a densification in an area not referenced in this map.  
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 $COS\ Datum\ Elevation + \Delta = NAVD-88$   
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 7. The survey reading for physical gage(s) was taken at a mark on the physical gage(s) and should NOT be used for the actual water surface elevation. As of 10/08/2020, SCL has not surveyed any water surface elevations.

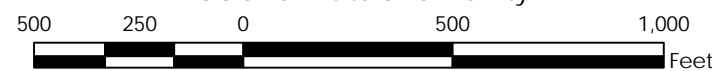


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## NAVD-88 Survey Elevations

Diablo Townsite and vicinity

1:5,500



All elevations in this map are current as of October 8, 2020.

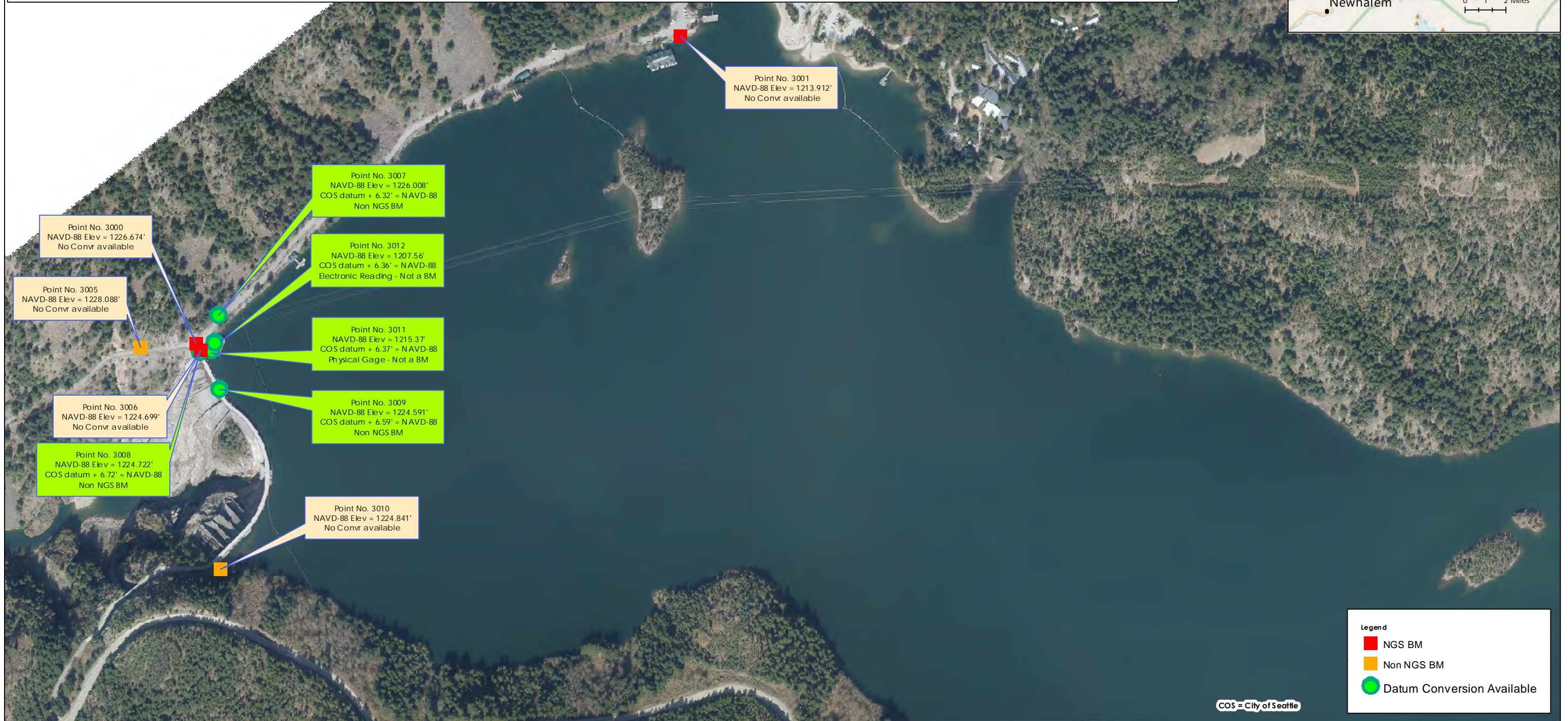


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**Legend**

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## NAVD-88 Survey Elevations

Diablo Dam and vicinity

1:5,500



All elevations in this map are current as of October 8, 2020.

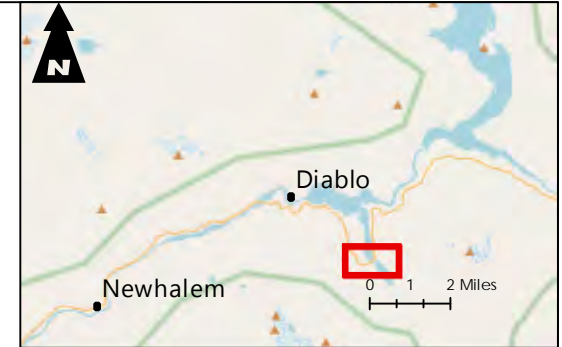


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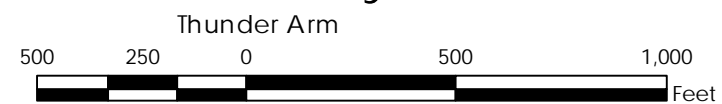


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### NAVD-88 Survey Elevations

1:5,500



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## NAVD-88 Survey Elevations

Diablo Overlook

1:5,500



All elevations in this map are current as of October 8, 2020.

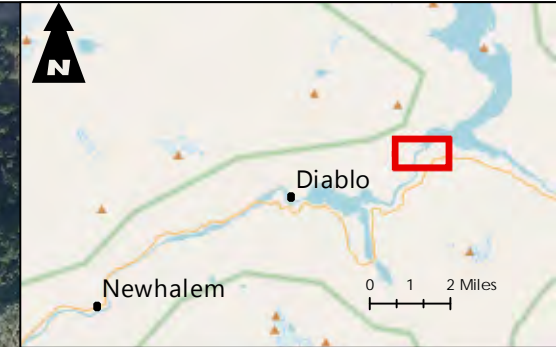


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**Legend**

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### NAVD-88 Survey Elevations

Ross Dam and vicinity

1:5,500



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**REVISED STUDY PLAN**

**APPENDIX B**

**LIST OF ORGANIZATIONS PARTICIPATING IN THE  
RESOURCE WORK GROUPS, STEERING COMMITTEE, PSP MEETINGS, AND  
TOPIC-BASED DISCUSSION MEETINGS**

List of organizations participating in the RWG and SC meetings through November 2020, January 2021 PSP Meetings and January/February 2021 Topic-Based Discussion Meetings.

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<b>Organization</b>
Access Fund
American Rivers
American Whitewater
Lummi Nation
National Marine Fisheries Service
Nlaka'pamux Nation
Nooksack Indian Tribe
North Cascades Conservation Council
North Cascades Institute
Samish Tribe
Sauk-Suiattle Indian Tribe
Skagit County
Skagit County Dike District Partnership
Skagit Drainage and Irrigation District Consortium
Skagit Environmental Endowment Council
Skagit Fisheries Enhancement Group
Skagit River System Cooperative
Snohomish County
Snoqualmie Indian Tribe
Stillaguamish Tribe of Indians
Stó:lō Nation
Suquamish Tribe
Swinomish Indian Tribal Community
Trout Unlimited
Ts'elxwéyeqw Tribe (Stó:lō Nation)
U.S. Army Corps of Engineers
U.S. Bureau of Indian Affairs
U.S. Department of the Interior
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey
U.S. National Park Service
Upper Skagit Indian Tribe
Washington Climbers Coalition
Washington Department of Archaeology and Historic Preservation
Washington Department of Ecology
Washington Department of Fish and Wildlife

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**REVISED STUDY PLAN**

**APPENDIX C**

**LIST OF PAD, SD1, PSP COMMENT LETTERS AND STUDY REQUESTS AS FILED  
WITH FERC**

List of PAD and SD1 comment letters and study requests regarding the Skagit River Project relicensing as filed with FERC or transmitted to City Light from September 11 to November 4 and PSP comment letters and study requests as filed with FERC or transmitted to City Light from March 5 to March 8.

<b>Filing Party</b>	<b>Date Letter Filed/Transmitted</b>	<b>Description of Letter</b>
Access Fund and Washington Climbers Coalition (jointly)	10/26/2020	PAD comments; study request
American Rivers and Trout Unlimited (jointly)	10/23/2020 03/08/2021	General comments; PAD comments; SD1 comments PSP comments
American Whitewater	10/26/2020 03/08/2021	General comments; PAD comments PSP comments
BIA	10/26/2020	Letter of support
Ecology	10/23/2020 03/08/2021	Study requests PSP comments
National Parks Conservation Association	10/23/2020	SD1 comments
Nlaka'pamux Nation Tribal Council	10/26/2020 03/08/2021	SD1 comments; study requests PSP comments
NMFS	10/22/2020 03/05/2021	General comments; PAD comments; SD1 comments; study requests PSP and SD2 comments
North Cascades Conservation Council	10/23/2020 03/08/2021	SD1 comments PSP comments
North Cascades Institute	03/08/2021	PSP comments
NPS	10/23/2020 03/05/2021 03/05/2021 (privileged)	General comments; PAD comments; SD1 comments PSP comments GE-03 PSP comments
Sauk-Suiattle Indian Tribe	10/26/2020 03/08/2021	General comments; PAD comments; SD1 comments; study requests PSP comments
Skagit County (Board of Commissioners)	10/23/2020 03/03/2021	Study requests PSPS Comments
Skagit County Drainage and Irrigation District Consortium / Skagit County Dike and Drainage District Flood Control Partnership	9/21/2020 03/04/2021	Study request PSP comments
Skagit County Drainage and Irrigation District Consortium	10/19/2020	Study request
Stillaguamish Tribe of Indians – Cultural Resources Dept	10/26/2020	General comments; study requests
Stillaguamish Tribe of Indians – Natural Resources Dept	11/4/2020 (dated 10/30) 03/08/2021	General comments; study requests PSP comments
Swinomish Indian Tribal Community	10/26/2020	General comments; PAD comments; SD1 comments; study requests

Revised Study Plan

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<b>Filing Party</b>	<b>Date Letter Filed/Transmitted</b>	<b>Description of Letter</b>
	03/08/2021	PSP and SD2 comments
Upper Skagit Indian Tribe	10/26/2020 03/08/2021	PAD comments; SD1 comments; study requests PSP comments
USACE	10/26/2020	PAD comments; SD1 comments
USFS	10/23/2020 03/08/2021	PAD comments; SD1 comments; study request PSP comments
USFWS	10/26/2020 03/08/2021	General comments; PAD comments; SD1 comments; study requests PSP comments
WDFW	10/26/2020 03/08/2021	General comments; PAD comments; study requests PSP comments

**REVISED STUDY PLAN**

**APPENDIX D**

**UNANTICIPATED DISCOVERY PLAN**

**UNANTICIPATED DISCOVERY PLAN  
FOR ARCHAEOLOGICAL MATERIALS AND HUMAN REMAINS  
SKAGIT RIVER HYDROELECTRIC PROJECT RELICENSING  
SEATTLE CITY LIGHT  
Whatcom, Skagit, Snohomish Counties, Washington  
April 2021**

**1.0 INTRODUCTION**

As part of relicensing the Skagit River Hydroelectric Project (Federal Energy Regulatory Commission [FERC] No. 553), Seattle City Light (City Light) will be implementing its Revised Study Plan (RSP). There is potential that archaeological materials or human remains could be discovered when personnel carry out studies for the relicensing. This Unanticipated Discovery Plan (UDP) describes procedures by which City Light and their consultants will respond to and manage unanticipated discoveries of archaeological materials and human remains during implementation of the relicensing studies.

The UDP is intended to provide guidance to City Light personnel and City Light's consultants in order to:

- Comply with applicable laws and regulations, including:
  - Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations [CFR] Part 800; 54 U.S.C. 300101 et seq.)
  - Revised Code of Washington (RCW) Chapter 27.44 Indian Graves and Records, and
  - RCW Chapter 27.53 Archaeological Sites and Resources
- Describe to FERC and Section 106 consulting parties the procedure City Light will follow in the event of an unanticipated discovery during the relicensing study period, and
- Provide proper procedures to study personnel to be followed should an unanticipated discovery occur.

**2.0 UNANTICIPATED DISCOVERY PROCEDURES**

This UDP serves to minimize damage to the following cultural resources during implementation of the relicensing studies: (1) archaeological materials and (2) human remains, funerary objects, and objects of cultural patrimony. Study personnel are required to follow the appropriate protocol when carrying out the studies.

Cultural resources include objects modified by humans and locations of human activity, occupation, or use, including locations (sites or places) of traditional religious and cultural importance to specified social and/or cultural groups.

**2.1 Archaeological Materials Discovery Protocol**

In the state of Washington, archaeological materials are the physical remnants from past human activities that are at least 50 years in age, which is the minimum National Register (36 CFR § 60)

age threshold. An archaeological material discovery could be from the precontact or historic period and consist of, but not be limited to, the following:

- Precontact features (e.g., hearths, occupational surfaces, middens, charcoal stains, cluster of animal bones or burned rocks in association with stone tools or chips, rockshelters and overhangs, peeled cedar trees, rock cairns, rock pits)
- Precontact artifacts (e.g., arrow or dart points, stone tool, stone chips, modified animal bones)
- Rock art (e.g., pictograph or petroglyph)
- Historic features (e.g., wells, railroad berms, foundations, cluster of tin cans or bottles, utensils, industrial equipment, springboard stumps, blazed trees and trail cairns)
- Historic artifacts (e.g., glass bottles, glass fragments, sanitary cans, bricks, lumber, nails, railroad ties)

If suspected archaeological materials are encountered by City Light staff or consultants, the following protocol will be implemented, no matter how insignificant the items may seem:

**Leave the archaeological material in place** and discretely flag for later recordation. If possible, take a global positioning system (GPS) data point or a location pin with a mobile device. Do not collect the material. Collecting archaeological materials without proper permits is illegal, which is a violation of federal and state laws.

- (1) Personnel will immediately stop study activities adjacent to the discovery and notify the Study Lead, who will immediately contact, via telephone, the City Light Senior Archaeologist Andrea Weiser and/or City Light Consultant Senior Archaeologist Jennifer Ferris, or other appropriate City Light Cultural Resources Staff as directed by Project management team. Photographs may be sent via email as part of the notification process but must not otherwise be distributed.
- (2) The Study Lead will take appropriate steps to protect the discovery site. At a minimum, the immediate area of the discovery site will be secured. Vehicles, boats, equipment, and unauthorized personnel will not be permitted to traverse the discovery site.
- (3) A restriction area will be established in coordination with Ms. Weiser and/or Ms. Ferris, if needed. The restriction area will be sufficient to provide for the security and protection of the cultural materials while allowing the study to continue away from the discovery. City Light will enforce appropriate security measures.
- (4) Ms. Weiser and/or Ms. Ferris will coordinate inspection of the discovery as timely as possible and will determine whether the discovery constitutes an archaeological resource.
- (5) If the discovery is determined not to be archaeological, no further cultural resources management consideration will be required.
- (6) If the discovery is potentially associated with a traditional cultural property (TCP), Ms. Weiser and/or Ms. Ferris will notify representatives from the associated Indian tribe(s) and First Nation(s).
- (7) If the discovery is determined to be archaeological, Ms. Weiser and/or Ms. Ferris will

assess whether the resource is precontact or historic in age.

- (8) Ms. Weiser and/or Ms. Ferris will notify the City Light Project Manager and Consultant Team Project Manager of the discovery.
- (9) Ms. Weiser and/or Ms. Ferris will work with subconsultants, as necessary, to preliminarily assess the find and formulate a determination regarding whether the discovery constitutes an archaeological site or an isolated find. If the study can avoid affecting the discovery, the discovery will be recorded later under the cultural resources relicensing studies.
- (10) If the discovery cannot be avoided, City Light will consult with the FERC, Department of Archeology and Historic Preservation (DAHP), and other consulting parties to determine the appropriate treatment. Treatment may include documentation, mapping, photography, limited probing, sample collection, protection measures, or other activities.
- (11) For long-term management purposes, the discovery will be included in the Historic Properties Management Plan (HPMP) for the new license, as appropriate.

## **2.2 Human Remains Discovery Protocol**

In the event that human remains, funerary objects, and objects of cultural patrimony are discovered during implementation of the studies, the following protocol will be strictly followed:

- (1) Immediately stop all ground disturbing activity within 50 feet of the discovery.
- (2) Ensure at all times that any discovered human remains, funerary objects, and objects of cultural patrimony are treated with dignity and respect.
- (3) Secure the site immediately from any possible disturbance. Do not remove the discovery. Protect the discovery from looting and vandalism.
- (4) If possible, take a GPS data point or a location pin with a mobile device.
- (5) Note the date, time, nature of discovery, and name of the person who made the discovery.
- (6) Notify the Study Lead, City Light Project Manager, and Consultant Team Project Manager of the discovery. The City Light Project Manager will be responsible for assuring that this protocol is followed.
- (7) City Light will notify the appropriate county medical examiner and local law enforcement in the most expeditious manner possible. DO NOT CALL 9-1-1.
- (8) Upon discovery, City Light and its consultants will comply with applicable laws and regulations including RCW Chapter 27.44 (Indian Graves and Records), RCW Chapter 68.60 (Protection of Historic Graves), and the Native American Graves Protection and Repatriation Act (NAGPRA; 25 U.S.C. 3001-3013).
- (9) The Study Lead, City Light Project Manager, and/or Consultant Team Project Manager will immediately contact City Light Senior Archaeologist Andrea Weiser and/or City Light Consultant Senior Archaeologist Jennifer Ferris via telephone.
- (10) If onsite personnel are unable to determine whether the remains are human or animal or associated with an archaeological context, the Study Lead will immediately contact Ms. Weiser and/or Ms. Ferris for confirmation and share photographs with them for identification. Treat all bones with dignity and respect and do not share photographs to

- additional individuals unless directed.
- a. If Ms. Weiser or Ms. Ferris determine that the remains are or may be human and/or animal and associated with an archaeological context, a site visit will be coordinated for Ms. Weiser and/or Ms. Ferris to observe the discovery immediately, as feasible, without causing further disturbance.
  - b. Ms. Weiser and/or Ms. Ferris will contact DAHP's Physical Anthropologist for confirmation and may email photographs.
    - If the results of the evaluation indicate that the remains are not human and do not have an archaeological association, no further cultural resources management consideration will be required.
    - If the evaluation determines the remains are not human but have an archaeological association, the procedures for Archaeological Materials will be followed, as stated above.
    - If the results of the evaluation indicate the remains are human, then the Study Lead, City Light Project Manager, Ms. Weiser and/or Ms. Ferris will notify the medical examiner and local law enforcement as described above. Ms. Weiser and/or Ms. Ferris will also notify the consulting Indian tribes and First Nations.
- (11) The medical examiner will be asked to determine whether the remains are forensic or nonforensic, which will be completed within 5 business days of receiving notification.
- a. The medical examiner will retain jurisdiction over forensic remains.
  - b. The study stoppage in the area will continue until such time that the medical examiner has secured and removed the remains from the discovery site.
  - c. If the medical examiner determines the remains are non-forensic, they will report that finding to the DAHP.
- (12) The state physical anthropologist will make an initial determination of whether nonforensic skeletal human remains are Indian or non-Indian to the extent possible based on the remains within 2 business days of notification of a finding of such nonforensic remains. If the remains are determined to be Indian, the DAHP will notify all affected Indian tribe(s) via certified mail to the head of the appropriate tribal government within 2 business days and contact the appropriate tribal cultural resources staff.
- (13) The affected Indian tribe(s) have 5 business days to respond via telephone or writing to the DAHP as to their interest in the remains. The DAHP will handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.
- (14) City Light and its consultants will resume study activities in the area of the discovery upon receipt of written authorization from either the medical examiner or the DAHP, whoever has jurisdiction under state law.



**2.3 CONTACTS**

AGENCY CONTACTS	
<p><b><u>Seattle City Light</u></b>  <b>Ms. Andrea Weiser</b>                      Senior Archaeologist  <a href="mailto:andrea.weiser@seattle.gov">andrea.weiser@seattle.gov</a>                      Office: (206) 233-1644                      Cell: (206) 858-1287</p>	<p><b><u>Seattle City Light</u></b>  <b>Mr. Andrew Bearlin</b>                      Project Manager  <a href="mailto:andrew.bearlin@seattle.gov">andrew.bearlin@seattle.gov</a>                      Office: (206) 684-3496                      Cell: (206) 858-0981</p>
<p><b><u>Seattle City Light Consultant– HDR, Inc.</u></b>  <b>Ms. Jennifer Ferris</b>                      Senior Archaeologist  <a href="mailto:jennifer.ferris@hdrinc.com">jennifer.ferris@hdrinc.com</a>                      Office: (425) 450-7129</p>	<p><b><u>Seattle City Light Consultant – HDR, Inc.</u></b>  <b>Jenna Borovansky</b>                      Project Manager  <a href="mailto:jenna.borovansky@hdrinc.com">jenna.borovansky@hdrinc.com</a>                      Cell: (425) 281-9557</p>
<p><b><u>North Cascades National Park</u></b>  <b>Ms. Kim Dicenzo</b>                      Archaeologist  <a href="mailto:kim_dicenzo@nps.gov">kim_dicenzo@nps.gov</a>                      Office: (360) 854-7341</p>	<p><b><u>Federal Energy Regulatory Commission</u></b>  <b>Ms. Suzanne Novak</b>                      Outdoor Recreation Planner  <a href="mailto:suzanne.novak@ferc.gov">suzanne.novak@ferc.gov</a>                      Office: (202) 502-6665</p>
<p><b><u>Department of Archaeology and Historic Preservation (DAHP)</u></b>  <b>Dr. Robert Whitlam</b>                      State Archaeologist  <a href="mailto:rob.whitlam@dahp.wa.gov">rob.whitlam@dahp.wa.gov</a>                      Office: (360) 890-2615</p>	<p><b><u>Department of Archaeology and Historic Preservation (DAHP)</u></b>  <b>Dr. Guy Tasa</b>                      State Physical Anthropologist  <a href="mailto:guy.tasa@dahp.wa.gov">guy.tasa@dahp.wa.gov</a>                      Office: (360) 790-1633</p>
<p><b><u>Snohomish County</u></b>  <b>Ms. Gretchen Kaehler</b>                      Archaeologist  <a href="mailto:gretchen.kaehler@co.snohomish.wa.us">gretchen.kaehler@co.snohomish.wa.us</a>                      Office: (425) 359-1504</p>	

TRIBAL CONTACTS (in alphabetical order)	
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**REVISED STUDY PLAN**

**APPENDIX E**

**LP PSP COMMENTS AND CITY LIGHT RESPONSES**

**Summary of Proposed Study Plan Comments and City Light’s Responses.**

Table No.	Organization	Date	Comment Letter Page	Comment ID No.	PSP Introduction (if §6, relevant ID No. used in PSP of entity’s own study request)	Study Plan(s)	Comment	Response
<b>General/Global</b>								
1.	American Rivers / Trout Unlimited	03/05/2021	pp. 2-3	ARTU-C01	N/A	N/A	<p><b>Process.</b> The Licensee has taken steps to include applicable federal and state agencies, local government, tribal governments, non-governmental organizations (NGOs) and the public (collectively, “Licensing Participants”). In some respects, the Licensee has extended effort beyond what is typically required by the Commission and the ILP in order to include all Licensing Participants in the relicensing process. These efforts are appreciated. However, such efforts have not been consistent nor sufficiently collaborative throughout the relicensing process to date. Conservation Groups acknowledge and appreciate the precedent set by the Licensee regarding the inclusion of the Licensing Participants, encourage the Licensee to consistently implement these practices, and look forward to additional collaboration throughout the licensing process.</p> <p>In addition to the Resource Work Groups facilitated by the Licensee as part of the Collaborative Study Plan Development Process, Conservation Groups participated in the Plan B Study Caucus (“Caucus”), which was initiated by the Upper Skagit Indian Tribe and facilitated by Thompson Consulting Group. The Caucus consists of three tribes, federal, state and local governmental agencies, and several nongovernmental organizations. The Licensee is not a party to the Caucus. The intent of the Caucus is to identify existing data gaps and to develop study requests that would obtain critical information needed to evaluate the Project’s operational impacts on terrestrial, aquatic, recreational, and cultural resources without influence from the Licensee. These study requests also intend to meet the information requirements of several agencies with conditioning authority under sections 4(e) and 10(j) of the Federal Power Act and Section 401 of the Clean Water Act.</p> <p>The more than 90 study requests submitted by Caucus members effectively identify information needed to understand Project-related impacts to natural resources in order to guide resource protection, mitigation, and enhancement measures (PMEs). These study requests serve to ensure that tribal treaty rights and interests are adequately considered in regard to these natural resources, as a majority of the requests were developed directly by or in collaboration with the affected tribes including Upper Skagit Indian Tribe, Swinomish Indian Tribal Community, and Sauk-Suiattle Indian Tribe. Conservation Groups maintain support for these study requests and encourage the Licensee to adopt their components. Accounting for the scope of our interests, we believe additional data is needed in the following areas 1) fish passage, 2) aquatic habitat, 3) water quality, 4) recreation and 5) climate change.</p>	City Light appreciates the significant time and expertise American Rivers, Trout Unlimited and other LPs have expended in participating in the relicensing process to date. City Light has carefully reviewed, analyzed, and considered all comments on the study plans and information needs. After thoughtful deliberation, City Light has decided to make significant revisions to its proposed studies, including the addition of five new studies and modification of many proposed studies included in the PSP to address LP comments, concerns, and information needs. Many of these changes will elicit additional data in the five areas flagged by American Rivers and Trout Unlimited. City Light hopes that these changes in the RSP will set the stage for further collaboration. City Light commits to continued work with LPs to refine the technical details of the studies and comprehensively address information needs.
2.	American Whitewater	03/08/2021	pp. 3-4	AW-C01	Section 2.5	N/A	<p><b>Coordinated Review of Study Results, Section 2.5.</b> We appreciate recognition by Seattle City Light of the importance of coordinated review of study results and welcome an opportunity to participate in a “process through which parties can work together to identify opportunities for a unified analytical approach and a desire for discussions of a comprehensive, ecologically sound Project proposal.”</p>	City Light continues to recognize the importance of coordinated review of study results. It is City Light’s intent that the significant changes in the RSP reflects its renewed commitment to collaboration with LPs in developing a comprehensive, ecologically sound Project proposal.
3.	American Whitewater	03/08/2021	p. 4	AW-C02	Section 2.6	N/A	<p><b>Management Plans, Section 2.6.</b> The discussion of Management Plans remains vague and undefined In the coming weeks, and prior to filing the Revised Study Plan, we request that Seattle City Light provide more definition and structure for Management Plans. Of particular concern is the statement that “many plans will rely upon review and discussion of draft study results before specific details may be developed.” In several meetings Seattle City Light has stated that information needs</p>	City Light has included additional information and a proposed schedule for the development of management plans in the RSP. City Light is committed to collaborating with LPs in the development of the management plans.

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							expressed by License Participants that are not included in Study Plans will be addressed in Management Plans. License Participants have no assurance what will be included in future Management Plans and this section of the Proposed Study Plan implies that they will, in fact, be based on the results of approved studies under 18 CFR § 5.13.  Ultimately, it becomes challenging to negotiate the details of Management Plans without the data to inform those discussions.	
4.	American Whitewater	03/08/2021	pp. 4-5	AW-C03	Section 2.7	N/A	<b>Draft License Application and Final License Application, Section 2.7.</b> Seattle City Light states that “the license application will include a comprehensive analysis of existing information from the PAD, combined with results from the studies implemented during the relicensing timeframe and cross-resource analysis of anticipated Project effects and associated PME (resource measures) related to the proposed operating proposal.” Notably absent from this list is additional information that License Participants could bring to the discussion. Throughout the series of meetings conducted under 18 CFR § 5.11, Seattle City Light expressed an openness to additional information provided by License Participants that might not have been included in the Pre Application Document. Seattle City Light should clarify that additional information relevant to the proceeding and that would inform resource protection, mitigation, and enhancement measures, would be welcomed from License Participants.	City Light acknowledges the additional information presented during the PSP Meetings subsequent to the writing of the RSP. Section 2.7 in the RSP has been updated to reflect that where additional reports were referenced by LPs, City Light welcomes receiving these additional documents and data sources from LPs to inform study implementation and future steps in the relicensing process.
5.	Ecology	03/08/2021	pp. 2-3	Ecology-C01	N/A	N/A	<b>Schedule for 401 Water Quality Certification.</b> The current FERC license for SCL expires on April 30, 2025. SCL is planning to submit the FERC draft license application (DLA) on Dec 01, 2022 and final license application (FLA) by April 30th, 2023. If the FERC license application is complete, and Commission staff does not require any additional information to process the application, FERC will publish notice that the application is accepted and ready for environmental analysis (REA).  As per 18 CFR § 5.23(b), within 60 days from the issuance of the REA notice, SCL must provide the Commission with a copy of the Section 401 Water Quality Certification, a copy of the request for Section 401 Water Quality Certification, or evidence of waiver of the water quality certification. Based upon these ILP timelines, Ecology is anticipating a “complete” 401 certification application from SCL by June 30, 2023.  In 2020, the U.S. Environmental Protection Agency (EPA) published its “Clean Water Act Section 401 Certification Rule” under the federal Clean Water Act. 85 Fed. Reg. 42,210 (July 13, 2020). This new federal rule, effective September 11, 2020, has changed some key areas of the 401 certification process, including strict timelines for state review and action. The new rule requires a state to take action on a certification request within a reasonable period of time, but in no case later than one year after the receipt of a certification request. The new rule precludes project applicants from withdrawing and resubmitting a 401 certification request, as has been done in years past for other similar projects. If Ecology receives the 401 Certification application by June 30, 2023 then Ecology must make a final decision by June 30, 2024. Therefore, it is imperative that SCL provide a complete 401 Certification application to Ecology by June 2023, including all the information necessary for Ecology to make a determination that the project complies with state requirements. Without the necessary information, Ecology will be unable to grant the 401 Certification.  In order to evaluate SCL’s 401 Certification application, Ecology will be relying in part on the data that will be generated from several studies that are being requested by the LPs. For example, for making decision on instream flow, Ecology relies on the	City Light has expanded information on study and licensing process schedules within the RSP to respond to Ecology’s information needs. City Light also welcomes continued consultation with Ecology regarding information necessary for a complete Section 401 certification application on the schedule identified by Ecology and consistent with ILP regulations and EPA regulations regarding pre-filing meetings.

Table No.	Organization	Date	Comment Letter Page	Comment ID No.	PSP Introduction (if §6, relevant ID No. used in PSP of entity's own study request)	Study Plan(s)	Comment	Response
							<p>data generated by studies requested by WDFW. All of the studies that are required by Ecology for 401 Certification evaluation, including the studies requested by the LPs that will inform Ecology's review, must be completed prior to the submission of SCL's 401 Certification application.</p> <p>Ecology and other LPs have been participating in a process convened by SCL in January 2019. We have also participated in a Caucus process initiated by Upper Skagit Indian Tribe (USIT) and supported by LPs. Based on its extensive experience in hydroelectric project relicensing proceedings, Ecology is committed to providing scientific and regulatory expertise on evaluation of project impacts on the environment. Despite the extensive commitment of agency resources there remains a lack of agreement with SCL on study plans. Ecology is concerned that SCL may lose potential study season opportunities. It is of the utmost urgency that SCL act promptly to address outstanding areas of disagreement with Ecology and the LPs and proceed with study implementation. Without two seasons of study, SCL risks having an incomplete understanding of project impacts, operating conditions, potential mitigation measures, and an insufficient record to meet the "substantial evidence" standard applicable to the license conditions. 16 U.S.C. § 825(b); 68 Fed. Reg. at 51,078 (ILP process is designed to eliminate delays caused "by deferring identification and resolution of fundamental issues about what information gathering and studies are necessary until after the application is filed").</p> <p>Ecology has identified studies that it believes will help SCL submit an adequate and complete application for 401 Certification. These studies need to be conducted and completed within the relicensing study period. To date, SCL has not committed to implementing all requested studies and has not identified specific timelines and process elements that ensure that Ecology will have the necessary information to make a timely determination on SCL's 401 Certification application.</p> <p>In addition, we recommend that SCL schedule time with Ecology at least 90 days prior to submittal of the final 401 Certification application in June 2023. This time will allow Ecology to provide any additional technical assistance and will also allow for the collection of any outstanding additional information or data analysis prior to submittal of the application. We recommend that SCL provide Ecology with a complete draft 401 certification application no later than March 2023. SCL is planning to submit the draft license application (DLA) to FERC in December 2022, and final license application (FLA) to FERC in April 2023. Ecology's proposed timelines for the 401 Certification application are achievable. Additionally, as per the new 401 rule, SCL needs to schedule a formal pre-application meeting with Ecology at least 30 days prior to 401 Certification application submission. This schedule works well with Ecology's request for a draft application for 401 Certification in March 2023.</p>	
6.	Ecology	03/08/2021	pp. 14-15	Ecology-C11	N/A	N/A	<p><b>Identification of study areas, study development process, study implementation.</b> SCL needs to reach agreement with Ecology on all the studies necessary for Ecology's review of SCL's 401 Certification application. These studies need to be conducted within the same timeframe as the licensing study period to give us the data we need to support technical staff's recommendations of the 401 application. As of the date of this letter, SCL has not committed to implement all of the studies needed and has not developed their individual study plans to the point where they are agreed to or approvable as written. The plans and implementation should provide information necessary to understand the nature and extent of project impacts and to determine potential PME or operational changes. Timelines and milestones for timely completion of studies and reports, should include scheduling adequate time for review and discussion of study designs, study results, and potential solutions (including operating conditions, PMEs, and mitigation). These timelines and milestones need to</p>	City Light appreciates Ecology's time and effort in continued discussions on identification of study areas, study development, and study implementation. In the RSP, City Light has proposed significant additions to the FA-01 Water Quality Monitoring Study Plan, based on these discussions with Ecology, to include a two-year sampling program. Additional modifications include: (1) an additional monitoring site in the Skagit River upstream of Ross Lake; (2) turbidity and TSS monitoring at the mouths of select tributaries in Ross and Diablo lakes and at transects in Ross Lake adjacent to areas of



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							<p>be geared towards completing this entire process prior to submittal of the application for 401 Certification.</p> <p>Issue resolution meetings held in January and February 2021 resulted in some verbal commitments and improvements to study designs, but they are not yet complete or documented. Issue Resolution Forms (IRF) created by SCL and distributed after the PSP meetings, are not an accurate representation of Issue Resolution meetings: IRFs were incomplete on the range of issues discussed, IRFs did not identify all areas of disagreement, and IRFs did not include all of the resolutions proposed by LPs. Furthermore, there are still issues (areas of disagreement) that have not been discussed at all due to lack of time. The details matter.</p> <p>On a number of occasions, SCL has mentioned the use of “management plans” or “forward-looking discussions on PMEs.” Ecology considers the use of management plans or adaptive management as a tool for long-term resolution of issues that absolutely could not be conducted or completed within the limitations of a licensing or permitting process. None of the studies needed by Ecology for the 401 Certification meet that criteria. Studies that will be used to identify the extent of project impacts, determine license and operating conditions, set instream and process flows, determine compliance with standards, and identify PMEs (mitigation) must be completed and included in the application for 401 Certification.</p> <p>Furthermore, SCL must conduct an analysis of the efficacy of mitigation efforts from the previous license. This analysis should be conducted in 2021 so that any further monitoring, analysis, or study can be conducted in 2022. The results of these mitigation efforts have a bearing on the 401 Certification and on potential license conditions and PMEs.</p> <p>The PSP does not include sufficient detail on data collection methodology, quality assurance protocols, scope and scale, modeling assumptions and data verification essential for ensuring scientific integrity. We request SCL include these details in the Revised PSP (RSP) and that SCL obtain review and approval (agreement) from Ecology prior to implementation. We encourage SCL to obtain review and agreement from other LPs as well. Getting agreement on the study design is important for developing and documenting the adequacy of the study and its defensibility for the 401 Certification. Although we have not yet reached agreement on the entire water quality study plan, the December 8, 2020 PSP Water Quality Study Plan does provide an example of the level of detail we need throughout the studies.</p> <p>Individual study plans identified in the PSP that relate to data needed for the 401 Certification include: FA-01, FA-02, FA-03, FA-04, FA-05, GE-01, GE-03, GE-04, OM-01, RA-02, TR-02.</p> <p>Data needs for Ecology that are not adequately described in the PSP include, but are not limited to, the following subject areas: 1) WQ Monitoring, 2) Instream Flows, 3) Fish Passage, 4) Sediment Budget, Deposition, and Transport, 5) Large Woody Debris, 6) Process Flows, 7) Floodplain Connectivity and Inundation, 8) Groundwater Discharge, 9) Nutrients and Productivity, 10) Wetlands, 11) Data Quality, 12) Data Analysis, 13) Previous Mitigation Efforts.</p>	<p>shoreline erosion during periods of reservoir drawdown; (3) an additional sampling site in the Gorge Bypass Reach; (4) fecal coliform monitoring in Diablo Lake; and (5) additional temperature and benthic macroinvertebrate monitoring sites below Gorge Dam (downstream to just below the Baker River) and in the Lower Sauk River. As noted in comment response Ecology-C01, City Light welcomes continued consultation with Ecology regarding information necessary for a complete Section 401 certification application on the schedule identified by Ecology and consistent with ILP regulations and EPA regulations regarding pre-filing meetings.</p>
7.	Ecology	03/08/2021	p. 18	Ecology-C20	N/A	N/A	<p><b>Previous Mitigation Measures.</b> During the last licensing period, SCL implemented a number of mitigation measures. SCL needs to analyze the measures to determine efficacy. Reports on mitigation effectiveness should include discussion on what worked, how it met the goals of the mitigation effort, the specific ways in which those goals were met and enumeration of the mitigation efforts that did not function as</p>	<p>City Light intends to study and gather information on existing conditions at the Project as part of the relicensing. Any restoration projects that it implements as part of the new license will be</p>

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							intended. Data from review of previous mitigation efforts will provide useful information as to whether similar mitigation could be applied to this license, and whether previous mitigations should be redone or manipulated in some way to achieve the originally intended results.	monitored as part of an adaptive management program.
8.	Ecology	03/08/2021	p. 20	Ecology-C29	N/A	N/A	<p><b>Data Analysis (not included in a specific study plan).</b> Conduct quality assurance quality control assessments of existing data proposed for use in various studies and models.</p> <p>SCL is proposing to use existing data from many different sources. We agree that existing data should be used whenever possible. In order for Ecology to use data sources for the 401 Certification, Ecology needs to have assurances from SCL of data validity and application. Any existing data or study results supporting SCL's application for a 401 Certification must include an analysis of the data and scientific methods used in collection of the data, similar to Ecology's requirements for collecting environmental data in Quality Assurance Project Plans for water quality.</p>	All City Light studies will be implemented in accordance with generally accepted scientific methods and QA/QC procedures. In addition, the water quality monitoring plan will be subject to QA/QC procedures that are consistent with Ecology's requirements.
9.	National Marine Fisheries Service (NMFS)	03/05/2021	pp. 4-5	NMFS-C01	N/A	N/A	<p><b>Introduction and Background.</b> NMFS submitted four study requests on October 22, 2020 (FERC Accession #: 20201022-5094) (incorporated herein by reference) to ensure that any new license for the Project fully complies with the requirements of the FPA, ESA, MSA, FWCA, and DQA, as well as with SCL's conservation goals for the Project.</p> <p>As noted in NMFS' January 15, 2021 filing (incorporated herein by reference), NMFS' requests were largely rejected without an explanation of the rationale required pursuant to 18 C.F.R. § 5.9(b). During the study planning meetings convened by SCL during January and February 2021, NMFS attempted to resolve outstanding issues with respect to SCL's PSP, as required under 18 C.F.R. § 5.11(e). SCL, however, still has not fully explained the regulatory basis for rejecting NMFS' study requests. While NMFS acknowledges and appreciates SCL's recent agreement to expand its proposed fish passage study and consider studying process flows, SCL has not yet provided the degree of specificity needed to achieve mutually-agreeable study plans. NMFS remains concerned that the studies described in the PSP, which were not substantially altered from the studies SCL proposed in the PAD, will not provide the information necessary for NMFS to fulfill our obligations under sections 4(e), 10(a), 10(j), and 18 of the FPA or our obligations under the ESA, MSA, FWCA, and DQA.</p> <p>We respectfully maintain that the NMFS study requests are consistent with the applicable regulatory criteria for study plans at 18 C.F.R. § 5.9(b), supported by the best available scientific information and professional judgment, and appropriately tailored to develop information needed to inform the relicensing process in general and NMFS' exercise of our statutory responsibilities in particular. As noted by NMFS and other LPs during the study plan meetings, the timing of the ILP process makes it imperative that an appropriate range of studies be carried out in 2021 and concluded in time to inform FERC's NEPA analysis, NMFS' ESA consultation, potential settlement negotiations, and the license application. See 68 Fed. Reg. at 51,07 (study plans must "provide a sound evidentiary basis on which the Commission and other participants in the process can make recommendations and provide terms and conditions."). Practically speaking, given the lack of consensus on study plan parameters and resultant delay in study implementation, we may have already lost one of two potential study season opportunities. It is of the utmost urgency that SCL act promptly to address outstanding areas of disagreement and proceed with study implementation rather than awaiting the results of the study-plan dispute process. Without two seasons of study, SCL risks having an incomplete understanding of Project impacts and needed Project enhancements and an insufficient record to meet</p>	City Light appreciates NMFS's time and effort in continued discussions on identification of study areas, study development, and study implementation. City Light has reconsidered its proposed plans and has made significant revisions to its proposed studies to address NMFS's comments and concerns regarding the information necessary for NMFS to fulfill its statutory mandates. As described in the RSP, these changes include significant expansion of both the FA-04 Fish Passage Technical Studies Program Study Plan and the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan, among others. In addition, City Light's RSP includes the addition of FA-07 Reservoir Tributary Habitat Assessment and SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River Study Plans. City Light welcomes the opportunity to continue consulting with NMFS to discuss its information needs.

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							the “substantial evidence” standard applicable to the license conditions. 16 U.S.C. § 825(b); 68 Fed. Reg. at 51,078 (ILP process is designed to eliminate delays caused “by deferring identification and resolution of fundamental issues about what information gathering and studies are necessary until after the application is filed”).	
10.	NMFS	03/05/2021	pp. 7-8	NMFS-C03	N/A	N/A	<p><b>Relicensing Study Concerns.</b> Despite the significant time and resources devoted by NMFS and the other LPs over the past several years to a process intended to achieve mutually-agreeable study plans, the parties remain far apart. Ongoing failure to resolve these disagreements puts at risk the viability of two complete study seasons and creates a potential that information generated over a single season will be insufficient for NEPA review, NMFS’ exercise of FPA, ESA, MSA, and FWCA authorities, and development of defensible license conditions. At least eight months of the first field season will be lost if study implementation is delayed pending the Commission’s Study Dispute Determination in August 2021. It is therefore essential that NMFS’ study requests be adopted in full in the RSP so that the studies requiring more than a single field season can be implemented this year.</p> <p>In this regard, the Commission should be aware that the study plans produced through the 2019 Collaborative Issue Identification and Study Plan Development Process (voluntary process) do not substantively reflect the input of NMFS or other LPs. Whereas the formal guidance on record for the voluntary process required collaboration and consensus in the process of study plan development, the resulting studies primarily represent the singular perspective of the applicant and are insufficient relative to NEPA and NMFS’ hydropower authorities.</p> <p>In our January 15, 2021 letter, we note that the PSP process has been similarly consultative and inconsistent with the 18 C.F.R. § 5.11(e) requirements to attempt to timely resolve outstanding issues. The initial public meetings convened by SCL between January 6-14, 2021 were structured primarily to initiate new participants into the relicensing process and did not provide an opportunity to identify and resolve areas of disagreement between the plans in the PSP and the plans requested by NMFS. The following subject-specific meetings, scheduled between January 26 and February 25, 2021, resulted in a largely one-way flow of information without meaningful issue resolution. At this stage, SCL’s inclusion of NMFS’ study plans in the RSP is the clearest path to ensure that we maintain two full study seasons and develop a legally sufficient information base for environmental review and decision-making.</p>	City Light has given careful thought to the comments and positions of the LPs and has made significant revisions to its proposed studies. As described in comment response NMFS-C01, the RSP includes changes and additions to address NMFS’s comments and concerns regarding the information needs, in an attempt to resolve outstanding issues with respect to the study plan and to enable City Light to implement the studies for the 2021 field season.
11.	NMFS	03/05/2021	pp. 8-9	NMFS-C04	N/A	N/A	<p><b>NMFS Studies Are Needed to Support Both License Conditions and ESA Consultation.</b> Under the Commission’s regulations at 18 C.F.R. § 5.9(a), studies should provide information both to inform the development of license requirements and “needed for consultation under section 7 of the Endangered Species Act.” See 18 C.F.R. § 5.9(a), (b)(5); 68 Fed. Reg. at 51,101 (Commission response to comments, rejecting suggestion that ESA-related information gathering be conducted independently from the study plan process, because “it would be inconsistent with the entire thrust of the integrated process, which is to maximize coordination of Federal, state, and tribal processes”). As discussed above, NMFS requested such studies in our October 22, 2020 filing. NMFS specifically designed the study requests to inform feasible project modifications that might be necessary for the conservation and recovery of ESA-listed and non-listed salmonid species and to ensure that the license does not result in “jeopardy” to ESA-listed species or the destruction of adverse modification of their critical habitats. Based on best professional judgment and the scientific information available to date, preliminarily such Project modifications may include:</p> <ul style="list-style-type: none"> <li>▪ Fish passage facilities for adult and juvenile life-history stages of fish above and below the Project.</li> </ul>	As described in comment response NMFS-C01, City Light has made significant revisions to its proposed studies, including to address NMFS’s comments and concerns regarding the information necessary for NMFS to fulfill its statutory mandates including for section 7 of the Endangered Species Act.

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							<ul style="list-style-type: none"> <li>▪ Off-channel habitat protection and restoration using process flow releases from the Project.</li> <li>▪ Sediment and large wood transport enhancements.</li> <li>▪ Flow control modification including:                             <ul style="list-style-type: none"> <li>• Flow management and water quality measures to protect diverse species and life histories from lethal and sub-lethal effects;</li> <li>• Floodplain inundation flows; and</li> <li>• Re-watering of the bypass reach.</li> </ul> </li> <li>▪ Lower river and estuary habitat restoration.</li> </ul> <p>As we noted in our comments on the PSP meetings (January 15, 2021), the PSP fails to adequately disclose the regulatory basis and scientific rationale for rejecting NMFS' study requests. NMFS filing of January 15, 2021 includes matrices that illustrate this failure at a detailed level (included here as Attachment A). Where the PSP does identify a regulatory criterion under 18 C.F.R. § 5.9(b) as the basis for rejecting an element of our study requests, the PSP generally fails to provide a meaningful scientific justification to support SCL's application of the regulatory criteria. In many instances, both a regulatory and a scientific rationale are missing entirely (e.g., sediment transport elements of NMFS Geomorphology study request, Attachment A).</p>	
12.	NMFS	03/05/2021	p. 9	NMFS-C05	N/A	N/A	<p><b>NMFS Studies Are Needed to Inform the Commission's NEPA Analysis.</b> NMFS is concerned that the studies proposed by SCL will not provide an adequate evidentiary basis to support the Commission's identification under NEPA of a reasonable range of alternatives to consider or to inform the Commission's evaluation of those alternatives. See, e.g., 68 Fed. Reg. at 51,078 (purpose of an approved study plan is to provide a sound evidentiary basis for recommended terms and conditions and inform judgements about which NEPA alternatives are reasonable to consider). As NMFS observed during the series of study plan meetings convened by SCL in February, here, the "proposed action" and "no-action" alternatives are essentially the same, therefore the Commission must carefully evaluate a range of additional operational and structural Project modifications to fulfill its NEPA obligations. Id.; see Audubon Soc'y of Portland v. US Army Corps of Eng'rs, 216 WL 4577009, at *7 (D. Or. 2016) ("Properly analyzing alternative actions is the 'heart' of an EIS.") (citations omitted). Based on the information provided above and best professional judgment acquired through other Pacific Northwest hydropower relicensing processes, NMFS believes that reasonable alternatives evaluated under NEPA should include the measures NMFS identifies in Section 2.3 above, that is: fish passage; process flows to protect and restore off-channel habitat; sediment and large wood transport enhancements; flow control modifications; and, lower river and estuary habitat restoration. See SD2 § 4 at 37-42. NMFS believes that our requested studies will provide the information necessary for the Commission to identify and evaluate reasonable alternatives under NEPA and support the Record of Decision. Failure to obtain this information creates the risk that the Commission's evaluation and decision will not meet NEPA requirements. See, e.g., American Rivers v. FERC, 895 F.3d 32, 49-50 (D.C. Cir. 2018) (FERC's reliance on data from a decade-old survey of fish entrainment provided by the applicant without any updated information, field studies, or independent verification was "unreasoned" and violated NEPA); FERC Handbook for Hydroelectric Project Licensing and 5MW Exemptions from Licensing (2004) at D-2 (Commission's NEPA documents must include staff-developed recommendations "based on a thorough evaluation of the project effects, the applicant's proposal, and agency protection, mitigation, and enhancement recommendations and conditions"); National Parks Conservation Ass'n v. Semonite, 916 F.3d 1075, 1089 (D.C. Cir. 2019) (during NEPA process, action agency must</p>	City Light believes that the RSP will fully support the Commission's NEPA analysis. As described in comment responses NMFS-C01 to NMFS-C04, City Light's significant revisions to the proposed studies reflect its interest in addressing NMFS and other LP comments and concerns regarding information needs.

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							consult other agencies with “special expertise with respect to any environmental impact involved”) (citing 42 U.S.C. § 4332(2)(C)) (other citations omitted).	
13.	NMFS	03/05/2021	pp. 9-10	NMFS-C06	N/A	N/A	<p><b>Data Quality.</b> NMFS is concerned that the PSP does not include a process for ensuring and maximizing the quality, objectivity, utility, and integrity of information that will be generated through the studies as required by Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554, commonly referred to as the Data Quality Act (DQA)). Pursuant to 18 C.F.R. § 5.9(b)(5), information generated through the studies will be used to elucidate the nexus between project operations and effects (direct, indirect, and/or cumulative) and inform the development of license requirements. NMFS complies with the DQA by ensuring that our dissemination of information (e.g., NMFS Biological Opinions) and exercise of authority (i.e., ESA, FPA, and MSA) maintain established standards of scientific integrity. Furthermore, regulations at 40 C.F.R. § 1502.23 are applicable to FERC’s implementation of NEPA and require that agencies “ensure the professional integrity, including scientific integrity, of the discussions and analyses in environmental documents.”</p> <p>NMFS (and other Federal agencies) may not indiscriminately adopt analyses or documents from non-NMFS sources such as ILP studies that will be implemented by SCL. Rather, NMFS may only rely on scientific information after determining that it meets regulatory and scientific standards. See 84 Fed. Reg. 45,007, 45,008 (2019).</p> <p>In recognition that the ILP provides limited time between the conclusion of studies and environmental review and preparation of draft proposed measures and plans to protect, mitigate, or enhance environmental resources (PM&amp;Es) and prescriptions, NMFS, other LPs, and the Steering Committee, beginning in early 2019, repeatedly encouraged SCL to proactively develop a Quality Assurance/Quality Control (QA/QC) plan consistent with DQA guidelines for incorporation into the final study plan. Absent such a plan, NMFS is concerned that information derived from SCL’s proposed studies may not be fully consistent with DQA guidelines. We encourage SCL to review existing QA/QC processes, including those that have worked well in other hydro projects, and work urgently and collaboratively with NMFS and other LPs to tailor a QA/QC plan that will meet the ILP timelines and achieve regulatory and scientific review standards.</p>	All City Light studies will be implemented in accordance with generally accepted scientific methods and include QA/QC to professional standards. Each study will be led by technical leads with expertise in the study area. All modeling studies (FA-02, FA-05, Sediment Transport and Operation Model) will be available for LPs to facilitate review of existing conditions and test hypotheses regarding potential future operations or scenarios. In addition, the water quality monitoring plan will be subject to QA/QC procedures that are consistent with Ecology’s requirements. The proposed fish passage and genetics studies include expert review panels. NMFS will be integrated in the study team for Fish Passage Study. The ILP requires progress reports and interim reporting with consultation and review by all parties and FERC.
14.	National Park Service (NPS)	03/05/2021	p. 2	NPS-C01	N/A	N/A	<p><b>General Comments on the Proposed Study Plan.</b> To address the shortcomings in the Proposed Study Plan, we continue to support implementation of all NPS Study Requests (SR) submitted to FERC to date. The post-PSP meetings narrowed differences in limited areas with concern to a handful of NPS Study Requests; we will examine the RSP and then reevaluate if we feel that all NPS study requests still stand or if differences have sufficiently narrowed to support what is proposed in the RSP.</p> <p>In general, the PSP leans on two general justifications for rejecting NPS SRs: the 7 FERC criteria and shared interest. The rationale that was provided in the PSP was based primarily on the FERC criteria, but we found that SCL did a cursory job of applying this filter, often relied on circular logic when rejecting studies, and added unstated qualifications when using the 7 criteria as a framework for dismissal of SR’s as detailed in the specific comments that follow, and shown in the winter 2021 meetings, it appears that SCL either did not read our SRs, or did not seriously consider them before rejecting them with boilerplate language applied to numerous Licensing Partner submitted SRs.</p>	<p>City Light has carefully reviewed all study requests submitted by LPs, considered feedback provided by LPs during the PSP Meetings and subsequent topic-based discussion meetings, and reexamined its approach to the relicensing study process. In response to recommendations from the LPs and in the spirit of collaboration, City Light has added five additional studies, and expanded a number of previously proposed studies, in this RSP. In some cases, these studies do not necessarily fall within the FERC Study Criteria, but City Light has proposed to expand its study plan to demonstrate its commitment to working with LPs and to compromise with its partners to accommodate their information needs beyond the relicensing process.</p> <p>City Light acknowledges comments received by NPS and other LPs that for studies it did not adopt,</p>

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								City Light did not include a sufficient explanation based on the FERC Study Criteria in each instance. City Light has made every effort in the RSP to provide sufficient justification in respect to the FERC Study Criteria to address this concern.
15.	North Cascades Conservation Council	03/08/2021	p. 2	NCCC-C01	N/A	N/A	NCCC has attempted within the limit of its volunteer resource, to participate in all of the study work groups (four working groups) and the Steering Committee in order to promote our goal to protect the North Cascades ecosystem and to support the interests of the tribes as well as the federal and state agencies with management mandates. Given the recalcitrance of SCL to engage in constructive and collaborative dialogue, NCCC has found it more conducive to our interests to work with others in the Plan B Caucus initiated by the Upper Skagit Tribe. Therefore NCCC would like to associate our comments in support for the detailed comments on studies submitted by the tribes, state (WDFW, WDOE) and federal (NPS, NMFS, USGS, USFS) agencies and other non-governmental environmental groups.	City Light appreciates the NCCC's participation in the work group process thus far. City Light is committed to working collaboratively with NCCC and its other LP partners through continued dialogue and a more inclusive approach toward implementation of the study program.
16.	North Cascades Conservation Council	03/08/2021	pp. 2-3	NCCC-C02	N/A	N/A	In particular NCCC would advocate for best available science and traditional ecological knowledge to be applied to study the present and potential future roles for the Skagit Project to support salmonid population restoration and recovery planning for salmonids and other species under the Endangered Species Act. Management of reservoir fisheries requires detailed study to understand the Project's impact and changing reservoir levels on the ecosystem as it affects in-reservoir and tributary streams. This would include full-scale study of the genetics of reservoir and tributary species. It is also critical to study the impact of invasive species (especially reed canary grass) associated with the Project.	City Light acknowledges there is a shared interest in developing a more in-depth genetics baseline for native fish species in Project reservoirs for the purpose of informing longer-term fish management objectives. In response to comments from NCCC and other LPs, City Light has proposed a new study plan in the RSP, FA-06 Reservoir Native Fish Genetics Baseline Study, to characterize baseline genetic conditions for three native fish species in Project reservoirs.  City Light also has proposed TR-04 Invasive Plants Study to provide information to determine locations of invasive plant occurrences, including reed canary grass.
17.	North Cascades Conservation Council	03/08/2021	p. 3	NCCC-C03	N/A	N/A	There is continued need study how to maintain and protect the wildlife and recreation lands purchased by SCL under the provisions of the current license. This includes, specifically, those lands that were selected outside of the project boundary because they constituted the most effective way to achieve mitigation for ongoing environmental impacts.	City Light has a shared interest with the LPs in managing these mitigation lands and believes that such matters would best be addressed in a management plan, which it has proposed to develop in consultation with the LPs. The management plan will include management and protection measures for each mitigation parcel. In response to LP comments, City Light has provided a timeline with milestones for development of the management plan.
18.	North Cascades Conservation Council	03/08/2021	p. 3	NCCC-C05	N/A	N/A	NCCC is not certain how key elements of the current license, e.g., the world-class environmental learning center are necessary to study. In many ways, its success speaks for itself. Continued engagement and support (financial, energy, maintenance, etc.) from SCL as an element of the next license needs to be a provision of the license. Study and planning to ensure its future is a critical element that so far has not been addressed in the ILP process.	The North Cascades Environmental Learning Center is a Project facility and City Light fully expects to continue its engagement and support of the facility under the new license.
19.	North Cascades Conservation Council	03/08/2021	p. 3	NCCC-C06	N/A	N/A	The Skagit Project has many downstream impacts on water quality, sediment, river morphology, large woody debris, etc. that are not recognized by limiting the studies as SCL proposes to the Project boundary. NCCC supports the Caucus proposals for broader studies on Project effects from the Skagit estuary to the headwaters. Note as well that new regulations with respect to flow require SCL to study how to meet water quality standards.	City Light acknowledges study requests from NCCC and other LPs to more fully understand the extent of the downstream influence of Project operations on resources below the Sauk River confluence. In consideration of the numerous study requests to extend the geographic scope of studies to below the Sauk River confluence, and

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								City Light's interests in watershed-level influences on anadromous fish resources, City Light is adding SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River (Synthesis Study) as part of its RSP to develop a comprehensive data synthesis of existing information focused on the reach downstream of the Sauk River confluence to the estuary. City Light will include a technical memorandum in the Initial Study Report (ISR) that (1) compiles, analyzes, and summarizes relevant available information about the condition of and primary factors affecting life stages of anadromous fish resources in the reach of river extending from the Sauk River confluence to the Skagit River delta and estuary; (2) identifies the Project's potential contribution to those factors affecting life stages of anadromous fish resources and identifies data gaps related to the evaluation of the Project's effects; and (3) proposes studies to be conducted during the second year of study to address those data gaps, if necessary. Upon Commission approval, City Light will implement such studies during the second year of study.
20.	North Cascades Conservation Council	03/08/2021	p. 3	NCCC-C07	N/A	N/A	In addition to the above, NCCC reiterates its concerns that the current study proposals by SCL under the FERC ILP process do not address the key macro issues of 1) evaluation of how well the provisions current license as implemented have performed to achieve mitigation of the original environmental impacts of the Skagit River Project (FERC 553) - especially with respect to off-channel spawning areas constructed under the current license; 2) cumulative impacts of the Project; 3) anticipation of impacts of a changing climate on Project operations and impacts over the life of the next license 30-50 years; and 4) the need for cooperation and planning with Canada and British Columbia for the future of developments in the transboundary Upper Skagit River watershed including logging, mining and the way the Skagit River serves as a wildlife corridor. In this respect we note the need for SCL to utilize the decades of collaboration on fish and wildlife research performed under the auspices of the Skagit Environmental Endowment Commission established by Treaty to deal specifically with these transboundary interactions.	City Light will continue to engage with the Skagit Environmental Endowment Commission to identify available information that may be informative of the relicensing process.
21.	North Cascades Institute	03/08/2021	p. 3	NCI-C01	N/A	N/A	<b>General Comments.</b> North Cascades Institute intend our comments to support the detailed comments provided in the more than 90 study requests submitted by Caucus members to understand Project-related impacts and inform resource protection, mitigation, and enhancement measures. These study requests serve to ensure that tribal treaty rights and interests are adequately considered in regard to these natural resources. North Cascades Institute supports these study requests and encourage the Licensee to adopt their components.	City Light recognizes that many study topics, such as those regarding fish, wildlife, plants, water quality, air quality, sound and light, and cosmology, have significance to Indian tribes and First Nations. As discussed above, City Light has made significant revisions to its proposed studies, as reflected in the RSP, including the addition of five new studies and modification of many proposed studies included the PSP to address study requests and comments from Indian tribes and other LPs.
22.	North Cascades Institute	03/08/2021	p. 3	NCI-C02	N/A	N/A	We believe there is a clear nexus between the project and the proposed study plan requests by the License Participants. The project boundary, or Licensee's control over a facility, do not limit project impacts, and are not the only criterion for establishing nexus.	In response to LP comments, City Light has revisited its position with respect to studying potential impacts outside the Project Boundary. For example, City Light has substantially

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							Our interests span the full range of issues that have been raised by the License Participants' study plans. We believe that good data will help all the land managers – Tribes, Agencies, and Seattle City Light – understand, manage, and appropriately mitigate the continuing impacts of the Skagit Hydroelectric Project. The proposed study plans will help manage these resources over the course of the new license. This information will help North Cascades Institute better serve the public who are drawn to the project, to meet their needs to learn and support ecosystem health and processes at a time of worldwide climate disruption.	expanded the scope of its Recreation Facilities and Visitor Use Study to include a number of recreation sites outside the Project Boundary. While City Light does not concede that these sites involve Project-induced recreation, City Light has expanded its study to provide information to aid in the long-term management of these sites. With respect to other studies, City Light has not limited the study area to the Project Boundary.
23.	Sauk-Suiattle Indian Tribe	03/08/2021	p. 1	SSIT-C01	N/A	N/A	The Tribe has been extensively involved in SCL's relicensing process including the pre-Notice of Intent process, a caucus of License Participants (LPs) including agencies, tribes, local governments, and NGOs to jointly develop study requests the Tribe believes necessary to evaluate project impacts, and in Proposed Study Plan meetings designed to resolve disagreements between SCL and the LPs. The Tribe believes the result of LP caucus was the development of well-reasoned study requests that, if implemented, will provide valuable information to the Commission for its evaluation of the project on resources vital to the Tribe. SCL partially incorporated some of these studies in the Proposed Study Plan but did not provide sufficient justification for partial or whole exclusion of many of these LP proposed studies. The Sauk-Suiattle Tribe makes the following comments on the proposed Study Plan and stands ready to continue to work with SCL toward a Revised Study Plan that provides all necessary information to develop a license that protects Treaty guaranteed resources vital to the Tribes culture and existence.	City Light appreciates the Sauk-Suiattle Indian Tribe's participation in the ILP process and acknowledges the importance of the Skagit River watershed and its resources to tribal members. As described above, City Light has made significant revisions to its proposed studies, as reflected in the RSP, including the addition of five new studies and modification of many proposed studies included the PSP to address study requests and comments from Indian tribes and other LPs. Where it did not adopt an LP study request in whole or in part, City Light has supplemented or clarified its explanation in the RSP based on the FERC Study Criteria.
24.	Swinomish Indian Tribal Community	03/08/2021	p. 5	SITC-C01	N/A	N/A	<b>III. General Concerns with City Light's Approach to Relicensing.</b> Regarding the geographic scope of many study requests, we support the National Marine Fisheries Service ("NMFS") and other state and federal resource agency trustees in their request to study the entire Skagit River system as a whole to understand the extent of ongoing and potential future Project impacts. This information would inform license conditions and enable the development of future protection, mitigation and enhancement measures appropriate to current – and future – circumstances throughout the duration of a future license.  Throughout the PSP, City Light seeks to limit downstream studies to the confluence with the Sauk River. In the subsequent discussions the LPs repeatedly expressed concern that there was no scientific basis for this decision, as there are no artificial or natural barriers that would suggest that the confluence would end Project effects. City Light still has not provided a rationale for its continued insistence that studies must stop at the Sauk confluence. USGS monitors detect flow effects from the Project as far downstream as Sedro Wooley, and Skagit flows account for at least 50% of the flows below the confluence. It is highly likely that Project effects for water quality extend well downstream of the Sauk confluence. For geomorphic processes and large woody debris, the link is even clearer. Given that the Project sequesters bedload from 37 percent of the Skagit Basin including fine sediment that would be transported to the Skagit estuary where marsh habitats are decreasing (Hood et al 2016), it is highly likely that the Project's entrapment of bedload and large woody debris significantly deprives the entire river system downstream of these important habitat constituents. Because NMFS and other LPs have provided sufficient evidence of Project effects below the Sauk confluence, it is incumbent on City Light to conduct studies downstream of the confluence. As a practical matter, extending already occurring data gathering and monitoring downstream should incur relatively minor expense with potentially significant benefit to understanding of Project effects and necessary license conditions.	In response to LP requests for City Light to expand the geographic scope of certain studies to include the reach of river from the Sauk River confluence to its mouth, the delta and the estuary, City Light proposes SY-01 as described in comment response NCCC-C06.



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25.	Swinomish Indian Tribal Community	03/08/2021	pp. 6-7	SITC-C02	N/A	N/A	<p><b>IV. The Commission's Study Plan Criteria.</b> To determine whether a proposed study is required to be conducted by the licensee as part of the license plan, the Commission applies the criteria set forth in 18 C.F.R. § 5.9(b). According to the preamble to the integrated license process regulations, “[t]he criteria are to be considered as a whole, in light of the circumstances of the individual proceeding, and any applicable Commission policies and practices.” 68 Fed. Reg. 51080 (August 25, 2003). However, the nexus requirement set forth in 18 C.F.R. § 5.9(b)(5) has particular significance as the only criterium which is mandatory. 68 Fed. Reg. at 51078 (“with the exception of the establishment of a nexus between the study request and operation of the project, no one criteria establishes a ‘litmus test’ for study requests”).</p> <p>The nexus criterium requires the study proponent to “[e]xplain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.” 18 C.F.R. § 5.9(b)(5). The regulation’s reference to direct, indirect, and cumulative effects establishes that project operations do not have to be the sole or leading cause of effects on a resource, but rather a reasonably likely contributing factor to such effects. The regulation, however, does not explain what degree of nexus is sufficient. In conversations with City Light, the question of whether a proposed study has a sufficiently strong nexus to satisfy Criteria § 5.9(b)(5) has emerged as a central area of disagreement, and thus bears further discussion.</p> <p>In 2012, the Commission published “A Guide to Understanding and Applying the Integrated Licensing Process Study Criteria.” (“Guidance”). With respect to 18 C.F.R. § 5.9(b)(5), the guidance summarizes: “<b>A reasonable connection between project construction or operation and potential effects on the resource in question is a threshold requirement</b> that must be demonstrated for the Commission to require that an applicant gather the requested information. Just as important, this section should also explain how the information would be used to develop license requirements.” Guidance at 4 (emphasis added). The reference to the rule of reason and “potential” effects indicates that effects do not have to be certain to occur, but rather reasonably likely to occur.</p> <p>As an example of a sufficient nexus, the Guidance sets forth the scenario in which the proponent “requests a survey for a federally endangered fish species and its habitat downstream of an existing project that operates in a peaking mode... If one of the factors leading to the listing of the fish has been the loss of spawning habitat, the study proponent could easily demonstrate a nexus between the presence of the fish or its habitat downstream of the project and the project’s effect on spawning habitat due to fluctuating flows from its peaking operation.” Guidance at 4-5. The Guidance acknowledges that a more attenuated nexus created by a dam on upstream tributaries may also be sufficient, but the proponent would bear a heavier burden to provide “a strong rationale for how fish habitat in the tributaries and the river reaches upstream of the project is affected by the project.” Id. at 5. The Guidance therefore suggests a sliding scale, in which a nexus that is relatively weak on its face must be supported by a stronger demonstration of project effects.</p> <p>In <i>Georgia Power Company</i>, 111 F.E.R.C. P61433; 2005 LEXIS 1668 (June 20, 2005), the Commission clarified that the proponent must not only show a nexus to habitat generally, but must link that nexus to impacts to the affected resource. The Commission ruled that the concentration of contamination of sediment caused by dam operations was not sufficient to demonstrate a nexus, but suggested that if the proponent had demonstrated a linkage to fisheries resources, the nexus would have been established. In <i>Georgia Power</i>, the U.S. Fish and Wildlife Service had</p>	Based on feedback received after filing the PSP and after thoughtful deliberation, City Light has decided to make significant revisions to its proposed studies, including the addition of five new studies and modification of many proposed studies included in the PSP to address LP comments, concerns, and information needs. City Light has incorporated components of many study requests that it previously rejected based on disagreements regarding project nexus. City Light hopes that these changes in the RSP will set the stage for further collaboration.

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							<p>conditioning authority relating to fisheries, and so demonstrating potential effects on fish was required. The case suggests that for Ecology, Project effects on water quality would be a sufficient nexus because of the Ecology's authority to impose mandatory water quality conditions.</p> <p>In <i>Alaska Energy Authority</i>, 144 F.E.R.C. P61040, 2013 WL 3962291 (July 18, 2013), the Commission considered a requested study of dam operations' impact on habitat and fisheries resources downstream of a licensed facility in light of climate change and melting headwater glaciers. While there was plainly a nexus, the Commission determined that the results of the study would likely be too speculative and general to develop license requirements. Because the effects were reasonably likely, the Commission determined that despite not satisfying the criterium for a study request, the effects were a necessary part of the NEPA analysis.</p> <p>In sum, under the Commission regulations, Guidance, and limited Commission rulings, the Tribe understands 18 C.F.R. § 5.9(b)(5) to require that the study proponent demonstrate a reasonably likely connection between project operations and potential effects on the identified resource and to further explain how the study results could be put to practical use as license requirements. Similarly, if a licensee rejects in whole or in part a study request submitted by a LP, the PSP should provide an explanation for the rejection based on the specific criteria enumerated in § 5.9 (b). 18 C.F. R. § 5.11 (b)(4). License requirements include potential conditions on operations or mitigation measures. In the comments below, the Tribe explains how each of the requested studies meets the most relevant § 5.9(b) criteria, including the § 5.9(b)(5) nexus requirement. The Tribe focuses its comments on contested § 5.9 (b) criteria, and does not comment where criteria are not in dispute with City Light or have been deemed to be adequately explained in the study request.</p>	
26.	Swinomish Indian Tribal Community	03/08/2021	pp. 7-9	SITC-C03	N/A	N/A	<p><b>V. Need for Quality Assurance – Quality Control Process.</b> Swinomish is concerned that the PSP does not include a process to ensure the quality, objectivity, and integrity of information that will be generated through the studies. City Light did not include a quality assurance / quality control (QA/QC) plan or process in the PSP or propose a process for peer review of the studies, despite the fact that this concern has been raised repeatedly through the Steering Committee since 2019. 18 C.F.R. § 5.11(d)(5) requires that the PSP “[e]xplain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers any known tribal interests.” It is plainly “generally accepted practice in the scientific community” that reputable study methodology includes robust QA/QC measures and peer review.</p> <p>Swinomish is aware that our federal resource trustees must adhere to the Data Quality Act (“DQA”) and Endangered Species Act to ensure that their biological opinions and exercise of authority under the ESA, for example by NMFS, adhere to established standards of scientific integrity. Under the ESA, “each agency,” including FERC, NMFS and USFWS, “shall use the best scientific and commercial data available” to ensure a lack of jeopardy to listed species and lack of adverse modification of critical habitat. See 16 U.S.C. § 1536 (a)(2). Additionally, NEPA regulations at 40 C.F.R. § 1502.23 are applicable to the Commission’s implementation of NEPA and require that agencies “ensure the professional integrity, including scientific integrity, of the discussions and analyses in environmental documents.”</p> <p>Because federal agencies may not adopt analyses or documents that do not receive rigorous scientific review, we believe it is imperative that the RSP include a QA/QC</p>	Please see comment response NMFS-C06.

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							<p>and peer review process so that LPs can review and comment on it for inclusion in the final study plan. City Light must engage in a process to ensure that proposed studies are consistent with DQA guidelines and therefore eligible for incorporation into the Commission's NEPA analysis and exercise of federal agency conditioning authorities under the FPA. If City Light does not do so, in order to fulfill their respective statutory mandates, federal agencies must conduct additional review or apply conservation biology standards of the precautionary principle to account for risks presented by uncertain or incomplete studies. We request that City Light review existing QA/QC processes, including those utilized in other dam relicensing projects, and work with the LPs to develop a QA/QC plan that will meet the ILP timelines and achieve regulatory and scientific review standards of all LPs.</p> <p>The need for a robust QA/QC process that is agreed upon by City Light and the LPs is exemplified in the Water Quality Monitoring Study Plan (FA-01). City Light's December 2020 version states that a final monitoring report will include additional data of "suitable" quality provided by other entities, but provides no objective criteria to define how suitable quality will be determined, by whom, or using what metrics and what process. Additionally, the Study Plan's QC section provides no objective criteria or process for how City Light intends to handle Quality Control at the data collection, data entry, and data review stages. If anomalies are found at any of these stages, how will they be rectified and documented? Given the importance and clear need to have a reliable, agreed upon QA/QC for all LPs, the Tribe recommends that City Light convene a small QA/QC working group without delay and agree to adhere to rigorous QA/QC measures developed by that group.</p>	
27.	Swinomish Indian Tribal Community	03/08/2021	p. 9	SITC-C04	N/A	N/A	<p><b><u>VI. City Light's PSP Is Incomplete and Insufficient to Achieve Legally Defensible and Scientifically Valid Studies to Guide the License and NEPA.</u></b> The Swinomish Tribe appreciates that City Light accepted in full the Tribe's Cultural Resources Study and offered a potential path forward on the Tribe's Mitigation Lands Access and Habitat Assessment study request. However, City Light's PSP otherwise fails to adequately disclose the regulatory basis and scientific rationale for rejecting in part or in whole critical issues and methods from virtually all study requests submitted by the LPs. Where the PSP does identify a regulatory criterion under 18 CFR 5.9(b) as the basis for rejecting an element of a study request, the PSP generally fails to provide a meaningful scientific justification to support City Light's application of the regulatory criteria.</p> <p>While we acknowledge and appreciate that City Light has recently taken a positive step forward to expand its proposed fish passage study and consider studying process flows, it has not yet provided the degree of specificity needed to achieve mutually-agreeable study plans, nor to collect the data and information that federal and state natural resource agencies have repeatedly made clear that they need to fulfill their statutory obligations. See, e.g., 33 U.S.C. § 1341(a)(1) (requiring certification from Department of Ecology that Project discharges "will comply with the applicable provisions" of the Federal Clean Water Act, including water quality standards); 16 U.S.C. § 1536(a)(2) (affirmatively mandating that the agencies "shall" insure a lack of jeopardy and adverse modification to critical habitat, using the best scientific and commercial data available); 18 C.F.R. § 5.11(d)(5) (requiring that study methodology must accord with "generally accepted practice in the scientific community."). As a result, Swinomish remains concerned about the ability of state and federal resource agencies with mandatory conditioning authority to carry out their statutory duties under the FPA, and other legal duties that underpin the federal Trust Responsibility. We offer the following specific comments on the PSP.</p>	As described above, City Light has made significant revisions to its proposed studies, as reflected in the RSP, including the addition of five new studies and modification of many proposed studies included the PSP to address study requests and comments from tribes and other LPs. Where it did not adopt an LP study request in whole or in part, City Light has supplemented or clarified its explanation in the RSP based on the FERC Study Criteria. City Light's significant revisions to the proposed studies reflect its interest in addressing LP comments and concerns regarding information needs.

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28.	Swinomish Indian Tribal Community (SITC)	03/08/2021	pp. 25-26	SITC-C42	N/A	N/A	<p><b>VI. Conclusion</b></p> <p>The Tribe's staff and SRSC fisheries biologists have worked extensively with City Light, federal and state natural resource agencies and other LPs during the current license term to ensure that the license requirements are met. While City Light has been a good partner in maintaining instream flows, our salmon and steelhead are still in decline, as are SRKW. We believe it is necessary to study the subjects outlined above as requested by the federal, state and tribal governments to inform the license application and license conditions. Doing so is necessary to ensure that the protections and recovery of all wild salmon stocks is supported by license conditions.</p> <p>As a result, a comprehensive, hard look at the Project's past, ongoing, and future impacts is required to ensure that all direct, indirect and cumulative Project impacts are fully evaluated and appropriate mitigation measures are developed and implemented in the future license City Light seeks. This holistic approach is the only way to uphold and honor the Tribe's natural and cultural resources interests, Treaty rights and way of life and to comply with applicable law.</p> <p>We appreciate the Commission's consideration, and look forward to remaining engaged with City Light to protect and recover the Skagit River and its wild salmon and the habitat they depend upon for current and future generations.</p>	City Light recognizes the Swinomish Indian Tribal Community's natural and cultural resource interests in the Project vicinity. It is City Light's intent that the significant changes in the RSP reflect its renewed commitment to collaboration with the Swinomish Indian Tribal Community and other LPs in developing a comprehensive, ecologically sound Project proposal. City Light has significantly modified its proposed fish and aquatics resources studies, including adopting all components of NMFS's fish passage study request and adding a new study on reservoir tributary fish habitat (FA-07 Reservoir Tributary Habitat Assessment). City Light welcomes the opportunity to continue consulting with the Swinomish Indian Tribal Community to discuss its information needs.
29.	USFWS	03/08/2021	pp. 26-27	USFWS-C21	N/A	N/A	<p><b>Issue Resolution Form: Studies below the Sauk River.</b> Throughout its PSP, SCL has identified the Skagit/Sauk River confluence as the downstream limit of empirical studies in the majority of its study plans. In Scoping Document 2, FERC states that the scope of effects analysis will encompass "those changes to the environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives," and will include "some portion of the Skagit River downstream of the project." The USFWS and other LPs continue to assert that the Skagit Hydroelectric Project exhibits Project related effects to Puget Sound. Stream gage data supports this assertion. cursory analysis of the contribution of Project flows (Newhalem Gage) to Skagit River flows at Marblemount Gage, Concrete Gage, and Mount Vernon demonstrates that over a ten year-period Project flows can contribute more than 50% of the mainstem Skagit River flows (Figure 12). This Project effect is likely related to the altered hydrograph associated with power production and flood control (ACOE Rule Curve). It is reasonable to assume that the Project has an effect on the environment of the Skagit River below the Sauk River confluence.</p> <p>On February 23, 2021, SCL circulated an Issue Resolution Form acknowledging both the position of the LPs and that extensive information exists on resources of interest downstream of the Sauk River that may be used to inform development of its license application. As such, SCL is proposing to develop a comprehensive data synthesis study plan to review existing information throughout the Skagit River watershed. A subsequent study report in the Initial Study Report would document available information, identify significant data gaps, and, as appropriate, propose a plan to address needed information. LPs would then have the opportunity to comment on the synthesis study report, identify potential data gaps, and request additional studies or modeling (18 CFR § 5.15)</p> <p>The USFWS appreciates the acknowledgment from SCL, however we believe SCL's proposal does not meet 18 CFR § 5.9(b)(5). Given the timeline proposed by SCL, we are not confident that once data gaps are identified, additional studies or modelling will be completed within the Integrated Licensing Process timeline to adequately inform the development of the license application. Instead, the USFWS suggests that</p>	In consideration of the numerous study requests to extend the geographic scope of studies to below the Sauk River confluence, City Light proposes SY-01 Synthesis and Integration of Available Information in the Lower Skagit River, as described in comment response NCCC-C06 above.

Table No.	Organization	Date	Comment Letter Page	Comment ID No.	PSP Introduction (if §6, relevant ID No. used in PSP of entity's own study request)	Study Plan(s)	Comment	Response
							SCL expand the scope of individual study plans as has been previously requested by LPs.	
30.	Washington Department of Fish and Wildlife (WDFW)	03/08/2021	p. 7	WDFW-C02	N/A	N/A	WDFW requests that FERC require SCL to create a study plan from the [19] WDFW study requests previously submitted in the PAD and named below and the two revised study requests (RSR) attached in this filing.	City Light appreciates WDFW's time and effort in continued discussions on identification of study areas, study development, and study implementation. City Light has carefully reviewed all study requests submitted by LPs, considered feedback provided by LPs during the PSP Meetings and subsequent topic-based discussion meetings, and reexamined its approach to the relicensing study process. In response to recommendations from the LPs and in the spirit of collaboration, City Light has added five additional studies, and expanded a number of previously proposed studies, in this RSP. City Light hopes that these changes in the RSP will set the stage for further collaboration.
<b>Cultural Resources</b>								
31.	Nlaka'pamux Nation Tribal Council	03/08/2021	pp. 1-2	NNTC-C01	N/A	CR-02	<p><b>Comments on Cultural Resources Survey (CR-02).</b> The survey methodology involves the identification of High Probability Areas (HPAs), as well as Moderate Probability Areas (MPAs) and Low Probability Areas (LPAs). The HPAs will be determined in part "based on the probability model available on WISAARD" – the Washington Information System for Architectural and Archaeological Records Data.</p> <ul style="list-style-type: none"> <li>Currently, there are no details on the proposed probabilistic analysis of the proposed APE for this Project, and there are plans to determine that methodology collaboratively with members of the Cultural Resources Working Group. While NNTC understands that certain aspects of the study will be determined during the research design phase, it is difficult to provide feedback, agreement, or points of concern when there are so few specifics regarding how this work will be done.</li> <li>Since the advent of predictive modelling in the 1990s, some scholars have critiqued untested probabilistic modelling as simplistic and creating circular logic in which sites are only found in expected places because unexpected places are not tested. Predictive modelling in practice has also been characterized as a cost-saving measure used largely in heritage management due to its usability by non-archaeologists, but not providing sufficient predictive power for archaeologists in academia to continue developing new methods.</li> <li>Since WISAARD is a probabilistic model developed for the entire state of Washington, it is not likely to be as powerful of a predictive tool as a model developed from scratch for specific contexts within the project area.</li> <li>The PSP as written does not contain enough information to assess the probability model to be used in this survey or to provide specific feedback on approaches and requests for variables or site conditions to be considered.</li> </ul> <p>NNTC looks forward to discussing this issue more with SCL in the Cultural Resource Working Group on April 14. In its Issue Resolution Form for cultural resources, SCL has stated that during this CRWG meeting, it will show details of the predictive modeling to be used for CR-02.</p>	City Light intends to develop the research design with the CRWG, the draft of which is included in the RSP. The predictive model developed by the DAHP and available on WISAARD was recommended for use as a starting point by the SHPO. City Light agrees that the DAHP predictive model is not specific enough to provide the detail-level high, medium and low probability information that could help prioritize a strategy for archaeological assessment. City Light plans to evaluate specific topography (i.e. including aerial photography and LiDAR), geomorphology, prior cultural resources discoveries and surveys, site leads from historic maps, ethnographies, and use overlays of project facilities and activities to aid in identification of areas where project effects and potential effects may occur. The preferred approach is to discuss and finalize the research design with the CRWG.
32.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 2	NNTC-C02	N/A	CR-02	NNTC also requests that Nlaka'pamux monitors participate in the survey in the area around Ross Lake. Cultural surveyors hope to be on the ground at Ross Lake in connection with CR-04, with easy access, therefore including NNTC monitors in CR-02 would not be a large additional expense. Including monitors will ensure that the	City Light recognizes NNTC's interest in the Ross Lake area. City Light welcomes participation from Indian Tribes and First Nations in field surveys and will coordinate with interested parties to collaborate and support field efforts.

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							results of CR-02 have NNTC's full support and that sites of importance to NNTC are identified and can be protected.	
33.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 2	NNTC-C03	N/A	CR-02	Lastly, NNTC notes that the Area of Potential Effects ("APE") referenced in the PSP is not yet finalized and will be discussed in the upcoming Cultural Resources Work Group meeting. NNTC is participating in the CRWG and will make any comments it has on the APE in that forum. Moreover, NNTC notes that the APE may need to be adjusted based on the results of the recreation studies (discussed below).	City Light will coordinate with participants in the CRWG April 14, 2021 meeting to refine the proposed APE. City Light will continue to work with LPs to identify potential updates to the APE once data from studies becomes available. City Light will complete any necessary updates to the APE at milestones in the process (such as the ISR and USR) based upon data gleaned from studies regarding Project activities and effects or reasonably anticipated Project activities and effects to historic properties, including those with traditional cultural significance.
34.	Nlaka'pamux Nation Tribal Council	03/08/2021	pp. 2-3	NNTC-C04	Sections 6.2.1, 6.2.2, 6.2.3  (NNTC-01, NNTC-02, NNTC-04)	CR-04	<b>Comments on Inventory of Historic Properties with Traditional Cultural Significance (CR-04).</b> City Light partially adopted NNTC's study requests into CR-04, Inventory of Historic Properties with Traditional Cultural Significance.  Many of the specifics of CR-04, such as the budget and the details of how the SCL overall study integrating the individual First Nation/Tribal studies will be staffed and carried out, are not reflected in the PSP and NNTC therefore cannot offer specific comments. While CR-04 gives First Nations and Tribes the option to hire their own cultural surveyors and ethnographer for their portions of the CR-04 studies, other fundamental details (such as budget and specific timing of the studies) will be worked out in the research design phase. <ul style="list-style-type: none"> <li>SCL has accepted NNTC's study requests and incorporated them into the PSP (except where SCL noted particular aspects it did not adopt). In individual meetings with NNTC, SCL has voiced support for NNTC's study methods and some elements of NNTC study requests have been specifically discussed—for example, SCL agreed that Nlaka'pamux surveyors will conduct NNTC's portion of CR-04. Although the specific components of NNTC's study requests are not described in the PSP, NNTC has understood from its conversations with SCL that that City Light has generally accepted its proposals and study methodology.</li> </ul> Because the more specific points have yet to be worked out in the research design phase, NNTC is unable to offer detailed feedback and must rely on City Light's acceptance of its study requests for the assurance that the NNTC portion of the studies will be conducted appropriately.	City Light accepts the methodology as stated in the NNTC study request for conducting surveys within the APE under the CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study). Details of implementation steps and budget appropriate to the scope of work for a two-year study (i.e., research design) will need to be refined through coordination with City Light team ethnographer(s) who will provide assistance to Indian Tribes, First Nations, and City Light to accomplish overlapping goals for the Properties with Traditional Cultural Significance Study.
35.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 3	NNTC-C05	N/A	CR-04	CR-04 notes that "First Nation communities will be provided the opportunity to review their own information as drafted for inclusion in this study report (as described further below) prior to distribution of this study report to City Light and the Section 106 consulting parties." CR-04 also provides: "Each Indian Tribe and/or First Nation community will be engaged separately for participation in this study and the information from each will only be edited by, or at the direction of, the Indian Tribe and/or First Nation community from which it was provided."  NNTC supports the separate engagement of each Tribe and First Nation to conduct their own cultural resources surveys. City Light has accepted NNTC's study requests and has expressed support for NNTC's direct involvement in the survey. NNTC understands from its conversations with City Light that the report for NNTC's portion of CR-04 will be prepared by NNTC in coordination with the selected ethnographer, and that this report will be included as part of the study results without edits by SCL (unless those edits are approved by NNTC). This framework for the study is necessary to ensure appropriate treatment of confidential and sensitive cultural resources information.	City Light will review the NNTC's study results and will offer suggestions on the technical data included, specifically as it relates to meeting Section 106 compliance, which is a goal of the CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study. City Light will include a summary of NNTC's study in a larger report that will be prepared to document the overall results of the Properties with Traditional Cultural Significance Study. City Light's larger report will be prepared in compliance with Section 106 for the ISR and USR.

Table No.	Organization	Date	Comment Letter Page	Comment ID No.	PSP Introduction (if §6, relevant ID No. used in PSP of entity's own study request)	Study Plan(s)	Comment	Response
36.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 3	NNTC-C06	N/A	CR-04	SCL states in the PSP, "[t]he Properties with Traditional Cultural Significance Study will identify Project effects on cultural sites in the APE. These effects will be managed under a new management plan for the new license." The CR-04 should be revised to reflect that a Traditional Cultural Properties Management Plan is one of the intended outcomes of that study.	Management of traditional cultural properties will be incorporated in the Historic Properties Management Plan (HPMP) for the new license. If a plan specific to traditional cultural properties is needed, it will be appended to the HPMP and would be considered a part of the HPMP.
37.	Nlaka'pamux Nation Tribal Council	03/08/2021	pp. 3-4	NNTC-C07	N/A	CR-04	Lastly, NNTC notes that the Area of Potential Effects ("APE") referenced in the PSP is not yet finalized and will be discussed in the upcoming Cultural Resources Work Group meeting. NNTC is participating in the CRWG and will make any comments it has on the APE in that forum. Moreover, NNTC notes that the APE may need to be adjusted based on the results of the recreation studies (discussed below).	Please see comment response NNTC-C03.
38.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 6	NNTC-C14	N/A	RA-01	Lastly, NNTC notes that the APE may need to be adjusted based on the results of these recreation studies. City Light indicates that it is open to considering impacts outside of the Project Boundary and outside of the APE: "Moreover, the above proposed definition of the APE would encompass lands or properties outside of the Project Boundary where Project operations or Project-related recreation activities or other enhancements may cause changes in the character or use of historic properties as informed by City Light research studies." <sup>25</sup> If recreation impacts are found outside of the APE as currently proposed as a result of these studies, then the APE would need to be revised.	If Project-related effects are identified that have the potential to affect historic properties outside the proposed APE, then the APE will be expanded to incorporate the areas where the effects are occurring.
39.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 7	NNTC-C15	N/A	N/A	<b>Other Studies with the Potential to Impact Nlaka'pamux Interests</b>  Cultural resources of importance to the Nlaka'pamux are impacted by numerous Project-related processes, such as erosion and sedimentation. NNTC requests that the PSP sections concerning studies conducted in Ross Lake and the surrounding area take Nlaka'pamux cultural resources into account in two distinct ways, both of which will appropriately take into account tribal values and knowledge.  (1) In carrying out studies in the Ross Lake area, the PSP should provide procedures to ensure that the staff conducting studies on topics unrelated to cultural resources do not inadvertently harm cultural resources in the process. NNTC requests that City Light revise its PSP to reflect that, for studies conducted in the Ross Lake area, City Light will coordinate with the cultural resources staff, who can in turn coordinate with NNTC representatives to ensure that Nlaka'pamux traditional cultural properties are not negatively impacted by the carrying out of these studies. NNTC has provided a video presentation to SCL for their researchers, with the aim of informing researching how to "do no harm" to potential cultural properties.	City Light is coordinating with its cultural resources team for all studies that have the potential to affect cultural resources. City Light's cultural resources team is developing a Cultural Resources Awareness Training for study implementation, which incorporates input from Indian Tribes and First Nations. Additionally, City Light's cultural resources team is coordinating with each study lead to identify any potential study implementation effects on cultural resources, as well as applicable permits, treatments, and/or avoidance. Such coordination will be discussed in the CRWG meetings throughout study implementation. City Light has included language in the RSP to reflect these activities.
40.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 7	NNTC-C16	N/A	N/A	(2) The studies conducted in the Ross Lake area should likewise take into account Nlaka'pamux traditional cultural properties in their results. The PSP should include a plan for ensuring that the results of certain studies are shared with the City Light cultural resources staff so that where study results reveal adverse impacts to cultural resources, those effects can be accounted for in subsequent stages of the relicensing process.	City Light's cultural resources staff will work closely with other study leads to not only ensure avoidance and consideration of cultural resources during study implementation, but also to account for study findings and subsequent management proposals that could either identify or result in adverse effects to cultural resources.
41.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 7	NNTC-C17		GE-01, GE-03, RA-01	The studies where coordination with the cultural resources staff is needed in both carrying out the studies and synthesizing the results include: GE-01 (Reservoir Shoreline Erosion Study); and GE- 03 (Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study). RA-01 (Recreation Use and Facility Assessment), even without the additions proposed above, should also take Nlaka'pamux cultural resources into account in the survey methodology as well as in the results.	City Light is coordinating with its cultural resources staff for all studies that have the potential to affect cultural resources including those noted here (GE-01, GE-03, and RA-01).

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42.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 7	NNTC-C18	N/A	N/A	On sedimentation, Scoping Document 2 added Project-related sedimentation impacts on traditional cultural properties and cultural sites, and the studies must therefore provide information on this point. Results will inform license requirements, management plans, and settlement discussions to enable the Commission to meet its NEPA and NHPA obligations.	City Light will assess effects on cultural resources that are eligible for or listed in the NRHP in accordance with Section 106 of the NHPA, including sedimentation, and will utilize the results from the geologic studies in this effort.
43.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 8	NNTC-C19	N/A	N/A	Finally, NNTC requests to be notified of any ground work in researching fish passage where the study extends into Ross Lake.  The studies described in this section [Other Studies with the Potential to Impact Nlaka'pamux Interests] have a potential to impact cultural resources and should take these resources into account.	City Light will provide the study schedule to NNTC.  City Light is coordinating with its cultural resources staff to review and assess all studies for activities with the potential to affect cultural resources (e.g., such as ground disturbing activities, vegetation clearing, or other activities with potential acoustic/visual effects) to ensure a good cross-walk between studies and potential impacts that could arise from implementing them. Additionally, studies in Ross Lake NRA go through NPS research permitting review, which includes an NPS assessment of whether proposed activities and methods have potential to affect cultural resources. Permit stipulations may include considerations for avoidance, cultural resources monitoring or collection of data, or curation as stipulated through NPS policy in the ARPA permit (approved by NPS). Field crews for relicensing studies are required to take cultural resources awareness training and to follow the unanticipated discovery plan (UDP) that has been developed for the relicensing studies. In the event that any unanticipated discoveries occur, NNTC cultural resources staff will be contacted along with Section 106 consulting parties regarding next steps, as outlined in the UDP.
44.	North Cascades Institute	03/08/2021	p. 5	NCI-C07	N/A	N/A	<b>Cultural Resources.</b> North Cascades Institute support the requests to study the impacts of project-induced recreation on cultural resources. The Upper Skagit Indian Tribes have requested that the Licensee study the impacts of recreation on cultural resources within and adjacent to the Project boundary. Increased recreation use has negative consequences on tribal cultural and historical resources, including vandalism and destruction of culturally significant sacred site and vegetation, increased litter and human waste, and other impacts which impact migration and the health of fish and wildlife.	City Light's proposed cultural resources studies (CR-02 Cultural Resources Survey, CR-03 Gorge Bypass Reach Cultural Resources Survey, and CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study) include documenting cultural resources in the APE. Documentation will include noting current conditions and potential impacts to each documented resource, including recreation related impacts.
45.	NPS	03/05/2021 (Privileged filing)	pp. 1-5	NPS-C81	6.2.14 (NPS-11)	CR-02, GE-03	<i>[summarized from original text]</i> The NPS filed privileged/confidential comments on the PSP with FERC and provided a copy to City Light. In these comments, the NPS requested five additional areas around Ross Lake to be included in GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas Of Concern Revised Study Plan. The NPS is requesting that City Light expand the scope of this study plan to provide a more comprehensive sediment study within Ross Lake, in order to provide information necessary for the identification and management of historic properties.	City Light agrees that sedimentation poses potential identification and management issues related to historic properties. City Light therefore commits to funding a study on deposition in Ross Lake at the five locations suggested in the comment for GE-03 under the current license compliance activities. This new study will be completed 2021-2022 during relicensing efforts and, when the results become available, the data from this study will be used to inform



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								management under the current license and will be integrated into the historic properties management plan under the new license.
46.	Sauk-Suiattle Indian Tribe	03/08/2021	pp. 6-7	SSIT-C15	Section 6.2.4 (SSIT-04)	N/A	<p><b><u>We appreciate Seattle City light (SCL) views and comments on the proposed cultural studies.</u></b> In anticipation of the Cultural Resource Work Group meeting on April 14, which is supposed to resolve the issue of the proposed transmission line survey (SSIT-04 Cultural Resources Transmission Line Study), we have several comments.</p> <p>Our general observation on the process is that it could have afforded more consideration for the studies proposed by Tribal Governments. Perhaps a little closer to the amount of time the license participants spent shaping up the SCL proposed original study. Rote responses seem confusing in several cases. The transmission line survey is one such case. We trust that FERC will consider these comments in sequence with the proposed study request, SCL comments, and online meeting discussion from February 14 that included FERC and SHPO representatives.</p> <p>Provided we still agree how nexus is defined, we maintain that the nexus between Project operations and effects on the resources/locations to be studied (18 CFR §§ S.9(b)(1), (5), (6), and (7)) is clearly demonstrated.</p> <p>Perhaps we can also agree that supplying site locations in order for the survey to happen would preclude any pretense of a scientific method. And as we prepare for the SO-year long license period, we should entertain definitions of science in this regard. Pedestrian survey, aided by technology, is the scientific method available to archaeology and cultural resource management. For this reason alone, it would behoove the Section 106 designee to survey the extent of the transmission line footprint.</p> <p>Listed below are other reasons:</p> <p>(1) The goal of the transmission line survey would be to inform the Section 106 designee (SCL) and the Federal agency (FERC), as well as the other license participants, about ongoing direct and indirect, future, foreseeable and cumulative impacts on the cultural landscape of affected parties.</p> <p>(2) There is a great private and public interest in the heritage of the region contained by the APE.</p> <p>(3) The existing information is several decades old, partial and fragmentary. Additional information obtained in a responsible, comprehensive manner would serve the long-term goal of water and land stewardship that SCL aspires to.</p> <p>(4) Archaeological Survey of the APE before the project re-starts is the desired (and common-place, expected) effect and the process that gives results that are quantifiable. The nexus has been already established in the previous license, however there was never a complete survey of the APE, which gives us pause. The results of an inclusive study would significantly inform the development of license requirements. Rob Whitlam (SHPO) has recommended as much, citing other similar projects, and Suzanne Novak (FERC), at the same meeting on February 23, indicated that the federal agency would defer to the profession (archaeology) on this issue.</p> <p>(5) Archaeological survey engages exhaustive data collection and analysis techniques. Such objectively quantified information is consistent with generally accepted practice in the scientific community. Since the tribes have professional staff that can do the work, the tribal values and heritage can be better served through their own cultural resource employment. The schedule of field season(s) and the duration fits perfectly the two-year cycle during which the proposed study can take place. There are plenty of examples of successful outcomes in similar scenarios.</p>	CR-02 has been modified to include cultural resources reconnaissance-level survey (i.e., pedestrian survey only) along the entire APE transmission line corridor (excluding areas that are too steep or too vegetated to safely survey or are inundated, and excluding areas where SCL does not conduct any activities [i.e., areas where the transmission line spans rivers or ravines]). During the reconnaissance-level survey, locations suitable for subsequent intensive level survey (i.e., shovel probing) will be identified. The intensive level survey will be completed along the transmission line where Project-related effects are occurring, or are likely to occur, and as time allows during the study period. In particular, intensive level survey would focus on locations of proposed or anticipated Project-related activities, such as road repairs or anticipated transmission line tower relocations. If intensive level survey is unable to be completed during the study period in these targeted areas, further intensive level survey will be provided for in the HPMP.

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							<p>(6) The proposed alternative study to the SSIT-04 argues for intermittent focus on the APE, citing the length of the transmission line as the reason against the full survey. We find that to be inconsistent with the mandate of Section 106, conversations that have been going on for the past two years, and with the level of effort put in by all the license participants - enterprising to ensure that the new license period can continue to serve the stakeholders.</p> <p>We hope that we can continue to discuss the terms and revisit some of these issues, most importantly the scientific value of the proposed studies.</p>	
47.	Swinomish Indian Tribal Community	03/08/2021	pp. 9-10	SITC-C05	Section 6.1.2 (SITC-03)	CR-01, CR-02, CR-04	<p><b>A. Acceptance of Swinomish Tribe Cultural Resources Study Request – SITC-03.</b> The Swinomish Tribe greatly appreciates City Light's acceptance of our Cultural Resources study request to develop an informationally comprehensive, culturally appropriate, and methodologically sound study document that holistically outlines, identifies, evaluates, and assesses potential adverse effects on and impacts to resources, places, and properties of traditional religious and cultural importance to the Swinomish Indian Tribal Community associated with the Project. This body of information will serve as the informational basis of government-to- government consultation and land/water management associated with the Project to ensure that the Tribe's perspectives, values, beliefs, and ongoing cultural and religious practices properly inform and pragmatically guide historic property and cultural and treaty resource treatment, preservation, protection, avoidance, and/or mitigation measures and considerations. We look forward to the opportunity to engage in this important assessment and ensure that it informs the license conditions. We also note that, because natural resources in the Skagit basin are cultural resources, robust study plans focused on dam operation effects on fish and wildlife habitat (as detailed below) are essential to meaningfully understand and mitigate impacts to cultural resources.</p>	City Light looks forward to working with the Swinomish Indian Tribal Community on this CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study). Details of implementation steps and budget appropriate to the scope of work for a two-year study (i.e., research design) will need to be refined through coordination with City Light team ethnographer(s) who will provide assistance to Indian Tribes, First Nations, and City Light to accomplish overlapping goals for the Properties with Traditional Cultural Significance Study.
48.	Upper Skagit Indian Tribe	03/08/2021	p. A1	USIT-C01	N/A	CR-04	<p>Unlike other cultural resource types, Traditional Cultural Properties (TCP's) defy strict physical boundaries. The geography of Upper Skagit Indian TCP's emphasizes the interconnections among landscape features that extent beyond the Skagit River corridor. Because the study area is too narrowly bounded, the ensuing identification phase, the inventory, and any preliminary assessments of project effects to TCP's will be incomplete or based on skewed data. Upper Skagit Indian cosmology does not separate the Skagit River from its adjacent canyons, mountain summits, waterfalls, all other natural resources, and the spiritual origins of the Upper Skagit Indian Tribe (USIT).</p> <p>For consistency with SCL's proposed cultural data synthesis (CR-01), USIT proposes that the study area of CR-04 be expanded to include the 1-mile buffer beyond the APE, consistent with the study area of CR-01, at the minimum. In addition, it is proposed that the study area include the High Ross Inundation Zone. The Washington State Department of Archaeology and Historic Preservation policy advice to LP's in SCL's Cultural Resources Working Group meetings in 2020 is to consider recreational effects adjacent to reservoirs as part of project operations. City Light should clarify that unevaluated sites will be managed in a manner that maintains their integrity and character, without diminishment from O&amp;M, until an evaluation can be performed.</p>	Though City Light anticipates Project-related visual and acoustic effects will not alter the character or use of known historic properties beyond the APE, City Light agrees there may be concerns related to visual and acoustic effects. Accordingly, City Light has modified its CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study (Properties with Traditional Cultural Significance Study) study plan to state that City Light understands and supports efforts by individual Indian Tribes or First Nations to provide context for locations of traditional cultural significance. As such, City Light will review and assess any such contextual information shared by the Indian Tribes or First Nations up to one mile beyond the APE (in the U.S.) as part of the scope of the Properties with Traditional Cultural Significance Study, to aid in evaluation of potential visual and acoustic effects to historic properties. An updated map book depicting this one-mile buffer for potential visual and acoustic effects is provided in CR-02 Cultural Resources Survey. Results from the study will inform any needed updates to the APE. Any updates to the APE would be described in the subsequent study report, which will be provided to

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								<p>Section 106 consulting parties for review and comment.</p> <p>The High Ross Inundation Zone is already included in the study area for the Properties with Traditional Cultural Significance Study. Condition assessments of all cultural resources identified during the study will be completed in order to determine the current integrity of each resource. This assessment will include consideration of Project-related effects and non-Project effects, including recreation related effects. Management of effects will be considered separately under the HPMP, which will be developed in consultation with Section 106 consulting parties.</p> <p>In regard to treatment of unevaluated resources, please see comment response USIT-C06.</p>
49.	Upper Skagit Indian Tribe	03/08/2021	pp. A1-A2	USIT-C02	N/A	CR-04 Section 1.3	<p>On pp. 1-2 – 1-3 City Light states: “Those elements of the study requests that were not adopted are primarily not adopted because they include studying areas and/or resources that fall outside the area of potential effects (APE).”</p> <p>As it stands, this assertion is not necessarily true, because there are potential acoustic and visual effects that extend beyond the APE boundaries that have yet to be addressed, and this is what some proposed studies are meant to determine.</p>	<p>Please see comment response USIT-C01.</p> <p>City Light will to work with the CRWG to refine the proposed APE based on study results. If there are demonstrated Project-related effects outside the APE, the APE will be expanded to include these areas.</p>
50.	Upper Skagit Indian Tribe	03/08/2021	p. A2	USIT-C03	N/A	CR-04 Section 2.5	<p>On p. 2-3 City Light states: “The study area for this Properties with Traditional Cultural Significance Study will be the APE.”</p> <p>Given the potential for acoustic and visual direct and indirect effects immediately adjacent to reservoirs, and the interconnectedness of contributing characteristics in traditional cultural properties, the APE does not appear to be sufficiently large to assess effects to TCP’s. USIT recommends that the area for this study be expanded, at a minimum, to be consistent with the 1-mile buffer study area beyond the APE consistent with CR-01.</p>	<p>Please see comment responses USIT-C01 and USIT-C02.</p>
51.	Upper Skagit Indian Tribe	03/08/2021	p. A2	USIT-C04	N/A	CR-04 Section 2.5	<p>On p. 2-3 City Light states: “While the APE encompasses all areas within the Project Boundary, some areas within the APE (e.g., the High Ross Inundation Zone) are not expected to be affected by the Project. Therefore, City Light does not anticipate proposing study work in these areas except where effects in specific areas can be clearly demonstrated to be project-related, if any.”</p> <p>The High Ross Inundation Zone is a place with traditional cultural significance to the USIT, which seeks to understand effects of project operations and maintenance, including acoustic and visual, but the conclusion in the second sentence above is premature, as it a priori excludes this zone from study. To be consistent with National Historic Preservation Management Act Sec. 106, study of this zone is necessary because potential effects here are yet to be formally determined. USIT recommends, 1) that the High Ross Inundation Zone be included in this and other studies, and 2) that researchers be permitted to go beyond the APE to gather data sufficient to support preliminary assessments of acoustic and visual effects.</p>	<p>City Light will work with the CRWG to refine the proposed APE based on study results. If there are demonstrated Project-related effects outside the APE, the APE will be expanded to include these areas.</p>

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52.	Upper Skagit Indian Tribe	03/08/2021	p. A2	USIT-C05	N/A	CR-04 Section 2.5	On p. 2-3 City Light states: "City Light anticipates submitting the APE to DAHP prior to filing the RSP."  It would be helpful to USIT if this study plan showed the approximate time in the project schedule when the ACHP will be consulted and its review solicited.	City Light submitted the proposed APE to DAHP on March 12, 2021 for review.  City Light has invited the ACHP to participate in the CRWG, including during the upcoming CRWG meeting in April 2021.
53.	Upper Skagit Indian Tribe	03/08/2021	p. A3	USIT-C06	N/A	CR-04 Section 2.6.2	On p. 2-8 City Light states: "It is possible that some identified properties may not have enough available information to complete NRHP eligibility evaluations, and/or be contributing elements to historic properties of traditional cultural significance where there is not enough available information to complete NRHP eligibility evaluations. These properties will remain unevaluated regarding their eligibility for inclusion in the NRHP. Such unevaluated resources within the APE may be evaluated at a later date if they are affected by the Project (see Step 5), . . ."  USIT recommends that an additional statement be added that clarifies that unevaluated sites will be identified and managed in a manner that maintains their integrity and character as these are defined in National Register Bulletin 15 (How to Apply the National Register Criteria for Evaluation) without diminishment from project operations, until an evaluation can be performed.	City Light updated the language in this section of the CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study Plan to add the following to describe how unevaluated resources will be managed: "and will be treated as if they are historic properties until or unless they are formally evaluated for the NRHP."  City Light believes adding this language adds the appropriate protection that would require consideration of any potential Project-related effects that would diminish the integrity or character of these properties.
<b>Fish and Aquatics (including Geomorphology)</b>								
54.	American Rivers / Trout Unlimited	03/05/2021	pp. 3-4	ARTU-C02	Section 6.2.10	FA-04	<b>Fish Passage.</b> Recent field observations by the Upper Skagit Indian Tribe (USIT) and the National Park Service (NPS) document the presence of anadromous salmonids in the Gorge bypass reach (defined as the reach between Gorge Dam to Gorge Powerhouse) upstream of the proposed natural barriers indicated as impassable under the current Project license. Given the depressed and declining trends of salmon and steelhead populations in the Skagit River (particularly for Upper Skagit River Chinook salmon and Skagit River steelhead), Conservation Groups strongly support securing information on large-scale actions that will help rebuild and recover these impacted populations. Because the Project obstructs upstream and downstream passage of several anadromous salmonids, and therefore limits the potential productivity of the basin by blocking access to documented suitable habitat, Licensee should be required to collect information on the feasibility of fish passage and evaluate how the license could be conditioned to address the blockage of upstream and downstream fish passage. Accordingly, we firmly support the multitude of requests to study fish passage feasibility through the Project. Understanding the potential benefit of reconnecting anadromous fish to spawning and rearing habitat upstream of Gorge Dam could have monumentally positive impacts on Skagit River salmon and steelhead.  Conservation Groups appreciate the consideration that the Licensee has given to studying fish passage feasibility at the Project. The Licensees received 11 study requests related to fish passage from five Licensing Participants. Throughout the collaborative PSP meeting process, the Licensee has agreed to undertake a significant portion of the National Marine Fisheries Service's (NMFS) Feasibility Analysis of Fish Passage study request, which was also submitted by USIT, United States Fish and Wildlife Service (USFWS), and Washington Department of Fish and Wildlife (WDFW). The Licensee states that its FA-04 Fish Passage Technical Studies Program study plan will include "an investigation of upstream and downstream fish passage at the Skagit Project dams." [See Fish Passage Issue Resolution Form] Conservation Groups encourage the Licensee to allow equitable participation of relevant Licensing Participants in developing and implementing this study.	City Light appreciates the comments and statement of support for the proposed study plans. City Light is filing three study plans to address the issues raised related to Fish Passage:  FA-04 Fish Passage Technical Studies Program (Fish Passage Study), which will explore the feasibility of upstream and downstream fish passage options at all three Project developments for a range of species. The Fish Passage Study Plan proposes (1) five Technical Workshops that will include active involvement of resource agency and tribal biologists and engineers who have specific fish passage or related experience; (2) the formation of a three-member Fish Passage Independent Expert Panel (Expert Panel), which would be available to review reports and provide advisory opinions when deemed appropriate by the LPs. The makeup of the Expert Panel will be determined in collaboration with LPs; and (3) A fish passage engineer from NMFS will be invited to participate as an integral member of the team executing the Fish Passage Study. The NMFS engineer will be included in study-related meetings or teleconferences with City Light and its consultants as an integral part of study plan implementation. The NMFS engineer will directly participate in the early review of all plans and reports. Feedback obtained from the NMFS engineer will be incorporated into each of the study elements.

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							<p>Conservation Groups maintain that fish passage feasibility studies are incomplete without the study of reservoir habitat suitability and availability, as well as productivity potential in the reservoirs and their tributaries. These components are necessary to meaningfully understand the benefit and potential design of a fish passage program. We understand it is the intent of the Licensee to revise its FA-04 study plan to include study of reservoir and tributary fisheries habitat and population modeling as an effort to evaluate habitat and production potential of anadromous fish throughout the reservoirs and their tributaries. We fully support this modification. Additionally, Conservation Groups encourage the Licensee to continue discussion with Licensing Participants to inform more comprehensive inclusions to the ongoing United States Geological Survey (USGS) Food Web Study. It is imperative that the Licensee and Licensing Participants obtain a full understanding of habitat and productivity potential for both resident and potentially introduced fish in the Project reservoirs and their tributaries as part of the fish passage feasibility evaluation.</p>	<p>FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study will assess flow conditions that would allow for the passage of various fish species through the Gorge bypass reach.</p> <p>FA-07 Reservoir Tributary Habitat Assessment will provide the information needed to evaluate and consider reservoir tributary habitat when assessing fish passage feasibility at the Project. City Light is proposing to expand the Food Web Study to conduct bioenergetic simulations in tributaries that have not already been modeled. In addition, City Light believes that the development of a process to integrate the results of the physical habitat and bioenergetics assessments (as part of the expanded Food Web Study) would be enhanced by consultation with LPs and proposes to schedule a workshop involving the author of the Food Web Study in July 2021. City Light believes the workshop would provide an opportunity to discuss how the Food Web Study results will be used to address reservoir-related issues raised in LP study requests.</p>
55.	American Rivers / Trout Unlimited	03/05/2021	pp. 4-5	ARTU-C03	Section 6.2.16, 6.3.6	GE-04, TR-02	<p><b>Aquatic Habitat.</b> The Skagit River Hydroelectric Project influences many aspects of aquatic habitat conditions within the Skagit River including, but not limited to, impacts to reservoir tributaries, water quality in off-channel habitat, nutrient availability, sediment transport, large wood for habitat, and flow rates. These factors are necessary components of Skagit River aquatic and riparian ecosystems and can have radical impacts on the productivity of all salmonid life stages. Several study requests presented by Licensing Participants either expand the scope of the Licensee's proposed studies related to aquatic habitat or present new study ideas to better understand Project impacts on some of these factors. Conservation Groups support the study requests put forth by several Licensing Participants to address the aquatic habitat conditions noted below.</p> <p><b>Off-channel Habitat.</b> Conservation Groups are encouraged by the Licensee's proposal to "determine the current location and condition of off-channel habitat and wetlands in the Skagit River floodplain between Gorge Dam and the Sauk River as part of the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study and TR-02 Wetland Assessment." However, Licensing Participants have requested that the Licensee deploy a network of piezometers in off-channel floodplain habitats to analyze the quality of off-channel habitat. The Licensee asserts that it does not find this to be necessary citing "groundwater levels are dependent upon a variety of non-Project factors that are beyond control of the Project and the level of effort required to try to determine Project vs. non-Project factors would be very high compared to the likely usefulness of the data." While off-channel habitat may be affected by non-Project related factors, it is also heavily impacted by Project-related factors. Studying the efficacy of off-channel habitat, particularly mitigation lands purchased and managed by the Licensee under the current license, does not require the Licensee to take full responsibility for all off-channel habitat areas.</p> <p>Simply, the related study requests submitted by NMFS, USFWS, USIT, and WDFW ask the Licensee to fill a data gap to better understand whether and to what extent</p>	<p>City Light appreciates the comments and statement of support for the proposed plans. City Light is filing three study plans related to the issue of off-channel habitat: (1) FA-02 Instream Flow Model Development Study from Gorge Powerhouse to Sauk River; (2) FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study; and (3) GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study. City Light believes the results of these studies will provide the needed information to evaluate Project effects related to off-channel habitat and floodplain connectivity and associated habitat conditions under varying potential flow alternatives during the relicensing timeframe as well as to explore future areas of interest where additional investigation may be warranted. The above-mentioned studies are intended to identify areas of additional interest, including the potential for constructed chum channels, as part of a future license PMEs.</p>

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							existing off-channel habitat areas can mitigate Project impacts on aquatic habitat. In the PSP, and in relation to USIT's and WDFW's requests to study the efficacy of engineered side channels created under the current license, the Licensee states, "Although the channels functioned as intended to provide spawning habitat for Chum Salmon, they are nearing the end of their functional design life, and it is unclear whether their restoration and future use would constitute a potential PME during the next license term." This makes clear to Conservation Groups that there is a definite need to study these mitigation lands to best determine whether their restoration would constitute PMEs for the next license term. Additionally, the Licensee does not provide rationale for denying the Licensing Participant's request to conduct field surveys in the floodplain. Floodplain connectivity as it relates to off-channel habitat is critical to the recovery of many Skagit River salmonids, and to more fully understand how Project operation negatively impacts this habitat is necessary.	
56.	American Rivers / Trout Unlimited	03/05/2021	pp. 5-7	ARTU-C04	Sections 6.2.11, 6.2.16	FA-02, FA-05, GE-03, GE-04	<p><b>Flows and Geomorphology.</b> The Project interrupts natural process flows which recruit sediment and large wood from upriver and distribute them throughout downstream aquatic and riparian habitats. The Project obstructs approximately 37% of sediment and wood in the Skagit River watershed from traveling downstream.5 Without the recruitment of sediment and large wood during process flows, the Skagit River is at risk of disconnected side channel habitat, separation of river and floodplain, and degraded habitat conditions for all major anadromous salmonid life stages (spawning, incubation, rearing, outmigration). It is necessary for Licensing Participants to understand the process flows necessary to maintain connectivity of the river to its side channels and floodplain, and to improve habitat diversity.</p> <p>The Licensee offers the FA-02 Instream Flow Model Development Study with the goal of "develop[ing] an updated flow/habitat management and evaluation tool for the Skagit River between the Gorge Powerhouse and the confluence with the Sauk River." The Licensee also offers the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study "to develop flow and habitat data in the Gorge bypass reach to support evaluation of instream flows for the Skagit River between Gorge Dam and the Sauk River and to develop hydraulic data necessary for the evaluation of fish passage, particularly at two previously identified potential upstream passage barriers (Envirosphere 1989) within the Gorge bypass reach." Additionally, the Licensee offers the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study "to characterize the current condition of aquatic habitat in the reach, and to characterize how Project-related changes in peak flows affect geomorphic processes, which will be used to evaluate the Project's contribution to cumulative effects in the reach."</p> <p>Six Licensing Participants submitted 15 study requests related to instream flows, process flows, geomorphology, sediment capture, and wood impoundment. The Licensee's proposed studies adopt some elements of these study requests submitted by NMFS, USIT, USFWS, NPS, Washington Department of Ecology, and WDFW. However, several elements of these studies are not included in the PSP which, if not modified, will result in critical data gaps that will limit Licensing Participants' understanding of Project impacts to aquatic habitat. For instance, the Licensee's PSP did not propose to include a study of process flows citing that "attempting to recreate conditions that existed 75 to 100 years ago is not feasible and attempting to recreate historical conditions would not inform the development of license requirements..." Requesting that the Licensee study process flows is not a request to return to pre-Project conditions, nor does it require the Licensee to establish PMEs that attempt to achieve pre-Project conditions. Current information suggests that present flows are not adequate to move gravel inputs from tributaries downstream of Gorge Dam, causing tributary mouths to encroach into the Skagit River. Other projects in the</p>	<p>City Light appreciates the comments and statement of support for the proposed plans. City Light is filing three study plans related to the issue of off-channel habitat: (1) FA-02 Instream Flow Model Development Study from Gorge Powerhouse to Sauk River; (2) FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study; and (3) GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study. City Light believes the results of these studies will provide information to evaluate potential Project effects to sediment and wood dynamics, aquatic habitat conditions, limiting factors, and flows to support geomorphic processes under varying potential flow alternatives during the relicensing timeframe as well as to explore future areas of interest where additional investigation/action may be warranted. An analysis of process flows has been added to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan. Please see comment response NMFS-C28 for more information.</p> <p>In consideration of the numerous study requests to extend the geographic scope of studies to below the Sauk River confluence, City Light proposes SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River, as described in comment response NCCC-C06 above.</p> <p>City Light proposes GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study to address deposition at three tributaries where sedimentation impacts to recreation and operations have been documented. City Light will include the other five reservoir tributaries as part of its Transitory Barrier Removal Program that is conducted annually (to be expanded to twice annually) as part of its</p>

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							<p>region have adopted measures that include process flows designed to improve instream and off-channel habitat quality (e.g. Jackson Hydroelectric Project on the Sultan River). Quantitative studies are critical, however, to inform the development of such measures that balance ecological needs, project operations, and flood control. After discussion, the Licensee has agreed to modify GE-04 to include installation of additional scour monitors at select tributary mouths and river bars, use of 2-D hydraulic model results to estimate process flows and determine off channel connection in relation to flow, and analysis of USGS hydrophone data to estimate flows necessary for bedload transport. Several process flow elements requested for study by Licensing Participants were not adopted by the Licensee and are instead proposed for management plans or PMEs. More information is needed to quantify the effects of insufficient process flows and to inform PMEs which would improve the channel maintenance and channel forming abilities of a Project-modified Skagit River. Conservation Groups maintain that information needed to inform PMEs and management plans should be collected during the study plan process and not during the management plan development process.</p> <p>Further, the Licensee again limits the geographic scope of the FA-02 Instream Flow Model Development Study to exclude the Skagit River downstream of the Sauk River confluence from study. Several Licensing Participants have requested the Skagit River downstream of the Sauk River confluence be included in geomorphology studies. The geographic scope for fisheries resources identified in the Commission's Scoping Document 1 (SD1) is considered "the entire Skagit River from its headwaters to where it empties into Puget Sound," and because flows directly impact Skagit River fisheries, the Licensee must expand the geographic scope of flow and geomorphology studies to comply with this FERC-specified scope. Anadromous fish that migrate up the Skagit River are affected by Project operation from the moment they enter the estuary, whether it be inadequate sedimentation, diminished woody debris, or inappropriate flows. Juvenile salmonids that rear in the delta also experience Project-related impacts. While "flow conditions in the lower river are influenced by the cumulative effects of an array of water management and land development activities in the watershed and tributary and accretion inflows," the Project remains largely responsible for the dam-altered qualities of the Skagit River downstream of Gorge Dam, including disconnected side channel habitat, separation of river and floodplain, and degraded habitat conditions.</p> <p>The Licensee has adopted some of the requests from Licensing Participants related to sediment transport and wood transport studies. The Licensee proposes to document and reflect upon current methods of collecting and transporting wood from the Project reservoirs to the Skagit River downstream of Gorge Dam. It also proposes a field inventory of large wood in the Skagit River between Gorge Dam and the Sauk River confluence, which includes an estimate of wood input from tributaries, bank erosion, and landslides in the same river segment. Conservation Groups encourage the Licensee to include the other requested study elements brought forward by NMFS, USFWS, USIT, and WDFW. These elements include the documentation of wood input into the Project reservoirs and a 2-D hydraulic wood transport model to inform the best methods of wood augmentation in the Skagit River downstream of Gorge Dam. Further, the Licensee should extend the geographic scope of the large wood field surveys to extend downstream of the Sauk River confluence to the Skagit River estuary, as stipulated by the geographic scope of fisheries resources (of which large wood is one) set forth in the Commission's SD1.</p> <p>The Licensee proposes to collect data on present substrate conditions in the Skagit River between Gorge Dam and the Sauk River confluence as part of the Instream Flow</p>	<p>current license. City Light will include a summary of 2021-2022 field observations during the Transitory Barrier Removal Program in the ISR and USR. Please also see comment response NPS-C77.</p>

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							Model Development Study. The Licensee also intends to estimate sediment input from tributaries and bank erosion in the same river segment as part of the Geomorphology Study. Several key elements of the relationship between sediment transport and aquatic habitat were not adopted by the Licensee. Conservation Groups believe it is necessary for the Licensee to study sediment characteristics, average annual load, and accumulation in the Project reservoirs. Sediment accumulation not only impacts reservoir capacity and power generation capability, but also stands to alter habitat quality within the reservoirs. NPS, USFWS, and WDFW all requested surveys of backwater effects on eight reservoir tributaries. The Licensee agreed to study three of the eight requested sites. Conservation Groups believe that all eight requested sites should be included in the Licensee's GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study (Sediment Deposition Study). This information is necessary to inform the most appropriate sediment management practices within the reservoirs and to improve aquatic habitat quality within the reservoirs and their tributaries. In addition, sediment characteristics and load in the lower Skagit River and its estuary have significant impacts on aquatic habitat. Appropriate substrate size is critical for the survival of juvenile salmonid life stages, and appropriate substrate load maintains suitable riverbed height which improves flow into side channels and improves floodplain connectivity. Without the information requested in the Licensing Participant's study requests, the Licensee will be unable to formulate the best PME's to improve aquatic habitat quality in the Skagit River affected by the Project.	
57.	American Rivers / Trout Unlimited	03/05/2021	pp. 7-8	ARTU-C05	Sections 6.2.9	FA-01	<p><b>Water Quality.</b> The Licensee offers the FA-01 Water Quality Monitoring Study with the goal of "monitor[ing] water quality parameters for which existing information is insufficient to characterize conditions within the study area." This study includes some elements of water quality-related study requests submitted by NMFS, USIT, USFWS, NPS, Washington Department of Ecology, and WDFW. (The Licensee's PSP incorrectly states that only five Licensing Participants submitted water quality studies). Of particular importance, the Washington Department of Ecology (Ecology) will rely on water quality study results to inform its decision to issue a Section 401 Water Quality Certification under the Clean Water Act. Without sufficient information, Ecology cannot issue this permit and the Licensee will be unable to secure a new federal hydropower license. The Commission must require the Licensee to collect all water quality data required by Ecology to ensure the Project is compliant with the Clean Water Act.</p> <p>FA-01 intends to collect data to fill existing gaps which includes measuring temperature, dissolved oxygen, and pH in Diablo and Gorge lakes, and continuously monitoring temperature, dissolved oxygen, total dissolved gas (TDG), and turbidity at two locations in the Gorge bypass reach. The Licensee adopted several elements of the submitted study requests including continuous TDG monitoring in the Diablo Dam tailrace and the Gorge Lake forebay, extension of turbidity and total suspended solids (TSS) monitoring in Ross Lake for a second year, and the addition of autumn and spring water quality sampling events in the Gorge bypass reach.</p> <p>FA-01 does not propose monitoring of fecal coliform or turbidity in each of the three Project reservoirs, study of the potential effects of heavy metal bioaccumulation on biota in the Project area, an assessment of nutrient dynamics in and downstream of Project reservoirs, or any water quality modeling – all elements requested by multiple Licensing Participants. Conservation Groups support these data needs identified by USIT and five resource agencies. Additionally, FA-01 does not propose to collect data downstream of the Sauk River confluence or in any off-channel habitat along the Skagit River. Again, because the geographic scope for fisheries resources identified in FERC's Scoping Document 1 (SD1) is considered "the entire Skagit River from its</p>	<p>City Light has revised the FA-01 Water Quality Monitoring Study Plan to gather additional information for relicensing the Project and securing Section 401-certification. After meetings with Ecology to discuss revisions, the study plan was revised in the following ways (when compared to the plan filed with the PSP): City Light (1) expanded the temporal scope to include sampling of all proposed parameters over a two-year period, and expanded the study to include (2) temperature monitoring and benthic macroinvertebrates data collection at additional locations between Marblemount and just below the Baker River confluence and at one location in the lower Sauk River, (3) turbidity/TSS data collection to include shoreline transects adjacent to the mid-reservoir sampling sites in Ross Lake, (4) turbidity/TSS data collection at mouths of tributaries to Ross and Diablo lakes, (5) an additional sampling site in the Gorge Bypass Reach and the Skagit River upstream of Ross Lake, and (6) fecal coliform sampling at two locations in Diablo Lake.</p> <p>In consideration of the numerous study requests to extend the geographic scope of studies to below the Sauk River confluence, City Light proposes SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River, as described in comment response NCCC-C06 above.</p>



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							headwaters to where it empties into Puget Sound,” and because watery quality directly impacts Skagit River fisheries, all water quality studies must include, at minimum, data collection from Ross Reservoir to the Skagit River estuary. The Licensee should expand the scope of FA-01 to satisfy this geographic area. Conservation Groups respectfully ask that the Commission require the Licensee to supplement FA-01 with the information requested by the six Licensing Participants and to enforce the appropriate geographic scope of the entire Skagit River including off-channel habitat.	
58.	American Whitewater	03/08/2021	p. 5	AW-C04	Section 5.9	FA-05	<b>FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study, Section 5-9.</b> The summary of the Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study appropriately notes that the study “will provide input to the Fish Passage Study, as well as provide data to assist with verifying aquatic habitat and to extrapolate measured substrate movement as part of the GE-04 Skagit River Geomorphology between Gorge Dam.” As noted above, the results of the Gorge Bypass Reach Safety and Whitewater Boating Study should also be integrated with these studies. This is important both for informing future license conditions but also for the Water Quality Certification under Section 401 of the Clean Water Act.	Given the complexity of working in the bypass reach, intends to coordinate elements of all bypass reach studies as appropriate. Results of bypass reach studies (including the RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study) will be integrated as part of the environmental analysis in support of the license application.
59.	American Whitewater	03/08/2021	p. 6	AW-C07	Section 6.2.10	FA-04	<b>Fish Passage, Section 6.2.10.</b> Based on conversations that occurred during the Study Plan Meetings we request that the following statement be removed prior to submission of the Revised Study Plan: “collection of fish habitat and productivity data in tributaries upstream of the Project Boundary (i.e., outside the influence of the Project’s effects) do not meet the requirements of the FERC Study Criteria.” Seattle City Light is well aware that evaluating fish passage is of interest to many license participants and is a study request that we support. To make an informed decision on whether such a significant potential investment is of value, it is critical to understand the habitat potential and productivity of upstream habitat for spawning and juvenile life stages. In addition to meeting all the rest of the criteria, this information is essential to “inform the development of license requirements” under 18 CFR § 5.9(b)(5) and to inform fishway prescriptions under Section 18 (16 U.S.C. § 811) of the Federal Power Act.  Seattle City Light states that “existing information indicates that prior to the Project’s existence anadromous fish from the lower Skagit River rarely passed upstream of what is now the Gorge bypass reach,” and cites Smith and Anderson (1921) as the primary source. In the second sentence of the introduction to their report, however the authors state that “the survey must be considered as superficial.” This report was not a quantitative assessment of salmon distribution in the watershed and its authors are careful to note the limitations of their field survey.	FA-04 Fish Passage Technical Studies Program will explore the feasibility of upstream and downstream fish passage options at all three Project developments for a range of species. Please see comment response ARTU-C02 for additional information.
60.	American Whitewater	03/08/2021	pp. 6-8	AW-C08	Section 6.2.11	FA-02	<b>Instream Flow Study, Section 6.2.11.</b> The responses in this section are confusing and appear to reflect a lack of understanding for modern science-based approaches to quantify instream flow needs and opportunities for elements of a natural flow regime for regulated river systems. The objective is not to “recreate conditions that may have existed 75 to 100 years ago” or “natural or ‘unmanaged’ conditions,” but to provide a quantitative basis for what elements of a flow regime can be restored while continuing to operate a hydroelectric project. These principles are discussed in Poff et al. (1997), and applying them in a management framework is discussed in Wald (2009). We have worked on dozens of projects across the country in many different states, and can attest to the fact that the scientists at the Washington Department of Fish and Wildlife and Washington Department of Ecology are among the best in the nation at applying modern principles of instream flow science to regulatory proceedings. Their work is not focused on recreating historical conditions or assessing original project effects, but rather developing an instream flow program that mitigates project impacts while addressing beneficial uses of the waterway.	Please see comment response NMFS-C28 for information related to process flows.  City Light is developing an additional recreation study, RA-05 Lower Skagit River Recreation Flow Study (Recreation Flow Study), designed to collect information on recreation flows for the mainstem Skagit River downstream of the Gorge Powerhouse. Specifically, the study will evaluate boatable flows for the river segments from the Goodell Creek boat launch to the Howard Miller Steelhead Park near Rockport, WA. Boatable flow information will be collected using an internet survey tool similar to that used in other hydroelectric proceedings. The Recreation Flow

Table No.	Organization	Date	Comment Letter Page	Comment ID No.	PSP Introduction (if §6, relevant ID No. used in PSP of entity's own study request)	Study Plan(s)	Comment	Response
							<p>We find it challenging to follow the logic in the statement that “if certain process flow releases are identified as a potential PME during the evaluation of alternative operational scenarios (which will take place following the completion of relevant studies), City Light will conduct the necessary modeling to assess potential resource benefits of the process flows and their influence on Project operations and other resource based flow demands.” On the one hand Seattle City Light seems to argue earlier in this section that quantification of process flows is unnecessary, but then goes on to state that process flows that are identified could be evaluated. The critical step however is the quantitative analysis to identify process flow needs prior to evaluation. Without this step it is unclear what process flows Seattle City Light would evaluate under various operational scenarios. In other words, Seattle City Light can't argue process flows would be evaluated without first acknowledging they need to be identified and quantified during the study process.</p> <p>The statement that “recreation flows in the Skagit River downstream of the Project will be addressed as part of the assessment of flow related PMEs using outputs of the instream flow model and existing information on recreation uses in the lower River,” similarly fails to recognize a critical data need. These instream flow needs for recreation need to be defined.</p> <p>Given the regular use of this section by the whitewater boating community and several outfitters, these flow needs could likely be easily quantified through an online survey and follow-up interviews with selected individuals. Such an approach has been used in other hydropower proceedings where a full controlled flow study is not necessary.</p>	Study will include hydrologic analysis of existing flows. Please see the Recreation Flow Study for detailed study objectives and methods.
61.	American Whitewater	03/08/2021	p. 8	AW-C09	Section 6.2.15	GE-04	<p><b>Channel Forming Flows, Section 6.2.15.</b> As noted above in the comments on the Instream Flow Study, the mis-understanding that the intention is to “recreate conditions that existed 75 to 100 years ago” obfuscates the true objective to develop a quantitative basis for flows that create and sustain fluvial habitats, including connectivity and interaction with off-channel or side-channel habitat. These flows obviously need to be designed in a manner that does not exacerbate downstream flooding, and there are ways to do this, but only if the information is available. In addition to duration, magnitude, and timing, it is also important to understand frequency and rate of change.</p> <p>In the Proposed Study Plan, Seattle City Light has focused on meeting biological criteria that include spawning, incubation, rearing, and migration requirements and Habitat Suitability Curves. We are optimistic that recent Study Plan Meetings have resulted in an enhanced understanding of a modern approach to an instream flow program that recognizes the critical role of dynamic flow regimes to drive geomorphic processes that create and sustain rearing habitat for salmonids. This does not mean restoring the historic flow regime of the Skagit River system, but rather taking a strategic approach to restore key elements of that flow regime by utilizing the Project and its ability to control flows to maximize ecological benefit in a manner that avoids destructive impacts to infrastructure downstream.</p>	An assessment of process flows has been added to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan. Please see comment response NMFS-C28 for more information.
62.	American Whitewater	03/08/2021	p. 14	AW-C19	Section 6.3.10	N/A	<p><b>Gorge Dam Removal, Section 6.3.10.</b> American Whitewater is not actively advocating for Gorge Dam removal but we are interested in better understanding this alternative and support information requests of the Upper Skagit Indian Tribe. The Proposed Study Plan makes general statements that this development is “vital for delivery of ancillary services to the electrical grid,” and “operations allow greater ability for City Light to incorporate intermittent renewable energy for City Light customers and the region at large, and its loss would restrict City Light’s further integration of solar and wind energy.” No data are provided however to quantify these</p>	Please see City Light’s response to the Gorge Dam Removal study request in Section 6 of the RSP.

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							ancillary services or the ability of the development to provide greater ability to incorporate other renewables.	
63.	American Whitewater	03/08/2021	pp. 14-15	AW-C21	N/A	FA-02	<b>FA-02 Instream Flow Model Development Proposed Study Plan Skagit Hydroelectric Project FERC No. 553.</b> In referencing consistency with generally accepted scientific practice, this study states that “HEC-RAS is widely recognized and accepted throughout the engineering and scientific community for riverine hydraulic modeling. The proposed study methodology for hydraulic model development is consistent with the approach used for similar work.” This statement should be cited with direct reference to application in a hydropower licensing proceeding. The same statement is repeated in the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Proposed Study Plan.	Various versions of HEC-RAS have been used for a wide variety of applications in hydropower licensing, relicensing, or other proceedings. A 1-D HEC-RAS model was used during relicensing of the R.L. Harris Hydroelectric Project (FERC 2628).  City Light is unaware of a previous use of the 2-D version of HEC-RAS for instream flow modeling used during hydropower relicensing, likely because the 2-D version of HEC-RAS is a relatively recent product. Its first full release was in 2016. Examples of past application of the 2D version for instream flow studies not involving project relicensing include on the Merced River, CA and the Jordan River, BC. Use of HEC-RAS 2-D for the proposed work has been accepted by instream flow modeling experts representing Ecology and WDFW.
64.	Ecology	03/08/2021	pp. 3-4	Ecology-C02	Section 6.2.9 (Ecology-01)	FA-01	<b>Water Quality Monitoring.</b> Ecology’s study request (APPENDIX 1) submitted to SCL and FERC in October 2020 proposed extension of water quality monitoring period through two years and expand the scope of monitoring. On December 8, 2020, SCL submitted their PSP to FERC in which they only proposed to monitor two parameters in Ross (Turbidity and Total Suspended Solids) for two years and one parameter in the Skagit River below Gorge (temperature) for two years. [Figure 1]  Comprehensive water quality monitoring data from multiple water years is needed to model and evaluate the Project’s effects on water quality. Limited water quality measurements for one year are not necessarily applicable to other years. Through the examination of physical water quality parameters we expect to better capture the project impacts on water quality and the designated uses. Ecology requires adequate, credible and representative water quality monitoring data in order to evaluate SCL’s 401 Water Quality Certification request.	Please see comment response ARTU-C05.
65.	Ecology	03/08/2021	pp. 4-5	Ecology-C03	N/A	FA-01, Table 2.3-1	SCL is proposing to use existing water quality data (temperature, DO, pH, nutrients, turbidity, etc.) for their study of Ross reservoir, Diablo reservoir, Gorge reservoir, and downstream reaches. This data is acceptable if it meets Ecology’s Quality Assurance criteria and standard operating procedures (SOPs). Detailed information on Quality Assurance and SOPs can be found here: <a href="https://ecology.wa.gov/About-us/How-we-operate/Scientific-services/Quality-assurance">https://ecology.wa.gov/About-us/How-we-operate/Scientific-services/Quality-assurance</a> . Ecology concludes that because of multiple data gaps in the existing data, this alone does not provide sufficient information for evaluating compliance with the water quality standards.	City Light’s data collected in the Project reservoirs and tributaries, like that collected by other entities, e.g., the NPS, was collected according to established scientific protocols. City Light is confident in the quality and reliability of the existing data. City Light will make all data files available to LPs for verification and/or independent analysis and further discuss Ecology’s information needs in ongoing consultations.
66.	Ecology	03/08/2021	pp. 4-5	Ecology-C04	N/A	FA-01, Table 2.6-1	Monitoring locations listed in table in FA-01 are not specifically defined. For example: Two monitoring locations listed for Gorge Bypass Reach are “Below Gorge Dam” and “Above Gorge Powerhouse.” Depending upon the point of reference, the entire (~2.5 miles) Bypass Reach can be either listed as “Below Gorge Dam” or “Above Gorge Powerhouse”. Water quality measurements (for example, TDG) can vary considerably with location within the Bypass Reach.	City Light’s revised FA-01 Water Quality Monitoring Study Plan includes a map that shows the locations of all proposed sampling locations for all parameters. The plan has been revised to include the rationale for selecting the sampling locations.

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							<p>SCL must include clear maps in the water quality monitoring plan that shows specific water quality monitoring locations for various parameters for the entire project.</p> <p>Include discussion on selection of monitoring locations, specifically what criteria was used for selecting a particular location.</p> <p>Ecology acknowledges that brief descriptions of some monitoring locations is provided in Section 1.1.1 to 1.1.5 of FA-01 Water Quality Monitoring Proposed Study Plan.</p>	
67.	Ecology	03/08/2021	p. 5	Ecology-C05	N/A	FA-01	<p>SCL is proposing to use existing water quality monitoring data and collect some new data for certain parameters. It is an acceptable approach if it provides the necessary data for project evaluation. However, close comparison of existing water quality monitoring data (SCL, FA-01 Water Quality Monitoring Proposed Study Plan, Table 2.3-1) and proposed water quality monitoring plan (SCL FA-01 Water Quality Monitoring Proposed Study Plan, Table 2.6-1) shows that SCL may not be able to collect all the required information for project evaluation. For example, SCL proposed to monitor several parameters for a limited duration during 2021. Given the variability in conditions, limited water quality parameter sampling during any one year would not accurately reflect the full range project impacts. Limited sampling within the year does not provide seasonal variations in conditions that are evident above and below the Project.</p>	Please refer to comment response ARTU-C05.
68.	Ecology	03/08/2021	pp. 5-6	Ecology-C06	N/A	FA-01	<p>All water quality monitoring locations must provide representative samples of respective water quality parameter. For example, Reservoir levels in Ross Lake have varied considerably over the past 10 years (Figure 2). These annual fluctuations in reservoir level impacts aquatic habitat upstream of the Project dams and on conditions in Ross Lake (temperature, turbidity, etc.), which ultimately influences the quality of water released below the dams. [Figure 2]</p> <p>Reservoir drawdown and water level fluctuations are known to impact turbidity and temperature at hydroelectric facilities in general. The impact is more pronounced in nearshore habitats where the effects on foraging fish are likely to be the highest. SCL has proposed increases in turbidity monitoring, but the monitoring locations are not representative. In order to collect data with representative sampling, SCL turbidity sampling plan must include (a) monitoring locations at reservoir shore perimeter and forebay, (b) sampling at the time of reservoir drawdown, snow- melt, reservoir filling and during over bank flows.</p>	City Light has revised the FA-01 Water Quality Monitoring Study Plan to include turbidity/TSS data collection along shoreline transects in Ross Lake and data collection at mouths of tributaries to Ross and Diablo lakes.
69.	Ecology	03/08/2021	p. 6	Ecology-C07	N/A	FA-01	<p>SCL must include contingencies in the Water Quality Monitoring Plan to accommodate potential failure to collect monitoring data, due to unplanned impacts such as equipment malfunction, weather hazards, or vandalism.</p>	City Light will undertake all reasonable actions to ensure that useful data are collected at all sites during all seasons. All equipment will be maintained and calibrated, and redundant equipment will be available during field sampling events (see QAPP). City Light will attempt to gather as much data as possible to account for any losses, recognizing that at some remote locations unplanned impacts could lead to limited data losses from installed devices collecting continuous data.
70.	Ecology	03/08/2021	pp. 7-10	Ecology-C08	N/A	FA-01	<p><b>Temperature Conditioning.</b> The three SCL dams, Ross, Diablo, and Gorge, control water flow from the headwaters of the Skagit River. Ross Dam, the uppermost of the three (RM 169.5), regulates Ross Reservoir, with a storage capacity of 177,043,800 m<sup>3</sup> (1,435,000 acre-ft). The intake tunnels in Ross Dam (elevation 433m, 1,423 ft) lie approximately 46 m (150 ft) below the reservoir surface under normal operations. Comparatively, Diablo and Gorge reservoirs are smaller with relatively short</p>	In addition to existing data for the Project reservoirs and the Skagit River downstream of the Project, City Light has continuously measured temperature for many years in tributaries to the reservoirs. NPS has also collected tributary temperature data. All reliable existing data will be

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							<p>detention times. Water discharged to Diablo and Gorge Reservoirs is from the hypolimnetic region of Ross Reservoir. Water from the hypolimnetic region is at much lower temperature, which was also confirmed by water temperature monitoring data collected by NPS at various depths in Ross Reservoir.</p> <p>The shorter detention times of Diablo and Gorge Reservoirs (11 days and 0.8 day respectively) does not allow sufficient time for temperature conditioning before the cold water is discharged downstream. Given that releases from the Project can constitute greater than 50% of the flow at the Mt Vernon Gage (RM 26), it is likely that temperature effects could extend downstream at certain times of the year.</p> <p>Release of colder water from Ross Reservoir is a direct project effect that has the potential to impact habitat and productivity of aquatic species downstream. There is significant scientific literature available that supports our assessment. Some of the relevant references are listed below:</p> <ul style="list-style-type: none"> <li>i) Discharge of colder water from hydroelectric facilities is known to impact the habitat and productivity of aquatic species downstream.</li> <li>ii) In the South Fork McKenzie River, it was observed that cold water releases from Cougar Dam significantly delayed the return migration of Chinook salmon adults in the spring and summer, while warmer fall temperatures resulted in the acceleration of Chinook salmon embryos and emergence several weeks early.</li> <li>iii) Deeply drawn water from Ross Reservoir is relatively at stable temperature, without the seasonal extremes experienced by natural systems. Available scientific studies suggest that natural short term variability in water temperature is important to the physiology of salmonids.</li> </ul> <p>Similar cold-water discharge issues were previously identified in the FERC relicensing and 401 Certification process for the Henry M. Jackson hydroelectric project (FERC # 2157). To mitigate the impact, SNOPUD modified their process to condition the temperature prior to discharging.</p> <p>Project facilities and operations have a major influence on the survival and productivity of aquatic species both above and below the Project through environmental modifications in flow, temperature, nutrient and sediment transport, and limitations on anadromous species access to habitat and habitat connectivity. Skagit River basin (WRIA 4) is the largest basin in the Puget Sound and critical habitat for five different species of salmon (chinook, chum, coho, pink, and sockeye) as well as steelhead. Chinook salmon and Steelhead are currently listed as threatened under the ESA. All five species of Skagit River salmon use habitat influenced by the Project. These aquatic species are either declining or are in a stable but depressed status in the Skagit River basin.</p> <p>There is documented evidence that the Chinook population is not recovering in the Skagit River system. [Figure 3]</p> <p>Similar downward trends in the recovery of Steelhead are also documented. [Figure 4]</p> <p>Evidence has been provided by federal and state agencies and Tribal governments during stakeholder meetings and through study plan requests on dwindling salmon population in the Skagit system. SCL has repeatedly expressed their strong commitment to environmental protection for the Project—notably, SCL has</p>	<p>assessed relative to measurements made by USGS at the Newhalem gage to compare thermal regimes above and below the Project. These comparisons will form the basis for an assessment of potential sublethal effects on fish downstream of the Project. Temperature data will be analyzed in combination with fisheries data to develop an understanding of potential Project impacts.</p>

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							<p>prioritized fish and wildlife protection above power generation in describing their goals for the Project.</p> <p>Based upon the review of scientific literature, information from other hydroelectric project in Washington State, and information provided by LPs and SCL, Ecology believes that release of colder water from Ross Reservoir has potential to impact the habitat and productivity of fish and other aquatic species. The typical license period of a FERC license and 401 Water Quality Certification for hydroelectric projects is 35 to 45 years. Considering the long life span of the project, and cumulative impacts the project may cause, temperature studies are necessary to evaluate the impact of cold water release on aquatic habitat and downstream productivity.</p>	
71.	Ecology	03/08/2021	pp. 10-11	Ecology-C09	Section 6.2.9 (Ecology-01)	FA-01	<p><b>Hydrodynamic Modeling.</b> Ecology and other LPs requested development of a hydrodynamic model to assess the project impact on water quality. The Skagit Hydroelectric Project is a complex linear system of three reservoirs with varying detention times and three dams that impact each other and the Skagit river system downstream. Flow, water quality characteristics, and aquatic habitat in these systems are inter-related. Modelling is necessary to gain an understanding of some of the project impacts listed below, and will also provide potential insight into mitigation measures.</p> <ul style="list-style-type: none"> <li>i) For the purpose of temperature conditioning SCL may need to release warmer water from Ross reservoir while not running into the risk of violating state numeric water quality criteria at any downstream location. Modelling can help determine how modifying the penstock intake depths can enhance water temperatures in Diablo and Gorge reservoirs while meeting the water quality criteria in the downstream reaches.</li> <li>ii) Review how adjustments to the timing, rate, and duration of: spill, reservoir drawdown and refill, powerhouse discharge can improve WQ conditions in each of the reservoirs.</li> <li>iv) Identify how providing flow in the Bypass Reach will affect WQ in each of the reservoirs and in the Skagit Gorge and Newhalem reaches.</li> <li>i) Identify how proposed pumped storage will affect WQ conditions in each of the reservoirs and in the Bypass and Newhalem reaches.</li> </ul> <p>SCL rejected the study request for (1.3) studying the impact of cold water release from Ross Reservoir and, (1.4) Hydrodynamic modelling based upon following reasoning.</p> <p>“The presumed need for modeling is predicated on the hypothesis that the temperature of water withdrawn through the deep intake in Ross Lake is adversely affecting fisheries resources downstream of the Project. None of the study requests included evidence of this adverse effect occurring, nor any data that show current water temperatures fall outside acceptable conditions.” (SCL, PSP, Section 6.2.9).</p> <p>CL’s rejection of our study requests is unacceptable on multiple grounds. There is water quality monitoring data available (collected by NPS) that confirms that the water released from hypolimnetic region of Ross Reservoir is colder. There are several scientific studies (as referenced in comment 1.3) that confirm the negative impacts of cold water releases on the habitat and productivity of aquatic species. There is available data that confirms that the salmon and steelhead population is dwindling in the Skagit Basin. A similar issue arose during relicensing of Jackson hydroelectric (FERC #2157) and SnoPUD mitigated the impact by altering their operations to facilitate temperature conditioning. Ecology’s study request is therefore premised on the best available scientific and technical information as well as best professional judgment.</p>	Please see response to Ecology-C08.

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							<p>SCL's assertion that the project is meeting the water quality standards is based on incomplete understanding of the water quality standards. In the State of Washington, surface waters are protected by a three-part approach, namely: numeric and narrative criteria, designated uses, and an antidegradation policy. Numeric as well as narrative criteria both support and protect the designated uses identified in WAC 173-201A-200. In some cases, satisfying the numeric criteria alone is insufficient to protect a designated use. SCL's assertion cold water discharges meet state criteria is erroneous in that it is limited to the numeric criteria portion of the water quality standards. Ecology agrees that, in general, SCL is in compliance with numeric water quality standards. However, compliance with narrative criteria cannot be clearly determined, as there are multiple sources available that indicate that aquatic life and productivity may be adversely impacted by the project.</p> <p>While the physical conditions in the reservoirs will influence the quality of water released below the project, the quantity of water released from the project will also influence the degree to which water outflow influences downstream water quality. Regular sampling is required for understanding this relationship, which is quite extensive and time consuming.</p> <p>A model can help us better understand and eventually control the flow and temperature downstream for water quality improvement. Development of a hydrodynamic model to predict and determine the downstream impacts is an efficient approach to manage a hydroelectric project of this complexity and size. In the absence of an accepted model to guide and refine monitoring, samples will need to be collected on a regular basis from each of the reaches and zones. This may not be cost effective or efficient in the long run compared to a model.</p>	
72.	Ecology	03/08/2021	pp. 11-13	Ecology-C10	6.2.11 (Ecology-02)	FA-02, FA-05	<p><b>Compliance with Water Quality Standards in the Bypass Reach.</b> The 2.5-mile-long segment of the Skagit River between Gorge Dam and Gorge Powerhouse is referred to as the Bypass Reach. Natural flows through the Bypass Reach are greatly impacted by Gorge Dam. Dam operations have dewatered the Bypass Reach, such that flows in the Bypass Reach are limited to accretion flow, spill-gate seepage, intermittent tributary input, precipitation runoff, and occasional spill at Gorge Dam. Because of the Project's position in the basin, water released downstream of the Project, whether through spill, regulating outlet, or turbines, has a direct influence on the quantity and quality of habitat for aquatic species.</p> <p>According to information provided in PAD, Envirosphere Company (Envirosphere, 1989) there are two "natural" partial passage barriers in the bypass reach and one partial man-made barrier at the Gorge Dam plunge pool. The presence of these fish passage barriers have been questioned by NPS, WDFW and USIT. The National Park Service has surveyed the bypass reach, including the "0.6 mile barrier" described in the PAD, and not found any evidence of a fish passage barrier between the Gorge powerhouse and Gorge Dam using the best available science and accepted methods established by WDFW. (<a href="https://wdfw.wa.gov/species-habitats/habitat-recovery/fish-passage/assessment">https://wdfw.wa.gov/species-habitats/habitat-recovery/fish-passage/assessment</a>).</p> <p>Direct observations of salmonids and multiple life histories have been observed at the base of Gorge Dam (USIT 2020a; USIT 2020b). The Upper Skagit Indian Tribe provided and documented direct observation of adult steelhead in the Gorge dam plunge pool after a spill event in 2015, and then again in May of 2018 the USIT documented observation of multiple salmonids and life stages in the bypass reach up to Gorge Dam. SCL was present for the 2015 and 2018 observation (USIT 2020b).</p>	<p>City Light has revised the FA-01 Water Quality Monitoring Study Plan to include three sampling locations in the bypass. These locations, which represent conditions throughout this reach of the river, will be sampled continuously for two years. Sampling will occur under a range of conditions, including all controlled releases made for other studies, e.g., fish habitat modeling in the bypass reach and under ambient conditions, such as spill events.</p> <p>Also, as part of its FA-04 Fish Passage Technical Studies Program, City Light, in consultation with LPs, will consider flows in the bypass reach when evaluating the feasibility of fish passage at the Project.</p>

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							<p>These relatively recent observations indicate that there is a readiness for species (present day) to move further upstream in search of lost habitat. The bypass reach is an important component of riverine habitat affected by SCL project operations and an important component included in this study request. Loss of aquatic habitat and productivity in the Bypass Reach is a direct project impact. As per WAC 173-201A-200, protected designated uses for Gorge Bypass Reach are "Core Summer Salmonid Habitat" (with special conditions for temperature criteria). Under current project operating conditions, this designated use is not being met.</p> <p>Additionally, due to lack of continuous flow in the Bypass reach, it is not possible to evaluate continuous compliance with the water quality numeric standards or plan for representative water quality monitoring. Water Quality monitoring in the Bypass Reach must be coordinated with flow studies.</p> <p>The Commission, in SD2 (§ 4.1.2), clearly identified the study of water quality parameters in the bypass reach as being within the scope of the Commission's NEPA analysis.</p> <p>While Ecology acknowledges and appreciates SCL's agreement to partially adopt Instream Flow Modelling Study and Water Quality monitoring study in the Bypass Reach, SCL has not yet provided the degree of specificity needed to achieve mutually agreeable study plans. Ecology remains concerned that in light of SCL's response to the study request, the SCL study may not provide all the information necessary for developing 401 water quality certification application. SCL partial rejection of Ecology's Study Requests related to Bypass Reach was based on the following reasoning:</p> <p>"Attempting to recreate conditions that may have existed 75 to 100 years ago is not scientifically feasible or reliable, and speculation regarding factors that have affected the environment since that time would not allow for the discernment of valid cause-and-effect relationships. As a result, attempting to recreate historical conditions would not inform the development of license requirements, nor is City Light required to assess original Project effects at the time of relicensing."</p> <p>Ecology would like to clarify that the intent of suggested studies is not to replicate pre-project conditions. Rather, the goal is to improve conditions in the Bypass Reach to attain compliance with the water quality standards.</p> <p>The bypass reach can be divided into four reaches for evaluating water quality and habitat conditions: a) Gorge Dam plunge pool, b) below Gorge Dam plunge pool to most upstream partial fish passage barrier (just below Afternoon [Butterfly] Creek landslide), c) most upstream passage partial fish barrier to most downstream partial fish passage barrier (major cascade-boulder complex), d) most downstream partial fish passage barrier to Gorge Powerhouse Backwater Pool.</p> <p>Water quality monitoring plan developed for Bypass Reach must collect representative samples for each of these reaches. As proposed, the monitoring plan does not clearly identify the monitoring locations within the Bypass Reach. Monitoring locations for various parameters must be identified in consultation with Ecology.</p>	
73.	Ecology	03/08/2021	p. 16	Ecology-C12	N/A	FA-01	<b>Water Quality (PSP Study FA-01).</b> Identify nature and extent of impacts of different flows on water quality in the Bypass Reach, include comments and requests for additional monitoring on existing study plan, and revise study plan to include new information and changes in other studies.	Please see comment response Ecology-C10.



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							<p>The WQ Study in the PSP mentions the WQ standards related to numeric criteria and designated uses, but fails to mention or account for the anti-degradation policy.</p> <p>SCL does not currently direct flow from Gorge Dam into the Bypass Reach. This action and operation of the facility is inconsistent with the antidegradation policy. Without other significant sources of water in this 2.5 mile stretch of river, beneficial uses of the river are reduced or eliminated, and the presence and amount of aquatic biota is significantly impacted. Lack of water is a direct impact on habitat and habitat use by fish and other aquatic species.</p>	
74.	Ecology	03/08/2021	p. 16	Ecology-C13	N/A	FA-01	Currently in Task 8 of FA-01, temp monitoring will take place at three locations downstream of Newhalem. Temperature monitoring should include all major tributaries and should be extended farther downstream than the Sauk River to identify influence of other tributary contributors compared to discharge flows from Gorge powerhouse. This will help determine both the nature and extent of project impacts.	Please see comment response ARTU-C05 for a description of City Light's revised temperature sampling plan for the Skagit River downstream of the Project.
75.	Ecology	03/08/2021	p. 16	Ecology-C14	N/A	FA-01	Temperature monitoring in Gorge Bypass Reach (field data or modeling) needs to include scenarios based on potential changes in large woody debris (LWD), sediment accumulation and transport, and flow rates.	Please see comment response Ecology-C10 for a description of proposed water quality monitoring in the bypass.
76.	Ecology	03/08/2021	p. 16	Ecology-C15	N/A	FA-01	In Gorge Bypass Reach sample benthic macroinvertebrates at key locations representing different habitat types.	The revised FA-01 Water Quality monitoring plan incorporates numerous sampling sites for other parameters in the Bypass Reach. City Light proposes a workshop to discuss additional monitoring needs in the Bypass Reach, as described in the study plan.
77.	Ecology	03/08/2021	p. 16	Ecology-C16	N/A	FA-01	Assess nutrients and productivity levels in the Bypass Reach in relation to temperatures to determine potential of cold water discharges to inhibit juvenile salmonid growth.	See comment response to Ecology-C08 and Ecology-C15.
78.	Ecology	03/08/2021	pp. 16-17	Ecology-C17	N/A	FA-01	SCL revised the PSP WQ study plan from the draft version in the PAD to accommodate LP input and revisions of other studies (PSP, FA-01, p. 1-3, Sec 1-3). We agree that this is an appropriate approach for the development of the study. Due to additional discussions on the study plan and revisions to other related studies, additional changes to the Water Quality Study are still appropriate and necessary. SCL should identify all study crossovers in the RSP, including, but not limited to: locations, frequency, parameters, and seasonal variation.	Please see comment response ARTU-C05. The results of the water quality study will be interpreted in conjunction with those of other studies as results become available and potential future scenarios are refined for analysis. City Light cannot map out such crossovers at this time, but will, in conjunction with Ecology, ensure that analysis of conditions will be holistic.
79.	Ecology	03/08/2021	p. 17	Ecology-C18	N/A	FA-01	SCL should conduct two years of data collection (in the field) to ensure data validity and to account for seasonal and annual variations.	Please see comment response ARTU-C05.
80.	Ecology	03/08/2021	p. 17	Ecology-C19	N/A	FA-02	<p><b>Instream Flow Model Development (PSP Study FA-02).</b> Complete the components needed for the Instream Flow study on the Mainstem Skagit River and analyze the results.</p> <p>This study plan accepts in principal the data needs of Ecology, but the timeline for the study components may be insufficient to develop the data and to negotiate the flow regimes required prior to the 401 application. For example, task 7 to develop habitat suitability criteria (HSC) occurs April-July 2021. Seattle has previously committed to conducting at least two spawning and two rearing HSC studies to be named in coordination with LPs. Task 8 includes five consultation workshops needed to review model details and allow LPs to provide input to the development of approved HSC development and model calibration efforts. The given time frame does not incorporate the time needed to conduct and analyze these new studies which is needed to effectively conduct these tasks. We have further concerned that their timeline is</p>	City Light has revised the FA-02 Instream Flow Model Development Study Plan (and FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study Plan) to include additional workshops to develop HSC in consultation with LPs and has also included additional detail related to the proposed schedule for the flow scenario identification and evaluation process that will occur in consultation with LPs after the instream flow model tools have been developed to clarify how these activities will support relicensing and development of the application of the Section 401 Certification within the required timeframe. This schedule also allows

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							<p>insufficient to analyze the results, and conduct the operational scenarios necessary to develop instream flows.</p> <p>Potential data sources for the Instream Flow model include other studies. Some of these are not yet agreed to by SCL or remain incomplete as of the date of this letter. The Instream Flow Model is intended to be developed in coordination with the Operations Model. The Operations model will not likely be complete or accurate without these other data sources or without accounting for their impact on the model. Important data to include in the Instream Flow Model includes, but is not limited to, the following study subject areas:</p> <ul style="list-style-type: none"> <li>▪ Fish Habitat: Spawning, Rearing, Migration, Substrate, Refugia, and Productivity</li> <li>▪ Aquatic Habitat</li> <li>▪ Geomorphology</li> <li>▪ Large Woody Debris</li> <li>▪ Stream Gaging (flow/stage height)</li> <li>▪ Off-Channel Habitat and In-Channel Habitat</li> <li>▪ Side Channel, Floodplain, and Riparian Connectivity</li> <li>▪ Sediment Transport</li> </ul> <p>Groundwater Piezometers</p>	<p>time to consider potential data sources from other relevant relicensing studies.</p> <p>As part of the Instream Flow workshops focused on HSC development, City Light will discuss with LPs available information and on-going activities that support HSC and whether additional field validation data collection is needed. In addition, City Light anticipates that effectiveness/validation monitoring of established HSC (which will be developed in consultation with agency experts during relicensing) as part of any flow management program is anticipated as part of a new FERC license.</p>
81.	Ecology	03/08/2021	p. 18	Ecology-C21	N/A	FA-04	<p><b>Fish Passage Technical Studies (PSP Study FA-04).</b> Modify proposed study to eliminate phased approach, identify fish species and species-specific data to include in study, and conduct and barrier assessments in coordination with WDFW. Determine extent of anadromy in the upper Skagit basin through eDNA, Marine Derived Nutrient sampling or other proposed methodology.</p> <p>SCL has agreed to withdraw the phased approach and agreed to fully study fish passage for a limited number of species. The LPs are requesting evaluation of passage for additional species and we support their request. These additional species need to be included in a revised study plan so that Ecology can fully evaluate study results and determine appropriate flow regimes that are protective of the suite of species and lifestages that use this section of the river.</p> <p>Study results and data will need to be included in the application of the 401 Certification.</p>	<p>Please see comment response ARTU-C02 for information regarding City Light's revised study plans addressing issues raised related to fish passage.</p>
82.	Ecology	03/08/2021	p. 18	Ecology-C22	N/A	FA-05	<p><b>Gorge Bypass Reach Hydraulic and Instream Flow (PSP Study FA-05).</b> Develop a detailed Study Plan on the Gorge Bypass reach, develop a timeline, obtain review and approval by Ecology, describe coordination with other studies.</p> <p>Seattle has agreed to conduct an instream flow study in the bypass reach and to establish a work group to develop the plan. SCL needs to obtain approval by Ecology and WDFW on a scientifically defensible study design. We have not yet reached agreement on the study design and are concerned that their timeline is insufficient to develop and conduct the study, analyze the results, and conduct the operational scenario modeling necessary to develop instream flows.</p> <p>Describe how and when the study results will feed into or include information from the Operations Model.</p> <p>Describe how SCL will coordinate model development and model runs with field data. Identify mechanisms to use actual field data testing scenarios (actual water flow) into the Bypass Reach with HSC's, stage/flow curves for specific areas or zones, barrier assessments, water quality monitoring, recreation, and gravel augmentation. Extend</p>	<p>The study plan for instream flow and hydraulic modeling of the Gorge bypass reach is as described in FA-05 Gorge Bypass Reach Hydraulic Model and Instream Flow Development Study. The level of detail in FA-05 is similar to that for FA-02 Instream Flow Model Development Study, which covers the reach from Gorge Powerhouse to the Sauk River confluence. City Light believes that the level of detail in the RSP is appropriate and adequately describes the proposed work.</p> <p>As indicated in the RSP, City Light proposes to engage with LPs during study implementation through the proposed series of workshops. The workshops will both apprise LPs of the status of the work and solicit input and feedback from the LPs. Workshop topics will include details of model development (such as model resolution, model geometry and model boundary conditions),</p>

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							<p>HSC development to include all fish species identified by Washington State Department of Fish and Wildlife.</p> <p>Elements of this study overlap with and should be coordinated with other study plans related to water quality, fish passage, operations modeling, aquatic habitat, sediment, LWD, etc.</p>	<p>model calibration, development of biological and aquatic habitat data, and integration with hydraulic model results to develop flow-habitat relationships.</p> <p>Planning for collection of field data to support model development is at an advanced stage and will also include consultation with LPs as indicated in FA-05 Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study Plan, Section 2.6.1.5.</p> <p>The linkage between the operations model and instream flow models is described in OM-01 Operations Model Study Plan, Section 2.6.</p> <p>The scope of Bypass Instream Flow Model Development Study Plan includes the development, calibration and validation of the model and its application to develop flow-habitat relationships. Application of the model to evaluate alternative flow management or Project operation scenarios for a range of hydrologic conditions will take place in subsequent phases of the relicensing process. The process and schedule for City Light and LPs to identify and evaluate model scenarios will be described in the RSP.</p> <p>As detailed in the Bypass Instream Flow Model Development Study Plan, Section 2.6.1.7, City Light will consult with LPs regarding species and life stage HSCs as part of the model workshops.</p>
83.	Ecology	03/08/2021	p. 19	Ecology-C23	N/A	N/A	<p><b>Sediment Deposition in Reservoirs.</b> Conduct an analysis of sediment deposition in reservoirs.</p> <p>SCL needs to analyze sediment deposition in reservoirs to understand potential impacts to storage capacity. Analysis needs to contain estimates of total deposition to date in relation to capacity, as well as estimates of annual accumulation and potential impacts to future capacity. Data from this analysis will be used in the Operations Model and may inform operating conditions of the 401 Certification.</p> <p>Sediment deposition should be characterized as to the amount and type of sediment sequestered from downstream transport. Data from this analysis will be used in the Instream Flow Model and may inform operating conditions of the 401 Certification.</p> <p>Results of a sediment deposition study will inform the process flow study and help with characterization of downstream needs, including the Bypass Reach.</p>	<p>City Light proposes to conduct an analysis of sediment deposition in reservoirs at locations where impacts to resources of concern have been identified (GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study).</p> <p>See section 6.2.14 of the RSP for response on estimating sediment accumulation in Project reservoirs.</p> <p>The Operations Model will be able to run sensitivity analyses to determine if changes in storage capacity over time would impact future operational scenarios. Process flows will be analyzed as described in GE-04.</p>
84.	Ecology	03/08/2021	p. 19	Ecology-C24	N/A	GE-04	<p><b>Geomorphology (PSP Study GE-04).</b> Revise Geomorphology study plan to assess the full range of project impacts and the relationship between geomorphic processes and flows.</p>	<p>An analysis of process flows has been added to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan. Please see comment response NMFS-C28 for more information.</p>

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							<p>SCL describes geomorphic project in the PSP as: "Project operations alter peak flow magnitude, duration, and timing in the Skagit River downstream of Gorge Dam, thereby altering geomorphic processes that may affect aquatic habitat and cultural resources through the alteration in flow, sediment, and large woody debris (LWD). Geomorphic processes affect aquatic habitat by influencing substrate size and quality, large wood dynamics, main channel and side channel habitat abundance and diversity, and side channel, wetland, and floodplain connectivity."</p> <p>Sediment transport data should be incorporated into instream flow and process flow models. The current status of sediment and woody debris accumulation and transport is a function of current project operations, which do not include process flows. Project impacts to geomorphic process and geomorphic structure of the Skagit River system are outlined in the PSP (see 2.7.1 above) and include impacts such as channel incision, thus should be adequately studied to determine the extent of impacts.</p>	
85.	Ecology	03/08/2021	pp. 19-20	Ecology-C25	N/A	GE-04	<p>SCL proposes to use scour chains to model sediment transport to determine the effects on redd scour. While it provides information on redds, this approach will not provide adequate data to determine sediment and wood accumulations related to connections of side channels which are important habitat for salmon and steelhead. It also fails to determine mobility of sediment accumulations at tributary mouths.</p>	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan has been updated to add scour monitors and accelerometers at tributary junctions. Please see comment response NMFS-C28 for more information.
86.	Ecology	03/08/2021	p. 20	Ecology-C26	N/A	GE-04	<p>SCL's proposal indicates the use of photos and Lidar to identify habitat changes over time. However, this will not likely determine appropriate habitat and geomorphic process relationships to the range of potential process flows that might be part of the operating conditions of the project. The study should be revised to include assessment of habitats and geomorphic structures in relation to actual flows, not just historical images. It appears that SCL intends to assess connected channels but may not include currently disconnected channels. The study should include comprehensive surveys of side channels, including locations, elevations, potentially connectivity, habitat suitability, etc. to determine project impacts and identify potential PMEs.</p>	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study will evaluate side channel and off-channel habitat in the floodplain (not only connected channels). The 2-D hydraulic Instream Flow Model will be used to assess off-channel and side channel connectivity at a variety of flow levels. Please see comment response NMFS-C28 for more information.
87.	Ecology	03/08/2021	p. 20	Ecology-C27	N/A	GE-04	<p>Sediment sequestration is a significant impact on downstream resources and aquatic habitat. Recent analysis (USGS 2008) indicates approximately 1M cubic yards per year is sequestered behind the dams, equivalent to 100,000 dump truck loads of sediment. The Bypass Reach is significantly lacking in gravel deposits and other downstream reaches are also considered impacted by the lack of gravel recruitment. SCL needs to evaluate the potential project effects. The study should also incorporate augmentation efforts.</p>	<p>See Section 6.2.14 of the RSP for response on estimating sediment accumulation in Project reservoirs. City Light proposes evaluating aquatic habitat and limiting factors to identify habitat improvement needs.</p> <p>Augmentation will be evaluated as part of PMEs after study results are available and, if appropriate, will be proposed by City Light in its license application.</p>
88.	Ecology	03/08/2021	p. 20	Ecology-C28	N/A	GE-04	<p>Large woody debris is sequestered behind the dams and impacts downstream reaches by eliminating wood recruitment. LWD also functions in conjunction with sediment on affecting channel morphology and hydrologic modifications. SCL should include LWD augmentation in its assessment of the impacts of wood sequestration.</p>	Please see comment response Ecology-C27 and Section 6.2.13 of the RSP.
89.	Ecology	03/08/2021	pp. 22-23	Ecology-C36	6.2.11 (Ecology-02)	FA-02, GE-04	<p><b>Study 2.10 Process Flows (No designated PSP study) SEE ALSO FA-02 and GE-04.</b> Combines elements of Process Flows studies proposed in other study plans into one comprehensive study design.</p> <p>A river has three main physical components of flow in addition to the various biological components. The obvious one is the flow of water. Less well known but also determined to be important is the flow of gravel and wood. The project disrupts all three physical processes, as shown of the exceedance flow hydrograph below. SCL needs to determine nature and extent of project's impact on all three flow types. A</p>	An analysis of process flows has been added to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan. Please see comment response NMFS-C28 for more information.

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							<p>study of the impacts or an approved action plan will be a required component of Ecology's 401 certification.</p> <p>Seattle rejected Ecology's and other LPs process flow study requests and submits that the data could be obtained from the FA-02 and GE-04. However, these other studies do not adequately correlate their data collection to development of a process flow regime.</p> <p>A process flow regime identifies magnitude, duration and frequency of discharge flows to the specific functions of the process flows, including, but not limited to, spawning gravel, gravel cleaning, tributary deposition scour, sediment transport, LWD movement, channel forming, channel maintenance, channel connection, floodplain inundation, riparian wetland connection, groundwater/surface water interaction, recharge, and flooding.</p> <p>SCL needs to obtain an agreement by LPs on a study design so that scientifically defensible study results and proposed flow regimes can be included in the application for a 401 Certification.</p> <p>Process flow scenarios need to be incorporated into the Operations Model. [Figure 5]</p>	
90.	NMFS	03/05/2021	p. 6	NMFS-C02	N/A	N/A	<p><b>Decline in ESA-Listed Species Trends.</b> Puget Sound Chinook salmon, Puget Sound steelhead, and Southern Resident killer whales (SRKW) were listed as threatened (Chinook, steelhead) or endangered (SRKW) during the current license term and continue to experience declines. The SRKW DPS is currently listed as endangered. All five species of Skagit River salmon use habitat influenced by the Project and all salmon and steelhead species are declining or are in a stable but depressed status in the Skagit River basin. Chinook salmon trends in the Skagit River populations are not trending toward recovery (Figure 1). Whereas several hundred thousand Chinook salmon returned to the Skagit Basin historically, populations are now a fraction of their recovery goal. Similarly, Skagit River steelhead populations are at very low abundances, and are not trending toward recovery (Figure 2). Chinook salmon are the primary prey for SRKW, and the Skagit River is among the primary sources of Chinook salmon in the diet of SRKW; steelhead are a secondary prey source (NMFS WCR and WDFW 2018). Project effects on Skagit River Chinook salmon and steelhead directly affect SRKW health and abundance. NMFS study requests are critical for the agency to identify options to support these species and for SCL to be issued a license that does not preclude recovery.</p>	City Light acknowledges that salmon populations are depressed region wide and agree that more effort needs to be made to reverse that trend. City Light has expanded its FA-04 Fish Passage Technical Studies Program and added an additional study, FA-07 Reservoir Tributary Habitat Assessment, to evaluate productivity potential in select reservoir tributaries. Please see comment response ARTU-C02.
91.	NMFS	03/05/2021	pp. 10-11	NMFS-C07	N/A	FA-01	<p><b>Comments on SCL FA-01—Water Quality.</b></p> <p><b>Summary of NMFS' Water Quality Study Request (NMFS Request No 1).</b> Project facilities and operations influence the survival and productivity of aquatic species both above and below the Project through modifications of flow, temperature, nutrients, and large wood transport, and limitations on anadromous species' access to habitat and habitat connectivity.</p> <p>NMFS proposed a water-quality study request (NMFS Request No. 1, or SR1), with the goal of more fully characterizing the effects of Project operations and facilities on water quality in the three reservoirs and in the mainstem Skagit River below the Gorge Dam (including the Gorge bypass reach). NMFS' request would expand the water quality study proposed by SCL in the PAD to more fully quantify the extent of downstream influence by SCL dam operations on water quality. NMFS' study proposes to monitor water quality parameters for two years, rather than SCL's proposal for one year of monitoring, in order to understand seasonal and inter-annual</p>	Please see comment responses ARTU-C05, Ecology-C06, and Ecology-C08.

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							<p>variability in water years. Through the examination of physical water quality parameters and biological indicators of stream health, we expect to better capture the potential impact of Project operations on water quality, the viability of fish species, and the habitats on which they depend.</p> <p>As originally proposed, SCL's water quality sampling in the reservoirs would be limited in the scope and parameters to be studied, especially in the Ross Reservoir, which has a capacity of 1.5 M acre-feet of water. Below Gorge Dam, SCL's study plan is similarly limited in its temporal and geographic scope. SCL's plan would include continuous monitoring of Total Dissolved Gas (TDG) in the Gorge Bypass to assess the potential effects of providing flows for spawning and rearing in that reach. While SCL's proposed studies focus on numeric water quality criteria, our study proposes assessing sublethal water quality effects on salmonids and effects to habitat productivity and important salmonid life history stage transitions (incubation, growth, smoltification, adult return migration, maturation, and spawning).</p> <p>NMFS' SR1 is needed both to inform NMFS' exercise of our statutory authorities and the Commission's analysis under NEPA. The Commission's SD2 includes evaluation of water quality parameters such as the effects of discharging cold water on macroinvertebrates and other aquatic organisms downstream of the projects, as well as additional water quality parameters<sup>16</sup> downstream of Gorge Dam. SD2 § 4.1.2 at 37. SD2 also identifies effects of and potential changes in Project facilities or operations on macroinvertebrates, resident, and anadromous fishes below Gorge Dam as areas in need of evaluation. SD2 § 4.1.4. While these effects are primarily related to operational flows, there are reasonably predictable concurrent water quality effects that merit study.</p>	
92.	NMFS	03/05/2021	pp. 11-12	NMFS-C08	Section 6.2.9 (NMFS-01)	FA-01	<p><b>SCL Response to NMFS SR1.</b> In response to NMFS' and the other LPs' study requests, SCL's PSP proposes to:</p> <ul style="list-style-type: none"> <li>▪ expand some water quality sampling duration two years in Ross Lake (three locations);</li> <li>▪ provide TDG monitoring in the Diablo Dam tailrace and the Gorge Lake forebay for one year;</li> <li>▪ provide water quality sampling at two locations in the Gorge Bypass for temperature, DO, turbidity, and TDG for one year;</li> <li>▪ sample macroinvertebrates at three locations downstream of the Gorge Powerhouse, in July and September 2021.</li> </ul> <p>Water quality study requests by NMFS and the other LPs that were not included in the PSP, include:</p> <ul style="list-style-type: none"> <li>▪ an additional year of study and additional sites in reservoirs;</li> <li>▪ sediment sampling in the reservoirs for metals and toxic substances;</li> <li>▪ sampling for chemical contaminants in the Goodell Levee;</li> <li>▪ development of a temperature model for Project operations;</li> <li>▪ estimation of sublethal effects (including temperature effects on habitat productivity, or salmonid incubation, growth, smoltification, etc);</li> <li>▪ measurement of sediment accumulation behind Ross Dam;</li> <li>▪ measurement of nutrient levels in and downstream of reservoirs;</li> <li>▪ additional monitoring in the Gorge Bypass with additional sites over two years and with a broader range of controlled flows;</li> <li>▪ macroinvertebrate sampling at a diverse set of fish habitat types (i.e. side channel, off channel, and floodplain habitats);</li> <li>▪ water quality sampling downstream of the confluence with the Sauk River and extending to potentially to the estuary.</li> </ul>	Please see comment responses ARTU-C05, NMFS-C28, Ecology-C06, Ecology-C08, NPS-C07, and responses in Section 6 of the RSP.

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							In justifying excluding these additional assessments of the effects of the Project facilities and operations, SCL provided a number of rationales that they considered relevant (PSP § 6.2.9). Foremost was the contention that existing information or the scope of study proposed by SCL was sufficient to describe Project effects per study plan criterion 5.9(b)(4).17 Further, SCL rejected some of NMFS and LP study components because the effects were too “complex” and could not be adequately addressed within the two-year study period. This rationale is not included in the applicable regulatory criteria and therefore is not an appropriate basis to reject a study request. 18 C.F.R. § 5.9(b) see 68 Fed. Reg. at 51,088 (confirming that 5.9(b) criteria are the exclusive considerations in evaluating study requests). SCL also characterized some of the Project effects proposed for study by NMFS and the LPs as “hypothetical.” i.e., without a definitive link to the Project facility or operational effects or that attempting to isolate any Project influence on water quality at remote downstream locations with reasonable certainty of a cause-and-effect relationship was not achievable and would not inform development of license conditions. SCL also dismissed studies that focused on sublethal water quality effects (i.e., whether current conditions meet the applicable narrative water quality standards), and instead reiterated that for 401 Certification, SCL’s operations conform with the numeric water quality criteria. Again, this rationale is not found in the applicable regulations. In the case of the Goodell Levee, SCL provided no response to NMFS’ study element focusing on chemical contaminants in the levee fill. Finally, SCL misunderstood the intent of some of the study goals, characterizing the NMFS and LP studies as focused on restoring historical conditions; rather, the goals of these studies are to provide information to inform appropriate Project modifications by examining historical river functions. NMFS disagrees that the available information is sufficient to characterize the Project’s water quality effects on NMFS’ trust resources and has established an adequate nexus between the Project’s effects and NMFS’ requested studies to satisfy the regulatory criteria, as explained below.	
93.	NMFS	03/05/2021	p. 12	NMFS-C09	Section 6.2.9 (NMFS-01)	FA-01	<b>NMFS’ SR1 Meets all Applicable Criteria.</b> As summarized below and explained in detail in NMFS’ previously-filed study requests, NMFS Study Request 1 meets all of the applicable regulatory criteria and should therefore be adopted by SCL. 18 C.F.R. § 5.9(b) [justification continues]	Please see Section 6 of the RSP for City Light’s response to study requests and FERC Study Criteria.
94.	NMFS	03/05/2021	p. 23	NMFS-C10	N/A	FA-01	<b>NMFS’ Requested Changes to FA-01.</b> NMFS is requesting that the water quality study plan (FA-01) submitted by SCL in its PSP be modified to better capture geographic, seasonal, and annual variability in water quality parameters. This would include: Extending water quality monitoring (primarily temperature) to downstream of the confluence with the Sauk River. Multiple temperature loggers positioned above the confluences of tributaries entering the Skagit River would provide an understanding of how Project releases influence downstream conditions and how that influence varies seasonally. Project releases would include those considered for process flows and fish passage operations.	Please see comment responses NCCC-C06, ARTU-C05, Ecology-C06, Ecology-C08, and Ecology-C10.
95.	NMFS	03/05/2021	p. 23	NMFS-C11	N/A	FA-01	Expanding all water quality monitoring for the two year data collection time period.	Please see comment response ARTU-C05.
96.	NMFS	03/05/2021	p. 23	NMFS-C12	N/A	FA-01	Expanding Ross Lake water quality monitoring to more test sites to better establish inputs from different tributaries.	A table was added to FA-01 Water Quality Monitoring Study to summarize on-going temperature monitoring in tributaries. There is abundant existing information on water quality conditions in Ross Lake, especially temperature that will be analyzed and summarized as part of FA-01 study report. See also comment responses ARTU-C05, Ecology-C06, Ecology-C08, and Ecology-C10
97.	NMFS	03/05/2021	p. 23	NMFS-C13	N/A	FA-01	Expanding macroinvertebrate monitoring to include multiple habitats (off-channel, side channel, and edge habitats) and provide greater temporal coverage (include a	City Light is collecting benthic macroinvertebrate data at six locations in the Skagit River between

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							spring and autumn sample) to better reflect when these areas are utilized by juvenile salmonids.	Gorge Powerhouse and just downstream of the Baker River. These data will be summarized and analyzed in the ISR.
98.	NMFS	03/05/2021	p. 23	NMFS-C14	N/A	FA-01	Monitor nutrient levels in the reservoirs and downstream of the Project for two years.	City Light is collecting benthic macroinvertebrate data at six locations in the Skagit River between Gorge Powerhouse and just downstream of the Baker River. These data will serve as an index of productivity at these locations. The Food Web Study is also collecting relevant information related to reservoir productivity. There is existing zooplankton data at three locations in Ross Lake from 2016-2018. The USGS, Washington Water Science Center, is also periodically collecting nutrient data in the Skagit River Basin at the U.S.-Canada border. These data will be summarized and analyzed in the ISR.
99.	NMFS	03/05/2021	p. 23	NMFS-C15	N/A	FA-01	Monitor metal levels in the reservoirs for two years at multiple locations.	Please see comment responses ARTU-C05, NMFS-C28, Ecology-C06, Ecology-C08, NPS-C07, and responses in Section 6 of the RSP.
100.	NMFS	03/05/2021	pp. 25-26	NMFS-C16	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16  (NMFS-02)	FA-02	<p><b><u>Comments on SCL FA-02--Instream Flow Model Development.</u></b></p> <p><b>Summary of NMFS' Geomorphology and Aquatic Habitat Study Request (NMFS Study Request No. 2).</b> As described in the PSP, there is a close association among SCL's proposed instream flow modelling (FA-02), bypass reach hydraulic modelling (FA-05), and geomorphology (GE-04) study plans. NMFS combined the study request elements relating to FA-02, FA-05, and GE-04 into a single study request (NMFS Study Request No. 2, or SR2) because of these close associations. As such, some elements of NMFS' NMFS SR2 will be discussed within our comments for multiple PSP studies.</p> <p>The successful upstream migration, spawning, incubation, juvenile rearing, and downstream emigration of ESA listed Puget Sound Chinook salmon and steelhead and other salmonid species is determined by the flow regime and associated geomorphological processes, including inundation of floodplain habitats. Thus, the Project not only has a significant impact on fish that spawn and rear downstream of the dams, it also controls every aspect of fish habitat, including access to and formation of floodplain habitats during elevated flow stages (i.e., process flows).</p> <p>The extent to which floodplain inundation has been constrained by Project operations is currently unknown and has not been proposed for study by SCL. Below the Project, the Skagit River floodplain features isolated sloughs, side channels, wetlands, ponds, dry channel scars, and relic channel meanders, many of which are isolated from the main river channel by constraining flows and are no longer accessible to salmonids. These types of floodplain habitats provide critical spawning and rearing opportunities for salmon and steelhead, and for this reason, they are a high priority for restoration in the Skagit River Chinook Recovery Plan (SRSC and WDFW 2005). An understanding of flow regimes necessary to inundate and maintain floodplain processes and habitats for salmon, steelhead, and consequently SRKW, is needed to increase the recovery opportunities for these imperiled species and inform an adequate alternatives analysis under NEPA. NMFS also requires an understanding of process flows needed to pass fish through the bypass reach, as described in Phase one of the PSP, and through the dam system (NMFS SR4) under section 18 of the FPA.</p>	Please see comment response NMFS-C28. An objective of the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study is to apply the model to provide hydraulic data for the evaluation of flows at which fish passage may be possible at potential barriers that have been identified in the bypass reach. The purpose of the FA-04 Fish Passage Technical Studies Program is to investigate biological, physical, operational, and engineering factors involved when considering the potential to provide safe, timely, and effective fish passage at any or all of the three Project developments.



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							SCL has not proposed studies that include process flows in the PSP. Recent verbal conversations from PSP meetings indicate that SCL may contemplate including process flow studies in their revised study plan (RSP) submission in April, 2021. It is currently unknown what goals, objectives, and methods might be included in SCL's revised study plan.	
101.	NMFS	03/05/2021	p. 26	NMFS-C17	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16  (NMFS-02)	FA-02	<b>SCL's Response to NMFS SR2.</b> SCL acknowledged that NMFS submitted comments on the instream flow model development (PSP at 1-2, FA-02), but provided no response or justification as to why NMFS' geomorphology and aquatic habitat study request was rejected (see PSP at 6-35 & 6-36, Instream Flow Study, Response to LP Study Requests). SCL did not identify any applicable regulatory criteria to support its rejection of NMFS' SR2.	City Light has revised GE-04 to include the majority of NMFS' SR2. Please see comment response NMFS-C28, Section 6 of the RSP, and Geomorphology Study appended to the RSP for additional details.
102.	NMFS	03/05/2021	p. 26	NMFS-C18	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16  (NMFS-02)	FA-02	<b>NMFS SR2 Meets All Applicable Criteria.</b> As summarized below and explained in detail in NMFS' previously-filed study requests, NMFS SR2 meets all of the applicable regulatory criteria and should therefore be adopted by SCL. 18 C.F.R. § 5.9(b) [justification continues].	Please see comment response NMFS-C17.
103.	NMFS	03/05/2021	p. 29	NMFS-C19	N/A	FA-02	<b>NMFS' Requested Changes to FA-02.</b> NMFS disagrees with SCL's proposal to limit their study to the area upstream of the Sauk River confluence. SCL states in the PSP that influences from water management, land management, and tributary in-flows limit the influence of Project effects in an attenuating downstream direction (PSP at 6-36). However, SCL does not provide a scientifically-based rationale for ceasing studies at the Sauk River per se. Verbally, SCL has stated that "we needed to stop somewhere." As a scientific matter, flow effects from the Project can be detected as far downstream as Sedro Woolley (Figure in 3.3.1.). NMFS therefore has proposed a study request to empirically determine the downstream influence of the Project using process flows, large wood, and sediment, which are currently constrained by Project operations.	City Light does not propose to extend its FA-02 Instream Flow Model Development Study downstream of the Sauk River confluence. Please see comment response NCCC-C06 and ARTU-C04 for more information.
104.	NMFS	03/05/2021	pp. 29-30	NMFS-C20	N/A	FA-02	NMFS appreciates SCL's proposal to collect side channel inventories in the floodplain (PSP, GE-04, pg. 2-10). Additionally, the PSP improves the study proposed in the PAD by modelling side channel ingress and egresses under current flows. However, SCL does not include an assessment of potential off-channel habitat that might become available under alternative process flows. Instead, SCL describes its use of a flow-habitat model to serve as a tool to analyze current conditions and alternative scenarios during the relicensing process (PSP, FA-02 at 2-1). Unfortunately, modelling current flows does not provide a useful tool for determining when off-channel habitat will be inundated beyond current conditions and has limited utility in developing "forward-thinking" off-channel and floodplain restoration projects to benefit salmonid spawning and rearing habitat. To adequately model potential off-channel rearing habitat, develop an alternatives analysis under NEPA, and develop empirical models that benefit salmon and steelhead habitat and recovery, modelling of process flows which inundate the floodplain are necessary.	GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study will be expanded to include application of the instream flow hydraulic model to evaluate the relationship between mainstem Skagit River flow and potential side channel/off channel connectivity.
105.	NMFS	03/05/2021	p. 30	NMFS-C21	N/A	FA-02	As a component of our Geomorphology and Aquatic Habitat study request (NMFS SR2), NMFS included three study elements related to the value of process flow influences on salmon and steelhead habitat. We believe these studies would strengthen the PSP by providing for a realistic analysis of alternatives under NEPA as by providing information necessary to inform NMFS' exercise of its statutory authorities. In summary, NMFS requests that SCL modify their proposed studies to include the following: Model and characterize process flows, including magnitude, timing, and duration, needed to assess fish passage under Phase one of the fish passage study proposed in the PSP, mobilize sediments (especially where bed load gravel stored in tributary confluences, low terraces and mid-channel and tributary bars is mobilized), route large wood, and develop and maintain aquatic floodplain habitat features. The use of	Please see comment response NMFS-C28 and NPS-C08.  The OM-01 Operations Model Study will provide Gorge Powerhouse flows and as necessary for evaluation of the bypass reach, bypass reach flows on a sub-daily basis for the duration of a scenario simulation. These Project flows can then be simulated through the Gorge Bypass Reach Model to evaluate the magnitude, timing, and duration of flows under alternative operations scenarios.

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							continuous recordings of water level in representative relict and active side channels, along with stream flow records and the 2-D flow model, would provide critical data for assessing Project impacts to watering or drying of side channels that are important rearing habitat for Chinook salmon. It would also help identify reaches of the river that are losing and gaining (i.e. areas of hyporheic exchange). FERC Project #2150 (Baker River) used this approach to understand the impact of their operations on side channels.	City Light will hold workshops and training for LPs on the Operations Model.
106.	NMFS	03/05/2021	p. 30	NMFS-C22	N/A	FA-02	Model and characterize process flows to determine how far downstream the benefits to salmon and steelhead habitat would occur if large wood and sediment were augmented from reservoir sources. This effort may require additional tagging of large wood and more intensive field efforts downstream of the Sauk, which is currently limited to aerial photo interpretation and existing studies.	City Light does not propose to extend its FA-02 Instream Flow Model Development Study downstream of the Sauk River confluence. Please see comment response NCCC-C06 and ARTU-C04 for more information. An analysis of large wood transport and modeling of sediment transport has been added to GE-04.
107.	NMFS	03/05/2021	p. 30	NMFS-C23	N/A	FA-02	Improve side channel mapping proposed by SCL by conducting field reconnaissance in floodplains (including those behind hydro modifications and those features currently disconnected to the main channel), or by developing a digital elevation model using LiDAR in the floodplain, and associating those habitats with modelled process flows to fully quantify and characterize side channel habitat connection and restoration opportunities for salmon and steelhead.	Use of LiDAR and aerial photographs to map side channels and off-channel habitat is described in the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan, Section 2.6.4. A Relative Elevation Map will also be used to help delineate side channels and off-channel areas.  City Light does not propose to conduct field reconnaissance of side channels in the floodplain. Field reconnaissance of side channels, including collection of substrate and cover data, will be restricted to significant side channels directly connected to the mainstem and whose hydraulic conditions are determined by mainstem flows.  The instream flow hydraulic model will be used to determine relationships between flow and potential side-channel/ off-channel connectivity. As noted previously, the model will be developed in such a way that it can be refined in areas of particular LP interest.
108.	NMFS	03/05/2021	p. 32	NMFS-C24	Section 6.2.10 (NMFS-03, NMFS-04)	FA-04	<b>Comments on SCL's FA-04—Fish Passage Feasibility.</b> <b>Summary of NMFS' Fish Passage Study Request (NMFS Study Requests Nos. 3 and 4).</b> The passage of anadromous salmonids above dams has become an increasingly common and necessary action for the recovery of ESA-listed salmon and steelhead and to support non-listed fishery resources throughout the Pacific Northwest. NMFS submitted two study requests related to fish passage: NMFS Study Request No. 3 (SR3), intended to quantify potentially available habitat and productivity of the Project reservoir tributaries and Skagit River headwaters for use by ESA-listed and non-listed salmon and steelhead; and, NMFS Study Request 4 (SR4), intended to assess the biological and physical feasibility of fish passage (Chinook and coho salmon and steelhead) at the Project dams, including determining the technical feasibility, biological limitations, and planning level cost estimates of providing fish passage above and below the Project (Gorge, Diablo, and Ross dams and powerhouses). NMFS acknowledges the challenge of design construction and operation of fish passage facilities. NMFS SR4 proposes a collaborative effort engaging SCL, as the Project owner/operator expert, and co-managing partners as resource experts in determining viability of passage through the Project. Both NMFS	Please see comment response ARTU-C02 for information regarding City Light's revised study plans addressing issues raised related to fish passage.

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							study requests are necessary to inform NMFS' evaluation of fish passage suitability at the Project under FPA § 18 and of other license conditions to advance the recovery of ESA-listed Chinook salmon and steelhead as well as currently unlisted coho, enhance migrating fish pursuant to the FWCA, and protect EFH pursuant to the MSA.	
109.	NMFS	03/05/2021	pp. 32-33	NMFS-C25	Section 6.2.10 (NMFS-03, NMFS-04)	FA-04	<p><b>SCL's Response to NMFS SR3 and SR4.</b> SCL rejected NMFS SR3, Quantifying Habitat and Production Potential of Chinook and Coho salmon and steelhead above the Project Dams. SCL states rationale for rejection in the response to the study request in Section 6.2.10 of the PSP:</p> <p>“Collection of fish habitat and productivity data in tributaries upstream of the Project Boundary (i.e., outside the influence of the Project's effects) do not meet the requirements of the FERC Study...”</p> <p>SCL proposes a truncated evaluation of habitat coinciding with the PSP geographic scope for fish passage feasibility assessment described below.</p> <p>SCL adopted /incorporated in part NMFS SR4 in their proposed FA-04 study. With that adoption, SCL proposes evaluating fish passage feasibility only at Gorge dam, representing a small component of NMFS SR4. SCL states in Section 6.2.10 of the PSP: “City Light has defined the geographical scope of the study (i.e., to include only Gorge Dam, Gorge Lake tributaries, and the bypass reach) and the target species of interest based on existing genetic information and information that characterizes the historical upstream extent of anadromous fish distributions in the Skagit River in what is now the Project area.”</p> <p>Section 2.3 of the FA-04 Fish Passage Proposed Study Plan states: “Until someone samples and definitively identifies fish in the bypass reach upstream of the potential passage barriers, it is inappropriate to engage in conjecture about anadromous origins.”</p> <p>NMFS does not agree with the interpretation of the historical accounts and finds no conclusive evidence of complete barriers to passage. Also, the genetic information relied upon by SCL does not apply to NMFS species of interest and is merely suggestive; SCL has stated repeatedly their position that it is inappropriate to engage in conjecture in determining appropriate areas of study. SCL provided no other reasons for rejection of the NMFS fish-passage study requests.</p>	Please see comment response ARTU-C02. Additionally, the FA-04 Fish Passage Technical Studies Program—while continuing to include the assessment of the bypass reach as a potential barrier (full, partial, or no barrier) to adult migratory fish species and the investigation of upstream and downstream fish passage at Gorge Dam—has been expanded to include the development and study of fish passage alternatives at the Diablo and Ross developments.
110.	NMFS	03/05/2021	p. 33	NMFS-C26	Section 6.2.10 (NMFS-03, NMFS-04)	FA-04	<p><b>NMFS' Study Request Meets All Applicable Criteria.</b> In our October 22, 2020 filing, NMFS describes how our study requests for Quantifying Habitat and Production Potential of Chinook and Coho salmon and steelhead above Ross Dam (NMFS SR3) and Feasibility of Fish Passage (NMFS SR4) meets the requirements of 18 C.F.R. § 5.9(b) [justification continues].</p>	As described in comment response NMFS-C01, City Light has reconsidered its proposed plans and has made significant revisions to its proposed studies, including to address NMFS's comments and information needs with respect to NMFS SR3 and NMFS SR4.
111.	NMFS	03/05/2021	p. 34-35	NMFS-C27	N/A	FA-04	<p><b>NMFS' requested changes to FA-04.</b> SCL has proposed a limited habitat evaluation constrained to Stetattle Creek, Gorge Creek, and the riverine reach downstream of Diablo Dam. This limited scope will yield small incremental gains in potential habitat access and will not adequately inform resource management actions regarding potential fish passage prescriptions for the Project. Interim desktop analysis indicates a significant quantity habitat upstream of Ross dam that needs to be considered in conjunction with fish passage.</p> <p>SCL has conditioned fish passage feasibility analysis (Phase 2) on reanalyzing passage in the Gorge bypass reach (Phase 1). The PSP proposes to reevaluate passage in the Gorge bypass as a phase gate for considering passage at Gorge dam. This</p>	Please see comment responses ARTU-C02 and NMFS-C25.

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							<p>dependency approach does not inform resource management actions, introduces uncertainty in the study, and further impacts the relicensing schedule, which is a noted concern of all LPs. SCL's proposed analysis does not address passage at Diablo or Ross dams. While NMFS agrees that passage at Gorge dam warrants evaluation, passage at Diablo and Ross dams has the potential to provide access to significantly more salmonid habitat. The narrow scope of consideration proposed by SCL does not address the extent of resource management actions needed to protect aquatic resources.</p> <p>Also, SCL's description and interpretation of historic conditions is inconsistent with the views of the expert resource agencies. The PSP neither identifies nor proves the existence of total passage barriers and places the burden for proof of historical passage on the LPs. The PSP constrains and predicates study phases without addressing resource management goals and actions informed through studies related to fish passage. Trends and status of listed species are not addressed, resource management goals are incorporated by reference, and clear justification for the scope of SCL's proposed study within the context of the ILP is not provided. As explained above, whether or not salmonids "historically" accessed habitat above the Project is irrelevant, in any event, to the issue of whether passage should be evaluated for purposes of this relicensing.</p> <p>Based on the above, NMFS requests that SCL revise their fish passage feasibility analysis so that Phase 2 of FA-04 be independent of the Gorge bypass passage analysis (Phase 1 of FA-04). SCL verbally committed to this during the PSP resolution meetings but has not definitively committed for the record.</p> <p>NMFS also requests the scope of the fish passage feasibility analysis in the RSP holistically address the Project as proposed in NMFS SR4. This includes evaluating passage above and below Gorge, Diablo, and Ross dams and powerhouses. SCL has issued a resolution proposal to include all dams in the RSP; however, it does not include removal of the dependency on Gorge bypass analysis. The resolution proposal commits to "generally follow, and be consistent with, the first five tasks." However, the resolution proposal does not commit to determination of feasibility for viable alternatives which is problematic as it is needed to inform NMFS' evaluation under FPA § 18. The resolution proposal provides high level acknowledgement and incorporation but does not provide definition on how it is incorporated in the FA-04 process while supporting quality assurance and quality control commensurate with NMFS SR4.</p> <p>NMFS also requests the scope of habitat evaluation expand to be consistent with, but not limited to, the scope identified in the NMFS SR3. On February 23, 2021, SCL issued a resolution proposal to include habitat above Ross dam and the tributaries in the RSP. The proposal states that it is largely supportive of NMFS SR3; however, there are a number of unresolved issues in the proposal that remain to be addressed as described in the resolution form. Additionally, SCL proposes to use the methods of Nathan et al. (2019) to examine productivity potential in the reservoir. NMFS is unclear how SCL would use a population hybridization model to quantify production potential of multiple species. NMFS will continue to work with SCL to bridge gaps in SCL's proposal prior to their RSP submission. However, until these gaps can be addressed, NMFS requests that its SR3 be adopted in full.</p>	
112.	NMFS	03/05/2021	p. 36	NMFS-C28	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16	GE-04	<p><b>Comments on SCL's GE-04—Geomorphology and Aquatic Habitat. Summary of NMFS' Geomorphology and Aquatic Habitat Study Request (NMFS Study Request No. 2).</b> As discussed in Section 4 above, SCL's PSP identifies the close association among instream flow modelling (FA-02), bypass reach hydraulic</p>	City Light has developed study plans with the intention of meeting many of the goals and objectives of NMFS-02, including modeling

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					(NMFS-02)		<p>modelling (FA-05), and geomorphology (GE-04) study plans. NMFS' study request elements relating to SCL's PSP were combined into a common study request (NMFS Study Request No. 2, or SR2) because of these close associations. As such, some elements of NMFS SR2 are addressed in our comments for multiple PSP studies. This section focuses in particular on the aspects of SCL's proposed GE-04 related to large wood, sediment, and the formation and maintenance of side channel habitat.</p> <p>The Project dams and operations impede three major physical processes which affect the spawning and rearing potential of anadromous salmonids downstream of the dams. The dams impound sediment and large wood and temper process flows, especially during spring months. Process flows move sediment and large wood to shape channel and floodplain habitat, including side channels, and are critically important in the formation of salmonid habitats. These influences affect the river and associated floodplain from the Gorge Dam to the Skagit River delta.</p> <p>NMFS' Geomorphology and Aquatic Habitat Study Request (NMFS SR2) is designed to inform the characterization of geomorphic processes and resulting aquatic habitat formation affected by Project-related flows below Gorge Dam and the interruption of sediment and wood transport through the Project, and to examine how improvement in process flows and associated management operations could increase mainstem and floodplain habitat (including off-channel habitats) and ameliorate the Project's impacts on ESA-listed species and other affected fishery resources.</p> <p>NMFS has proposed studies to quantify the rate of sediment and large wood sequestered behind the dams and to use this information to develop license conditions to actively transport wood and sediment to downstream reaches below the Project. NMFS' study would measure the active and off-channel geomorphic responses, including side channel development and maintenance. Additionally, we seek to understand the downstream extent of these elements in forming habitat under process flows.</p>	<p>sediment transport and assessing large wood transport.</p> <p>The information required to support consideration of a variety of geomorphic process flows will be investigated under GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study (Geomorphology Study), including:</p> <ul style="list-style-type: none"> <li>▪ use of scour monitors to estimate flow required to mobilize coarse sediment at key spawning locations;</li> <li>▪ aerial photo analysis to link evolution of sediment deposits at the mouth of tributaries to flow;</li> <li>▪ aerial photo analysis of wood input and transport and their relationship to flow in the interval between aerial photos; and,</li> <li>▪ aerial photo analysis to link channel migration and side channel formation to flow or geomorphic disturbance.</li> <li>▪ Analysis of large wood transport and modeling of sediment transport</li> </ul> <p>City Light has expanded the scope of the Geomorphology Study in the RSP to develop additional information on process flows as follows:</p> <ul style="list-style-type: none"> <li>▪ Scour monitors to be installed at major tributary mouths will be used in conjunction with hydraulic model results and aerial photo analysis to determine flows that mobilize and erode/transport tributary sediment deposits.</li> <li>▪ Additional scour monitors to be installed at select river bars will be used in conjunction with hydrophone data and hydraulic model results to determine flow that mobilizes and transport coarse sediment.</li> <li>▪ The 2-D instream flow model will be used to determine relationships between flow and potential side-channel/off-channel connectivity</li> <li>▪ The IHA (Indicators of Hydrologic Alteration) model will be used to analyze historic or potential alternative hydrologic time series data to inform the development of process flow scenarios.</li> <li>▪ Tagging of large wood and development of sediment transport modeling tools will analyze the transport of sediment and large wood in the Skagit River between Gorge Dam and the Sauk River confluence.</li> </ul>

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								<p>In addition to the above, the 2-D instream flow hydraulic models (FA-02 Instream Flow Model Development Study/FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study) will be used to determine the relationship between flow and the extent and duration of floodplain inundation.</p> <p>See section 6.2.14 of the RSP for response on estimating sediment accumulation in Project reservoirs.</p>
113.	NMFS	03/05/2021	pp. 36-37	NMFS-C29	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16 (NMFS-02)	GE-04	<p><b>SCL's Response to NMFS SR2.</b> NMFS' requested study would actively relocate wood and sediment from reservoir sources to determine how these features contribute to off-channel habitat formation, including reaches downstream of the Sauk River and to examine potential flooding risks to landowners. SCL failed to acknowledge NMFS' study requests related to augmentation and did not identify a regulatory criterion as the basis for their rejection of these study elements. SCL wrongly interpreted NMFS' study requests by stating that modelling include run-of-the-river flows and flooding risks (PSP §§ 6.2.11, 6.2.14, &amp; 6.2.15). NMFS reiterates here that process flows are not run-of-the-river flows. Further, SCL's proposed studies do not address floodplain processes in need of restoration as a result of Project-related effects. NMFS' study requests are needed to augment SCL's studies to adequately determine project effects and potential PM&amp;Es and to provide a meaningful alternatives analysis under NEPA.</p> <p>NMFS requested that the amount of sediment trapped in the Project reservoirs be quantified to approximate the rate of sediment that could be transported to below the Project to restore geomorphic processes. Without identifying a relevant criteria under 18 C.F.R. § 5.9(b), SCL rejected this study request, asserting that documenting sediment accumulation in the reservoirs, especially in Ross Lake, is unnecessary to inform the development of license conditions that address the adequacy of spawning habitat or gravel needs downstream of the Project. NMFS strongly maintains that sediment transport would have habitat enhancement benefits, including spawning habitat, and that understanding quantities stored in the reservoirs provides a reasonable indicator of natural rates of sediment delivery currently blocked by the projects and would inform operational improvements to benefit salmon and steelhead.</p> <p>NMFS requested that SCL model and characterize the process flows, including magnitude, timing, and duration, needed to mobilize sediments, including bars and tributary junctions. SCL did not recognize NMFS' study request in one response (PSP § 6.2.11), and rejected the study elsewhere (PSP § 6.2.14) by wrongly interpreting the need to study sediment accumulation at tributary junctions as merely a fish passage concern. SCL disregarded the concern among NMFS and other LPs that operation flows were not mobilizing the tributary sediments, which serve as spawning habitats in downstream reaches (PSP at 6-41). Thus, SCL wrongly cited 18 C.F.R. § 5.9(b)(5) (nexus) as a rationale to reject this request. Downstream reaches are sediment-starved as evidenced by incision and poor interaction with floodplain habitats (Riedel et al. in prep).18 NMFS' study requests are necessary to determine the influence of sequestered flows, sediment, and wood to downstream habitats.</p>	<p>Please see comment response NMFS-C28 and Ecology-C23. City Light acknowledges comments received by certain LPs on the PSP that for studies it did not adopt, City Light did not include a sufficient explanation based on FERC Study Criteria in each instance. City Light has made every effort in the RSP to address this concern.</p>
114.	NMFS	03/05/2021	p. 37	NMFS-C30	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16	GE-04	<p><b>NMFS SR2 Meets All Applicable Criteria.</b> In our October 22, 2020 filing, NMFS describes how our Geomorphology and Aquatic Habitat study request (NMFS SR2) meets the requirements of 18 C.F.R. § 5.9(b). SCL did not reject studies with complete reference to regulatory criteria. In fact, in some instances, the PSP failed to</p>	<p>City Light acknowledges comments received by certain LPs on the PSP that for studies it did not adopt, City Light did not include a sufficient explanation based on FERC Study Criteria in each</p>

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					(NMFS-02)		acknowledge NMFS study requests at all. In each case, NMFS' study requests clearly demonstrated a nexus to project operations, used established methods, and added necessary studies to fill information gaps in SCL's PSP.	instance. City Light has made every effort in the RSP to address this concern.
115.	NMFS	03/05/2021	pp. 40-41	NMFS-C31	N/A	GE-04	<p><b>NMFS' Requested Changes to GE-04.</b> NMFS shares SCL's recognition that the Project affects downstream habitats, including floodplain habitats. We appreciate SCL's initial assessment of off-channel habitats using field, aerial imagery, and LiDAR methods. NMFS also supports SCL's study of gravel movement using accelerometers during peak flow releases as a measure to avoid or minimize redd scour and redd stranding. Despite these areas of agreement, we believe the PSP still has several shortcomings.</p> <p><u>Side Channels</u> – SCL proposes to map side channels connected to the mainstem river. They also propose to estimate changes in these habitats through time using a time series of aerial photos and attributing those changes with peak flows between the aerial photo periods. However, the SCL's plan fails to quantify off-channel habitats that might be available for salmonid habitat if process flows were not constrained by Project operations. Instead of determining a priori side channels for habitat study, SCL should study process flows and examine those habitats influenced by the flows. NMFS' study request addresses this shortcoming and provides a viable approach to forming alternatives analyses under NEPA and effects analysis under the ESA.</p>	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan includes an assessment of off channel habitat and side channels in the floodplain (not only those connected to the river).
116.	NMFS	03/05/2021	p. 41	NMFS-C32	N/A	GE-04	<p><u>Sediment</u> – SCL proposes to collect longitudinal profiles of sediment and track changes through time using a time series of aerial photos. They also propose to measure redd scour using accelerometers under various flows (PSP at 2-11). While longitudinal sediment profiles and redd scour are useful assessments, they inadequately address larger process consequences of project operations.</p> <p>The upper Skagit River, below Newhalem, is in a degraded state where incision and coarsening of the channel bed have led to diminished habitat diversity and a functional disconnect between the river and its floodplain. As a result of these impacts, the formation and renewal of aquatic habitat for threatened Chinook salmon and steelhead is impeded. These impacts likely extend to the delta where erosion due to a lack of fine-grained sediment is limiting habitat for juvenile Chinook salmon. Concurrently, Project dams sequester sediment from 37% of the Skagit River watershed, approximately 1 M yd<sup>3</sup> a year. SCL's study plan does not address diminished sediment below the project or accumulating sediment in the reservoirs, and thus fails to provide for NEPA alternatives analysis beyond a no-action alternative and fails to provide an effects analysis needed for the ESA.</p> <p>Several hydropower projects in the Pacific Northwest have studied sediment transport, process flows, and reservoir sediment accumulations as a component of the relicensing process (e.g. Commission Projects #637 (Chelan), #2157 (Henry M Jackson), #460 (Cushman), and #1862 (Baker)). NMFS' study request addresses SCL's shortcomings and is consistent with the previous Commission filings regarding sediment accumulation, transport, and downstream degradation.</p>	Please see comment response NMFS-C28 for proposed additions to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan that address sediment transport and habitat concerns.
117.	NMFS	03/05/2021	pp. 41-42	NMFS-C33	N/A	GE-04	<p><u>Large wood</u> – Similar to its approach to sediment and side channel studies, SCL proposes to inventory large wood downstream of the project using field inventories and LiDAR. SCL then plans to measure abundance and distribution changes through time using a series of aerial photos to understand how wood moves and recruitment occurs under peak flows between periods of the aerial imagery.</p> <p>Unfortunately, SCL does not propose to study large wood sequestered in the reservoirs by Project operations. But for the dams and Project operations, this wood would be available to form habitat in reaches below the dams, including in-channel and off-</p>	<p>Please see comment response NMFS-C28 for changes proposed to address NMFS SR2.</p> <p>City Light intends to develop a wood management plan during relicensing to address large wood accumulations and management in reservoirs. City Light intends to develop the plan in consultation with NMFS and other interested LPs.</p>

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							channel habitats. Active large wood transport (presumably, by truck) from the reservoirs to below Gorge Dam has been loosely referenced in the PAD and in PSP meetings, but the current quantity, size, and fate of the large wood transport from the reservoirs has not been clearly described. In NMFS' study request (SR2), we request studies that address the shortcomings of SCL's study plan by quantifying and transporting large wood from the project reservoirs to downstream reaches to improve our understanding of how to improve floodplain and in-channel habitats.	
118.	NMFS	03/05/2021	p. 42	NMFS-C34	N/A	GE-04	As a component of our Geomorphology and Aquatic Habitat study request (NMFS SR2), NMFS included five study elements related to the value of wood and sediment influences on salmon and steelhead habitat. NMFS requests that these study elements be included in the revised and final study plans: Quantify the sediment sequestered in the Project reservoirs as a rate (accumulation through time). We request that this rate of sediment accumulation serve as a quantity of sediment that could be modelled for distribution into downstream habitats (augmented sediment below Newhalem Powerhouse) for salmon and steelhead spawning habitats.	Please see comment response Ecology-C23.
119.	NMFS	03/05/2021	p. 42	NMFS-C35	N/A	GE-04	Quantify large wood removed from the reservoirs be used to model the amount of large wood that could be relocated to downstream reaches (augmented large wood below Newhalem Powerhouse) to provide instream and off-channel habitat for salmon and steelhead spawning and rearing habitat.	Please see comment response NMFS-C28 for changes proposed to address NMFS SR2.
120.	NMFS	03/05/2021	p. 42	NMFS-C36	N/A	GE-04	Assess feasibility of sediment and wood augmentation and potential risks to human development by instituting a process flow regime based on model results.	Please see comment response NMFS-C28 for changes proposed to address NMFS SR2.
121.	NMFS	03/05/2021	p. 42	NMFS-C37	N/A	GE-04	Improve side channel mapping proposed by SCL by conducting off-channel assessments into floodplains, including those side channels potentially inundated by process flows and those behind hydro modifications (i.e., not merely side channel habitats with immediate connection to the main channel as proposed by SCL) and associating those off-channel habitats with modelled process flows to fully quantify side channel habitat restoration opportunities. Ingress and egresses of all potentially inundated side channels should be mapped with elevations relative to mainstem stage height.	Please see comment response NMFS-C28 for changes proposed to address NMFS SR2.
122.	NMFS	03/05/2021	p. 42	NMFS-C38	N/A	GE-04	Install and monitor piezometers in key side channels that may be inundated under process flows to understand the timing and duration of available off-channel rearing habitat.	Deploying a large network of piezometers in off-channel floodplain habitats is not justified in City Light's opinion because groundwater levels are dependent upon a variety of non-Project factors that are beyond control of the Project, and the level of effort required to try to determine Project vs. non-Project factors would be very high compared to the likely usefulness of the data. If particular side channel or off channel areas are proposed for specific mitigation measures that require groundwater information, City Light will collect more detailed information on groundwater at those locations as part of its detailed planning efforts.
123.	NPS	03/05/2021	p. 2-3	NPS-C02	Section 6.2.9 (NPS-02)	FA-01	<b>FA-01 Water Quality Monitoring.</b> The NPS water quality study request (SR2: Skagit Project Water Quality Assessment and Modeling) included four distinct goals with specific objectives identified for each goal. In general, SCL dismissed many of the components requested and proposed a sample design that is too limited in both geographic scope and frequency of sampling to determine the magnitude and extent of water quality concerns presented by the NPS. The only significant area of agreement between the PSP and the NPS SR is the need to collect samples and make measurements for more than two years in some locations. Given the high degree of variability in project operations, such as the failure to refill Ross Reservoir in 2019,	Please see comment responses ARTU-C05, Ecology-C03, Ecology-C06, Ecology-C08, Ecology-C10, and NMFS-C12.



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							<p>data need to be collected over a time-frame to capture this variability. Therefore, we request that the RSP include data collection for all water quality parameters for two years and that during the first and second season study reviews; SCL, FERC, and LPs can make iterative decisions about increasing or decreasing the sample effort.</p> <p>Given the large extent of the area of influence, variety underlying landscape features, numerous ecological endpoints, and diversity of water quality paraments, we have included a table and series of maps to better illustrate the sample frame that will be needed to address this issue (Tables 1 and 2, Figures 1, 2, and 3). The zones and river reaches outlined (Tables 1 and 2) are based on geologic landforms that in turn create distinct habitat types and zones in the reservoirs that are distinguished from each other in terms of landform, habitat type, and reservoir water level fluctuations (primarily dewatered areas). This concept for the sample frame was originally proposed in SR3: Assessing the Impacts of Project Operations on Secondary Productivity and the PSP did not provide a response. Many of the reservoir zones and river reaches have water quality concerns that have been documented through direct measurements and field observations and these have been noted in SR2.</p> <p>The PAD states (pg. 3-54) that operation of Skagit Dams is predicated on flow conditions that are measured at the USGS Skagit River gage near Concrete (12194000) acknowledging that the combined flows originating from the Baker and Skagit Projects control flow and hence water quality down stream to at least Mt. Vernon. For this reason, and those stated in SR2, the NPS requests that the scope of the water quality study extend below the currently delineated the Hamilton Reach (Table 1) to Puget Sound.</p> <p>The PSP did not directly address our comments related to problems with the existing information and the need for additional information and the RSP should address these issues.</p> <p>For some water quality concerns (for example: depressed water temperatures and nutrient depletion/cultural oligotrophication) SCL states that project specific impacts were not identified. We disagree with this premise and rationale for dismissing SRs. The literature cited in our SR and by other LP's demonstrates and clearly links the evidence provided in the NPS SR to a project specific impact in need of study. The above and issues identified in SR2 reflect impacts known to occur at other similar hydropower projects.</p> <p>The data collected from the components of this SR will inform the needs of NPS and other LPs to inform FERC and SCL in the development of alternatives for the EA/EIS and commensurate protection, mitigation, and enhancement measures (PM&amp;Es) for the future license. The specific uses of results from the NPS SR are described below.</p>	
124.	NPS	03/05/2021	pp. 3-5	NPS-C03	Section 6.2.9 (NPS-02)	FA-01	<p><b>NPS SR2 Component 1: Collect baseline and calibration data and develop a CE-QUAL-W2 hydrodynamic model.</b> A key component of the NPS water quality study request was the development of a CE-QUAL-W2 or similar hydro dynamic model. This component of SR2 was rejected by in the PSP on the grounds that it would only be useful for determining the impacts of pumped storage and therefore was not needed at this time. However, SR2 included multiple uses for a CE-QUAL type model and these uses were not addressed in the PSP and should be addressed in the RSP. These models have gained widespread acceptance and CE-QUAL-W2 has been developed to evaluate operations for 319 reservoirs in the United States and internationally (<a href="http://www.cee.pdx.edu/w2/">www.cee.pdx.edu/w2/</a>). Developing this type of model early in the study process will determine key data gaps and will hopefully reduce unneeded sampling. In the absence of an accepted model to guide and refine sampling; samples will need to be collected</p>	Please see comment response Ecology-C08.

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							<p>on a recurring (potentially more than 2x month) basis from each of the reaches and zones described in Table 2. As stated in SR2, and expanded on here (due to the mischaracterization in the PSP), the objectives of this component are to: <i>[See comment letter for list]</i></p> <p>Accepted practices for developing a CE-QUAL-W2 model can be found in Wells (2000). However, we believe costs could be reduced by consulting directly with the model developers at Portland State University or with the USGS Washington WaterScience Center on specific baseline and calibration data requirements. At a minimum, based on Wells (2020) new field data would be needed for: <i>[See comment letter for list]</i></p>	
125.	NPS	03/05/2021	p. 6	NPS-C04	Section 6.2.9 (NPS-02)	FA-01	<p><b>NPS SR2 Component 2: Determine the amount of dissolved nutrients and nutrient-laden suspended sediment that are sequester.</b> The PSP stated that the reservoirs are naturally nutrient poor without providing any supporting evidence. This argument ignores the fact that even though a system may be nutrient limited, project operations can exacerbate these conditions making the problem more acute. Additionally, NPS measurements of nutrients in the reservoirs are very low (typically below detection limits) while USGS modeled inputs of nutrients to the reservoirs indicates that these systems should not be as nutrient limited as NPS monitoring results indicate (<a href="https://sparrow.wim.usgs.gov/sparrow-pacific-2012/">https://sparrow.wim.usgs.gov/sparrow-pacific-2012/</a>). Before developing prescriptions for nutrient enhancement NPS believes field data should be collected to validate the USGS models. The use of a CE-QUAL model will also help to determine the interaction effects of enhancing water temperatures with existing nutrient concentrations and potential nutrient enhancement measures. Methods are outlined in SR2: Skagit Project Water Quality Assessment and Modeling.</p>	Please see comment response NMFS-C14.
126.	NPS	03/05/2021	p. 6	NPS-C05	Section 6.2.9 (NPS-02)	FA-01	<p><b>NPS SR2 Component 3: Determine if water temperatures in the epilimnion of Ross Reservoir are inhibiting the spawning and foraging movements of Bull Trout, Dolly Varden, and Rainbow Trout into tributary streams.</b> The objectives of the study are:</p> <ol style="list-style-type: none"> <li>1. To determine if inflow from tributary streams are providing a corridor, via inter- or underflow, to facilitate fish movements between the reservoir and tributaries.</li> <li>2. Identify the timing, duration, and location of temperature and/or DO barriers and determine if reservoir elevations can be adjusted to facilitate tributary access or if tributary channels in the reservoirs can be modified to facilitate passage.</li> <li>3. Identify monitoring locations and develop quantitative performance metrics to evaluate the effects of Project operations (current and future) on temperature in the staging and migration corridors of the reservoir.</li> </ol> <p>The PSP did not address this component of SR2. This would be a simple data collection exercise consisting of installing data loggers to record hourly temperatures at the plunge point of all tributary streams that are accessible to native fish. These data could be compared to a series of vertical temperature and DO profiles that are collected in the reservoir at the tributary/reservoir confluence and throughout the riverine and transitional zone of the reservoir. Profiles would be measured at least twice a month during summer stratification until fall turnover. Methods are outlined in SR2: Skagit Project Water Quality Assessment and Modeling.</p>	City Light is unaware of any information suggesting spawning and foraging movements of native fish into and around tributary streams are being inhibited. However, City Light plans to evaluate temperature differences between the reservoirs and tributaries based on existing data and data gathered as part of ongoing temperature monitoring. In addition, turbidity/TSS will be measured at select tributary mouths as part of the proposed FA-01 Water Quality Monitoring Study. The ongoing Transitory Barrier Removal Program will continue to be implemented and produce information pertaining to fish access to reservoir tributaries.
127.	NPS	03/05/2021	pp. 6-7	NPS-C06	Section 6.2.9 (NPS-02)	FA-01	<p><b>NPS SR2 Component 4: Determine the temporal and spatial extent and causes of elevated turbidity levels in tributary stream channels and in littoral and pelagic habitats when the reservoirs are drawn down.</b> The objectives of the study are:</p> <ol style="list-style-type: none"> <li>1. Identify specific areas and operations that cause increased turbidity.</li> <li>2. Identify operational changes or restoration activities that could eliminate or decrease turbidity.</li> </ol>	Please see comment response Ecology-C06.

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							<p>3. Compare information from this study to an assessment of fish distribution and habitat use to determine the effects of turbidity on spawning migrations, foraging, and predation.</p> <p>4. Compare information from this study to an assessment of amphibian distribution and habitat use to determine the effect of turbidity on reproduction, foraging, and predation.</p> <p>5. Identify monitoring locations and develop quantitative performance metrics to evaluate the effects of Project operations (current and future) on turbidity in the reservoirs.</p> <p>The PSP acknowledged turbidity as an issue but proposed a sample frame that will not adequately address the issue. Namely turbidity monitoring will be conducted at a fixed point and not account for reservoir level fluctuations or measure turbidity in nearshore habitats where the effects on foraging fish are likely to be the highest. We recommend that sampling should be conducted weekly in all 2nd order and higher tributary streams and around the lake shore perimeter at regularly spaced intervals. Stream samples should be collected within 10 meters of the tributary/reservoir confluence. Shoreline and stream samples should be collected weekly as the reservoir is being drawn down in the fall for flood control, in early spring to accommodate snow melt, and as the reservoir is filling. Sampling in winter could be less frequent but should capture rain-on-snow events if possible. During mid- and late-winter turbidity levels are expected to be low due to freezing temperatures. Since over bank flows are a large contributing factor to increased turbidity efforts should be made to collect samples when these conditions are occurring. Methods are outlined in SR2: Skagit Project Water Quality Assessment and Modeling.</p>	
128.	NPS	03/05/2021	pp. 7-8	NPS-C07	Section 6.2.9 (NPS-02)	FA-01	<p><b>Determine if contamination from the Azurite Mine CERCLA site, the Skagit Queen Mine, and the Silver Daisey Mine are accumulating in Ross and Diablo Reservoirs.</b> The objectives of the study are:</p> <ol style="list-style-type: none"> <li>1. Determine the spatial extent, chemical form, and concentration of contamination in the sediment deposits from the Skagit River and Ruby Creek in Ross Lake and from Thunder Creek in Diablo Lake.</li> <li>2. Determine if project operations related to reservoir levels mobilize or sequester contaminants.</li> <li>3. Determine if contaminants are being taken up by the food web and concentrated in fish tissue.</li> <li>4. Determine if clean-up or capping activities need to be undertaken.</li> </ol> <p>The PSP dismissed this element of SR2 stating that existing information did not indicate that metals contaminations was an issue. However, the summary of existing information failed to account for the fact that the analysis was conducted on fish fillets and not whole fish. As such, it was only focused on human consumption and not effects of metals contamination on fish and the food web. The NPS considers humans, wildlife that feed on fish, and fish to be the endpoints of concern. The RSP should include a description of the ongoing USGS mining impacts study and how it will address this issue and include sampling of the sediments nears the mouths of the Skagit River, Ruby and Thunder Creeks. The RSP should also address findings from the Azurite Mine CERCLA site as well as findings metals contamination from the Silver Daisey Mine in BC (Perrin and Bennett 2010). Current USGS sampling is limited to the confluence of the Skagit River with Ross Lake.</p>	Available information, such as Seiders and Deligeannis (2018), indicates that toxics are not an issue that needs to be assessed as part of FERC relicensing or for the Section 401 certification application (please see Section 6 of the RSP for a more detailed response).
129.	NPS	03/05/2021	p. 27	NPS-C08	Section 6.2.11	FA-02	<p><b>FA-02 Instream Flow Modeling Development Study.</b> NPS did not submit a SR but supports those of our Caucus partners (e.g., Ecology-02).</p>	City Light appreciates NPS support for development of the proposed 2-D hydraulic model.

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							<p><b>Where We Agree.</b> We support the development of a calibrated two-dimensional hydraulic model as a critical tool for understanding Project impacts to the flow of the Skagit River. There should be adequate calibration data at several USGS gages in the model domain. Model output will be used in several important ways, including understanding sediment entrainment and transport, hydraulic connectivity, and other project impacts.</p> <p><b>Where We Disagree.</b> There are a few shortcomings in the PSP FA-02 that we request be addressed:                      1-SCL proposes relying on the 2-D hydraulic model and spot checks for assessing hydraulic connectivity in the Skagit River floodplain. Recognizing the importance of side channels as rearing habitat for Chinook salmon and other species, we believe that the accuracy of Lidar and model (calibration, testing, model domain density, roughness, etc.) and spot field checks will likely not be adequate because the number and type of side channels is extensive. Riedel et al. (2020) identified 119 active side channels and 110 relict channels between Sauk River and Gorge Dam that represent a wide range of conditions. For example, side-channel inundation will be influenced by groundwater levels as well as river levels, depending on their proximity to the main channel, sediment blockages, and elevation. Groundwater influence varies seasonally and over decadal time scales. During the warm dry summer months parts of the river could be 'losing reaches' where water moves from the river to the groundwater. In other locations and at other times of year, the river is likely to gain water from the ground, which is important for temperature regulation and for sustaining low flows. Along with our Caucus partners, we have recommended use of piezometers in a large number of these channels to record water level fluctuations. We think it is not feasible to use a hydraulic model and spot field checks to characterize this number and diversity of side channels.                      2 - We believe the model grid should be informed by the landform maps. This would link the model to hydraulic roughness since each landform has a different slope, sediment texture, elevation, and often vegetation type and age.                      3 - SCL proposes to end the model study at the Sauk River confluence. Data analyzed by Washington Department of Ecology (Figure 2) shows that the Project likely effects flow at least as far as the Concrete gage. We therefore recommend that the model domain be extended down Skagit River to the estuary.</p> <p><b>Why This Information is Needed.</b> Use of continuous recordings of water level in representative relict and active side channels, along with stream flow records and the 2-D flow model, would provide critical data for assessing Project impacts to watering or drying of side channels that are important rearing habitat for Chinook salmon. It would also help identify reaches of the river that are losing and gaining (i.e. areas of hyporheic exchange). FERC Project #2150 (Baker River) used this approach to understand the impact of their operations on side channels, and it has been used effectively on the Goodell Alluvial Fan during a multi-agency restoration project.</p>	<p>An inventory will be taken under GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study (Geomorphology Study) of the current status of side channels and off-channel habitat in the Skagit River floodplain between Gorge Dam and the Sauk River. The inventory will be made using a combination of remote sensing and field methods. In addition, the Geomorphology Study will be expanded to include application of the instream flow hydraulic model to determine the relationship between mainstem Skagit River flow and potential side channel/off channel connectivity.</p> <p>The focus of the hydraulic model will continue to be on the in-channel portion of the mainstem Skagit River to inform mainstem flow management. The model will include significant side channels directly connected to the mainstem and with hydraulic conditions determined by mainstem flows. The model will also include, in lesser detail, the overbank floodplain out to the valley side walls. The model will be able to simulate floodplain inundation, but the accuracy of such simulations will be limited by lack of calibration data at flows greater than those collected during the study monitoring period and by the resolution of the floodplain component of the model. As indicated in the FA-02 Instream Flow Model Development Study Plan, Section 2.6.1.3, delineation of hydraulic roughness zones will be informed by the results of the landform mapping study. The model will be developed in such a way that it can be refined in areas of particular LP interest.</p> <p>City Light does not think deploying a large network of piezometers in off-channel floodplain habitats is justified because groundwater levels are dependent upon a variety of non-Project factors that are beyond control of the Project, and the level of effort required to try to determine Project vs. non-Project factors would be very high compared to the likely usefulness of the data. City Light thinks that, alternatively, if particular side channel or off channel areas are proposed for specific mitigation measures that require groundwater information, more detail on groundwater at those locations could be collected as part of detailed planning efforts.</p> <p>City Light does not propose to extend its FA-02 Instream Flow Model Development Study downstream of the Sauk River confluence. Please</p>

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								see comment response NCCC-C06 and ARTU-C04 for more information.
130.	NPS	03/05/2021	pp. 28-29	NPS-C09	Section 6.2.10  (NPS-01)	FA-04	<p><b>FA-04 Fish Passage Technical Studies Program. Fish Passage Feasibility.</b> The NPS submitted SR1: Feasibility Analysis of Anadromous and Resident Fish Passage which was partially denied in the PSP with SCL only agreeing to assess the feasibility of fish passage above Gorge Dam and only after conducting a flow study to determine is fish could migrate through the Skagit Gorge. The PSP did not address:</p> <ol style="list-style-type: none"> <li>1. The fact that SCL has failed to document alleged fish passage barriers in the Skagit River using best available science (SR1, Rawhouser 2020a);</li> <li>2. The fact that current conditions in the Skagit Gorge reflect 140 years of human manipulation which has likely exacerbated upstream migration (Rawhouser 2020a);</li> <li>3. The importance of downstream fish passage of O. mykiss that would contribute to the anadromous life history form of Steelhead in the Skagit River if they were not blocked by the dams (Bodensteiner 2020);</li> <li>4. The importance of providing connectivity for native fish populations above Gorge Dam;</li> <li>5. The limited amount of habitat available in the Gorge and Diablo watershed and the extensive amount of habitat available in the Ross watershed (Rawhouser 2020a); and</li> <li>6. The likelihood that Pacific Lamprey and other species would have been able to migrate into the Ross watershed.</li> </ol> <p>While the Study Plan Meetings and subsequent Issue Resolution Form dated February 23, 2021 narrowed the differences between the SR1 and the PSP we continue to request that SR1 be implemented in its entirety pending revisions in the RSP and that the RSP consider Pacific Lamprey, Coastal Cutthroat Trout, Bull Trout, and Dolly Varden at multiple life history stages since these were not included in the NMFS SR04 Feasibility Analysis of Fish Passage.</p> <p>The goal of this study request is to assess the biological and physical feasibility of fish passage at the project dams, including determining the technical feasibility, biological limitations, and planning level cost estimates of providing fish passage above and below the Project (Gorge, Diablo, and Ross powerhouses and dams). The objectives of this study are to:</p> <ol style="list-style-type: none"> <li>1. Develop a set of criteria for determining feasibility of passage concepts based on biological and engineering considerations.</li> <li>2. Assemble and review biological and engineering background information for the Project and other fish passage projects of the Pacific Northwest.</li> <li>3. Develop fish passage concepts (upstream and downstream) through the Project with rough order of magnitude costs of construction, and operations and maintenance. Concepts shall include but are not limited to passage at each project barrier (i.e. individual dam passage concepts) and multiple project barriers (i.e. multiple dam passage concepts).</li> <li>4. Assess the proposed concepts in accordance with the feasibility criteria.</li> <li>5. Prepare a Final Feasibility Study Report to inform further licensing/management actions. If this effort identifies feasible concepts for fish passage, subsequent studies will be needed to support selection and/or design of the fish passage concepts</li> </ol> <p>This study request is intended to obtain information to assess whether safe, timely passage of adult and juvenile salmonids and lamprey at the Project is feasible and to inform development of Project modifications to address Project's effects on ESA</p>	Please see comment response ARTU-C02. Also, see City Light's revised FA-04 Fish Passage Technical Studies Program Study Plan for City Light's proposed approach to development of a fish species list for the feasibility assessment.

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							listed and other native fish and to enhance fishery resources in the Skagit Watershed. Note: In the Study Plan meetings SCL stated that there was no information about the presence of lamprey in the Skagit River near the project area. The NPS disagrees with this determination and considers it highly probable this species occurs in the project area given that eDNA samples collected from the Sauk River have documented the distribution of Pacific Lamprey well past Darington at the confluence of the North and South Forks of the Sauk River (Figure 1).	
131.	NPS	03/05/2021	p. 29	NPS-C10	Section 6.2.10 (NPS-08)	FA-04	<p><b>Reservoir Stream Habitat Potential.</b> The NPS submitted SR8: Quantifying the Productivity Potential of Reservoir Tributary Habitat which SCL originally denied. However, through the course of the Study Plan Meetings SCL agreed to implement this study and sent an Issue Resolution Form on February 23, 2021. In this form, it appears SCL will quantify the habitat and production potential of Chinook Salmon, Coho Salmon, and Steelhead above all three Project Reservoirs and that this would be in addition to quantifying similar habitat and production potential for Bull Trout, Dolly Varden, resident Rainbow Trout, Eastern Brook Trout, Cutthroat Trout, and Brown Trout as part of the on-going Food Web Study. As such, it appears this study plan will meet most of the needs of SR8, however until the details of the study can be discerned from the forthcoming RSP the NPS requests that SR8 be addressed in its entirety in the RSP and conducted to include Chinook, Coho, Pink, Chum, and Sockeye Salmon, Steelhead/Rainbow Trout, Coastal Cutthroat Trout, Bull Trout, Doll Varden, Pacific Lamprey, Eastern Book Trout, Westslope Cutthroat Trout, and Brown Trout.</p> <p>This study would determine the production potential of the estimated 157.5, 17.0, and 1.2 miles of accessible stream and river habitat available to adfluvial fish in the Ross, Diablo, and Gorge watersheds respectively (Rawhouser 2020b). This information is needed to determine the extent to which each watershed is capable of supporting existing populations of resident fish and anadromous fish if they are transported into these watersheds.</p>	Please see comment response ARTU-C02.
132.	NPS	03/05/2021	p. 31	NPS-C11	Section 6.2.17 (NPS-05)	FA-06	<p><b>FA-06 Reservoir Native Fish Genetic Baseline.</b> The NPS submitted SR5: Population Structure of Native Fish in the Project Area which SCL agreed to partially study in the PSP and provided a draft study plan for LPs to review on February 24, 2021. It appears this study plan will meet some of the needs of SR5, however until the details of FA-06 can be discerned from the forthcoming RSP the NPS requests that SR5 be addressed in its entirety in the RSP. This study should complement the on-going genetics studies that are being conducted as part the Baker Hydroelectric Project. Information from this study, which does not require lethal sampling, will determine: 1) the number of local populations upstream of Gorge Dam, their spawning grounds, and how they relate to other local populations; 2) fish passage prescriptions for resident fish, 3) areas (tributaries, reaches, shorelines, drawdown zones etc.) where hybridization is occurring; and 4) to what degree each local population is affected by project operations such as migration barriers that are created by sediment deposition, turbidity, or high temperatures</p>	City Light has revised FA-06 Reservoir Native Fish Genetics Study Plan to clarify City Light's proposed study in response to PSP comments. Additional fish genetics analyses and potential PME's may be identified as part of the reservoir fisheries management plan, which will be informed by the process outlined by City Light in its study plan.
133.	NPS	03/05/2021	pp. 32-33	NPS-C12	Section 6.2.14 (NPS-11)	GE-03	<p><b>GE-03: Sediment Deposition in Reservoirs Affecting Resources Areas of Concern Study.</b>  <b>Where We Agree.</b> There is a clear Project nexus with the accumulation of an estimated 1M yd3 of sediment a year in the reservoirs and we agree with SCL that there are important data gaps that need to be addressed. The PSP plans to collect data on reservoir sedimentation at four discreet sites in the three Project reservoirs. We appreciate the proposal to study the impact sedimentation has on operational issues at these sites. Our primary issue is with the limited scope of GE-03, particularly on Ross Lake where only one of six major stream deltas is examined. The methodology for a</p>	City Light appreciates the NPS's point of view that quantifying the total amount of sediment stored in reservoirs is needed to answer questions about Project impacts to water quality, reservoir aquatic habitat, cultural resources, reservoir storage capacity, and changes to sediment levels downstream of the reservoirs. However, City Light has a different proposal to address these concerns, as included in the proposed study plans and

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							<p>comprehensive measurement of the sediment in the reservoirs has been demonstrated at other FERC Projects (e.g., #637, #1862).</p> <p><b>Where We Disagree.</b> GE-03 has several shortcomings that we address in NPS SR 11 (Sediment Budget). This SR and our 2/4/21 presentation provided a clear rationale for the need for the reservoir sediment data to address development of a sediment budget for the river and to manage a host of management issues within the reservoirs (see list below). As noted, several other FERC Projects in Washington have developed sediment budget data (e.g. FERC Projects #637, #2157, #460, and #1862). Grant (2012) provides an excellent example of how this data could be used to assess dam impacts on the geomorphology of the Skagit River by use of the ratio of sediment supply below the dam to that above. This approach also can help NPS understand what is possible with or without gravel augmentation. Furthermore, the data will inform the level of impact in FERC's NEPA document and assist in determining whether and Environmental Assessment (EA) or an Environmental Impact Statement (EIS) is the appropriate vehicle based on the determined level of impact. Our issues are:</p> <ol style="list-style-type: none"> <li>1. The PSP is not a comprehensive study of sediment in the reservoirs, leaving several data gaps in our understanding of the drawdown zone and the annual magnitude of the Project's impacts on sediment deposition in the reservoirs and sediment starvation below the dams.</li> <li>2. The PSP proposes to only collect data on bathymetry, and not the full accumulation of sediment at four sites, including Hozomeen, Stetattle Creek, Thunder Creek, and Sourdough Creek. Without a sub-bottom survey, we will have no idea what the annual impact of the Project is, or where different types of sediments are accumulating.</li> </ol> <p><b>Why This Information is Needed.</b> Measuring the volume and distribution of different types of sediment trapped by the dams every year will help FERC conduct NEPA analyses of basic Project impacts (Figure 1). These include those on the Skagit River below the dams, but also the largely-forgotten, but extensive drawdown one of Ross Lake above the dams. Knowledge of the annual amount of gravel cut-off by the dams provides a fundamental measure of Project impacts. These types of data are commonly collected at other FERC Projects as noted above.</p> <p>A comprehensive reservoir sediment survey will inform PM&amp;E efforts for water quality, stream channel condition, and cultural resources, particularly in the Ross Reservoir drawdown. In the case of water quality, knowledge of the location and elevation of silt and clay deposits in the reservoirs would provide an understanding of how reservoir level manipulations impact Bull trout through high turbidity in the reservoir and spawning streams. We have witnessed drawdowns of Gorge Lake impact water quality on the Skagit River for many tens of miles downstream of the Project.</p> <p>The NPS Mission and Trust responsibilities will require data from SR 11 to design PM&amp;Es such as a Process Flow Plan, gravel augmentation, and management of the extensive NPS land seasonally exposed in the drawdowns. The project nexus is clear and the methods demonstrated at other FERC Projects.</p> <p>We appreciate that work in SP GE04 will address sediment recovery and erosion downstream of the dams, but SCL's refusal to conduct a comprehensive survey of sediment in the reservoir leaves several important gaps in our understanding of ongoing Project impacts. A comprehensive survey of sediment in the reservoirs would provide data to address these management questions:</p>	<p>summarized below for the data gaps NPS has listed:</p> <ul style="list-style-type: none"> <li>How much active flood-storage capacity will be lost to sediment accumulation?</li> <li>How much fine-grained sediment is being kept from the delta?</li> <li>How much bed load sediment do the dams remove from the river system annually?</li> <li>Where and at what elevation are major sources of fine-grained sediment exposed to erosion and how much does it degrade water quality (Figure 6)?</li> <li>How will alterations in operations (reservoir level) effect water quality?</li> <li>How, where, and to what extent is sedimentation affecting CR sites and TCPs (Figure 7)?</li> </ul> <p>Based on calculations of estimated sediment accumulation (1,000,000 cu yd/yr) vs. total storage in Ross Lake (the flood control facility; over 2,000,000,000 cubic yards of storage), it will take hundreds to thousands of years for sediment accumulation to affect storage capacity.</p> <p>There are numerous existing data and studies of the Skagit River delta, including studies of sediment input; these will be compiled as part of the Synthesis Study.</p> <p>The current conditions and potential methods to improve bedload sediment movement and associated aquatic habitat quality is being addressed as part of GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study.</p> <p>Turbidity monitoring to assess potential effects of erosion of fine-grained sediment is included in the FA-01 Water Quality Monitoring Study Plan.</p> <p>Potential effects of any proposed alterations to reservoir operations will be discussed as part of the license application (not study plans)</p>

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							<ul style="list-style-type: none"> <li>▪ How much active flood-storage capacity will be lost to sediment accumulation?</li> <li>▪ How much fine-grained sediment is being kept from the delta?</li> <li>▪ How much bed load sediment do the dams remove from the river system annually?</li> <li>▪ Where and at what elevation are major sources of fine-grained sediment exposed to erosion and how much does it degrade water quality (Figure 6)?</li> <li>▪ How will alterations in operations (reservoir level) effect water quality?</li> <li>▪ How, where, and to what extent is sedimentation affecting CR sites and TCPs (Figure 7)?</li> <li>▪ Where and how is fine-grained sediment impacting stream channels in drawdown?</li> <li>▪ How long will Thunder Arm be a lake?</li> <li>▪ Where are there opportunities to improved aquatic habitat in the drawdown where streams flow seasonally through mud (e.g. log or rock structures)?</li> </ul>	<p>Sediment erosion and deposition at cultural resource sites within the drawdown zone is being addressed in the Archaeological Resources Mitigation and Management Program (ARMMP).</p> <ul style="list-style-type: none"> <li>▪ Where and how is fine-grained sediment impacting stream channels in drawdown?</li> </ul> <p>Sediment accumulations that could block fish passage in the drawdown zone are removed as part of the on-going Transitory Barrier Removal Program.</p> <ul style="list-style-type: none"> <li>▪ How long will Thunder Arm be a lake?</li> </ul> <p>An analysis of Thunder Arm is included in the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study.</p> <ul style="list-style-type: none"> <li>▪ Where are there opportunities to improved aquatic habitat in the drawdown where streams flow seasonally through mud (e.g. log or rock structures)?</li> </ul> <p>Sediment and wood accumulations that could block fish passage in the drawdown zone are removed as part of the on-going Transitory Barrier Removal Program.</p>
134.	NPS	03/05/2021	pp. 36-37	NPS-C13	Sections 6.2.14, 6.2.15  (NPS-11, NPS-12, NPS-13)	GE-04	<p><b>GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study.</b></p> <p><b>Where We Agree.</b> We agree with SCL that there is a clear project nexus and impacts from the Project on geomorphic process and aquatic habitat. This is a critical project and we agree on the need for new data and appreciate all the thought that went in to creating this project, including linkages with other SPs such as FA02 and OM1. PSP element GE04 will collect important data on Project impacts by focusing on impacts to fluvial geomorphology (sediment) and river habitat. Further, we strongly support the landform mapping and bed scour/entrainment and sediment transport data collection efforts underway. We also support the plan to measure sediment texture at a variety of settings on the Skagit River, such as tributary, mid-channel, and lateral gravel bars within distinct geomorphic reaches because they will be extremely useful in development of a Process Flow Plan, as well as provide a benchmark for current habitat conditions.</p> <p><b>Where We Disagree.</b> We do not think the data collection in GE-04 goes far enough downstream, NPS suspects that some of the response reaches below the Sauk River could be influenced by Project's elimination of sediment and manipulation of flows that preclude transport of tributary gravel inputs (i.e. the telescoping effect).</p> <p>PSP GE-04 also leaves several important specific gaps, in addition to scope. A few are minor but several are major and we believe must be addressed. In general, the statement for the plan does not even mention sediment as a primary Project impact</p>	<p>For elements related to geographic scope, please see response to comment NCCC-C06. In response to the four limitations identified in the comment:</p> <ol style="list-style-type: none"> <li>1. No plan to collect data on the texture of bank sediments needed to inform sediment recovery and transport below dams;</li> </ol> <p>This data collection has been added to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River (Geomorphology) Study Plan.</p> <ol style="list-style-type: none"> <li>2. No plan to collect data on sediment capture above the dams;</li> </ol> <p>Please see comment response Ecology-C23.</p> <ol style="list-style-type: none"> <li>3. No plan to collect data below the Sauk River, where there are habitat maps and historic channel change surveys, but no data on sediment texture of the bed, bars, or banks;</li> </ol> <p>The Geomorphology Study and the Synthesis and Integration of Available Information in the</p>



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							<p>(GE-04, p. 5-14). This sets the stage for a PSP project that has several shortcomings related to sediment, as detailed in our rejected SRs. These limitations include:</p> <ol style="list-style-type: none"> <li>1. No plan to collect data on the texture of bank sediments needed to inform sediment recovery and transport below dams;</li> <li>2. No plan to collect data on sediment capture above the dams;</li> <li>3. No plan to collect data below the Sauk River, where there are habitat maps and historic channel change surveys, but no data on sediment texture of the bed, bars, or banks;</li> <li>4. Limited data or tools developed to understand the impact of the Project on process flows of water, sediment, and wood. On several occasions we have suggested that a Study Plan specific to Process Flows is needed given the interconnected, complicated relationships between geomorphic process and habitat (Figure 1). Our SR 13 outlines the data acquired at other FERC Projects to develop Process Flow Plans. Our modified SR 12 provides an outline for modeling of sediment erosion and transport.</li> </ol> <p>While GE-04 does collect data on bed scour, sediment texture, and sediment entrainment, it does not assess sediment transport. Several options are available including HEC-RAS sediment transport or morpho-dynamic models such as MAST 1-D (De Rego et al. 2020). The HEC-RAS sediment model is 1-D and assumes rigid banks. Morph-dynamic models such as MAST 1-D incorporate lateral channel erosion and sediment transport. Another approach would be to collect empirical data through flow releases during the 2-year study period, but this approach could be costly in terms of lost generation capacity and would require a lot of field data collection (see FERC Project #2157 monitoring plan for Process flow releases); and</p> <p>Neither GE-04 nor any other SP project proposes a study of Project runoff alteration (IHA/RV or similar analysis) that is common in other FERC projects (e.g.#2157). This data is needed to effectively design periodic flow levels that reach formative discharge at the three scales outlined in our SR 13. Methods are clearly available including software. We believe this would cost less than \$20,000 for this for this foundational data.</p> <p><b>Why This Information is Needed.</b> Filling the data gaps in GE-04 identified above will help FERC conduct NEPA analysis of basic Project impacts on the Skagit River and multiple ESA species (Figure 1). These include the manipulation of the natural river hydrograph on an annual basis and the impact of the loss of spawning gravel and formative discharge on aquatic habitat (Figures 2 and 3). NEPA analyses should also include a determination of how far below the Project operational impacts are observed in the flow record, stream channel adjustments, with sediment transport models, and aquatic habitat changes.</p> <p>We also believe that these data are critical for development of PM&amp;Es to mitigate Project impacts and restore ESA species habitat on Skagit River. GE-04 does not mention the NPS, but NPS Mission and Tribal Trust responsibilities will require data and tools from SRs 11, 12 and 13 to achieve a Process Flow Plan to inform a new operating license in the Ross Lake National Recreation Area.</p>	<p>Lower Skagit River Study both will collect existing information on the Skagit River downstream of the confluence with the Sauk River to assess conditions and to identify any data gaps.</p> <p>4. Limited data or tools developed to understand the impact of the Project on process flows of water, sediment, and wood. On several occasions we have suggested that a Study Plan specific to Process Flows is needed given the interconnected, complicated relationships between geomorphic process and habitat (Figure 1). Our SR 13 outlines the data acquired at other FERC Projects to develop Process Flow Plans. Our modified SR 12 provides an outline for modeling of sediment erosion and transport.</p> <p>An analysis of process flows and tools to understand geomorphic processes has been added to the Geomorphology Study Plan.</p>
135.	NPS	03/05/2021	p. 37	NPS-C14	N/A	GE-04 Section 1.3	<b>Specific Comments on GE-04.</b> The SP correctly identified 13 LP SRs, but it should noted that in practical terms there were 4 because many were very similar.	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan language has been revised for clarity where appropriate.
136.	NPS	03/05/2021	p. 37	NPS-C15	N/A	GE-04 Section 2.1	SCL Project impact studies focus on keeping redds wet and free of scour. This approach ignores the need for habitat connectivity, renewal, and regeneration.	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan

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								language has been revised for clarity where appropriate.
137.	NPS	03/05/2021	p. 37	NPS-C16	N/A	GE-04 Section 2.3	This would be a good place to mention landform mapping. These data will provide some of what SCL proposes in their PSP.	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan language has been revised for clarity where appropriate.
138.	NPS	03/05/2021	p. 37	NPS-C17	N/A	GE-04 Section 2.3	The plan mentions quantifying gravel quantities, but only for tributaries and not what the Project impact is in terms of what it cuts off each year behind dams.	Please see comment response NPS-C28.
139.	NPS	03/05/2021	p. 37	NPS-C18	N/A	GE-04 Section 2.4	No mention of loss of bedload as primary Project impact.	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan language has been revised for clarity where appropriate.
140.	NPS	03/05/2021	p. 37	NPS-C19	N/A	GE-04 Section 2.5	As previously noted, the tributary junctions with the Skagit River below Gorge Dam are not deltas. They are alluvial fans. There is a big difference in process between a delta (enters lake or sea) and an alluvial fan.	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan language has been revised for clarity where appropriate.
141.	NPS	03/05/2021	p. 38	NPS-C20	N/A	GE-04 Section 2.5	There are known gaps in the data for the middle and lower Skagit. These include grain size of the bed, bars and banks of the river below the Sauk.	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study will collect available geomorphic and aquatic habitat information downstream of the Sauk confluence to help identify any data gaps. City Light is also proposing SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River, as described in response NCCC-C06.
142.	NPS	03/05/2021	p. 38	NPS-C21	N/A	GE-04 Section 2.6.2	To be clear, NPS is not sampling or quantifying stream bank material. We are classifying river terraces as to composition (e.g. gravel, sand, silt/clay, or mixed). We are assuming alluvial fans are cobble or pebble gravel and that debris cones and fans are dominated by cobble and boulder bed loads.	Collection of bank material has been added to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan.
143.	NPS	03/05/2021	p. 38	NPS-C22	N/A	GE-04 Section 2.6.2	Note that Shelby Arendt (University of Washington) has plotted the bed elevation changes at the Skagit River gages. No need to duplicate.	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan language has been revised for clarity where appropriate.
144.	NPS	03/05/2021	p. 38	NPS-C23	N/A	GE-04 Section 2.6.2	Will SCL collect data on channel armoring?	Surface and sub-surface sampling is included in the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study and can be used to assess bed armoring.
145.	NPS	03/05/2021	p. 38	NPS-C24	N/A	GE-04 Section 2.6.4	The NAIP images are taken in summer when it will be difficult to identify side channels.	Agreed. LiDAR is also going to be used to identify side channel and off-channel habitat units.
146.	NPS	03/05/2021	p. 38	NPS-C25	N/A	GE-04 Section 2.6.5	Maps of scour monitoring are not complete in the PSP. Suggest they be overlain with geomorphic reaches to focus sampling on 'response reaches. In other words, a sample every mile may not be useful.	Agreed. The example of "every mile" was meant to give an approximate indication of the density of sampling locations. They will be selected based on geomorphic reaches and availability of river bars.
147.	NPS	03/05/2021	p. 38	NPS-C26	N/A	GE-04 Section 2.6.7	Will charts and tables include data from below Sauk? We assume it will since SCL proposes analysis of this data.	Yes.
148.	NPS	03/05/2021	p. 38	NPS-C27	N/A	GE-04 Section 2.6.7	Process Flow discussion is focused on historical (backward?) approach. We have proposed supplementing this with either theoretical (model) or empirical (actual flow releases) data, which might fit better with SCL's preferred 'forward-looking' approach.	A section on process flows has been added to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan.

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149.	NPS	03/05/2021	p. 38	NPS-C28	N/A	GE-04 Section 2.6.7	How will you estimate the efficacy of future gravel loading without knowing what the dams trap? It may be ten thousand or several hundred thousand yards of gravel a year but we really don't know. We agree that mobilizing sediment from tributaries is the appropriate first step in a Process Flow Plan.	See section 6.2.14 of the RSP for response on estimating sediment accumulation in Project reservoirs.
150.	NPS	03/05/2021	pp. 76-80	NPS-C71	N/A	N/A	<p><b>Cross-study Comments.</b> In multiple occasions in the Proposed Study Plan (PSP) there were mis-representations of NPS Study Requests (SRs) and statements of not being aware of a data request that was made in a SR and made clear at the winter 2021 meetings. For example, the NPS Study Request on Process Flows spelled-out what an IHA/RV is, but in a meeting on 2-2-21 neither SCL nor their consultant had an idea what it was when asked by FERC.</p> <p>The PSP projects to collect some important data on Project impacts but leaves some important studies out that were detailed in the NPS SR (Figure 1). These include SRs on Process Flows (NPS 13), Sediment Transport on Skagit River (NPS 12), Reservoir Backwater (NPS 10), and Sediment Capture in the Reservoirs (NPS 11), to name a few.</p> <p>It is alarming that SCL does not see that the capture of sediment behind the dams and the loss of sediment and sediment-transporting flows as impacts worthy of study. In particular, sediment is extremely critical to the response of rivers to dams (Figures 1 and 2; Grant, 2012) and sediment transport results in the creation of new habitat and changes in bed elevation caused by sediment transport connect off-channel habitat on this region's gravel-bed rivers (Figure 2; Pfeiffer et al. 2019). The data in Figure 3 clearly shows a lack of sediment transport at two USGS gage sites below the project. Further, many other FERC projects in this region have collected data on sediment, process flows, and reservoir sediment accumulations (e.g. FERC Projects #637, #2157, #460, and #1862).</p> <p>During the course of the last two-and-a-half years NPS has emphasized in our original issue statements, comments on the Draft SP, and in the NPS SRs that sediment has impacts within the reservoirs (operations, water quality, cultural resources, aquatic habitat) and that the lack of sediment has clear impacts on the Skagit River and riparian habitat downstream (Figure 1; incision, hydraulic disconnect with side channels, habitat formation, armoring, etc.). NPS does not accept SCL's position that keeping redds wet and free from scouring events alone, as was practiced in the current license Instream Flow Agreement, is adequate for the long-term recovery and survival of endangered salmon and trout.</p> <p>The Project has significant impacts on natural riverine processes in the Skagit River, including the flow of sediment, water and large wood (Figure 1). Project dams trap sediment from 37% of the Skagit River watershed, a quantity estimated at roughly 1 M yd<sup>3</sup> a year (USACE, 2008; Curran et al. 2016). Further, project operations alter the timing, duration and magnitude of runoff, particularly in the spring, when Ross Reservoir is filled. Flow records show substantial effects on the timing, magnitude and duration of the spring flood as far downstream as the Concrete gage (Figure 2). As a result of these operational effects, there was little change in bed elevation at two USGS gages below the Project, indicating a lack of sediment transport (Figure 3). Indeed, recent gravel filling of the main channel of the Skagit River at tributary junctions illustrates this problem due to a lack of long duration peak flood events on the main stem Skagit River since 2002 (Figure 4).</p> <p>These impacts maintain the upper Skagit River in what NPS suspects is an arrested state of degradation (Stage 3s of Cluer and Thorne, 2014) where incision and coarsening of the channel bed have led to diminished habitat diversity and possibly a</p>	<p>City Light feels that the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study will include the analyses necessary to help better understand the current geomorphic and aquatic habitat conditions in the Sauk River through gathering existing data, collecting additional field and remote sensing data, and conducting more detailed analyses of these data.</p> <p>City Light is also proposing SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River, as described in response to comment NCCC-C06.</p>

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							<p>functional disconnect between the river and its floodplain (off-channel or side channel spawning and rearing habitat for ESA species). The net result of these impacts is to curtail the formation and renewal of aquatic habitat for endangered chinook salmon (NMFS, 2006) steelhead (NMFS, 2019) and Bull trout (USFWS, 2015a; 2015b). These impacts likely extend to the Skagit River delta where there is delta front erosion due to a lack of fine-grained sediment (Hood et al. 2016). It is likely that these conditions will persist and could potentially become exacerbated under future operation of the Skagit roject. Attempts could be made to mitigate these impacts as they have at other regional hydroelectric projects on the Sultan, Skokomish and Cowlitz rivers.</p> <p>SCL suggests that they prefer ‘forward-looking’ approaches that do not rely on examination of historic or upriver data such as flow records or historic sediment accumulation in the reservoirs. NPS understands that the current condition is the baseline, yet several PSP projects propose using aerial photographs and historic data to examine operations and project impacts on the river over the last license. SCL proposes to use only historic data to examine cumulative impacts below the Sauk River confluence. NPS is concerned and would like an explanation about this inconsistency.</p> <p>Using only the last license as a timeframe to understand the natural range of variation is problematic given the decadal nature and rapid current change in this regions’ climate. NPS is confident that the historic record is our best guide to understand recent and future project impacts. It shows us what the Skagit River can be; looking at the past is not ‘backwards’. As Winston Churchill said: “The longer you can look back, the farther you can look forward’. This is not to say that NPS seeks to recreate the past. NPS understands that would be impossible with three massive dams upstream. However, NPS maintains that we cannot protect, much less restore, endangered salmon runs without answering basic questions on the spatial and temporal scales of Project impacts superimposed on a widely varying and changing climate. NPS considers the past in this context as a guide to the natural and Project-induced variability to inform future management decisions.</p> <p>NPS does not accept SCL’s claim on page 6-35 (and repeated in responses Attachment A pg. A-2) that natural range of variation and other human-caused watershed factors make it impossible to identify the Project’s impacts on the river ecosystem below Sauk River. While the response of the river system to perturbation is indeed complex, the signal from the dam impacts is well-beyond the scale of natural variation in climate (PDO). Furthermore, in the upper Skagit River watershed, there are no confounding land-use impacts in the National Park Complex or from the adjacent Noisy-Diobsud and Glacier Peak Wilderness Areas. Project effects are evident in the spring streamflow records at least as far as Concrete (Figure 2), and the Skagit Dams cut-off sediment from 37% of the watershed at the sediment starved Skagit Delta (Hood et al. 2016). Above Bacon Creek, within the Ross Lake National Recreation Area, the Project is solely responsible for altering the natural flow of sediment, wood, and water on the river system.</p> <p>It is not known how far downstream the Project influences river habitat. However, given the hour-glass nature of the Skagit Valley, where long stretches of the river are narrow and do not store significant quantities of sediment (Figure 5; Riedel et al. 2020), it is very likely that Project effects are ‘telescoped’ farther down-valley to response reaches on the lower Skagit River (Grant 2012). The concept of a gradually widening and slowing river where Project effects gradually diminish is not appropriate for the Skagit River. This why a study is needed to determine the downstream limits of Project effects on river geomorphology and habitat.</p>	

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151.	NPS	03/05/2021	pp. 81-82	NPS-C72	Section 6.3.4  (NPS-03)	N/A	<p><b>SR3: Skagit Project Reservoir Secondary Productivity Study. Aquatic Productivity.</b> The NPS submitted SR3: Assessing the Impacts of Project Operations on Secondary Productivity (zooplankton and benthic macroinvertebrates) which was entirely denied in the PSP with the exception of collecting benthic invertebrate samples from three locations in the Skagit River. As such, the proposed sampling in the PSP is inadequate and the NPS requests that the RSP address SR3 in its entirety. Most notably, this study needs to be conducted in all three reservoirs and downstream below Gorge Dam in the Skagit River as described in Table 2 of our comments to the proposed study FA-01.</p> <p>The data collected for SR3 will inform the needs of the NPS and other LPs to inform FERC and SCL in the development of alternatives for the EA/EIS as well as, targeted, cost effective, and commensurate PM&amp;Es for the future license. The specific uses of results from SR3 include:</p> <ol style="list-style-type: none"> <li>1. Quantifying invertebrate prey resources availability for fish in each reservoir and in the Skagit River;</li> <li>2. In combination with SR2, determine the specific project operations (i.e. draw down timing and duration, depressed water temperatures, and nutrient depletion/cultural oligotrophication) that are having the largest effect on secondary productivity in the reservoirs and the Skagit River below Gorge Dam; and</li> <li>3. Determining the effect of enhancing water temperatures below Ross Dam on secondary productivity. Combined with SR2, SR3 will provide information to determine the interaction effects of enhancing water temperatures with existing nutrient concentrations and fluxes and to evaluate potential nutrient enhancement measures on secondary productivity.</li> </ol> <p>Please note: This study request is tightly linked with the on-going Food Web Study and SR2: Skagit Project Water Quality Assessment and Modeling. As such, the NPS PSP comments related to these studies should be referred to in combination with these comments. Also note, Tables 1 and 2, Figures 1, 2, and 3 associated with NPS comments to FA-01 Water Quality Monitoring provide an overview of the NPS proposed sample frame, existing data, as well as PSP proposed sampling for both water quality parameters and secondary productivity.</p> <p>For water quality concerns that directly impact secondary productivity (i.e. depressed water temperatures and cultural oligotrophication) SCL stated that project specific impacts were not identified. We disagree with this premise and rationale for dismissing this SRs. The NPS provided numerous literature citations that clearly linked the evidence provided in the NPS SRs to project specific impacts that need to be studied. These reflect impacts known to occur at other similar hydropower projects.</p> <p>The PSP also stated that the reservoirs are naturally nutrient poor without providing any evidence to support this assertion. This argument ignores the fact that even though a system may be nutrient limited project operations can exacerbate these conditions making the problem more acute. Additionally, NPS measurements indicate nutrients in the reservoirs are very low (typically below detection limits) while USGS modeled inputs of nutrients to the reservoirs indicates that these systems should not be as nutrient limited as NPS monitoring results indicate (<a href="https://sparrow.wim.usgs.gov/sparrow-pacific-2012/">https://sparrow.wim.usgs.gov/sparrow-pacific-2012/</a>). As with all models, the NPS believes field data should be collected to validate this USGS model for the upper Skagit.</p>	<p>City Light's rationale for not adopting this study is detailed in Section 6.3 of the RSP. Several of the proposed study objectives identified by NPS are being addressed by the ongoing (and expanding) Food Web Study being conducted by USGS in the Project vicinity. Additionally, City Light is proposing to collect benthic macroinvertebrates at six locations in the Skagit River downstream of Gorge Powerhouse as part of the FA-01 Water Quality Monitoring Study. Benthic macroinvertebrate community metrics provide an index of productivity and locating sampling sites at multiple locations downstream of the Project will shed light on any longitudinal trends. City Light also has multiple years of zooplankton abundance and taxonomic composition data for Ross Lake, which City Light believes adequately characterize existing conditions.</p>

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							Additionally, although limited in scope, data specific to the project indicate that cultural oligotrophication is likely a problem that needs to be studied (Figure 1). Given the broad body of science that has demonstrated the impacts of hydropower operations on secondary productivity and the information presented here and in SR2 and SR3 the NPS requests that S3 be included in it's entirety the RSP.	
152.	NPS	03/05/2021	p. 83	NPS-C73	Section 6.3.4 (NPS-03)	N/A	<b>Food Web Study.</b> SCL is currently funding a study being conducted by the USGS to determine and quantify the trophic interactions for adfluvial "resident" fish that are confined in Diablo and Ross reservoirs. Gorge reservoir is not being studied. The NPS generally supports this project but raised several concerns with the implementation of the project as described in our comments to the PAD and in SR3: Skagit Project Reservoir Secondary Productivity Study, SR8: Productivity Potential of Reservoir Tributary Habitat, and SR9: Habitat Use and Population Dynamics of Reservoir Fish. The PSP did not address these concerns and the issues should be resolved in the RSP.	City Light believes the ongoing USGS study that is being conducted as part of the current license will provide sufficient information to inform several of the issues raised by NPS. The rationale for elements not adopted by City Light are detailed in Sections 6.3 of the RSP. Note also that City Light has developed FA-07 Reservoir Tributary Habitat Assessment to address in part LPs' requests regarding the productivity potential of reservoir tributary habitat.
153.	NPS	03/05/2021	p. 84	NPS-C74	Section 6.3.7 (NPS-04)	N/A	<b>SR4: Skagit Project Recreational Fishing (Creel) Survey.</b> The NPS submitted SR4: Skagit Project Recreational Fishing (Creel) Survey which was entirely denied in the PSP on the grounds that it lacked a Project nexus. The NPS disagrees with this determination and re-asserts the Project nexus described in SR4 and this study should be adopted in its entirety in the RSP. Ross, Diablo, and Gorge Reservoirs all provide recreational angling for people visiting the area and many come to the reservoirs specifically to fish (NPS 2012, Anthony and Rawhouser 2017). Additionally, in the current license SCL has funded the installation of docks, boat launches, and a fishing pier that facilitate recreational angling. SCL also provides funds in the current license to WDFW to maintain catchable levels of Rainbow Trout in Diablo and Gorge reservoir which attract anglers specifically to recreate in these Project waters. Additionally, reservoir level fluctuations also influence the ability of visitors to launch boats and access the reservoirs for angling and a creel survey would also address this issue. During the Study Plan meetings a FERC representative was asked if FERC had approved studies to address this issue and provided the NPS and SCL with examples from two projects (Williams Project P-2335 and Rumford Falls Project P-2333) where they approved creel surveys.	City Light acknowledges and appreciates the comment and has provided its rationale for not adopting this study in Section 6.3 of the RSP.
154.	NPS	03/05/2021	pp. 85-88	NPS-C75	Section 6.3.5 (NPS-06, NPS-09)	N/A	<b>SR6: Littoral and Riparian Habitat &amp; SR9: Habitat Use and Population Dynamics of Reservoir Fish.</b> The NPS submitted two requests: SR6: Determine the Suitability and Productive Potential of Littoral and Riparian Habitat for Resident and Anadromous Fish in the Project Area and SR9: Habitat Use and Population Dynamics of Reservoir Fish which were combined in the PSP and entirely denied. One of the primary reasons for denying the request was the claim that evidence does not exist that the Project is having an effect on fish in the reservoirs and that the on-going Food Web Study will address the issues that were brought forward in SR6 and SR9. The NPS disagrees with both of these allegations. First, SCL has funded studies, participated in data collection, and reviewed reports related to the fish populations in Ross, Diablo, and Gorge reservoirs. These studies highlight several issues: <ol style="list-style-type: none"> <li>1. Potential competition between Redside Shinæer and juvenile salmonids (Welch 2012, Anthony et al. 2019, and Figure 1 (below)).</li> <li>2. Potential competition between Eastern Brook Trout and native salmonids in the reservoirs (Anthony et al. 2019).</li> <li>3. Hybridization between Eastern Brook Trout and Dolly Varden and between Dolly Varden and Bull Trout in all three reservoirs (Anthony et al. 2019).</li> <li>4. Decreasing abundance of adfluvial Bull Trout in the Skagit River in British Columbia</li> </ol> <ol style="list-style-type: none"> <li>1. (Figure 2) and very low numbers of spawning Bull Trout in tributaries located in the US (Anthony et al. 2019, Majeske et al. 2020)</li> </ol>	City Light's rationale for not adopting elements of these studies are detailed in Sections 6.3 of the RSP. City Light believes that existing knowledge, data from ongoing efforts conducted in coordination with members of the NCC, along with data from its proposed studies, will provide information sufficient to address the LPs' concerns as reflected in these study requests.  Note also that City Light has developed the FA-07 Reservoir Tributary Habitat Assessment Study Plan to address in part LPs requests regarding the productivity potential of reservoir tributary habitat, i.e., information necessary for assessing the feasibility of implementing fish passage at the Project. Additionally, some population analyses (via CDMetaPOP models or similar modeling tools) may be used for subsequent analyses.

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							<p>5. Depressed numbers of spawning Rainbow Trout in Ross Reservoir tributaries (Anthony et al. 2019) and a decreasing trend in larger size class Rainbow Trout in the Skagit River (Figure 2).</p> <p>6. The relative weights for all species in all reservoirs consistently falls below the 75th percentile indicating poor health in the populations of these fish (Anthony et al. 2019)</p> <p>7. The Brook Trout in Ross Lake have shown an increasing trend in relative weight over time increasing the risk this species will outcompete native salmonids including Bull Trout (Anthony et al. 2019).</p> <p>8. Infection rates for parasites is high for most species in all reservoirs (Anthony et al. 2019).</p> <p>Secondly, the PSP did not address the shortcomings of the Food Web study that we brought forward in the NPS comments to the PAD and in SR3, SR5, SR6, SR8, and SR9 and these issues should be addressed in full in the RSP. Many of these issues are attributable to the conditions created by the reservoirs. For example, Redside Shiner are primarily a lentic species and they would not occur in the upper Skagit River watershed if the river was not impounded. Similarly, Brook Trout have colonized and are exploiting all three reservoirs and constitute a significant proportion of the fish populations in Diablo and Gorge reservoirs where they overlap with native salmonids. It also appears that Brook Trout are capitalizing on the Redside Shiner as a food resource and are increasing in size which is likely going to increase the risk of hybridization and competition with Bull Trout. These and other issues noted in SR9 need to be studied in order to inform the needs of the NPS and other LPs in meeting their management obligations and to inform FERC and SCL in the development of alternatives for the EA/EIS as well as, targeted, cost effective, and commensurate PM&amp;Es for the future license. Specific uses for this information were described in SR2, SR3, SR5, SR6, SR8, and SR9 and should be addressed in the RSP.</p>	
155.	NPS	03/05/2021	p. 89	NPS-C76	Section 6.3.3  (NPS-07)	N/A	<p><b>SR7: Evaluating Existing Fish Passage and Entrainment.</b> The NPS submitted SR7: Evaluating Existing Fish Passage and Entrainment which was denied in full in the PSP on the grounds that 1) the existing information generated from a small number of large adfluvial Bull Trout was sufficient to address entrainment, 2) that the intakes are deeper than smaller fish and early life-stage salmonids occupy and that 3) larger fish are strong enough swimmers to avoid being entrained. However, the PSP did not address the NPS concerns with existing data or provide any information to support the stated assumptions. Additionally, the PSP did not address fish passage related to spill. A primary concern is how non-native fish are colonizing downstream reservoirs and potentially the Skagit River. The NPS has documented that Redside Shiner have been able to emigrate from Ross Reservoir into Diablo and eventually Gorge reservoirs. Similarly, Eastern Brook Trout which were historically stocked in the Ross and Diablo watersheds have emigrated to and successfully colonized Gorge Reservoir where they are a prevalent species. This species has also been recently observed during snorkel surveys in the upstream end of the Skagit Gorge (bypass reach) where it is assumed, they were spilled. This clearly illustrates that the existing information generated from the hydroacoustic tagging study is insufficient to address this issue and additional studies are needed.</p> <p>During the Study Plan meetings, FERC suggested that a desktop analysis could be used to evaluate entrainment and the NPS would support this as an addition to SR7. However, this analysis would need to account for the existing data that documents the downstream dispersion of non-native species including Brown Trout that have been illegally stocking in the Ross watershed headwaters. If this cannot be accomplished the NPS requests that SR7 be implemented in its entirety to evaluate fish dispersion through both entrainment and spill.</p>	City Light is proposing to conduct a desktop analysis with the goal of evaluating fish entrainment and impingement at the Project developments and the potential effect on the Skagit River fish community (FA-08 Fish Entrainment Study). This will include characterization of entrainment and impingement risk to species of interest based on physical intake specifications, environmental factors, and species life history.

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							The NPS along with the USFWS is committed to working with SCL to develop a feasible entrainment study that would inform license conditions. NPS believes a robust study should include the following elements: 1) a desk top analysis that can be conducted early in the study to guide; 2) PIT and JSAT tagging; 3) a mark/recapture component; 4) fish of various species, sizes, and age classes; 5) an assessment of various operational scenarios, and; 5) account for diurnal and seasonal variation. Tagging fish for this study will also support SR: Habitat Use and Population Dynamics of Reservoir Fish and FA-03 Reservoir Fish Stranding and Trapping Risk Assessment.	
156.	NPS	03/05/2021	p. 90	NPS-C77	Section 6.2.12 (NPS-10)	N/A	<p><b>SR10: Impact of the Operations of Skagit Hydroelectric Project (#553) Backwater on Six Major Streams Tributaries to Ross Lake and its Influence on Habitat Quality.</b> The purpose of this study request was to obtain data on which of eight low-gradient reservoir tributary streams could be influenced by reservoir backwater. This data is needed to inform blockage surveys and is justified by our awareness of a ¼ mile backwater effect from a FERC Project (#637) on another stream in North Cascades National Park and the Project's ability to overdraft Ross Reservoir by up to 10ft. during a large flood.</p> <p>SCL rejected this request because we did not document an impact, because, they state, Bull Trout are not a concern on Ross Reservoir, and because of 'limited' opportunities for a backwater blocking event to occur. However, this request was designed to identify which streams would be vulnerable to possible backwater events. SCL acknowledges the importance of reservoir backwater on three streams in GE03: Why not the other five major streams? Big Beaver, in particular, is a low gradient stream that carries a heavy wood and sediment load due to its extensive glacial cover (Figure 7).</p> <p>NPS appreciated the further investigation SCL did into backwater effects on the reservoirs by comparing the drawdown curves to the timing of peak flows. While this 'backward-looking' approach is useful, it is not clear how peak flow timing on the tributaries was determined given the short flow records on these tributaries. NPS notes that there were two events shown in Figure 6.2.1 that occurred when Ross Reservoir was high, and one of these may have caused impacts above the reservoir level. Ross Lake was also nearly at full pool during the November 1995 flood, and operators were prepared to overdraft the reservoir. Project design allows Ross Lake to be 'over-drafted' 10 ft above normal full pool of 1602.5 ft.</p> <p>These clear Project impacts are the reasons why our NPS SR10 sought a systematic survey of the eight major tributaries that enter Project reservoirs. The methods are straight-forward and inexpensive, as demonstrated at FERC Project #637. NPS requests that SCL look at the profiles of these streams to determine if and where backwater impacts (logjams, sediment bars) might occur in the future to inform their ongoing blockage survey.</p>	<p>The GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study will collect information to evaluate backwater effects in the Skagit River, Thunder Creek, and Stetattle Creek.</p> <p>City Light proposes to expand the existing annual Transitory Barrier Removal Program that currently looks for and corrects any sediment/wood accumulations within the drawdown zone of all three reservoirs to look downstream from normal maximum water surface elevation at the remaining five tributaries listed in NPS-10 following any flood events when Ross Lake is at normal maximum surface elevation. This will allow for correction of any actual problems.</p>
157.	NPS	03/05/2021	p. 91	NPS-C78	Section 6.2.14 (NPS-11)	N/A	<p><b>SR11: Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Capture Within Reservoirs and Sediment Recovery Below Gorge Dam and Its Influence on Endangered Species Habitat.</b> The purpose of this study request was to obtain data on sediment accumulation in all three reservoirs. The Project nexus is clear, and the data are needed to address a number of management concerns discussed above, including water quality and habitat quality in streams that flow for more than half of the year in drawdowns. The SR is justified by similar actions at other FERC Projects and the lack of any data.</p>	Please see comment response Ecology-C23.



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							SCL rejected this request for a comprehensive study of sediment accumulating in the reservoirs because they did not think that it would inform license conditions that deal with the adequacy of spawning gravel. (FERC 5.9 (b)(5)). NPS notes that SCL ignored the impacts to water quality, stream habitat and cultural resources in the drawdowns. NPS also notes that several other FERC Projects have developed sediment budgets for areas above dams (e.g. FERC 3627, 2150). PSP GE03 is inadequate because it only looks at four small areas on three Project reservoirs and does not conduct sub-bottom surveys of areas not exposed in drawdowns.	
158.	NPS	03/05/2021	p. 92	NPS-C79	Section 6.3.8  (NPS-12)	N/A	<p><b><u>SR12: Impact of the Operations of Skagit Hydroelectric Project (#553) on Sediment Storage, Stability and Transport on Skagit River and its Influence on Endangered Species Habitat.</u></b> This Study Request (SR) has been modified.</p> <p>The purpose of this SR is to develop a capability to understand the influence of Project alteration of river discharge on sediment transport. This tool is needed to understand why sediment is accumulating in the main channel at tributary junctions, and to help design and monitor the effectiveness of a future Process Flow Plan. The project is justified by the apparent 'arrested degradation' state of the Skagit River below the Project and need for formative discharges on the Skagit River.</p> <p>SCL dismissed our initial SR12 for two reasons and also mis-represented this proposal in the PSP. The main reasons for rejection were that our cost estimates were too low and the scale of the proposed sediment modeling was too great. NPS acknowledged in the SR that the cost would be high but did not develop a cost estimate because we lacked that expertise. NPS made it clear in the SR that one 29-mile long sediment transport model was probably not feasible and suggested that shorter nested models in key river-response reaches already identified would be more appropriate. NPS considers these models as critical tools for understanding project impacts and designing habitat forming Process Flows to mitigate known Project impacts.</p> <p>The PSP also mis-represents the NPS statement about the modeling at Barnaby Reach: NPS did not state that a sediment transport model was constructed, but that the existing 2-D model and some calibration data were already available. These mis-statements about the NPS SRs appear to indicate that SCL did not seriously consider them.</p>	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan has been modified to include process flows and a study of tributary confluences as well as sediment transport modeling.
159.	NPS	03/05/2021	p. 93	NPS-C80	Section 6.2.15  (NPS-13)	N/A	<p><b><u>SR13: Impact of the Operations of Skagit Hydroelectric Project (#553) on Process Flows of Water, Wood and Sediment Below Gorge Dam.</u></b> The purpose of this SR was to obtain data on formative discharge on the Skagit River. NPS need this data to understand the geomorphic and aquatic habitat impacts from a lack of bed load gravel transport on the upper Skagit River (see Figures 2 and 3 above in "Cross-study Comments"). These include a lack of gravel transport at tributary junctions, armoring of the riverbed, and a lack of hydraulic connectivity between the main channel and side channel habitats. This request is justified by these needs and the fact that other FERC Projects have developed Process Flow Plans.</p> <p>SCL appears to miss the point of this Study Request in two critical ways. First, SCL mistakenly asserts that the goal of this SR is to recreate historic, pre-project conditions. This is not the purpose of the SR or the IHA/RV analysis. The objective of the study is to understand how variable the basin's hydrology is as a first step in understanding how the Project will manipulate the basin's hydrology.</p> <p>Second, SCL appears to believe that only large floods that would impact communities downstream are process flows. SCL's position in the PSP mis-represents what NPS identified as 'Process Flows' in the SR. In fact, NPS identified three scales of process</p>	An analysis of process flows has been added to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan.

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							flows that all have a less than 25-year recurrence interval. As implemented at other FERC Projects in the region, Process Flows are infrequent and often can occur as a result of natural runoff events (FERC #460, #2157). At this moment the alluvial fans of several tributaries are narrowing and shallowing the Skagit River main channel. Clearly, the river has not had the capacity to move this gravel for several years. This is unambiguous evidence of a lack of Process Flows, and NPS strongly suspects that the lack of gravel movement on the upper Skagit River is limiting salmon habitat.  The goal is to develop data and an understanding of geomorphic processes on the Skagit River. These data would allow NPS to design a Process Flow Study Plan for the next license. The FERC criteria are addressed in NPS SR13.	
160.	North Cascades Institute	03/08/2021	p. 4	NCI-C04	Section 6.3.9	N/A	<b>Climate Change.</b> Over the term of the current license, the Skagit River has experienced drastic impacts from the effects of natural disasters, climate change, increased human populations, decreased salmon and steelhead populations. Climate change alone suggests that the next license period will see even more drastic events and impacts. It is imperative that new license be informed by sufficient information that accounts for present and reasonably foreseeable issues and offers appropriate protection, enhancement, and mitigation measures to lessen the impacts of the Project on the Skagit River and the communities that depend on it.  North Cascades Institute supports the suggestions put forward in study requests NPS-14, USFWS-14, USIT-11, and WDFW-12. We agree that there is a need to perform a more comprehensive and collaborative review of the most current and technically-sound climate projections for the region. The effects of climate change on the Pacific Northwest region have been profound over the last decade, and the institute believes that the best possible practices must be engaged to study potential future impacts of a rapidly changing hydrologic regime in relation to the Project and the resources that it affects.	City Light's rationale for not adopting this study are detailed in Section 6.3 of the RSP.
161.	North Cascades Institute	03/08/2021	pp. 4-5	NCI-C05	N/A	FA-04	<b>Fish Passage.</b> North Cascades Institute supports using the best available science and traditional ecological knowledge to study the present and potential future roles for the Skagit Project to support salmonid population restoration and recovery planning for salmonids and other species under the Endangered Species Act. Management of reservoir fisheries requires detailed study to understand the Project's impact and changing reservoir levels on the ecosystem as it affects in-reservoir and tributary streams  The Institute appreciate the consideration that the Licensee has given to studying fish passage feasibility at the Project and that they have agreed to undertake studies that include "an investigation of upstream and downstream fish passage at the Skagit Project. Recent field observations by the Upper Skagit Indian Tribe and the National Park Service document the presence of anadromous salmonids in the Gorge bypass reach upstream of the proposed natural barriers indicated as impassable under the current Project license.  In light of the declining trends of salmon and steelhead populations in the Skagit River, the Institute supports securing information on large-scale actions that may help rebuild and recover these impacted populations. We support the requests to study fish passage feasibility through the Project, which have the potential benefit of reconnecting anadromous fish to spawning and rearing habitat upstream of Gorge Dam, with positive impacts on Skagit River salmon and steelhead.	Please see comment responses ARTU-C02.
162.	North Cascades Institute	03/08/2021	p. 5	NCI-C08	Section 6.2.13, 6.2.14, 6.2.15, 6.2.16	N/A	<b>Aquatic Habitat.</b> North Cascades Institute supports the study requests put forth by several Licensing Participants to address aquatic habitat conditions. The Skagit River Hydroelectric Project influences many aspects of aquatic habitat conditions within the	Please see comment responses ARTU-C05, NMFS-C14, NMFS-C28, Ecology-C06, Ecology-

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							Skagit River including impacts to reservoir tributaries, water quality in off-channel habitat, nutrient availability, sediment transport, large wood for habitat, and flow rates. These factors are necessary components of Skagit River aquatic and riparian ecosystems and can have radical impacts on the productivity of all salmonid life stages. Several study requests presented by Licensing Participants either expand the scope of the Licensee's proposed studies related to aquatic habitat or present new study ideas to better understand Project impacts on some of these factors.	C08, NPS-C07, and responses in Section 6 of the RSP.
163.	Sauk-Suiattle Indian Tribe	03/08/2021	pp. 1-2	SSIT-C02	6.2.9	FA-01	<b>FA-01 Water Quality Monitoring Study.</b> Of primary importance to the Sauk-Suiattle Tribe for water quality is the potential for the project to reduce primary productivity in the Skagit River downstream of the project by seasonally altering the temperature regime of the river by drawing water into the project penstocks from below the thermocline. FA-01 does not examine this important potential project impact although it is an impact commonly studied in FERC relicenses. SCL believes that if water released from Gorge Powerhouse is within tolerance limits for salmonids the project does not have a detrimental water quality effect. This view ignores the potential reduction in primary productivity vital for juvenile salmonids. The Tribe is aware there are ongoing discussions between SCL and the Washington Department of Ecology (WDOE) for the 401 Cert but to our knowledge the issue of alteration of the temperature regime remains an area of disagreement between SCL and the LPs. The Sauk-Suiattle Tribe requests SCL include study of reduction in primary productivity by altered temperature regime (as requested by NMFS and WDOE) in the RSP and if they choose not to the Tribe requests FERC order those studies in the Final Study Plan Determination. Those studies are necessary for the Tribe to form its Section 10(a) comments to FERC and to develop license articles including potential for additional project infrastructure to modulate water temperatures of flow released by the project.	Please see comment responses ARTU-C05, NMFS-C14, NMFS-C28, Ecology-C06, Ecology-C08, NPS-C07, and responses in Section 6 of the RSP.
164.	Sauk-Suiattle Indian Tribe	03/08/2021	p. 2	SSIT-C03	6.2.11	FA-02	<b>FA-02 Instream Flow Model Development Study.</b> The development of an instream flow model is not a proposal for an instream flow study. The Instream -Flow Model Development Study basically proposes to develop a model and then figure out how to use it later. The study does not state the types of habitats and processes that model runs will evaluate. Downstream of the project there are important side channel and off-channel juvenile fish habitats that may be isolated or functioning poorly due to the flow regime from the Project. These habitats have been identified as important limiting factors for rearing habitat in the Skagit Chinook Recovery Plan. FA-02 does not propose to study flows at which these important habitats function or process flows necessary to maintain connection of these habitats. FA-02 is also limited in scope as it ends at the Sauk River confluence while the effect of flow releases by the project, including floodplain inundation, carries much further downstream. SCL appears to have a misconception of what may constitute process flows thinking that flood control operations at the project would curtail the ability to implement process flows or that process flow implementation could not occur without flooding the lower valley. Process flows may be of significantly lower recurrence than flood flows with a likely longer duration. Implementation of instream flow study request from WDOE and NMFS is essential to the Tribes Section 10(a) recommendations and to the development of license articles including an instream flow regime for the project and a management plan for Chum Channels that is actionable with the license order from FERC. A Chum Channel Management Plan could include direct connection of some of those channels to the river.	Please see comment responses NMFS-C28 and NPS-C08.  The scope of the FA-02 Instream Flow Model Development Study is the development, calibration and validation of the instream flow model and its application to develop flow-habitat relationships. Application of the model to evaluate alternative flow management or Project operation scenarios for a range of hydrologic conditions will take place in subsequent phases of the relicensing process with LPs.  The process and schedule for City Light and LPs to identify and evaluate model scenarios will be described in the RSP and appended study plans.  With respect to the downstream study extent, please see comment response NCCC-C06, NMFS-C19 and ARTU-C04.
165.	Sauk-Suiattle Indian Tribe	03/08/2021	pp. 2-3	SSIT-C04	N/A	FA-02	SCL should use a combination of several existing or proposed studies and data to evaluate the extent of impacts from ongoing operations of the Project on floodplain habitats. This would include the following elements:	City Light believes that emphasis by the FA-02 Instream Flow Model Development Study on the mainstem Skagit River channel and development of an accurate model of mainstem hydraulics and aquatic habitat is appropriate and will provide the

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							1. SCL is proposing to develop a 2-d hydraulic model, but unfortunately the main emphasis is on the main Skagit River channel where it will be calibrated and will have the highest density model mesh. To evaluate project effects on floodplain channels, the model mesh should also be developed at a high density for floodplain channels that have potential to be influenced by Project operations and the model calibration should consider these channels as well. As a first step, potential channels should be identified by running an early version of 2-d hydraulic model at a mid-sized peak flow, surveyed in the field or on aerial photographs as part of the geomorphology study, and by using Relative Elevation Maps.	best foundation both for supporting flow management decisions and for potential future model development or refinement in areas of particular interest.  Please also see comment response NPS-C08.
166.	Sauk-Suiattle Indian Tribe	03/08/2021	p. 3	SSIT-C05	N/A	FA-02	2. Once potentially affected floodplain channels are identified then the model should be validated to ensure it is sufficiently robust in floodplain areas. This should include topographic/bathymetric surveys on these channels if needed to address gaps in the topobathymetric LiDAR data, comparisons with field measurements of water elevations in select channels throughout the study reach, and then the model mesh should be developed at a higher resolution for these channels. Once validated the model can be run for various operational and process flow scenarios, and model results for these floodplain channels should be used to characterize the duration of seasonal connectivity with the main channel relative to timing of likely fish utilization, and also to compare the depths and velocities within these channels to known habitat preferences for juvenile fish.	Please see comment response NPS-C08.
167.	Sauk-Suiattle Indian Tribe	03/08/2021	p. 3	SSIT-C06	N/A	FA-02	3. The flow hydrograph, mainstem bed elevation and the presence of log jams can have significant effects on the connectivity of floodplain channels and should be considered carefully to evaluate Project effects. The best approach would be to consider these elements together in an integrated way in a series of model runs because of the complex relationship between them, but they are described separately below:  a. For the flow hydrographs, it will be essential to evaluate connectivity of floodplain channels for the range of operational flows and process flows that will be considered in the relicense process. For the process flows, additional analyses that look at bed shear stress and the potential for geomorphic changes in floodplain channels should be used to evaluate how well different scenarios maintain floodplain habitats.	Please see comment responses NPS-C08 and NMFS-C28.
168.	Sauk-Suiattle Indian Tribe	03/08/2021	p. 3	SSIT-C07	N/A	FA-02	b. Localized or reach-scale increases in mainstem bed elevation can have a significant effect on both the duration of channel connectivity and on the depth and velocity characteristics within floodplain channels. But Project operations obstruct sediment from traveling downstream and likely have resulted in incision and reduced bed elevations in the main channel. The best approach to evaluate these effects would be to use the results of a sediment transport model (such as HEC-RAS or MAST 1-0) run to evaluate different process flow scenarios to modify the model mesh for different bed elevations to determine if bed elevation influences the duration of seasonal connectivity or the depth and velocity conditions within the channels. Another option would be to use estimates of incision depth determined from other studies to uniformly raise the bed elevation in the model mesh in each study reach, and then run model scenarios.	City Light disagrees that application of a numerical model is the best approach to evaluating reach-scale changes in main-stem bed elevations. Estimates of actual reach-scale changes in bed elevation are best estimated through geomorphic analysis as described in GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan, Section 2.6.2. Sediment transport modeling has been added to GE-04 to run different process flow scenarios to help evaluate potential PME measures.  Regarding the process, schedule, and application of the model to evaluate the impacts of alternative flow management or Project operation scenarios, please see comment response SSIT-C03. Such scenarios could include examination of the impacts of hypothetical changes in bed elevation on side channel connectivity.
169.	Sauk-Suiattle Indian Tribe	03/08/2021	pp. 3-4	SSIT-C08	N/A	FA-02	c. Large woody debris accumulations can influence floodplain channel connectivity with local changes in bed elevation, water surface elevation, and changes in velocity	Regarding the process, schedule, and application of the model to evaluate the impacts of alternative

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							vectors. Large woody debris quantity in the reach is reduced by ongoing Project operations which prevents wood from being transported downstream. Unfortunately, the exact locations of woody debris accumulations and how that might be altered by project activities can be difficult to predict accurately. We would suggest an approach that identifies the quantity and characteristics of large woody debris obstructed by the Project and distributes those amounts near the inlets of a sub-set of floodplain channels across the study reach in a manner agreed to by the license participants. Then the model mesh should be modified based on the woody debris structures and estimates of the associated changes in bed elevations, and model scenarios should be run to evaluate changes in connectivity for specific side channels.	flow management or Project operation scenarios, please see comment response SSIT-C03. Such scenarios could include examination of the impacts of hypothetical changes in model terrain or bed elevation on side channel connectivity.
170.	Sauk-Suiattle Indian Tribe	03/08/2021	p. 4	SSIT-C09	N/A	FA-02	Lastly, dikes, rip-rap and other hydromodifications can prevent connectivity with floodplain channels. With the exception of armor to isolate chum channels these structures are not related to the Skagit Project, but their locations should be identified as they may represent good Protection, Mitigation, and Enhancement opportunities.	The locations and character of bank protection will be mapped between Gorge Dam and the Sauk River under the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study (Geomorphology Study) to update existing information. This will be coordinated with other field efforts (e.g., landform mapping study or aquatic habitat mapping) and any other updated hydromodification data from other sources. (See the Geomorphology Study Plan, Section 2.6.2).
171.	Sauk-Suiattle Indian Tribe	03/08/2021	p. 4	SSIT-C10	6.2.10	FA-04	<b>FA-04 Fish Passage Technical Studies Program.</b> The Sauk-Suiattle Tribe fully supports NMFS request for a full evaluation of fish passage feasibility and habitat potential in the project area. Through discussion in the PSP meetings the Tribe feels that some progress has been made toward resolution of disagreement, but it is difficult to tell where disagreement still exist. We are also aware of ongoing discussions between SCL and NMFS. The Tribe requests SCL include NMFS study request for passage evaluation and habitat potential in the RSP and if they choose not to the Tribe requests FERC order NMFS study request in the FSP determination.	Please see comment responses ARTU-C02.
172.	Sauk-Suiattle Indian Tribe	03/08/2021	p. 4	SSIT-C11	N/A	FA-04	Another aspect of fish passage is the lack of connectivity of downstream movement from above the hydro project. Bull Trout and Steelhead are species listed under the Endangered Species Act (ESA). Previous studies have shown rainbow trout contribute to steelhead propagation and anadromy. Skagit bull trout are known to move throughout the Skagit River system including the Puget Sound nearshore. The lack of connectivity of fish resources above the project to the rest of the river system precludes a segment of the gene pool for these ESA listed species. Therefore, Sauk-Suiattle Indian Tribe believes downstream passage needs to be a component of any fish passage study.	FA-04 Fish Passage Technical Studies Program will include the development and evaluation of concept level engineering alternatives of upstream and downstream fish passage facilities at all three Project dams. City Light has also developed a study plan to conduct an entrainment desktop analysis for Project dams (FA-08 Fish Entrainment Study) as part of the RSP.
173.	Sauk-Suiattle Indian Tribe	03/08/2021	pp. 5-6	SSIT-C14	Sections 6.2.14, 6.2.15, 6.3.8	GE-04	<b>GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study.</b> GE-04 does not acknowledge that disruption of bedload by the Skagit Project is a potential project impact. This is a major area of disagreement between SCL and the LPs and the Tribe does not believe there was an effort to resolve this disagreement in the PSP meeting process.  Several LPs submitted study request for an estimate of annual LWD sequestered by the project and modeling of LWD transport in the Skagit River below the project if that LWD were in the system. SCL agreed to add a LWO component to GE-04 but it is mainly in the form of a management plan and not modeling of wood transport that would evaluate benefits of wood reintroduction. The Tribe believes LWD remains a significant area of disagreement between SCL and the LPs. SCL has stated there are five years of data of LWD accumulation in the reservoirs but discussions of LWO accumulation in Ross Reservoir years ago during the current license led us to believe	City Light is developing a wood management plan, which will compile existing information on wood within Project reservoirs. City Light will develop alternatives to address wood accumulations in collaboration with LPs.  Currently, modeling of large wood transport is in the experimental stage, so City Light does not propose to develop a wood transport model.  GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study (Geomorphology Study) includes an analysis of

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							<p>there may be many more years of data available. LWD input to the reservoirs is likely very episodic with storms and five years of recent data may underestimate the average annual LWD input to the reservoirs.</p> <p>Another area that remains a significant disagreement is the scope, both temporally and geographically, of the study. The study plans to look at geomorphic changes to the Skagit River mainstem across the term of the current license. Impacts of the project may have taken place before the current license and it is very possible that project operations during the current license are only maintaining an already degraded state (Cluer that Thorne 2014). GE-04 proposes to end its geographic scope at the Sauk River confluence without sound rational. The project sequesters bedload from 37 percent of the Skagit Basin including fine sediment that would be transported to the Skagit estuary where marsh habitats are decreasing (Hood et al. 2016).</p> <p>Several LPs, including the Sauk-Suiattle Tribe, have long been advocating for a holistic approach that looks at sediment transport, LWD transport, and process flows together since the pre-NOI process. SCL and the LPs should collaboratively develop a series of flow and sediment/LWD transport models that develops information that can be used to develop a flow regime that optimizes not only spawning and incubation but also connectivity to floodplain habitats for juvenile rearing as well as other factors such as outmigration flows.</p> <p>The Sauk-Suiattle Tribe requests SCL revise GE-04 in collaboration with the LPs to estimate average annual LWD input to the reservoirs, estimate average annual bed load sequestration by the project, model multiple levels of bed load and LWD augmentation across multiple flow regimes to develop a number potential flow regimes to best manage flows in the new license. If SCL declines to revise GE-04 and develop a more holistic approach to process flows, sediment, and LWD the Tribe request FERC include a study that does so based on LP study requests.</p>	<p>geomorphic changes in the Skagit River prior to the current license period.</p> <p>See section 6.2.14 of the RSP for response on estimating sediment accumulation in Project reservoirs.</p> <p>The Geomorphology Study and the SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River Study both will collect existing information on the Skagit River downstream of the confluence with the Sauk River to assess conditions and to identify any data gaps.</p> <p>The Geomorphology Study Plan has been revised to include sediment transport modeling and an analysis of large wood transport.</p>
174.	Skagit County Board of Commissioners	03/03/2021	pp. 3-5	SCBC-C02	N/A	FA-04	<p><b><u>Skagit County Supports The Skagit Tribes, Federal Agencies and State Agencies In Seeking Comprehensive Analysis Of The Feasibility Of Fish Passage and Habitat Improvement Above Seattle's Dams.</u></b> Seattle is being asked to consider the feasibility of fish passage over and anadromous habitat above its three Skagit dams, as reflected in the various study requests and comments submitted to the Commission by the Upper Skagit Indian Tribe, Swinomish Indian Tribal Community, Sauk-Suiattle Tribe, National Marine Fisheries Service, U.S. Fish &amp; Wildlife Service, National Parks Service, Washington Department of Fish and Wildlife, Washington Department of Ecology and many others. These same entities also ask that Seattle study the Project's impacts on process flows, geomorphology and riverine habitat, from Seattle's Skagit dams downstream to Skagit Bay, a mere 75 river miles in total. Skagit County previously endorsed these requests as set forth in our prior filings. We continue to support these requests.</p> <p>None of these questions have been fully and credibly studied since the construction of the Skagit dams began in 1919, despite significant dam-caused impacts apparent to most informed observers, as reflected by stakeholders' filings.</p> <p>As to downstream impacts, Seattle intends to generally rely on existing information.</p> <p>In response to stakeholders' upstream study requests, Seattle contends that habitat above the Skagit dams need not be studied, because, Seattle argues, Skagit anadromous species never travelled upstream of Seattle's dams. While unable to point to any single natural feature that would block anadromous species (such as a waterfall), Seattle instead asserts that the totality of rapids and large boulders, most of</p>	Please see comment responses ARTU-C02.

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							<p>which are currently underneath Seattle's dams and reservoirs, was, taken as a whole, too much for anadromous species to navigate.</p> <p>In making this convenient assertion, Seattle relies on information that largely amounts to hearsay, selectively curated by Seattle over the course of many decades, cemented into the public consciousness by an extensive public information campaign. From our perspective, this deeply-held narrative is an inadequate substitute for the legitimate scientific inquiry required by federal law.</p> <p>For their part, the Skagit Tribes and resource agencies have furnished substantial evidence that no conclusive barrier prevents anadromous species' usage of the upper 37% of the Skagit River - other than Seattle's three dams.</p> <p>Seattle seems to be asserting that Skagit Tribes and resource agencies must prove Seattle's narrative wrong beyond a reasonable doubt in order to invoke study of the feasibility of passage and habitat above Seattle's dams, which could involve the construction of systems like Puget Sound Energy was required by its FERC license to install and operate on the Baker River, a Skagit tributary.</p> <p>Seattle's characterization of the issue appears to be inconsistent with controlling law on the subject, which instead suggests the relevant question is whether fish passage and habitat improvement above the three Skagit dams can feasibly mitigate for the totality of the dams' impacts. See, <i>Confederated Tribes and Bands of Yakima Indian Nation v. FERC</i>, 746 F.2d 466, 470-71, (9th Cir 1984)(quoting <i>Udall v. FERC</i>, 387 U.S. 428, 440 (1967)(The law, then, is well defined: Prior to issuance of a new license, FERC must study the effect of a project on the fishery resource and consider possible mitigative measures.)</p> <p>Contrary to Seattle's assertion, the question is not properly centered on an exploration of the perceived condition of the Skagit at the precise moment over a century ago that Seattle shut off the Skagit's flow in order to construct its first dam. Rather, it must be an analysis focused on the continuing impacts of the Project. See, <i>American Rivers v. FERC</i>, 895 F.3d 32, 46 (DC Cir. 2018)("[T]he Fish and Wildlife Service acted arbitrarily in establishing the environmental baseline without considering the degradation to the environment caused by the Coosa River Project's operation and its continuing impacts.")</p> <p>This concern is particularly pointed given the multiple ESA listings involved in the Skagit, listings that impact our entire community. <i>American Rivers v. FERC</i>, 895 F.3d at 47 ("[A]ttributing ongoing project impacts to the 'baseline' and excluding those impacts from the jeopardy analysis does not provide an adequate jeopardy analysis. The Opinion's jeopardy analysis is arbitrary in failing to account for the impact of continued operations of the existing dams.")</p> <p>Skagit County supports the Skagit Tribes and resource agencies in their request to study the feasibility of passage over and below the three dams, as well as the viability of habitat and related improvements above the dams, a mechanism proven successful in other locations to mitigate for the various fishery impacts that dams inevitably create. Anadromous species in the Pacific Northwest have survived millennia of geologic upheaval through their astounding ability to colonize habitat, and, given the condition of Skagit anadromous species, we believe that exploring this possibility in the public lands above Seattle's dams is squarely in the public interest.</p>	

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							<p>Seattle has recently agreed to study fish passage and upstream habitat, so long as Seattle controls the study as its lead investigator. [See Fish Passage Issue Resolution Form] It would be extraordinarily difficult for our community to view this as a credible and unbiased study, something we feel is important for the Commission to ensure.</p> <p>Seattle has spent many decades and considerable resources undermining the idea that the Skagit above Seattle's dams is suitable for anadromous species, and it defies reason to suggest that Seattle should now lead and control what is supposed to be an objective analysis of that very question. Accordingly, we respectfully request that the Commission require federal agency and tribal co-lead participation in all studies of fish passage and habitat above Seattle's dams.</p>	
175.	Swinomish Indian Tribal Community	03/08/2021	pp. 13-17	SITC-C08	Section 6.2.9	FA-01	<p><b>D. City Light's FA-01 Water Quality Monitoring Study Is Incomplete Without Additional Issues, Methodologies Proposed by NMFS, NPS and Ecology.</b> In its October 26, 2020 comments to the Commission, the Tribe highlighted details of, and expressed support for, the four study requests submitted by NMFS, as well as multiple other study requests submitted by LPs, including the NPS, Ecology, WDFW, USFWS and the Upper Skagit Indian Tribe. These study requests are focused on the issues of most concern to Swinomish, namely water quality, instream and process flows, sediment, bedload and large wood disruption, and the feasibility of fish passage at all three dams. We encouraged City Light to accept the study requests about these topics in totality to ensure a legally defensible and scientifically valid final study plan. Alternatively, we encouraged the Commission to require City Light to incorporate the issues and methodologies relied upon by the agencies to clearly define the nexus to the Project impacts into the revised study plan.</p> <p>Swinomish maintains that it is essential to defer to the federal and state natural resource agencies with subject matter expertise in their data collection and study request needs. For example, NMFS has considerable applicable statutory responsibilities and significant license conditioning authority. The technically necessary data and information requests they and other resource agencies made should be incorporated into the RSP in order for City Light to produce a license application that protects and recovers salmon and their habitat and complies with applicable law, including duties to the Tribe.</p> <p>As an example, the Tribe's position is underscored by the reality of the substantial duties and responsibilities over Treaty protected resources with which NMFS is entrusted to steward, protect and recover. As People of the Salmon, the Tribe is dependent upon NMFS to fulfill both the letter and spirit of their resource responsibilities in order for them to uphold their Trust Responsibility to the Tribe. As NMFS states in its comment letter:</p> <p>"NMFS has ESA responsibilities for the listed Puget Sound Chinook salmon ESU and Puget Sound steelhead DPS. Both of these species occur within the Skagit River Basin and are affected by the Project. Critical habitat for these species is designated in the Skagit Basin and is also affected by the Project. The Project also affects the ESA-listed SRKW DPS, which rely on Chinook salmon as a preferred prey resource. NMFS's primary management goals for these species, as required by the ESA and relevant here, are to ensure that federal actions do not jeopardize the listed species or adversely modify their critical habits and to develop and implement measures for the conservation and recovery of listed species to the point where they no longer require the protections of the ESA. The Project area includes EFH for Chinook, coho, and pink salmon (PFMC 1999)."</p>	Please see comment responses NCCC-C06, ARTU-C04, ARTU-C05, Ecology-C06, Ecology-C08, Ecology-C10, NMFS-C08, NMFS-C12, NMFS-C14, and NPS-C07.



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							<p>City Light's PSP failed to provide either an adequate scientific basis or a regulatory justification for rejecting in whole or part NMFS's study requests based on the § 5.9(b) criteria. We note that the example of an adequate nexus provided in the Commission's Guidance is surveys of fish habitat downstream of a licensed project to study effects on ESA-listed fish—nearly exactly what NMFS has requested in its studies. <i>See</i> Guidance at 4-5. For each of the study requests there is also a link to potential license conditions, because license provisions regarding the release depths, timing of releases, extent of releases, and transport of bedload and large woody debris would potentially mitigate Project effects on a critical resource by improving water quality and fish habitat downstream.</p> <p>Numerous federal and state resource agencies proposed study plans to address key deficiencies in City Light's FA-01, including Ecology, NPS, NMFS and WDFW. Their water- quality study requests had the goal of more fully characterizing the effects of Project operations and facilities on water quality in the three reservoirs and in the mainstem Skagit River below the Gorge Dam (including the Gorge bypass reach). Of primary importance to the Tribe is the need for water quality to maintain designated uses for aquatic life, and limit the potential for the Project to reduce primary productivity in the Skagit River downstream of the Project by seasonally altering the temperature regime of the river by drawing water into the project penstocks from below the thermocline. Equally important to the Tribe is the need to ensure that Project operations maintain numeric water quality criteria for sediments and dissolved oxygen, and that the Project does not unnecessarily degrade or lower water quality in areas of otherwise pristine water quality.</p> <p>City Light's FA-01 still does not propose to adequately examine all of the important potential Project impacts on water quality, even though we understand temperature impacts, for example, are a commonly studied impact in relicensing processes. City Light apparently believes that if water released from Gorge Powerhouse is within tolerance limits for salmonids the Project does not have a detrimental water quality effect. This view ignores the likely effects of potential reduction in primary productivity vital for juvenile salmonids, as well as potential impairment of spawning in bull trout and other salmonids in overly low temperature water. The Tribe is aware there are ongoing discussions between City Light and Ecology for the 401 Certification but to our knowledge the issue of alteration of the temperature regime remains an area of disagreement between City Light and the LPs.</p> <p>The Tribe continues to support Ecology's, NMFS's and other study requests that would expand the FA-01 water quality study proposed by City Light in the PSP to more fully quantify the extent of downstream influence by City Light dam operations on water quality. NMFS's study proposes to monitor water quality parameters for two years, rather than City Light's proposal for one year of monitoring, in order to understand seasonal and inter-annual variability in water years. Through the examination of physical water quality parameters and biological indicators of stream health, NMFS expects to better capture the potential impact of Project operations on water quality, the viability of fish species, and the habitats on which they depend.</p> <p>Ecology, NMFS and other LPs propose to study Project effects below the confluence of the Sauk River and extending to the estuary both to inform its exercise of statutory authorities and the Commission's analysis under NEPA. City Light contends, without citing to any scientific support, that the influence of Project flows on water quality is minimal below the Sauk River confluence. However, the available scientific evidence suggest otherwise; releases from the Project can constitute greater than 50% of the flow at the Mount Vernon gage. Thus, it is quite likely that temperature and other</p>	

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							<p>Project effects extend at least that far at certain times of the year. The nexus requirement is satisfied and we urge City Light to heed the repeated calls by Ecology to provide the basic data and studies they need for their 401 water quality certification.</p> <p>Because of the potential for Project operations to influence downstream temperatures in the Skagit River, the development of a temperature model to predict the downstream impact of releases is a logical next step. This modeling and predictive capacity is especially important in predicting the temperature effects of process flows. Understanding the relationship between Project flows and downstream temperatures is also important in quantifying the effects of cold water releases on stream productivity and fish physiology. NMFS's SR1 includes macroinvertebrate sampling to provide a biological indicator of aquatic habitat condition and productivity above and below the Project. The PSP does include some macroinvertebrate sampling, but only at 3 sites downstream of the Project and only during July and September 2021. NMFS and other LPs have deemed this level of sampling completely insufficient to capture year- to-year variability in aquatic conditions.</p> <p>As many LPs have pointed out, virtually every life history stage – return migration, spawning, incubation, juvenile rearing, and downstream emigration – of ESA-listed Chinook salmon and steelhead and the other affected anadromous species is predicated on the availability of adequate flows, water quality (temperature, total dissolved gas, nutrients needed for primary productivity) and suitable habitat during specific temporal windows. Clearly, the Project's operation has an influence on temperature (City Light concedes as much) and thus there is a direct nexus.</p> <p>Ecology, NMFS and other LPs have requested that City Light's water quality monitoring study plan (FA-01) in its PSP be modified to better capture geographic, seasonal, and annual variability in water quality parameters. We support their proposed changes to the FA-01 water quality monitoring study plan that would include, but not be limited to the following:</p> <ol style="list-style-type: none"> <li>a. Extending water quality monitoring (primarily temperature) to downstream of the confluence with the Sauk River. Multiple temperature loggers positioned above the confluences of tributaries entering the Skagit River would provide an understanding of how Project releases influence downstream conditions and how that influence varies seasonally. Project releases would include those considered for process flows and fish passage operations.</li> <li>b. Expanding all water quality monitoring for the two-year data collection time period.</li> <li>c. Expanding Ross Lake water quality monitoring to more test sites to better establish inputs from different tributaries.</li> <li>d. Expanding macroinvertebrate monitoring to include multiple habitats (off-channel, side channel, and edge habitats) and provide greater temporal coverage (include a spring and autumn sample) to better reflect when these areas are utilized by juvenile salmonids.</li> <li>e. Monitor nutrient levels in the reservoirs and downstream of the Project for two years.</li> <li>f. Monitor metal levels in the reservoirs for two years at multiple locations.</li> </ol> <p>The Tribe recommends City Light include study of the above-mentioned water quality monitoring and study elements, as requested by Ecology, NMFS and others, in the RSP. If City Light declines to do so then the Tribe requests that the Commission order those studies in the Final Study Plan Determination. The Tribe believes that these studies are necessary for the Tribe to develop Section 10(a) comments and for the Commission to develop license conditions regarding these Project impacts, including below the Sauk to the estuary, and, as noted above, such studies are necessary for</p>	

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							Ecology and NMFS to carry out their statutory duties. We request that City Light incorporate these necessary study components into the RSP to enable NMFS and other federal resource trustees to carry out their statutory mandates and duties that are key to upholding its Trust Responsibility to the Tribe.	
176.	Swinomish Indian Tribal Community	03/08/2021	pp. 17-20	SITC-C09	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16	GE-04	<p><b>E. City Light's GE-04 Geomorphology Study Is Incomplete Without Expanded Scope, Issues and Methodologies Proposed by NMFS, NPS and WDFW.</b> Dams, including those operated by City Light, have a substantial impact on natural river functions, including sediment bedload disruption, large wood disruption, and interruption of flows that would otherwise connect off-channel and floodplain habitats. Given the imperiled state of wild salmon stocks in the Skagit River, there is an obvious need to better understand how numerous individual, but closely inter-related, impacts affect fish habitat in the reservoirs down to the estuary. Virtually all LPs agree, and met the §5.9(b)(5) nexus criterion, in proposing that ceasing study of Project impacts below the Sauk River confluence has no scientific justification. The Swinomish Tribe agrees that there is ample evidence already provided to require analysis of Project impacts down to the estuary.</p> <p>For its Study Request 2, NMFS combined proposed instream flow modelling (FA-02), bypass reach hydraulic modelling (FA-05), and geomorphology (GE-04) study plans given the inter-relatedness of these issues. The NMFS SR2 was designed to examine the inter-relatedness of multiple critical river habitat-forming processes; its intent is to inform the characterization of geomorphic processes and resulting aquatic habitat formation affected by Project-related flows below Gorge Dam and the interruption of sediment and wood transport through the Project, as well as to examine how improvement in process flows and associated management operations could increase mainstem and floodplain habitat (including off-channel habitats) and ameliorate the Project's impacts on ESA-listed species and other affected fishery resources. City Light did not provide any justification for rejecting NMFS' Study Request 2.</p> <p>The importance of these study requests was aptly captured by NMFS:</p> <p>The successful upstream migration, spawning, incubation, juvenile rearing, and downstream emigration of ESA listed Puget Sound Chinook salmon and steelhead and other salmonid species is determined by the flow regime and associated geomorphological processes, including inundation of floodplain habitats. Thus, the Project not only has a significant impact on fish that spawn and rear downstream of the dams, it also controls every aspect of fish habitat, including access to and formation of floodplain habitats during elevated flow stages (i.e., process flows).</p> <p>These types of floodplain habitats provide critical spawning and rearing opportunities for salmon and steelhead, and for this reason, they are a high priority for restoration in the Skagit River Chinook Recovery Plan (SRSC and WDFW 2005). There is a direct, clear nexus between this component of the geomorphology study requests submitted by multiple LPs and Project operations. That is why numerous LPs requested modeling and that an examination of the amount of sediment trapped in the Project reservoirs be quantified to approximate the rate of sediment that could be transported to below the Project to restore geomorphic processes. Without identifying relevant criteria under § 5.9(b), City Light rejected this study request, asserting that documenting sediment accumulation in the reservoirs, especially in Ross Lake, is unnecessary to inform the development of license conditions that address the adequacy of spawning habitat or gravel needs downstream of the Project. City Light has not provided a basis for this contention. We strongly agree with NMFS and other LPs that increased sediment transport would have habitat enhancement benefits,</p>	<p>GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study and SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River will collect and synthesize available information downstream of the Sauk River confluence.</p> <p>Please see comment response NPS-C28 and Ecology-C23 regarding sediment accumulation in reservoirs.</p> <p>Please see comment response NMFS-C28 regarding NMFS-02 which addresses the remaining elements in this comment.</p>

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							<p>including spawning habitat, and that understanding quantities stored in the reservoirs provides a reasonable indicator of natural rates of sediment delivery currently blocked by the projects and would inform operational improvements to benefit salmon and steelhead.</p> <p>City Light did make some amendments in the PSP based on multiple study requests to amend GE-04, which the Tribe appreciates. City Light proposes to collect side channel inventories in the floodplain (PSP, GE-04, pg. 2-10). Additionally, the PSP improves the study proposed in the PAD by modelling side channel ingress and egresses under current flows.</p> <p>However, we agree with NMFS, NPS and other LPs that City Light's PSP does not go far enough, and therefore has limited utility in developing "forward-thinking" off-channel and floodplain restoration projects to benefit salmonid spawning and rearing habitat in order to offset adverse impacts from the Project associated with disruptions to sediment and wood transport. NMFS, NPS and other LPs have made clear that to adequately model potential off-channel rearing habitat, develop an alternatives analysis under NEPA, and develop empirical models that benefit salmon and steelhead habitat and recovery, modelling of process flows which inundate the floodplain are necessary. In addition, as a component of NMFS's Geomorphology and Aquatic Habitat study request it included five study elements related to the value of wood and sediment influences on salmon and steelhead habitat.</p> <p>GE-04 does not acknowledge that disruption of bedload by the Project is a potential project impact. This is a remaining major area of disagreement between City Light and the LPs and the Tribe does not believe there was a sufficient effort by City Light to resolve this disagreement in the process that followed the PSP. The reality is that the Project sequesters bedload from 37 percent of the Skagit Basin including fine sediment that would be transported to the Skagit estuary where marsh habitats are decreasing (Hood et al 2016). To deny that the Project has any effect, let alone a significant one, downstream is untenable.</p> <p>Additionally, several LPs submitted multiple study requests for an estimate of annual large wood debris ("LWD") sequestered by the project and modeling of LWD transport in the Skagit River below the Project if that LWD were in the system. City Light agreed to add a LWD component to GE-04 but it is mainly in the form of an uncertain management plan and not modeling of wood transport that would evaluate benefits of wood reintroduction. City Light acknowledged after the publication of the PAD that it had been collecting data on LWD for a number of years, but to-date inexplicably has not provided that data to the LPs. We believe this data should have been provided months ago. The Tribe believes LWD remains a significant area of disagreement between City Light and the LPs. It is unclear why City Light has not provided this information to the LPs as this appears to be a significant and intentional withholding of crucial data. The Tribe requests that City Light immediately provide that information and include within the RSP a study to determine how much wood City Light transports downstream, including how much of it is cut from its original size, and how much remains in the reservoirs. The study should identify alternative methods for transporting woody debris and the feasibility of those methods. Wood that enters the reservoirs is an ongoing Project impact, whether it is managed by City Light or left unattended within the reservoir system. Ross Reservoir, at nearly 23 miles long, has potential to store massive amounts of woody debris along its shorelines. The requested study would inform potential PMEs related to wood augmentation downstream of Gorge Dam, which has obvious potential to improve habitat for anadromous salmonids.</p>	

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							<p>Another area of remaining significant disagreement is the scope, both temporally and geographically, of the study. City Light's GE-04 intends to look at geomorphic changes to the Skagit River mainstem across the term of the current license. Impacts of the Project may have taken place before the current license and it is very possible that project operations during the current license are only maintaining an already degraded state (Cluer and Thorne 2014). GE-04 proposes to end its geographic scope at the Sauk River confluence without any scientific basis or sound explanation.</p> <p>Several LPs, including the Tribe, have long been advocating for a holistic approach that looks at sediment transport, LWD transport, and process flows together since the pre-NOI process. City Light has not provided an adequate response to these repeated requests. We request that City Light commit to work collaboratively with the LPs develop a series of flow and sediment/LWD transport models that develops information that can be used to develop a flow regime that optimizes not only spawning and incubation but also connectivity to floodplain habitats for juvenile rearing as well as other factors such as outmigration flows.</p> <p>The Tribe supports NMFS and multiple other LPs in reiterating the request that the following study elements be included in City Light's GE-04 revised and final study plans:</p> <ol style="list-style-type: none"> <li>Quantify the sediment sequestered in the Project reservoirs as a rate (accumulation through time). We request that this rate of sediment accumulation serve as a quantity of sediment that could be modelled for distribution into downstream habitats (augmented sediment below Newhalem Powerhouse) for salmon and steelhead spawning habitats.</li> <li>Quantify large wood removed from the reservoirs and use it to model the amount of large wood that could be relocated to downstream reaches (augmented large wood below Newhalem Powerhouse) to provide instream and off-channel habitat for salmon and steelhead spawning and rearing habitat.</li> <li>Assess feasibility of sediment and wood augmentation and potential risks to human development by instituting a process flow regime based on model results.</li> <li>Improve side channel mapping proposed by City Light by conducting off-channel assessments into floodplains, including those side channels potentially inundated by process flows and those behind hydromodifications (i.e., not merely side channel habitats with immediate connection to the main channel as proposed by City Light) and associating those off-channel habitats with modelled process flows to fully quantify side channel habitat restoration opportunities. Ingress and egress of all potentially inundated side channels should be mapped with elevations relative to mainstem stage height.</li> </ol> <p>Install and monitor piezometers in key side channels that may be inundated under process flows to understand the timing and duration of available off-channel rearing habitat.</p> <p>The Tribe requests that City Light revise GE-04 in collaboration with the LPs in a manner highlighted above to estimate average annual LWD input to the reservoirs, estimate average annual bedload sequestration by the project, model multiple levels of bedload and LWD augmentation across multiple flow regimes to develop a number potential flow regimes to best manage flows in the new license to enable NMFS and other resource agencies to carry out its statutory mandates and duties that are key to the agency upholding its Trust Responsibility to the Tribe. If City Light declines to revise GE-04 and develop a more holistic approach to process flows, sediment, and</p>	

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177.	Swinomish Indian Tribal Community	03/08/2021	pp. 20-21	SITC-C10	Section 6.2.10	FA-04	<p>LWD then the Tribe requests that the Commission include a comprehensive study that does so based on LP study requests.</p> <p><b>F. City Light's FA-04 Fish Passage Feasibility Is Incomplete Without Expanded Geography, Issues and Methodologies Proposed by NMFS and Other LPs.</b> NMFS Study Request No. 3 (SR3), was intended to quantify potentially available habitat and productivity of the Project reservoir tributaries and Skagit River headwaters for use by ESA- listed and non-listed salmon and steelhead. City Light rejected the study request but did not provide a scientific or substantive explanation as required. 18 C.F.R. §5.11(b)(4).</p> <p>Under the FPA and Fish and Wildlife Coordination Act, NMFS is responsible for the protection, mitigation of damage to, and enhancement of non-listed salmonid species that occur in the Skagit Basin. Included under the FPA, NMFS has authority to prescribe fishways. NMFS demonstrated the need for site specific study of passage at the Project dams. The status of many listed and non-listed species is in decline or short of recovery goals. Determination of the habitat above and the viability of passage at the Project through the requested studies will inform management actions with respect to recovery.</p> <p>City Light's description and interpretation of historic conditions is inconsistent with the views of the expert resource agencies. The PSP neither identifies nor proves the existence of total passage barriers and places the burden for proof of historical passage on the LPs. The PSP constrains and predicates study phases without addressing resource management goals and actions informed through studies related to fish passage. Trends and status of listed species are not addressed, resource management goals are incorporated by reference, and clear justification for the scope of City Light's proposed study within the context of the ILP is not provided. As explained above, whether or not salmonids "historically" accessed habitat above the Project is irrelevant, in any event, to the issue of whether passage should be evaluated for purposes of this relicensing. City Light and its attorney agreed during a meeting in February with representatives from NMFS, Swinomish and the Upper Skagit Tribe.</p> <p>Based on the above, the Tribe requests that City Light revise their fish passage feasibility analysis so that Phase 2 of FA-04 be independent of the Gorge bypass passage analysis (Phase 1 of FA-04). City Light verbally committed to this during the PSP resolution meetings but has not definitively committed in writing.</p> <p>The Project creates numerous fish passage barriers blocking access to habitat for ESA-listed species (salmon and steelhead) and other non-listed species (e.g., coho salmon). These barriers exist due to the physical presence and operations of the dams and associated facilities, currently lacking any structural mechanism for passage of native fishes. The habitat above the dams may serve to improve basin species production and resiliency against stock and climate variability.</p> <p>The Tribe also requests that the scope of the fish passage feasibility analysis in the RSP holistically address the Project as proposed in NMFS SR4. This includes evaluating passage above and below Gorge, Diablo, and Ross dams and powerhouses. City Light has issued a proposal that would include all dams in the RSP; however, it does not include removal of the dependency on Gorge bypass analysis. The resolution proposal commits to "generally follow, and be consistent with, the first five tasks." However, the resolution proposal does not commit to determination of feasibility for viable alternatives which is problematic as it is needed to inform NMFS's evaluation under FPA section 18. The resolution proposal provides high level acknowledgement and incorporation but does not provide definition on how it is incorporated in the FA-</p>	Please see comment responses ARTU-C02.

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							<p>04 process while supporting quality assurance and quality control commensurate with NMFS SR4.</p> <p>The Tribe also requests the scope of habitat evaluation expand to be consistent with, but not limited to, the scope identified in the NMFS SR 3. On 2/23/2021, City Light issued a resolution proposal to include habitat above Ross dam and the tributaries in the RSP. The proposal states that it is largely supportive of the NMFS SR3 study request; however, there are a number of unresolved issues in the proposal that remain to be addressed as described in the resolution form. Additionally, City Light proposes to use the methods of Nathan et al. (2019) to examine productivity potential in the reservoir. It is unclear how City Light would use a population hybridization model to quantify production potential of multiple species.</p> <p>The Tribe requests that City Light work with NMFS and other LPs to close the gaps in City Light's proposal prior to their RSP submission. However, until these gaps are sufficiently addressed, the Tribe requests that NMFS's Fish Passage Feasibility study proposals be adopted in full. We request that City Light incorporate these necessary study components into the RSP to enable NMFS to carry out its statutory mandates and duties that are key to the agency upholding its Trust Responsibility to the Tribe. Conversely, we request that the Commission require City Light to include these study components in the final study plan.</p>	
178.	Swinomish Indian Tribal Community	03/08/2021	pp. 21-24	SITC-C11	Section 6.2.11	FA-02	<p><b>G. City Light's Instream Flow Model Study Is Incomplete Without Including Ecology's Needed Instream and Process Flows.</b> Ecology's Instream Flow Study made a clear scientifically valid and legally defensible case for the need to include process flows as a component of the instream flow study. Rivers tend to have three flow components, including flows of water, gravel and wood. It is well accepted in the scientific and natural resource management communities that hydropower dams disrupt all three flow components to some degree. The goal of process flow studies and negotiations is to develop a flow regime that restores some of the natural processes lost due to project operations. For process flows, Ecology looks at historical conditions to evaluate what was lost and work with licensing partners and operators and negotiate the different frequencies, durations and magnitudes of process flows to restore some of the of natural river processes.</p> <p>The study should consider three types of process flows. High flow pulses and flushing flows are on the order of mean annual discharges, channel maintenance flows are on the order of 1.5 to 2-year recurrence interval peak flows, and channel forming flows are on the order of 10 to 25-year recurrence interval peak flows (Wald, 2009). All three types of process flows include dynamic interactions among sediment, wood, and flow. Impacts to any of these components can have detrimental impacts on geomorphic process and fluvial habitats, including those relied on by anadromous salmonids to complete their life cycle. A process flows regime supports recreation, fish migration, gravel flushing, gravel transport, channel maintenance, channel formation, and recreation. Importantly, process flows are an essential component of Ecology's 401 water quality certification conditions, and as Ecology has repeatedly stated to City Light for two years, the studies and analyses that are needed to prepare and issue the 401 certification are not subject to rejection.</p> <p>The Tribe also agrees that in order to effectively assess Project impacts on fish habitat and the aquatic ecosystem, there must be a coordinated effort between studies to identify interrelationships and interdependencies that reveal how study results (presumably from other models – e.g. water quality model; sediment transport model) from each will be linked with the Operations Model. Analytical metrics that will be</p>	<p>Please see comment responses ARTU-C04, NMFS-C19, NMFS-C23, NMFS-C28, NPS-C08, and SSIT-C09.</p> <p>The linkage between the operations model and the instream flow models is described in OM-01 Operations Model Study Plan, Section 2.6.</p> <p>Regarding process flows for fish passage in the bypass reach, please see comment response NMFS-C28.</p>

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							<p>used in the effects analysis should also be identified as part of the studies. In its current form, FA-02 does not do this.</p> <p>In its Geomorphology and Aquatic Habitat study request, NMFS included three study elements related to the value of process flows on salmon and steelhead habitat. Process flows are essential to study because they provide essential information on the inter-connectedness of complicated relationships between river flows, geomorphological processes and the formation of fish habitat. That is why numerous LPs requested that FA-02 be expanded to identify the affected floodplain channels using a 2-D hydraulic model then validating the model with LiDar and field data. The model could run various flow scenarios to characterize the duration of floodplain channel connectivity with the main channel relative to the likely timing of fish use.</p> <p>The point of the Ecology-02 and NPS-13 process flows study requests, for example, was to understand how variable the basin's hydrology is as a first step in comprehending how the Project will manipulate it. As the NPS pointed out in its February 2021 presentation to City Light and the LPs, the Skagit River's alluvial fans of several tributaries are narrowing, and this is shallowing the Skagit River main channel. The NPS pointed out that the river has not had the capacity to move this gravel for several years, which it maintains is unambiguous evidence of a lack of necessary process flows. The NPS believes that the lack of gravel movement on the upper Skagit is limiting salmon habitat, and that is a clear nexus for the study request.</p> <p>We concur with NMFS, Ecology, NPS and other LPs that these study elements are necessary in order for Ecology to gather the data and information it needs for the 401 water quality certification, and to strengthen the PSP by providing for a realistic analysis of alternatives under NEPA through development of information necessary to the exercise of state and federal resource agencies' statutory authorities. The needed study elements for FA-02 include the following:</p> <ol style="list-style-type: none"> <li>a. Model and characterize process flows, including magnitude, timing, and duration, needed to assess fish passage under Phase One of the fish passage study proposed in the PSP, mobilize sediments (especially where bed load gravel stored in tributary confluences, low terraces and mid-channel and tributary bars is mobilized), route large wood, and develop and maintain aquatic floodplain habitat features. The use of continuous recordings of water levels in representative relict and active side channels, along with stream flow records and the 2-D flow model, would provide critical data for assessing Project impacts to watering or drying of side channels that are important rearing habitat for Chinook salmon. It would also help identify reaches of the river that are losing and gaining (i.e. areas of hyporheic exchange). Commission Project #2150 (Baker River) used this approach to understand the impact of their operations on side channels, and the same should be done here.</li> <li>b. Model and characterize process flows to determine how far downstream the benefits to salmon and steelhead habitat to offset adverse impacts from Project operations would occur if large wood and sediment were augmented from reservoir sources. This effort may require additional tagging of large wood and more intensive field efforts downstream of the Sauk, which is currently limited to aerial photo interpretation and existing studies.</li> <li>c. Improve side channel mapping proposed by City Light by conducting field reconnaissance in floodplains (including those behind hydro modifications and those features currently disconnected to the main channel), or by developing a digital elevation model using LiDAR in the floodplain, and associating those habitats with modelled process flows to fully quantify and characterize side channel habitat connection and restoration opportunities for salmon and steelhead.</li> </ol>	



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							<p>d. d. Lastly, dikes, rip-rap and other hydromodifications can prevent connectivity with floodplain channels. With the exception of armor to isolate chum channels these structures are not related to the Skagit Project, but their locations should be identified as they may represent good protection, mitigation, and enhancement opportunities.</p> <p>The Tribe requests that City Light work with Ecology, NPS, NMFS and other LPs to close the gaps in City Light's Instream Flow Study proposal prior to their RSP submission. However, until these gaps are sufficiently addressed, the Tribe requests that Ecology's, NMFS's and NPS's study proposals on instream and process flows be adopted in full. We request that City Light incorporate these necessary study components into the RSP to enable our federal resource trustees to carry out their statutory mandates and duties that are key to the agency upholding its Trust Responsibility to the Tribe.</p>	
179.	USFWS	03/08/2021	p. 3	USFWS-C01	Section 6.2.9 (USFWS-03)	FA-01	<p><b>FA-01 Water Quality Monitoring Study.</b> In the PSP, SCL has proposed a water quality monitoring study, which is primarily intended to support the Washington Department of Ecology's certification of the Project under Section 401 of the Clean Water Act. Within its study proposal, SCL largely rejected study components recommended by the USFWS and other LPs. To their credit, since the issuance of the PAD, SCL has agreed to: (1) collect two years of turbidity and total suspended solids data in Ross Reservoir; (2) conduct continuous total dissolved gasses (TDG) monitoring for a full year in the Diablo Dam tailrace and Gorge Reservoir Forebay; (3) conduct continuous monitoring of temperature, dissolved oxygen (DO), turbidity, and TDG at two locations in the Gorge Bypass reach, and; (4) conduct continuous temperature monitoring and supplemental macroinvertebrate sampling for two years at three locations in the Skagit River downstream of Gorge Powerhouse. There remains, however, a number of deficiencies in SCL's proposed study, which are described below.</p> <p>Water quality zones and river reaches proposed by the USFWS and other LPs for monitoring and major differences in water quality data collection needs between SCL's and the LP's proposals are outlined in Tables 1 and 2 (Appendix 1). River reaches defined within the tables are based on geologic landforms, which in turn create distinct meso-habitats for native biota; zones within reservoirs (Figures 1, 2, and 3) are distinguished by landforms, habitat types, and reservoir water level fluctuations (i.e. drawdown and dewatered areas). Many of the river reaches and reservoir zones have documented water quality concerns that were noted in our study request. The USFWS requests that SCL collect the additional water quality parameters at the location and frequency we have outline in Table 2.</p>	Please see comment responses ARTU-C05, Ecology-C06, Ecology-C08, Ecology-C10, NMFS-C08, and NMFS-C12, NMFS-C14, and NPS-C07.
180.	USFWS	03/08/2021	pp. 3-4	USFWS-C02	Section 6.2.9 (USFWS-03)	FA-01	<p>In its study request, the USFWS proposes the development of CE-QUAL-W2 hydrodynamic model to assess the effects of current and proposed Project operations on various water quality parameters throughout and downstream of the Project. SCL rejected the adoption of water quality modeling, stating that Project water temperatures comply with relevant numeric criteria and no evidence exists showing a detrimental effect of hypolimnetic releases on fisheries resources downstream. SCL points to increased spawner abundance downstream of the Project in support of this statement. Spawner abundance responses, however, are presumably more closely linked to flow timing and quantity of water than temperature. It has been well documented in the literature that cold water releases from high head dams can alter downstream temperatures and have impacts on adult and juvenile fish migration behavior and growth rates in poikilothermic species (Homolka and Downey 1995, Angilletta et al. 2008).</p>	Please see comment responses Ecology-C06 and Ecology-C08.

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							<p>Protracted larval development, a sublethal effect not captured by numeric criteria, directly affects salmon and steelhead production and indirectly affect bull trout who rely on salmonid larvae as prey base. A comparison of data between comparable Sauk and Skagit River gages, which are located at similar elevations and positions in their respective watersheds and are both influenced by glacial runoff, shows lower temperatures in the Skagit, suggestive of an effect of cold water releases from the Project (Figure 4). Therefore, utilization of a CE-QUAL-W2 model would assist in determining how various operation modifications/scenarios may affect water quality as it relates to species productivity and management. Examples include, but are not limited to, investigating penstock intake depth modifications to condition downstream water temperatures (as was done at the Jackson Hydroelectric Project); identifying the timing, duration, and location of temperature and/or DO barriers and determine if reservoir elevations can be adjusted to facilitate tributary passage, and; identifying specific areas or operations that increase turbidity below the dams, within the reservoirs, and at tributary mouths.</p> <p>In rejecting the adoption of a CE-QUAL-W2 model, SCL also stated the need for such a model was moot because operations, and therefore parameters like temperature, were unlikely to change much within the new license period. However, SCL's stated objective for the Operation Model appears to contradict this statement: "The objective of this study is to develop an Operations Model that represents existing Project operations with reasonable accuracy for purposes of relicensing, and which can be used to simulate potential future operations under a variety of operating scenarios.". The USFWS believes a CE-QUAL-W2 model, which has been utilized at numerous reservoirs (www.cee.pdx.edu/w2/), would prove beneficial considering various climate change and operational scenarios under a new license.</p>	
181.	USFWS	03/08/2021	p. 4	USFWS-C03	Section 6.2.9 (USFWS-03)	FA-01	<p>SCL also rejected a requested analysis of heavy metal contamination citing adequate existing information in the form of multiple studies suggesting that metals contamination was below acceptable levels. The summary of existing information, however, failed to account for the fact that the analysis was conducted on fish filets and not whole fish. Therefore, the studies were only focused on human consumption and not effects of metals contamination on fish and the food web. The USFWS is concerned with the cumulative sublethal effects to fish and wildlife that could limit fitness. We request that the RSP include a description of the ongoing U.S. Geological Survey (USGS) mining impacts study and how it will address this issue and include sampling of the sediments nears the mouths of the Skagit River, Ruby and Thunder Creeks; current USGS sampling is limited to the confluence of the Skagit River with Ross Lake. Similarly, SCL asserted no need to investigation of nutrient dynamics since the Project reservoirs are oligotrophic systems. Annual variability in reservoir levels, however, especially during drawdowns, likely results in differing levels of contaminants and nutrients being released from sediments more than normal oligotrophic lakes. Furthermore, FERC, in Scoping Document 2, recognized the need for the National Environmental Policy Act (NEPA) document to examine the "effects of existing and any potential changes in project facilities and operation on water quality in the three project reservoirs, including: nutrients, water temperatures, metals, fecal coliform, and turbidity levels in Ross Lake, and nutrients, water temperatures, metals, dissolved oxygen, and pH levels in Diablo and Gorge Reservoirs." Please refer to Table 2 for our requests related to metals and nutrient sampling.</p>	Please see comment responses ARTU-C05, NMFS-C14, NMFS-C28, Ecology-C06, Ecology-C08, NPS-C07, and responses in Section 6 of the RSP
182.	USFWS	03/08/2021	p. 8	USFWS-C04	N/A	FA-02	<p><b>FA-02 Instream Flow Model Development Study.</b> Overall, this study proposes to collect important data; however, the scope, the data sets, and time allowed for the study, are inadequate for the development of information needed to be able to assess effects of the Project. Using only the last license as a timeframe to understand the natural range of variation is problematic given the decadal nature and rapid current change in this region's climate. The historic record is our best guide to understand</p>	Please see comment response SSIT-C03.

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							recent and future Project impacts. It illustrates the actual range of flows and conditions of the Skagit River. The USFWS requests that SCL utilize all available stream gage data to assess Project-induced variability to inform future management decisions.	
183.	USFWS	03/08/2021	pp. 8-10	USFWS-C05	N/A	FA-02	<p>Currently, the study terminates at the confluence of the Sauk River. Furthermore, the study does not go upstream far enough to provide a reference reach from which to address Project effects to flows, habitat quality, and water quality and quantity. SCL has not provided appropriate justification as to why their proposed scope is adequate in this and other studies in the PSP. We expect that instream flows and operational modeling will include these other areas at a minimum, as previous biological opinions from the USFWS and National Marine Fisheries Service (NMFS) [collectively the Services], have established that the action of the Project extends downstream to the mouth of the Skagit River and its estuary.</p> <p>Because the headwaters are protected, the Project is the only major interruption to process flows. Farther downstream, there are legacy landscape activities that also impact process flows, however, because the Project manipulates the largest volumes in the Skagit basin, it has a proportionally greater effect on the geomorphology of the basin. Besides the lack of natural flushing flows to move gravels and altered flow processes, current geomorphology is impacted. The evidence of Project-impacted flows is clear in spring streamflow records at least as far downstream as Concrete. USGS gage data at Concrete, which shows the combined effects of the Skagit and Baker Projects, documents changes in spring floods with a 10% exceedance 13,000 cfs lower and 50% exceedance 6,700 cfs lower than pre-Project conditions. (Figure 5). The Skagit Dams also cut off sediment from approximately 37% of the watershed to the Skagit Delta (Hood et al. 2016). Above Bacon Creek, within the Ross Lake National Recreation Area (RLNRA), the Project is solely responsible for altering the natural flow of sediment, wood, and water on the river system. The USFWS does not agree with SCL's assertion that the natural range of variation and other human-caused watershed factors make it impossible to identify the Project's impacts on the river ecosystem below Sauk River.</p> <p>Manipulation of water flows by the Project, including the coordination of flood flow and storage with the U.S. Army Corps of Engineers (ACOE) and the Baker River Hydroelectric Project informs the nexus for instream flow effects to be analyzed. We expect that through the term of the next license, and simultaneously as the climate warms, flood flow operations will become more evident. To determine appropriate instream flows below the Project dams, the USFWS requests SCL develop models and conduct studies to collect information downstream to the mouth of the Skagit, and upstream of current Project boundaries. Coordination with Puget Sound Energy and the ACOE to collect appropriate instream flow data downstream, and coordination with appropriate Canadian agencies upstream (Upper Skagit River), should occur to determine the extent of the effects from the Project. We expect climate change scenarios will be incorporated in both the Instream Flow and the Operations Models development.</p> <p>Currently, the Instream Flow Model does not include monitoring locations upstream of the Project dams. The USFWS requests upstream monitoring sites be included to compare regulated flows to unregulated flows. Long-term geo-referenced monitoring sites are also necessary to understand the effect of changes that occur to streams and reservoir beds across the new license term. SCL has commented that there is no need to collect data from natural systems above the Project since current conditions represent the baseline of analysis. We understand that the current condition is part of the baseline. The objective of our request is not to re-create historical conditions that</p>	<p>Please see comment responses NCCC-C06, ARTU-C04 and NMFS-C19 regarding the downstream study extent.</p> <p>Regarding the process, schedule, and application of the model to evaluate the impacts of alternative flow management or Project operation scenarios, please see comment response SSIT-C03.</p> <p>The OM-01 Operations Model will be capable of evaluating alternative Project operation scenarios developed by City Light and/or LPs. As described in the Operations Model Study Plan, Section 2.6.1.5, alternative operation scenarios could include operation under alternative (as opposed to historic) basin inflows. The impact of alternative operation scenarios on downstream mainstem hydraulics and aquatic habitat would be determined by the instream flow models. The linkage between the operations model and instream flow models is described in the Operations Model Study Plan, Section 2.6.</p> <p>Monitoring of flows upstream from the Project dams is already undertaken by the USGS at several locations, including on Big Beaver Creek and Ruby Creek. Data from these locations, along with estimates of reservoir inflows determined from reservoir elevation and Project release data, are sufficient to compare regulated flows to unregulated flows where necessary. The instream flow model would not use unregulated flow data directly but only through simulation of alternative Project operations by the operations model as discussed above.</p>

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							existed before the Project but to understand the range of flows to which these systems and the associated aquatic biota have become accustomed. Understanding the potential range of flows can inform feasible operational alternatives that may be necessary to protect, manage, and improve species and habitat conditions through the term of a new license. SCL suggests that they prefer “forward-looking” approaches that do not rely on examination of historic or upriver data, yet several of SCL’s study plans propose using historic data to examine operations and Project impacts over the last license. This approach within this study plan is inconsistent with several other study plans.	
184.	USFWS	03/08/2021	p. 10	USFWS-C06	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16  (USFWS-13, USFWS-15)	FA-02	The Instream Flow Model currently does not have agreed upon flow scenarios to conduct monitoring and other aquatic data to assess effects by flow patterns. The Instream Flow and Operational Models will need to establish scenarios, as described in our proposed studies: USFWS-13; and USFWS-15. Without a wide range of flow scenarios (i.e. drought, low moderate, moderate, moderate high, average high, and flood flows), this study and the Operations Model Study (OM-01) risks the inadequate characterization of species and habitat effects necessary to understand how the Project protects, enhances, or mitigates ongoing habitat alteration in the Skagit River and reservoirs. We recommend that collection of field data occur similarly to reach breaks developed in our comments for the Water Quality Study (FA-01) to allow data sets to be comparable.	Please see Comment Response USFWS-C04 and SSIT-C03.  The field data collection program for model development, calibration and validation is as described in the FA-02 Instream Flow Model Development Study.
185.	USFWS	03/08/2021	p. 10-13	USFWS-C07	Sections 6.2.14, 6.2.15  (USFWS-13)	FA-02	As described by LPs, the lack of sediment has clear impacts on the Skagit River and riparian habitat downstream (Figure 6 - incision, hydraulic disconnect with side channels, habitat formation, armoring, etc.). The Project reduces formative discharges that directly affect the river channel, which in turn has a ripple effect on habitat quality. Unnaturally low or high levels of sediment affect complex habitat, refugia, spawning, rearing, foraging, migration, and overwintering habitats across the range of the species. FERC and SCL will need to address the conditions and effects to nine primary constituent elements (PCEs) for bull trout critical habitat of which most are affected by flows and high levels of sediment. The geomorphology and instream flow presentations in Appendix 1 describe some basic Project impacts to geomorphic and stream processes. This study falls short at addressing sedimentation including levels of sediment behind the dams and understanding how processes are disrupted from upstream to downstream.  The Skagit Hydroelectric Project has been shown to disrupt natural riverine processes in the Skagit River, including the flow of sediment, water, and large wood (Figure 6). A documented lack of variation in bed height illustrates a symptomatic of a lack of bed-load transport (Figure 7). Accumulated gravel deposits at tributary mouths causes significant reduction in channel width at many locations along the Skagit River (Figure 8). Reduced channel valley widths in the mid and upper Skagit valley are indicative of a lack of channel forming flows (Figure 9; Riedel et al. 2020). Flow records show substantial effects on the timing, magnitude, and duration of the spring flood or process flows. In turn this alters the condition of and disrupts the renewal of aquatic habitat for endangered Chinook salmon (NMFS, 2006) steelhead (NMFS, 2019) and Bull trout (USFWS, 2015a; 2015b). It is likely that these conditions will persist and could potentially become exacerbated under future operation of the Project without adequate process flows. Other regional hydroelectric projects previously described in our Study Request, USFWS-13, have established process flow studies and have mitigation to address channel conditions, erosion, and sedimentation.	Please see comment response NMFS-C28.
186.	USFWS	03/08/2021	pp. 13-14	USFWS-C08	N/A	FA-03	<b>FA-03 Reservoir Fish Stranding and Trapping Risk Assessment.</b> SCL proposes to assess stranding and trapping risk of native fishes in the drawdown areas of the Project reservoirs using a two-phase approach consisting of development of digital elevation models (DEMs) using LiDAR and bathymetric data and field analysis to	Three-foot DEM cells were selected due to the nature of the terrain and area involved in this study and to be complimentary to the scope of a risk assessment level analysis. However, the study plan

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							<p>verify models. The USFWS supports this approach, but we have two comments related to methodology and scope.</p> <p>First, we recommend smaller DEM cells to obtain a finer resolution of slopes. Second, we are concerned about the potential lack of field analysis in Canadian side of Ross Reservoir; because of the size of the watershed above and the large drawdown effects, this is an area of great concern as it relates to trapping and stranding. Therefore, the USFWS requests that SCL begin to explore the feasibility of field data collection within Canada with the expectation of conducting on-the-ground surveys during the December 2021 – April 2022 field season. The USFWS acknowledges that the FERC Project boundary exists at the US/Canada border, but indirect and cumulative effects of the Project extend into Canada; bull trout and other native fishes that inhabit the FERC Project boundary also utilize the upper end of Ross Reservoir and are susceptible to stranding risk due to SCL's operations.</p>	<p>allows for adaptive adjustments if needed, pending results from field reconnaissance of features of concern.</p> <p>If analysis of existing information and field data collected in the U.S. indicates that information from parts of Ross Lake in Canada is needed to adequately address the objectives of this study, City Light will explore the feasibility of field data collection in Canada.</p>
187.	USFWS	03/08/2021	pp. 14-15	USFWS-C09	Section 6.2.10 (USFWS-02)	FA-04	<p><b>FA-04 Fish Passage Technical Studies Program.</b> In its PSP, SCL proposes a phased fish passage study program. Phase 1 includes an investigation of the Gorge Bypass Reach for partial and total barriers to upstream fish passage for anadromous salmonids and subsequent hydraulic modeling to identify the flow ranges under which steelhead, Chinook salmon, and coho salmon (the study target species) could pass these barriers. Phase 2 proposes an analysis to identify, develop, and evaluate conceptual alternatives of upstream and downstream passage options for Gorge Dam; also proposed is a habitat evaluation of Stettattle Creek, Gorge Creek, and the riverine reach of the Skagit River downstream of Diablo Dam to assess what portions of these reaches could support various life-history stages of the target anadromous species. In its PSP, however, SCL did not address:</p> <ul style="list-style-type: none"> <li>▪ The fact that SCL has failed to document a fish passage barrier in the Skagit River using best available science; in fact, a 1915 survey of the Skagit River (USGS 1915) found no evidence of a passage barrier (see Appendix 1 for fish passage presentation);</li> <li>▪ The fact that current conditions in the Skagit Gorge reflect 140 years of human manipulation which has likely exacerbated upstream migration (see Appendix 1 for fish passage presentation);</li> <li>▪ The importance of downstream fish passage of <i>O. mykiss</i> that would contribute to the anadromous life history form of steelhead in the Skagit River if they were not blocked by the dams;</li> <li>▪ The importance of providing connectivity of for native fish populations above Gorge Dam;</li> <li>▪ The limited amount of habitat available in the Gorge and Diablo watershed and the extensive amount of habitat available in the Ross watershed (see attached fish habitat presentation); and</li> <li>▪ The likelihood that Pacific lamprey and other species would have been able to migrate into the Ross watershed.</li> </ul> <p>While the USFWS appreciates the recognition from SCL that fish passage has value, we continue to assert that upstream and downstream fish passage feasibility should be analyzed at Diablo and Ross Dams in addition to Gorge Dam. Analyses should not only include passage alternatives for anadromous life histories, but also assess connectivity between reservoirs.</p> <p>Providing access to headwater habitats above dams, including the Skagit River, are major strategies for the recovery of these Endangered Species Act (ESA)-listed species under recovery plans approved by NMFS (NMFS 2006; NMFS 2016; NMFS 2019). Similarly, the 2015 USFWS Bull Trout Recovery Plan (USFWS 2015a and 2015b) describes that connectivity is recovery objective and an ongoing impairment</p>	<p>Please see comment response ARTU-C02. City Light eliminated the proposed phased approach for studying fish passage from the FA-04 Fish Passage Technical Studies Program Study Plan. City Light will engage collaboratively with LPs, such as through multiple workshops and engagement with a fish passage engineer from NMFS acting as a liaison and advisor in the planning and preparation of the Fish Passage Alternatives Assessment.</p>

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							<p>within the Puget Sound and within the Skagit River basin; intervention measures for recovery may be necessary to enhance population connectivity (spatial and genetic). As such, understanding the bull trout genetics baseline in the Skagit (expanded upon elsewhere in our comments) will assist in determining how connectivity is best manifested for bull trout recovery. We also request that investigations of passage include Pacific lamprey, coastal cutthroat trout, and Dolly Varden to help inform analysis pursuant to Section 18 of the Federal Powers Act.</p> <p>An important component of assessing fish passage feasibility at the Project is determining the suitability of habitat upstream of the Project dams, therefore we submitted our study request USFWS-02 Quantifying the Habitat and Production Potential of ESA-Listed Salmon, Steelhead, and Bull Trout above Dams. For the reasons stated above and in our PAD comments, we continue to assert that habitat and production potential should be assessed not just above Gorge Dam (as was proposed in the PSP), but also above Diablo and Ross Dams. Therefore, the USFWS welcomed the Issue Resolution Form issued by SCL on February 23, 2021 describing its intent to create an additional study plan (Quantifying Habitat and Production Potential of Chinook and coho salmon and steelhead above Project Reservoirs) to evaluate habitat capacity and suitability, production potential, and population dynamics above the Project dams. The USFWS looks forward to reviewing specifics of the study plan and how it will compliment other proposed and existing studies. We will withhold additional comments until after the RSP is issued.</p> <p>Since the submission of the PSP, and during a Proposed Study Plan topic-based meeting on February 11, 2021, SCL verbally agreed to abandon aspects of Phase 1 of the study plan, specifically the investigation of the Bypass Reach for passage barriers. SCL has acknowledged that upstream passage in the Bypass Reach is achievable by salmonids. Flow range identification to facilitate passage of anadromous salmonids in the Bypass Reach would still occur as a part of the study. The USFWS supports this change, but we request that bull trout be added a target species during the evaluation of passable flows for anadromous fish in the Bypass Reach.</p> <p>On February 23, 2021, SCL issued an Issue Resolution Form indicating that it proposes to undertake an investigation of upstream and downstream passage at all Skagit Project dams. The proposed scope of work would generally follow and be consistent with the first five tasks listed in the study request methodology as proposed by the Services and other LPs. The USFWS welcomes this change to the study plan. We look forward to working collaboratively with SCL to assess feasibility of passage alternatives and request that the revised study plan identify one or more resource agencies (the Services, Washington Department of Fish and Wildlife [WDFW], NMFS, and/or National Park Service [NPS]) as co-leads.</p>	
188.	USFWS	03/08/2021	p. 16	USFWS-C10	N/A	FA-05	<p><b>FA-05 Skagit River Gorge Bypass reach Hydraulic and Instream Flow Model Development Study.</b> This study is similar to FA-02 and has similar limitations as described above in FA-02. We suggest that this could be combined with FA-02 and included as a separate task and section. Similarly, data will need to be collected for a number of flow scenarios. These flow scenarios are not described in this study. Data should also be collected in the Skagit River and tributaries upstream of the Project reservoirs. As mentioned in FA-02, having data points in areas both below and above dams will allow us to understand the effects at the range of operational flows chosen in both locations. Results from both studies will inform the fish passage feasibility study and other geomorphic and habitat studies.</p>	<p>Please see comment response USFWS-C05.</p> <p>Consideration was given to combining studies FA-02 Instream Flow Model Development Study and FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study, but the studies were ultimately kept separate because of somewhat different modeling needs and for logistical reasons. The hydraulic models to be developed will both be HEC-RAS 2-D models and will be readily integrated, with the Gorge bypass reach model under FA-05 providing input to the Gorge Powerhouse to Sauk River model under FA-02.</p>

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189.	USFWS	03/08/2021	pp. 19-20	USFWS-C13	Section 6.2.12  (USFWS-09)	GE-03	<p><b><u>GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study.</u></b> In its PSP, SCL proposes a study to evaluate the effects of deposition on four recreational resources and operations areas within Ross, Diablo, and Gorge Reservoirs:</p> <ul style="list-style-type: none"> <li>▪ Hozomeen inlet at the head of Ross Lake – recreational resource: Hozomeen and Winnebago Flats boat launches;</li> <li>▪ Sourdough inlet in Diablo Lake – City Light resources: City Light Boat Launch, City Light Boat House, City Light Dry Dock; recreational resources: West Ferry Landing, Environmental Learning Center Canoe and Kayak Dock;</li> <li>▪ Thunder inlet in Diablo Lake – recreational resource: Colonial Creek Boat Launch/Dock;</li> <li>▪ Stetattle Creek delta in Gorge Lake – recreational resource: whitewater training and instruction, Gorge Lake Campground Boat Launch and Dock; operational resource: City Light Diablo Powerhouse Tailrace.</li> </ul> <p>The USFWS submitted a similar study request (USFWS-09, Impact of the Operations of Skagit Hydroelectric Project (#553) Backwater on Major Tributaries to Reservoirs and its Influence on Habitat Quality), which identified eight streams subject to backwater effects. Three streams (the Skagit River, Thunder Creek, and Stetattle Creek) are being addressed in SCL's study proposal; Big Beaver Creek, Little Beaver Creek, Lightning Creek, Devil's Creek, and Ruby Creek on Ross Reservoir are not. The USFWS sees an opportunity to expand the scope of SCL's study to include these five additional tributaries that also experience substantial backwater effects. As we detailed in our study request, these tributaries are strongly influenced by manipulations of the reservoir surface water level. Furthermore, these hydraulically blocked streams can deposit loads of large wood and sediment in the backwater area, resulting in possible channel filling and blocking of side channels. This has the potential to inhibit migration of fish, both adult and juveniles, in and out of these streams from the reservoirs. Therefore, we propose the development of a HEC-RAS 1-D modelling study akin to the study undertaken at Lake Chelan (FERC No. 637). SCL already has much of the data to construct these models.</p> <p>The USFWS also has concerns related to SCL's methodology. While we appreciate that SCL is investigating the Skagit River as it enters Ross Reservoir, methods are limited to desktop analysis because the study area is in Canada. By limiting the study to a desktop analysis, there is a risk of inaccurately characterizing the extent of the backwater effect. The USFWS acknowledges that the FERC Project boundary exists at the US/Canada border, but indirect and cumulative effects of the Project extend into Canada. Bull trout and other native fish that utilize Ross Reservoir migrate into the Skagit River and their migrations may be impeded by accumulated sediment and wood.</p> <p>SCL stated in its PSP that it does not believe it is necessary to collect information on the remaining five tributaries (Big Beaver, Little Beaver, Lightning Creek, Devil's Creek, and Ruby Creek) that enter Ross Lake primarily because annual surveys are currently being conducted to clear out any sediment/wood accumulations within the drawdown zone through SCL's Transitory Barrier Removal Program. Clearing out the drawdown zone, however, may not fully ameliorate the effect; Christman (2001) found that the lake levels had a backwater effect as much as one quarter of a mile. On February 26, 2021, SCL issued an Issue Resolution Form stating that while it does not intend to include the five additional tributaries into the study proposal, it will modify the existing Transitory Barrier Removal Program. City Light proposes to check the tributaries during the next scheduled transitory barrier removal survey whenever the following conditions are met:</p>	Please see comment response NPS-C77.

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							<p>1. Reservoir is within 2 feet of full pool.</p> <p>2. Tributary peak instantaneous flow (using the Ruby Creek, Big Beaver, and Thunder Creek gages to determine general tributary inflow patterns for glacial vs. non-glacial tributaries as appropriate) is at or above a 2-year peak flow recurrence interval.</p> <p>The barrier survey distance upstream in each tributary will be determined based on the longitudinal profile of each tributary (from existing LiDAR data) and the reservoir level at the time of the peak flow event to be sure to include the length of stream where backwater effects could occur.</p> <p>The USFWS appreciates the proposal to modify the Transitory Barrier Removal Program, however, the frequency and permanency of the modified protocol is unclear to us. The Issue Resolution Form seems to indicate that only “the next” survey would include an investigation of broader scope; a permanent adoption of expanded surveys and barrier removal would be preferred by the USFWS. Furthermore, we believe development of the HEC-RAS models would be more advantageous to SCL in the long term by allowing SCL to model how potential changes in inflow due to environmental factors, such as changing hydrologic conditions, could affect sediment loading in the backwater areas of the tributaries. Therefore, we reiterate our request that SCL investigate the reservoir backwater effects in Big Beaver, Little Beaver, Lightning, Devil’s, and Ruby Creeks.</p>	
190.	USFWS	03/08/2021	pp. 20-22	USFWS-C14	<p>Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16, 6.3.5, 6.3.8</p> <p>(USFWS-07, USFWS-11, USFWS-12, USFWS-13, USFWS-15)</p>	GE-04	<p><b><u>GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study).</u></b> This study will collect important data on Project impacts by gathering data related to fluvial geomorphology, sediment type, and riverine habitat. A geomorphic study is necessary for mapping channel changes, bar formations, and the understanding of how flows are altering the river. Sediment size classes are likely affected by the holding back and sorting of sediments at the dams, and it is highly likely that gravels are lacking in salmon spawning areas. We support the landform mapping that is occurring across the reach as part of this study plan. The USFWS agrees on the need for this type of information and appreciates the effort in developing this study plan.</p> <p>The USFWS contends, however, that the geomorphology affected by the Project is larger than the scope of SCL’s study plan GE-04 and likely effects downstream reaches and the estuary. Therefore, this study should include Skagit River reaches downstream of the Sauk River confluence to the estuary and in connected tributaries. The ongoing operations including flood management with the ACOE and the Baker River Hydroelectric Project demonstrate a nexus of Project flows affecting Skagit River processes downstream of Concrete, WA. Project operations affect aquatic habitat, foraging and spawning areas, prey availability, critical habitat, and have direct and indirect, and both short- and long-term effects. We have previously provided comments on these issues during Resource Working Group meetings. Because this study still does not address our comments, we maintain the need for our study request USFWS-15 and several other studies that have linkages: USFWS-07, USFWS-11, USFWS-12, and USFWS-13.</p> <p>Understanding geology and geomorphology forms the basis for understanding stream habitat. SCL’s GE-04 study plan does not address several important data gaps including:</p> <ul style="list-style-type: none"> <li>▪ texture of bank sediments needed to inform sediment recovery and transport below dams.</li> <li>▪ sediment texture of the bed, bars, or banks below the Sauk River.</li> <li>▪ impact of the Project on process flows of water, sediment, and wood.</li> </ul>	Please see comment responses NMFS-C28 and NCCC-C06.



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							<p>On several occasions, LPs have suggested that a study plan specific to process flows is needed given the interconnected, complex relationships between geomorphic processes and habitat. Other regional FERC projects where process flows were evaluated as part of relicensing can be used as a model (e.g. Jackson Hydroelectric FERC No. 2157, Cushman Hydroelectric FERC No. 460).</p> <p>SCL’s study plan collects data on bed scour, sediment texture, and sediment entrainment; however, it does not assess sediment transport. We suggest SCL utilize our study plan USFWS-12 to address this data gap. Several options are available including HEC-RAS sediment transport or morpho-dynamic models such as MAST 1-D (De Rego et al. 2020). The HEC-RAS sediment model is 1-D and assumes rigid banks. Morpho-dynamic models such as MAST 1-D incorporate lateral channel erosion and sediment transport. Another approach would be to collect empirical data through flow releases during the 2-year study period (see FERC Project No. 2157 monitoring plan for process flow releases). This data is needed to effectively design periodic flow levels that reach formative discharge at the three scales and is considered foundational data in understanding effects from the Project operational flows on riverine and reservoir habitats.</p> <p>On February 16, 2021, SCL circulated an Issue Resolution Form regarding wood management. In it, SCL agreed to consult with LPs on wood management options, provide existing information, design a wood management pilot program with LPs, develop a process for defining a long-term wood management program with effectiveness monitoring and adaptive management plans, beginning in October of 2021. The goal would be that this work would help to develop a Wood Management Plan for the final license application.</p> <p>On February 26, 2021, SCL issued an Issue Resolution Form related to process flow. In it, SCL has agreed to augment the Skagit River Geomorphology between Gorge Dam and the Sauk River Study (GE-04) to collect additional information. The following are agreed upon attributes and associated methods that will be added into GE-04:</p> <ul style="list-style-type: none"> <li>▪ Mobilization of deposits at tributary mouths – Install additional scour monitors at major tributary mouths to estimate flows that result in tributary deposits;</li> <li>▪ Mobilize riverbed and bars – Install additional scour monitors at select river bars to help determine flows that mobilize course sediment; and use USGS hydrophone data to determine flow that initiates bedload transport; Use instream flow study 2-D model results, water depth, velocity, shear stress, to estimate flows that result in gravel bar/river bed erosion/transport;</li> <li>▪ Connect side channel and off-channel habitat (hydraulic connectivity) – Use instream 2D model to determine side channel/off channel connections by flow levels; and</li> <li>▪ Information on the occurrence of process flows – The Indicators of Hydrologic Alteration model will be used and results may serve to inform the development of process flow scenarios, which can be used in defining potential alternative flow scenarios for analysis in operations model.</li> </ul> <p>The LPs and SCL also discussed the potential for using several different modeling platforms (such as MAST 1-D, HEC-RAS 2-D, UBC Regime Model) to help assess one or more elements of process flows and they will continue to explore the utility of these and other models as they develop the license document and Protection, Mitigation, and Enhancements. SCL will also explore the possibility of identifying specific “response reaches” with LPs’ input to help focus the analysis. The USFWS</p>	

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191.	USFWS	03/08/2021	p. 28	USFWS-C22	Section 6.3.4 (USFWS-04)	N/A	<p>welcomes this development and looks forward to seeing a revised GE-04 study plan in the RSP.</p> <p><b>USFWS-04 Reservoir Secondary Productivity Study.</b> The goal of this study request by the USFWS and other LPs (Upper Skagit Indian Tribe, NPS, and WDFW) is to assess productivity upstream and downstream of the Project dams for salmon steelhead, and bull trout. Information will be important in understanding prey base and predator prey relationships. This is important because large dams that spill and store water typically alter the predator prey base relationships through Project operations. Bull trout critical habitat is also listed in the Project reservoirs, rivers, and streams. FERC and SCL will need to address how the Project affects bull trout critical habitat PCEs including productivity and prey resources as part ESA Section 7 consultation. Because these reservoirs contain spawning, rearing, foraging, migration, and overwintering habitat for bull trout, it is necessary to understand Project effects to prey species and how habitat alterations affect all life history stages. There is also a minimum of 36 km of habitat known to be accessible in the headwaters of the Skagit River above Ross Lake Reservoir (Foord 2008). Currently, there is an ongoing study by USGS to collect data about the amount of tributary habitat available to adfluvial fishes from Ross Lake Reservoir.</p> <p>There is no systematic assessment of total available habitat and its production potential for Pacific salmon and steelhead. Data described in this study plan will not be collected according to the PSP (Seattle City Light 2019b). SCL is not proposing to study secondary productivity outside of stable isotope analysis and some limited zooplankton samples that are being collected three times a year as part of the USGS Food Web and Bioenergetics Study (Beauchamp 2020). Additionally, despite the Project's initial study plan, the USGS Food Web and Bioenergetics Study does not include Gorge Reservoir within its scope. It is important to know when bull trout juveniles out-migrate and how they use the littoral shoreline in order to determine the magnitude of Project effects. Bull trout are heavily substrate oriented as juveniles. Understanding how they feed and the amount of productive habitat available to them in these reservoirs, is to analyze Project effects. Our study request has further details about methods and efficiencies.</p> <p>USFWS and other LPs disagree with SCLs rationale to reject this study because it did not meet 18 CFR 5.9(b), 5.11(b) (4) or other FERC criteria. We believe to conduct adequate data collection and analysis this study may take two years to complete. The expansion of the scope of the work with USGS (Beauchamp 2020) should include these additional methods as separate tasks. Efficiencies could be achieved by coordinating with WDFW and/or NPS.</p> <p>The PSP describes that the study request did not have a nexus to develop this study plan. We disagree and understand that the PAD describes operations that raise and lower the reservoir, in some case 80 to 100 feet. The productivity of the littoral zone is impacted, as well as the lower portions of all tributaries that range from being fully inundated to existing within a dry reservoir devoid of vegetation. The data is not available or described to be able to determine levels of effects or it is not shown in the PAD. The USFWS continues to request the adoption of our USFWS-04 study request to further develop information for effects analysis and potentially re-introducing salmon and steelhead into the upper Skagit Basin. One option for efficiencies may be to combine GE-01 with this study since both studies would be looking at reservoir shorelines and/or littoral zones, and tributary junctions at reservoirs, due to their erosion potential.</p>	Please see comment response NPS-C72.

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192.	USFWS	03/08/2021	p. 29	USFWS-C23	Section 6.3.7  (USFWS-05)	N/A	<p><b>USFWS-05 Skagit Project Recreational Fishing (Creel) Survey.</b> To determine the Project-induced effect of angling pressure on native fishes including bull trout, the USFWS, along with the NPS and WDFW, requested a Recreational Fishing (Creel) Survey. The objectives of the proposed study are to determine:</p> <ul style="list-style-type: none"> <li>▪ Fishing effort (pressure), catch and harvest per unit effort, the number, sizes, and species of fish that are released and harvested, and angling related mortality.</li> <li>▪ Direct biological information related to species, size, and age of the fish that are harvested as well as information related to parasite loads and disease.</li> <li>▪ The economic value of angling in each reservoir.</li> <li>▪ Angler preferences, satisfaction, knowledge of fishing regulations, and understanding of catch-and-release practices.</li> <li>▪ Impacts to ESA listed bull trout from angling.</li> <li>▪ The effectiveness of fishing regulations.</li> <li>▪ The areas and reservoir elevations with the most fishing effort (pressure).</li> </ul> <p>In Section 6.3.7 of its PSP, SCL declined to conduct our requested study citing a lack of reasonable Project nexus (18 CFR § 5.9(b)(5)). SCL further elaborated that the objectives of the study request are the responsibility of the resource management agencies.</p> <p>The USFWS disagrees with the lack of a reasonable Project nexus. The angling opportunity available in the reservoirs is a direct of result of the Project hydropower facilities. As the USFWS noted in its study request, SCL made a similar claim in 1989: "The reservoirs created by the Skagit Project have significant influence on the type of recreation facilities present, and therefore upon recreation management of the RLNRA. The three reservoirs cover an area of 12,850 acres, which represents a recreation setting that are highly desired for fishing and flatwater boating activities. As a result, the reservoirs have a type, and perhaps a level of recreational development that would not have occurred in the absence of the Project" (SCL 1989). Furthermore, SCL provides access to angling opportunities by offering a ferry service, numerous docks, and a fishing pier at Diablo Reservoir. Project funds are also allocated to hatcheries and rainbow trout fishery stocking. Therefore, harvest and subsequent mortality rates of native fishes is closely linked to the Project.</p> <p>The USFWS continues to request the adoption of the Recreational Fishing (Creel) Survey. In addition to informing recreational activities at the Project, information collected from the survey could be used to inform the current USGS food web and bioenergetics study (Beauchamp 2020) and to quantify the production potential of ESA Listed Chinook, steelhead, bull trout, and coho above Gorge Dam.</p>	Please see comment response NPS-C74.
193.	USFWS	03/08/2021	p. 30	USFWS-C24	Section 6.2.17  (USFWS-06)	FA-06	<p><b>USFWS-06 Population Structure of Native Fish in the Project Area.</b> The USFWS submitted USFWS-06 Population Structure of Native Fish in the Project Area to further evaluate the genetic variability of bull trout, rainbow trout, and Dolly Varden within the Project reservoirs. In the PSP, SCL stated that the study request failed to meet (18 CFR § 5.9(b)(5)) by not making a compelling case of how the results would be used to inform the development of license conditions. The USFWS contends that a robust genetics baseline is necessary to make informed management decisions that are beneficial to native fishes. Information from this study will determine: 1) the number of local populations upstream of Gorge Dam, their spawning grounds, and how they relate to other local populations; 2) areas (tributaries, reaches, shorelines, drawdown zones, etc.) where hybridization is occurring; and 3) to what degree each local population is affected by Project operations such as migration barriers that are created by sediment deposition, turbidity, high temperatures in the epilimnion, or Project dams. This knowledge will aid in developing fish passage prescriptions for resident fish and rates and timing of reservoir drawdown.</p>	City Light has developed the FA-06 Reservoir Native Fish Genetics Baseline Study Plan as part of the RSP. City Light acknowledges a shared interest in developing a more in-depth genetics baseline for native salmonid species in Project reservoirs to inform longer-term fish management objectives.

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							While SCL believes there is adequate existing genetic information for the purposes of relicensing, they acknowledge in the PSP a shared interest in developing a more in-depth genetics baseline for native fish species in Project reservoirs for informing longer-term fish management objectives. As such, SCL agreed to develop a new study to establish a baseline for the Skagit basin for native fish species. On February 24, 2021, SLC circulated a draft Study Plan (FA-06 Reservoir Native Fish Genetics Baseline) which has yet to be submitted to FERC. The study plan aims to characterize baseline genetic condition within two years for bull trout, rainbow trout, and Dolly Varden in the Project reservoirs. We appreciate SCL's willingness to conduct a genetic study. It appears the draft study plan meets some of the objectives outlined in our study request, although it may fall short in methodology (e.g. not using SNPs data, lack of out comparison to other basins). However, until the details of FA-06 are provided in the RSP, the USFWS withholds further comments at this time and look forward to working with SCL to develop the study plan. Please refer to the Skagit Presentation: Bull Trout Genetics in Appendix 2 for a synthesis of bull trout genetics work within the region.	
194.	USFWS	03/08/2021	pp. 30-32	USFWS-C25	Section 6.3.3  (USFWS-08)	N/A	<p><b>USFWS-08 Evaluating Fish Passage and Entrainment through the Skagit Hydroelectric Project Dams and Appurtenant Facilities.</b> In an effort to better gauge the magnitude of entrainment at the Project, the USFWS, along with the NPS, WDFW, and the Upper Skagit Indian Tribe, requested that SCL conduct an entrainment study at all three Project dams. The objectives of the study request are to assess entrainment and mortality rates for various age/size classes of multiple species. In addition to a literature review of entrainment data at similar facilities, we propose a mark/recapture study to directly measure entrainment and mortality rates. Conducting this study would address the need to assess effects of existing and any potential changes to powerhouse facilities and operations at the three developments on resident fish entrainment injury and mortality that is outlined in FERC Scoping Document 2.</p> <p>In Section 6.3.3 of its PSP, SCL rejected our requested study citing: (1) sufficient existing information (18 CFR § 5.9(b)(4)); (2) inability to inform license conditions due to the extensive scope of work (18 CFR § 5.9(b)(5)), and; (3) extensive effort and cost (18 CFR § 5.9(b)(7)).</p> <p>SCL also stated that turbine entrainment at the Project dams is a non-issue because the intakes are deeper than smaller fishes and early life-stage salmonids occupy, and larger species are strong enough swimmers to avoid being entrained. In addition to not providing evidence of fish swimming depths or speeds or water velocities at turbine intakes, this statement also ignores annual drawdown rates of 75-100+ feet at Ross Reservoir, which likely affects hydraulic head and fish access to intakes.</p> <p>SCL believes a survey of a limited number of acoustic tagged adult bull trout from 2013-2018 is sufficient information to characterize entrainment for all species and sizes. While there is value in this data, the USFWS does not believe SCL's survey offers a complete and comprehensive analysis of entrainment at the Project. Most notably, SCL's study only used adult bull trout as test subjects; by relying on a study that used only one species and size-class of fish, no robust conclusions can be made about how entrainment may affect species other than bull trout or juvenile/small-bodied fishes of any species. In review of hydropower dams across the US and Canada, the Electric Power Research Institute (1992) found that, at most sites, the large majority of resident fish entrained were small (&lt; 200 mm). Information regarding how entrainment affects multiple species and life-stages will be critical in the new license period to understand a myriad of processes, such as reservoir food</p>	Please see comment response NPS-C76.

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							<p>web and population dynamics and routes of invasive species introduction (e.g. redbreasted shiner and eastern brook trout). Furthermore, the SCL study is also deficient because it relies entirely on detection rates and efficiencies. In their review, Algera et al. (2020) found that entrainment mortality studies relying on detection histories alone, as opposed to augmenting telemetry with downstream netting, increased bias and decreased mortality estimates. Accurate estimation of turbine (and spillway) mortality is especially important at the Skagit since the Project utilizes Francis turbines, which have been shown to have higher rates of mortality (EPRI 1992). A clearer picture of entrainment and entrainment-related mortality will be an important piece of information to consider as FERC, SCL, and the resource agencies contemplate reintroduction of anadromous salmonids to the Upper Skagit basin.</p> <p>SCL asserts that the USFWS's study request is too extensive in scope to fit within the Integrated Licensing Process (ILP) timeline, and, therefore, would not be able to inform license conditions. We disagree with this conclusion. Similar surveys assessing entrainment and/or mortality rates have been conducted throughout the Northwest within short timelines, some within an ILP framework. Most notably, SCL executed an entrainment study plan via the ILP at Boundary Hydroelectric Project (FERC No. 2144); this study included both hydroacoustic tagging and netting. In the Yakima basin, entrainment studies have been undertaken at Rimrock Dam on the Tieton River (James 2002, Couter and Vaughan 2011) and Keechelus Dam on the Yakima River (USBR 2010). Entrainment mortality studies were carried out in the Pend Oreille at Box Canyon Dam (Normandeau Associates 2012) and Albeni Falls Dam (Normandeau 2014). A phased entrainment analysis was conducted at Jackson Hydroelectric Project (FERC No. 2157) as a part of the ILP. The methodology proposed by the USFWS in our study plan is a suggested framework with which to develop a robust entrainment study; it is not intended to be prescriptive. The USFWS is committed to working with SCL to develop a feasible entrainment study that would inform license conditions. We recommend the study include the following elements: (1) a thorough review of literature and similar projects; (2) PIT and JSAT tagging; (3) a mark/recapture component; (4) fish of various species, sizes, and age classes; (5) assessment of various operational scenarios, and; (6) an account for diurnal and seasonal variation.</p> <p>SCL also rejected the study request stating that level of cost was underestimated. As stated above, the USFWS is committed to working with SCL to develop a feasible study. As such, we suggest that SCL repurpose its existing infrastructure of acoustic telemetry equipment to reduce costs and effort. Tags can also serve a dual purpose and help inform other studies, such as the reservoir productivity study.</p>	
195.	USFWS	03/08/2021	pp. 32-33	USFWS-C26	Section 6.3.5  (USFWS-07, USFWS-10)	N/A	<p><b><u>USFWS-07: Suitability and Productive Potential of Littoral and Riparian Habitat for Resident and Anadromous Fish and USFWS-10 Habitat Use and Population Dynamics of Reservoir Fish.</u></b> The USFWS submitted two requests related to reservoir habitat: USFWS-07, Determine the Suitability and Productive Potential of Littoral and Riparian Habitat for Resident and Anadromous Fish in the Project Area and USFWS-10, Habitat Use and Population Dynamics of Reservoir Fish. Both study requests were rejected in their entirety in the PSP. Citing 18 CFR § 5.9(b)(5) as a reason for denial, SCL claimed that there is no indication that the Project is having an effect on fish and littoral habitat in the reservoirs. SCL also stated that various elements of the study requests were an “unnecessary expansion of activities” that are addressed by other ongoing or proposed studies, primarily the USGS Food Web study. The USFWS disagrees with both points.</p>	Please see comment response NPS-C75.

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							<p>SCL has funded studies, participated in data collection, and reviewed reports related to the fish populations in Ross, Diablo, and Gorge Reservoirs. These studies have highlighted several issues:</p> <ul style="list-style-type: none"> <li>▪ Potential competition between redbase shiner and juvenile salmonids (Welch 2012, Anthony et al. 2019), as illustrated by a reduction in length of juvenile rainbow trout since redbase shiner was first observed in Ross Reservoir in 2000 (Figure 13)</li> <li>▪ Potential competition between eastern brook trout and native salmonids in the reservoirs (Anthony et al. 2019)</li> <li>▪ Hybridization between eastern brook trout and Dolly Varden and between Dolly Varden and bull trout in all three reservoirs (Anthony et al. 2019)</li> <li>▪ Decreasing abundance of adfluvial bull trout throughout a majority of the habitat accessible (36.8 rkm) in the Skagit River in British Columbia (Figure 14; email communication with D. Courcelles, Aquatic Ecologist, Ministry of Forests, Lands, Natural Resource Operations, BC, Canada) and very low numbers of spawning bull trout in tributaries located in the US (Anthony et al. 2019, Majeske et al. 2020)</li> <li>▪ Depressed number of spawning rainbow trout in Ross Reservoir (Anthony et al. 2019)</li> <li>▪ The relative weights for all species in all reservoirs consistently fall below the 75th percentile indicating poor health in the populations of these fish (Anthony et al. 2019)</li> <li>▪ The brook trout in Ross Lake have shown an increasing trend in relative weight over time increasing the risk this species will outcompete native salmonids including Bull Trout (Anthony et al. 2019)</li> <li>▪ Infection rates for parasites is high for most species in all reservoirs (Anthony et al. 2019)</li> </ul> <p>Many, if not all, of these issues can be attributed to the conditions created by the reservoirs. For example, redbase shiner are primarily a lentic species and they would not occur in the upper Skagit watershed if the river was not impounded. Similarly, brook trout have colonized and are exploiting all three reservoirs and constitute a significant proportion of the populations in Diablo and Gorge reservoirs where they overlap with native salmonids. It also appears that brook trout are utilizing redbase shiner as a food resource and are increasing in size which is likely going to increase the risk of hybridization and competition with bull trout. These and other issues brought forward in our study requests need to be investigated in order to inform the needs of the USFWS and other LPs in meeting management obligations. Likewise, understanding these issues will inform FERC and SCL in the development of alternatives for the NEPA document and help create targeted, cost effective, and commensurate Protection, Mitigation, and Enhancements for the future license. The USFWS continues to request the adoption of the USFWS-07 and USFWS-10 study requests.</p>	
196.	USFWS	03/08/2021	pp. 33-36	USFWS-C27	Section 6.3.4 (USFWS-16)	N/A	<p><b>USFWS-16: Impacts of Operations on Aquatic and Riparian Biological Productivity Downstream of Gorge Dam.</b> Several LPs focused on assessing productivity downstream of the Gorge Dam. SCL described that these studies do not meet FERC Study Criteria (18 CFR § 5.9(b)(5)). Again, SCL mentions that study requests do not provide evidence of adverse effects. The effects do not need to be adverse to develop a study plan. SLC may need to study an issue with a study plan that could lead to operational changes, such as a water quality criterion like DO. SLC may not know there is an effect until it is monitored or studied. Similarly, many of the studies we have developed are based on our experience with similar situations with documented effects. Here, SCL rejected many of the studies because there was no demonstrable effect. We disagree with this method of rejection because absent empirical evidence, occurrence or absence of an affect or the impact cannot be documented. Productivity is the basis of the food pyramid for streams. SCL asserts</p>	Please see comment response NPS-C72.

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							<p>that because the request does not show evidence of an adverse Project effect on nutrients and productivity, the study is not warranted. This information is needed to determine this the level of the effect. Flow operations affect habitat and prey as evidenced by other FERC projects and the associated science. The purpose of our study plan is to understand how the Skagit Project affects habitat, productivity, and predator prey relationships. We are aware of the fact that flow operations can encourage non-natives and predators to congregate or can change habitat conditions that alter productivity and quality of habitat. The USFWS will need to know the level of effects, duration, and magnitude for both the ESA species and critical habitat and other species for the Fish Wildlife Coordination Act.</p> <p>SCL is proposing to collect benthic samples at three locations in the Gorge Bypass, with ongoing work as part of the current license. The current SCL ongoing food web study (USGS) is not designed to collect all the data we would need to assess conditions below the dam. This study could be combined and the current USGS study, where it is updated or augmented with additional crews to assist in the collection of new data simultaneously to collect it within a shorter timeframe. The USFWS requests FERC and SCL to incorporate the predator prey relationships and other parameters described in our Study Request. This is necessary to assess effects of operations on habitat and prey base conditions. Addressing data gaps regarding productivity and habitat is necessary to inform development of a long-term management plan.</p> <p>The USFWS disagrees with the comment from SCL which describes this study as part of a long-term management study from the beginning. The first collection of data will set the baseline and assist us in making our effects determinations, then a long-term monitoring plan would be developed to monitor productivity at longer-term intervals, and designed to facilitate adaptive management during the term of the license. We agree that this type of information gathered after the baseline is set, could be a long-term management plan used for adaptive management. The information could be used to develop operational flows or develop restoration projects. The USFWS continues to request the adoption of our USFWS-16 study to understand effects of the Project.</p>	
197.	Upper Skagit Indian Tribe	03/08/2021	p. A4	USIT-C07	Section 5.5	FA-01	<p>The Upper Skagit Indian Tribe (USIT) is requesting major revisions to FA-01 Water Quality Monitoring. From its original inception by Seattle City Light (City Light), FA-01 has improved in ability to address concerns raised by License Participants (LP) during the relicense process. However, based on the most recent changes put forth by City Light, FA-01 still falls short in being able to adequately assess impacts from the Skagit River Hydroelectric Project (Project) on water quality (including narrative criteria requested by Washington Department of Ecology (WDOE)). In general, FA-01 falls short in scope and scale to characterize Project impacts to water quality in the Skagit River and project reservoirs. Because of the shortcomings, we are requesting: (1) more sampling locations; (2) increased frequency, and (3) an increase in the number of parameters sampled - in order to satisfy all the goals and objectives laid out in USIT's Water Quality Study Request. Please refer to USIT's Study Request (Oct. 26, 2020), page A3-90 for details. Collecting the requested data will aid in the development of license conditions consistent with treaty trust obligations and public purpose of the reservation which the project encumbers. It will provide harvestable salmon. Water quality is a critical component to recovery and health of Skagit River salmon populations (please USIT's Study Request page A3-90 for details). Additionally, a comprehensive analysis of water quality impacts is critical for many other Proposed Study Plans as well as LP submitted Study Requests (e.g., FA-04, OM-01, GE-01, GE-04, and the Riverine and Riparian Study Request).</p>	Please see comment responses ARTU-C05, Ecology-C03, Ecology-C06, Ecology-C08, Ecology-C10, NMFS-C08, NMFS-C12, NMFS-C14, NMFS-C28 and NPS-C07.
198.	Upper Skagit Indian Tribe	03/08/2021	pp. A4-A6	USIT-C08	Section 6.2.9	FA-01	<p>On October 26, 2020, USIT submitted its Water Quality Impacts Above and Below City Light Project Infrastructure Study Request (WQSR), which was largely reject by</p>	Please see comment responses ARTU-C05, Ecology-C03, Ecology-C06, Ecology-C08,

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					(USIT-07)		<p>City Light in their Water Quality Studies FA-01 Proposed Study Plan (PSP) response. A primary area of disagreement between USIT's WQSR and FA-01 PSP is the spatial scope and temporal frequency of the proposed sampling, which is one of the main reasons why City Light's water quality PSP will fall short in being able to identify all impacts and condition the license to address Project level impacts to water quality-particularly sublethal effects. Sublethal effects can impact organisms in many ways: (1) physiology and metabolism (e.g. growth, secondary productivity, respiration); (2) phenology (e.g. development time, emergence); (3) reproductive success and fitness (e.g. fecundity, egg development/hatching); (4) behavior (e.g. migration, movement); (5) and broad-scale ecological effects (e.g. species richness, composition, density, distribution patterns) (Dallas and Ross-Gillespie 2015). However, USIT's WQSR will be sufficient to elucidate Project impacts to water quality (including sublethal effects) and formulate meaningful license conditions through a comprehensive sampling plan that samples all parameters needed at appropriate frequencies, and is delineated by reach breaks (based on specific habitat characteristics).</p> <p>USIT acknowledges City Light's intent to make limited accommodations to USIT's WQSR. Unfortunately, too many of the components of USIT's WQSR were either rejected in full or in part- including: (1) comprehensive sampling in time and space within the specific parameters; (2) the hydrodynamic model described in USIT WQSR (e.g. CE-QUAL-W2); (3) nutrient sampling; (4) sampling sediment retention/suspended solids; and (4) chemical containments from Goodell Levee leakage. These components were rejected due the Utility's assertion that sites a lack of Project nexus, the Project already meets Washington State Department of Ecology (DOE) water quality standards, and there is adequate existing information to evaluate Project impacts. City Light's conjecture regarding meeting WADOE water quality standards is in fact yet to be determined. In their statements of compliance, they fail to address beneficial use and narrative criteria standards or requirements needed by ESA salmonid species to maintain habitat quantity, quality, and function. Excluding discussions on narrative criteria City Light ignores a large body of evidence that sublethal effects caused by alterations to environmental conditions (e.g. thermal regimes) can drastically impact fishery and ecosystem health as well as productivity (Hicks 1999, Steel and Lange 2007, Angilletta et al. 2008, Dallas and Ross-Gillespie 2015).</p> <p>While some of the existing data may be beneficial in determining Project impacts to water quality, many of it will not- making it important to review the utility (and applicability) of the current data in determining specific Project operational impacts going forward. In cases where existing data is cited, City Light does not explain its rationale as to why existing information is sufficient, nor do they proposed to analyze existing information for effectiveness in determining operational impacts during the study process. USIT maintains much the existing information is not sufficient to elucidate Project effects due to the samples either being discrete (and not continuous), limited in sample location, and limited by sample collection method (e.g. collection surface "grab samples" rather than profile sampling for many parameters). Simply put, a majority of the existing data is not comprehensive and should be considered pilot level for the use in the relicensing efforts.</p> <p>Of what was adopted in FA-01 from USIT's WQSR, the proposed data collection is too limited to identify a Project impacts and develop meaningful license conditions to lessen the impacts. For example, in City Light's response to USIT's WQSR (Section 6.2.9 of the PSP), City Light stated that they met USIT's WQSR needs by extending sampling of select parameters to two years, without recognizing that the parameters in FA-01 are limited (omitting components requested) and the spatial and temporal</p>	Ecology-C10, NMFS-C08, NMFS-C12, NMFS-C14, and NPS-C07.



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							sampling frequency of the sampling is not sufficient. More specifically, the PSP only proposes to sample two parameters in Ross (Turbidity and Total Suspended Solids) for two years and one parameter in the Skagit river below Gorge (temperature) for two years. By not addressing all water quality parameters outlined in USIT's WQSR (for two years in all reservoirs and additional reaches of the Skagit River), it will not be possible to develop meaningful license requirements and satisfy water quality narrative criteria (by way of contrast see the WDOE PSP presentation for water quality criteria details, Appendix B1). The shortcomings of the PSP in addressing specific Project impacts through adequate sampling is problematic and have resulted in the need to revisit the sampling proposed in USIT's WQSR. For example, temperature monitoring in the PSP is not sufficient to: (1) understand the extent to which decreased temperature impacts habitat; and (2) determine optimal thermal conditioning. However, in applying the sampling proposed in USIT's WQSR, it will be possible to discern Project level impacts and, consequently, develop meaningful license conditions to assist in the recovery of ESA listed salmonid species in the Skagit River.	
199.	Upper Skagit Indian Tribe	03/08/2021	p. A6	USIT-C09	Section 6.2.9 (USIT-07)	FA-01 Section 1.3	<b>Study Plan Development.</b> It should be noted that, although the opportunity existed (and was capitalized on by USIT) to submit forms and comment on the study plan development, City Light made few accommodations to the specific justified requests of USIT (discounting many of the suggestions) resulting in the large areas of discrepancy between USIT's WQSR and FA-01.	City Light has carefully reviewed all study requests submitted by LPs, considered feedback provided by LPs during the PSP Meetings and subsequent topic-based discussion meetings, and reexamined its approach to the relicensing study process. In response to recommendations from the LPs and in the spirit of collaboration, City Light has added five additional studies and expanded a number of previously proposed studies in this RSP. In some cases, these studies do not necessarily fall within the FERC Study Criteria, and City Light does not believe these studies are required for the relicensing. Rather, City Light has proposed to expand its study plan program to take an ecosystem approach and to demonstrate its commitment to working with LPs and to compromise with its partners to accommodate their information needs beyond the relicensing process.
200.	Upper Skagit Indian Tribe	03/08/2021	p. A6	USIT-C10	Section 6.2.9 (USIT-07)	FA-01 Section 2.1	<b>Study Goals and Objectives.</b> The study goals and objectives need to include the requested components as justified in USIT's WQSR to include measurements of all physical parameters in adequate time and space, measurements of all nutrients, measurements of chemical containments, and a hydrodynamic model to integrate data with Project operations. Additionally, all parameters need to be assessed in all reservoirs and all habitat types found in the Skagit River. Please refer to the USIT's WQSR submission as well as the suggested additions to the methodology below for details to guide the inclusion of all water quality study concerns into the goals and objectives (Study Request pages A3-92 – A3-95).	Please see comment responses ARTU-C05, Ecology-C03, Ecology-C06, Ecology-C08, Ecology-C10, NMFS-C08, NMFS-C12, NMFS-C14, and NPS-C07.
201.	Upper Skagit Indian Tribe	03/08/2021	p. A6	USIT-C11		FA-01 Section 2.2	<b>Resource Management Goals.</b> The importance of water quality to ESA species beneficial uses, ESA species habitat quality, and WDOE narrative criteria need to be added to City Light's resource management goals. Please refer to comments in section 2.4 below (Project Operations and Effects on Resources) for details on how Project operations impact water quality designated uses and narrative criteria.	City Light has carefully reviewed all study requests submitted by LPs, considered feedback provided by LPs during the PSP Meetings and subsequent topic-based discussion meetings, and reexamined its approach to the relicensing study process. In response to recommendations from the LPs and in the spirit of collaboration, City Light has added five additional studies and expanded a number of previously proposed studies in this

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								<p>RSP. In some cases, these studies do not necessarily fall within the FERC Study Criteria, and City Light does not believe these studies are required for the relicensing. Rather, City Light has proposed to expand its study plan program to take an ecosystem approach and to demonstrate its commitment to working with LPs and to compromise with its partners to accommodate their information needs beyond the relicensing process.</p> <p>City Light has modified the FA-01 Water Quality Monitoring Study Plan to include language expressing City Light's commitment to working with Ecology to address the narrative criteria. City Light anticipates that the results of the Water Quality could help inform ESA consultation.</p>
202.	Upper Skagit Indian Tribe	03/08/2021	pp. A6-A7	USIT-C12	Section 6.2.9 (USIT-07)	FA-01 Section 2.3	<p><b>Background and Existing Information.</b> The background information presented by City Light in FA-01 is not comprehensive, and needs to include more historical information. For example, only including 5, select years to quantify the number of spills is insufficient and not representative of Project operations. City Light should provide LPs with the conditions over the course of the entire previous license in order to accurately determine how Project operations impact resources. By failing to divulge all background information and only including select information, it will be difficult to discern operational impacts that negatively impact fish and aquatic resources. Additionally, City Light should provide information on drawdown frequency and magnitude as drawdowns can have significant impacts on fish and aquatic resources as well as function of the system severely impacting aquatic productivity (as noted in section 2.4 below and the USIT's WQSR- beginning page A3-102). This grading of background information by City Light and exclusion of all conditions throughout the previous license was mentioned in the Tribe's PAD comments (PAD comment page A1-14)– please refer to those comments as the concerns still stand. City Light's table of existing information is beneficial in guiding upcoming sampling regimes.</p> <p>However, in many cases the data are not sufficient for the purposes of deciphering Project operational impacts to implement license conditions (e.g. due to sample collections and methods designed for long-term monitoring not discrete synoptic conditions analysis needed, as described response to 6.2 above). Please refer to USIT's WQSR pages A3-96 for more information regarding shortcomings of existing information and needs for additional information. Because some existing data is lacking detail needed, waiting to assess the utility of the exiting data until the Initial Study Report, as City Light suggested, is problematic and not acceptable. For example, City Light's statements that parameters, for which multiple years of data are collected, are considered sufficient do not account for shortcomings of how those data were collected, nor if the years of collection were representative of environmental conditions. Therefore, as part of the exercise to determine what data to collect, quality control needs to be conducted on the existing data to assess if the data are appropriate to use in developing license conditions (e.g. sample collection frequency, location, and method). Simply listing all of the data collected to date, and stating the data are sufficient, is not sufficient and fails to consider cumulative effects. Analysis needs to be conducted before sampling occurs to determine the utility of said data- thereby guiding future sampling efforts.</p>	<p>City Light will provide a summary and analysis of all pertinent existing information in its ISR report. Complete assessment of Project impacts will take place when all existing data have been analyzed and when new information collected during relicensing becomes available. Also, please see comment response Ecology-C03.</p>

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203.	Upper Skagit Indian Tribe	03/08/2021	pp. A7-A11	USIT-C13	Sections 6.2.9, 6.3.4 (USIT-05, USIT-07, USIT-09)	FA-01 Section 2.4	<p><b>Project Operations and Effects on Resources.</b> Impacts to water quality from the Project operations directly affects treaty and non-treaty fishery resources through degradation of habitat, whereby aquatic productivity is limited (causing sublethal effects in salmonids) from altered hydraulic regimes (water quantity) and physical characteristics (water quality).</p> <p>City Light maintains that the Project has minimal impact to water quality- particularly that the Project does not influence water quality below the Sauk River, and there are no impacts to water quality numeric criteria set forth by DOE. The extent to which Project operations influence water quantity and quality below the Sauk River (e.g. hydraulic regimes critical for nutrient cycling processes that are tied to narrative criteria of productivity) is demonstrated by the significant influence of Project flows (gauged in Newhalem) to the Mount Vernon Gauge (as discussed in the NMFS Water Quality PSP comment filing; as well as USIT's comments to GE-04 in this filing). There are narrative and beneficial use criteria that have sublethal impacts on fish and aquatic life that FA-01 does not address such as depressed water temperatures and breaks in productivity pathways (production pathways are linked to habitat and geomorphology). It is worth noting that City Light is committed to studying and implementing flows in Gorge Bypass (FA-05). Currently, the only means for providing flows into the Gorge Bypass Reach is through spill, which could significantly increase concerns of impacts from elevated Total Dissolved Gas (TDG). Such increase has the potential to increase TDG above numerical criteria standards- a Project impact that needs to be fully evaluated. These narrative criteria influencing aquatic productivity are not addressed by City Light in FA-01. Specifically, the FA-01 did not directly address the comments and concerns related to shortcomings of the existing information, and the need for additional information to understand Project impacts to aquatic productivity (and consequently ESA listed species recovery and tribal treaty rights). Those needs still need to be accounted for (please refer to USIT's WQSR for details, beginning page A3-102).</p> <p>Breaks in productivity pathways (e.g. from Project operations such as lack of process flows, off-channel and back water connectivity, riparian connectivity, sediment mobilization, and log-jam formation that limit nutrient transfer and storage) and changes in physical characteristics (e.g. temperature) have the potential to lead to cultural oligotrophication- severely limiting aquatic productivity (please refer to USIT's WQSR (page A3-102), Secondary Productivity Study Request (A3-62), Aquatic &amp; Riparian Biological Productivity Downstream of Gorge Dam Study Request (A3-128), and associated comments to PSPs in this filing (e.g. FA-04, TR-01, and TR-02) linking Project operations to aquatic productivity loss and cultural oligotrophication). The impacts of sediment deposition in the reservoirs are highlighted in comments to GE-01 and GE-03 as well as NPS's PSP #4 presentations on sediment and backwater (Appendix B53, B63, and B73). Because nutrients are bound to sediments, the prevention of sediment mobilization impacts delivery and cycling of nutrients needed for aquatic productivity throughout the Project area extending to the estuary (see comments to GE-04 for details on sediment). Limits to productivity from disruptions in nutrient cycling was raised as a concern in the Riverine and Riparian Productivity Study Request because nutrients, and their availability, are the building blocks for aquatic productivity, from a stone fly to salmon to Orca (October 26, 2020 filing page A3-132). It will therefore be important to study the impacts of Project operations to sediment mobilization through sampling Total Suspended Solids (TSS) as well as nutrient concentrations through the Project area.</p>	Please see comment responses ARTU-C05, Ecology-C03, Ecology-C06, Ecology-C08, Ecology-C10, NMFS-C08, NMFS-C12, NMFS-C14, and NPS-C07.

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							<p>Not presented in USIT's WQSR are a limited amount of nutrient data collected by the National Park Service in Ross reservoir (unpublished data) and Skagit Environmental Endowment Commission from the Skagit River in British Columbia (HMC 2011, 2012, 2013, 2017). While it is agreed that the Ross reservoir is naturally nutrient poor (oligotrophic), based on preliminary analysis of Orthophosphate and Nitrate data collected in September, the nutrient inputs into Ross from the Skagit River in British Columbia are greater than Ross nutrients, Figure 1. Moreover, USGS modeled inputs from nutrients into the reservoirs should not be as limited as the current data indicates, or City Light claims (<a href="https://sparrow.wim.usgs.gov/sparrow-pacific-2012/">https://sparrow.wim.usgs.gov/sparrow-pacific-2012/</a>). This relationship raises the question if operations impacting the reservoirs hydraulic regime, connection to terrestrial environments, and natural nutrient cycling processes may be further driving the system into oligotrophication. Although these data are limited, the relationship warrants the need to monitor nutrient dynamics in the impacted Project area; it has been noted elsewhere that altered hydraulic residence times (from annual and interannual drawdowns) in reservoirs can decrease productivity (Beaver et al. 2015). Understanding nutrient dynamics will allow for identification of limiting factors to aquatic productivity caused by Project operations, and for example, develop license conditions to improve nutrient availability in the reservoirs. The potential for salmon reintroduction into the reservoirs could add demand to prey resources, and determining how nutrients could be limited will allow for a feasibility assessment of nutrient additions to assist reintroductions of salmon in a highly oligotrophic (nutrient starved) system. Similar assessments and PME's have been discussed in the Baker River hydroelectric project Please see comments to FA-04 for discussions on reservoir prey resources and productivity. [Figure 1]</p> <p>As mentioned, the need to monitor nutrients is correlated to other study requests-represented in the connection between nutrient transport and hydraulic/geomorphic process (e.g. sediment transport, hyporheic connection, and wood accumulation, i.e. GE-04). Nutrient storage in river channels is highly influenced by obstructions including wood (longer storage equates to more availability for biologic uptake, bolstering aquatic productivity); indeed, removal of wood and vegetation from streams has been noted to reduce nutrient storage by up to 60% (Ensign and Doyle 2005). Given the impact the Project has on large wood distribution and log-jams (PSP #4 presentation, Appendix B103), operations likely reduce nutrient storage in the Skagit River downstream of the Project dams (PSP #4 presentation Appendix B53). Additionally, increased nutrient storage is found in streams with deeper sediments and greater hyporheic exchange (Allan and Castillo 2007). Indeed, sediment transport is a major concern in the Skagit River to the estuary as highlighted in comments to GE-04 in this filing. The flood pulse concept detailed by Tockner et al. (2000) clearly illustrates the importance of nutrient sources and nutrient exchange in off-channel habitats, and given the Project impacts to flow (Appendix B17 – B19), it will be important to evaluate nutrient dynamic disruption. This is important to considering when evaluating flows impacting the connection of backwater and off-channel habitats. By evaluating nutrient and sediment dynamics in parallel with modeling hydraulic, geomorphic, sediment, and habitat forming process (as noted in USIT's comments to GE-04), it will be possible to fully grasp how improving geomorphic process in license conditions improves productivity and water quality narrative criteria for the recovery of salmonid populations.</p> <p>Ongoing Project operations also impact temperature through the release of hypolimnetic water from each reservoir into the next downstream waterbody causing sublethal effects to fish residing or migrating in those downstream reaches. The impacts of high head dam releases on water quality, fish productivity, and fish life history expression have been well documented (Todd et al. 2005, Steel and Lange</p>	

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							2007, Angilletta et al. 2008, Steel et al. 2012), and operational changes or structural modifications have been raised by Olden and Naiman (2010) to counter the downstream effects on aquatic productivity. Consequently, operations of numerous dams throughout the Northwest have been altered to limit hydropower sublethal impacts to fish (e.g. Cougar Dam (McKenzie River, Oregon), Round Butte Dam (Deschutes River, Oregon), Detroit Dam (North Santiam River, Oregon), Lost Creek Dam (Rogue River, Oregon). In the Skagit River, impacts to water temperature can be seen through comparing temperatures of the Skagit River at Newhalem and the Sauk River (Figure 2). In this figure, it is evident the Skagit River experiences unnatural changes in thermal regimes, where temperatures are cooler in the summer and warmer fall, that can impact life histories. For example, elevated temperatures in the fall can result in changes in spawning timing that result in fry emergence timing that is less than optimal. Additionally, depressed water temperatures can reduce growth in the winter and summer resulting in smaller fish with a reduced chance of survival. All salmonid life history stages rely upon the availability of adequate flows, productive water quality (temperature, dissolved gas, and nutrients for productive food resources) for growth and survival but also to signal temporal windows (e.g. from thermal cues) that initiate transitions between life history events (e.g. Hicks 1999 – temperatures to initiate spawning). Because of their modifications to survival, growth, behavior, and life history expression, singular (e.g. alterations to the thermal regime) and cumulative (e.g. disruptions in nutrient/production pathways) sublethal effects need to be evaluated adequately in determining the impacts of ongoing Project operations to water quality and quantity. [Figure 2]	
204.	Upper Skagit Indian Tribe	03/08/2021	p. A11	USIT-C14	N/A	FA-01 Section 2.5	<b>Study Area.</b> As reflected in the USIT's comments on Project impacts (section 2.4, above) and methodology (section 2.6, below) the study area needs to be increased to reflect areas of the reservoir into Canada as well as the Skagit River to the estuary (not to conclude at the Sauk River). See Table 1 below (as discussed in the Methodology comments) as well as comments to GE-04 for details regarding the expansion downstream of the Sauk River. Extending water quality monitoring to the estuary will allow for evaluation of Project impacts to water quality and sublethal effects in key juvenile salmonid off-channel rearing areas below the Sauk River (as outlined in FA-02, GE-04, TR-01, and TR-02). Additionally, evaluating total suspended solids (i.e. sediment mobilization) to the estuary will allow for water quality conditions to be coupled with geomorphic process throughout the entire Skagit River, resulting in a sediment budget to be developed for evaluation of sediment inputs into estuary habitats (as is discussed in comments to GE-04).	Please see comment responses ARTU-C04, ARTU-C05, Ecology-C03, Ecology-C06, Ecology-C08, Ecology-C10, NMFS-C08, NMFS-C12, NMFS-C14, and NPS-C07.
205.	Upper Skagit Indian Tribe	03/08/2021	pp. A12-A27	USIT-C15	Section 6.2.9 (USIT-07)	FA-01 Section 2.6	<b>Methodology.</b> USIT's WQSR expanded the study proposed in the PAD through increased parameters, temporal scope, and geographic scope of data collection to adequately characterize conditions impacted by Project operations. Please refer back to USIT's WQSR (beginning Study Request page A3-103) for more information detailing specifics regarding the need for the requested information, as that need was not addressed in FA-01 – our concerns and study goals, and objectives still stand. Specific modifications to FA-01 that are required for a comprehensive evaluation of impacts to water quality include the following sample collection: <ul style="list-style-type: none"> <li>▪ Extension of monitoring physical water characteristics to all physical parameters in the reservoirs and the Skagit River downstream of the Sauk River to the estuary. Multiple data loggers above and below the confluences of tributaries will provide a means to understand how Project release influence downstream conditions.</li> <li>▪ Comprehensive evaluation of the temporal and spatial extent of elevated turbidity levels in all reservoirs' tributary stream channels and littoral/pelagic habitats when the reservoirs are drawn down</li> <li>▪ Expanding reservoir water quality monitoring to more test sites as to better establish inputs from tributaries.</li> </ul>	Please see comment responses ARTU-C04, ARTU-C05, Ecology-C03, Ecology-C06, Ecology-C08, Ecology-C10, NMFS-C08, NMFS-C12, NMFS-C14, and NPS-C07.

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							<ul style="list-style-type: none"> <li>▪ Expanding macroinvertebrate sampling to include the reservoirs and multiple habitats in off-channel, side channel, and edge areas for both benthic and drift samples.</li> <li>▪ Monitor nutrient levels in the reservoirs (to determine the amount of nutrients and nutrient-laden suspended sediment sequestered by the dams) and in the Skagit River downstream of Gorge Dam to the estuary (to determine how operations impact nutrient cycling dynamics).</li> <li>▪ Monitor metal levels in the reservoirs.</li> <li>▪ Monitor chemical containments from the Goodell Levee.</li> <li>▪ Provide a means to incorporate the water quality results with specific Project operations through the use of a CE-QUAL-2, or similar, hydrodynamic model.</li> <li>▪ The QAPP procedures outlined in FA-01 should incorporate these changes.</li> </ul> <p>Several of these parameters are highlighted in sections 4.1.2 and 4.1.4 the Scoping Document 2 (SD-2):</p> <p>On p. 37 and 38 SD-2 states:  “Effects of existing and any potential changes in project facilities and operation on water quality in the three project reservoirs, including: nutrients, water temperatures, metals, fecal coliform, and turbidity levels in Ross Lake, and nutrients, water temperatures, metals, dissolved oxygen, and pH levels in Diablo and Gorge Reservoirs.”</p> <p>“Effects of existing and any potential changes in project facilities and operation (e.g., reservoir level fluctuations and drawdowns) on macroinvertebrate production in the project reservoirs.”</p> <p>“Effects of existing and any potential changes in project facilities and operation, including ramping rates, on benthic macroinvertebrates in the Skagit River downstream of Gorge Dam.”</p> <p>As mentioned, FA-01 adopted some of the requests in USIT's WQSR, but in a limited manner. Consequently, the temporal scope was increased to account for both intra- and inter-seasonal/annual variability in aquatic conditions for two years. For samples that are not sampled continuously, collecting samples monthly (as City Light has proposed) will not be sufficient to discern acute project impacts like sudden drawdowns. Therefore, USIT requests samples be collected at a minimum of bimonthly. For example, where the PSP proposed to only sample macroinvertebrates once (in one habitat type), LPs are proposing to sample macroinvertebrates bimonthly (in all habitat types). Understanding macroinvertebrate productivity of all juvenile salmonid habitat types will allow us to identify habitats that are limiting, and how those habitats can be expanded (e.g. through flow) to optimize rearing capacity (see comments to GE-04 for discussions on process flow influence to habitat). The spatial scope was increased to the estuary (based on the influence of Project flows/temperature to the total Skagit River flow/temperature), and sample reach location delineated based on landform features. To adequately characterize all habitat types, several sample locations will need to be included in each reach, as well as above and below major tributary inputs (e.g. littoral vs. pelagic in the reservoirs and pool, riffle, vs. backwater in the river reaches). Spatial scope was increased because Project effects extend far beyond the Sauk River.t. For example, Total Dissolved Gas (TDG) needs to be extended beyond Gorge Power house because in other hydropower projects, the impacts of TDG have been noted to occur much further downstream than the terminus of Project infrastructure (e.g. Bonneville and Similkameen). City Light has committed to studying and implementing flows in Gorge bypass. Currently, the only means for providing flows into the by-pass is through spill, which could</p>	

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							<p>significantly increase concerns of impacts from elevated TDG. Based on the importance of sediment in nutrient delivery and aquatic habitat (as detailed in comments to GE-04), sampling of TSS has been increased and extended to the estuary. Lastly, a component not adopted by the FA-01 PSP is the need for nutrient analysis. Nutrient analysis includes monitoring all components of Phosphorus and Nitrogen found in aquatic systems (e.g. total Phosphorus, Orthophosphate, total Nitrogen, Nitrate, Nitrite, Ammonia). Specific details of the proposed sample increase can be found in Tables 1 and 2. The specific reservoir breaks can be found in Figures 3, 4, and 5.</p> <p>Not addressed in Table 1 is the need to incorporate the aforementioned data into a hydrodynamic model such as CE-QUAL-2, which will provide a means to integrate water quality conditions with Project operations. These models have gained widespread acceptance and CE-QUAL-W2 has been developed to evaluate operations for 319 reservoirs in the United States and internationally (<a href="http://www.cce.pdx.edu/w2/">www.cce.pdx.edu/w2/</a>), and has been highlighted as a necessity in many other study requests (e.g. FA-04). Developing this type of model early in the study process will determine key data gaps and will hopefully reduce unneeded sampling. As stated in the original study request, and expanded on here, the objects of this component are to:</p> <ul style="list-style-type: none"> <li>▪ Evaluate alternative management scenarios for: <ul style="list-style-type: none"> <li>• Enhancing water temperatures in Diablo and Gorge Reservoirs and in the Skagit River. Conditioning water temperatures downstream of Ross Dam will require striking a balance between water quality conditions in Ross Lake and downstream. Note: WQSR contained information documenting depressed water temperatures in Diablo and Gorge Reservoirs. USGS gaging data illustrates the magnitude of the effect of project operations on water temperature in the Skagit River below the Newhalem Powerhouse outfall (Figure 2).</li> <li>• Determining flow prescriptions for the currently dewatered Skagit Gorge (bypass reach).</li> <li>• Flow prescriptions related to redd protection measures (current and potential future FSA) and process flows in the Skagit River.</li> <li>• Prescribing nutrient enhancement measures and habitat enhancements to offset cultural oligotrophication.</li> </ul> </li> <li>▪ Determine how the timing, rate, and duration of: spill, reservoir drawdown and refill, powerhouse discharge affect water quality conditions in each of the reservoirs (since they are linked as an integral system and in the Skagit Gorge and Newhalem reaches).</li> <li>▪ Determine how providing flow in the Bypass Reach will affect water quality in each of the reservoirs and in the Skagit Gorge and Newhalem reaches.</li> <li>▪ Determine how modifying the penstock intake depths, using spill, or other means to enhance water temperatures in Diablo and Gorge reservoirs and in the Bypass and Newhalem reaches will affect temperatures and nutrient fluxes in those areas and in Ross Reservoir.</li> <li>▪ Determine the trophic status, productive potential, and carrying capacity of each reservoir (in conjunction with aquatic productivity data needs outlined in FA-04 comments).</li> <li>▪ Provide information that can be used to compare current and potential (enhanced) invertebrate productivity in the reservoirs and in the Skagit below Gorge dam</li> <li>▪ Provide information to determine the productive potential of the Skagit Gorge reach under different flow scenarios and how increased productivity in the Skagit Gorge reach could enhance fisheries resources in the Newhalem reach and downstream.</li> </ul>	

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							<ul style="list-style-type: none"> <li>Determine the effects of increasing air temperatures and changes in flow regimes related to global change on reservoir water temperatures and water quality variables associated with fish habitat (note ties to comments on OM-01).</li> <li>Identify monitoring locations and develop quantitative performance metrics to evaluate the effects of Project operations (current and future) on water quality conditions in the reservoirs, the Bypass and Newhalem Reaches, and the Skagit River below Bacon Creek to the estuary.</li> </ul> <p>The development of a CE-QUAL-W2 hydrodynamic model will allow for the integration of Project operational impacts to hydrodynamics, water quality, and habitat conditions resulting in meaningful license conditions to be developed, as detailed in the above list. Examples of license conditions include alterations in reservoir hydrodynamics (residence time) to allow for increased plankton productivity (see comments to FA-04), conditioning of water temperatures, and mobilization of sediments to distribute nutrients and increase aquatic habitat quality.</p> <p>Accepted practices for developing a CE-QUAL-W2 model can be found in Wells (2020). However, we believe costs could be reduced by consulting directly with the model developers at Portland State University or with the USGS Washington Water Science Center on specific baseline and calibration data requirements. At a minimum, based on Wells (2020) new field data would be needed for (some of this data would be collected in Table 1): [See list on p. A15]</p>	
206.	Upper Skagit Indian Tribe	03/08/2021	p. A28	USIT-C16	N/A	FA-01 Section 2.7	<b>Consistency with Generally Accepted Scientific Papers.</b> The suggested changes to the sampling and methodology need to be reflected in the QAPP to ensure the data are collected pursuant to commonly accepted scientific practices.	All changes made to the FA-01 Water Quality Monitoring Study plan are reflected in the accompanying QAPP.
207.	Upper Skagit Indian Tribe	03/08/2021	pp. A28-A29	USIT-C17	Section 6.2.9 (USIT-07)	FA-01	<p><b>Application to License Development.</b> Based on the study plan presented in City Light's FA-01, it will be difficult to evaluate the Project operational impacts listed in USIT's WQSR. However, through the collection of the data outlined here and in USIT's WQSR (Study Request page A3-103 – A3-105) it will be possible to better develop license requirements and complete the NEPA analysis. It should be noted that the requested studies are not designed so we can later replicate pre-project conditions; nor restore all-natural processes. Rather, the goal is to quantify where and how the project impacts these processes (i.e. water quality beneficial uses), so later City Light and LPs can work together to design Project operational conditions that mitigate or even improve water quality narrative criteria. Currently, due to Project operations the ecological system is compromised. For example, alterations in natural thermal regimes can reduce species productivity. Rather than experiencing stable, low thermal conditions (as occurs in the Skagit due to Project operations), it will be necessary to restore natural inter-annual thermal regulations (a natural process that is critical to aquatic productivity, providing growth, spawning, and migration cues). Specific Project operational changes or mitigation measures that can be incorporated in the license that would address potential water quality sublethal impacts include but are not limited to:</p> <ul style="list-style-type: none"> <li>Conditioning of water temperatures to replicate natural thermal regimes and restore system function where appropriate</li> <li>Nutrient additions to increase primary productivity</li> <li>Alterations in hydraulic regimes (particularly in the reservoirs) to increase connectivity with terrestrial habitats</li> <li>Instigating process flows to increase off-channel/back water connectivity and facilitate nutrient cycling processes</li> <li>Mobilization of sediments to distribute nutrients</li> </ul>	Please see comment response Ecology-C08 and NMFS-C14.



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							<ul style="list-style-type: none"> <li>▪ Mobilization of large and small wood as well as provide conditions conducive to wood jams to restore system function and increase nutrient storage</li> </ul> <p>As mentioned, water quality concerns share many parallels with other study requests and Proposed Study Plans. Therefore, the instigation these operational changes will likely ameliorate the concerns described in FA-04 and GE-04, for example. As highlighted by the utility of such analysis as the CE-QUAL-2 model, macroinvertebrate monitoring, temperature monitoring, and suspended sediment monitoring across many study requests, gathering the data listed here will save costs (through reduction of repetition in data collection). Additionally, the need data from water quality studies will be critical when consulting on requirements for ESA critical habitat for listed salmon species (Chinook Salmon, Steelhead, and Bull Trout) as well as the Clean Water Act.</p>	
208.	Upper Skagit Indian Tribe	03/08/2021	pp. A29-A31	USIT-C18	Section 6.2.11	FA-02	<p>USIT supports the need for the development of the habitat flow relation tool described in FA-02 but requests an expanded effort that would use the 2-D hydraulic model to accurately assess floodplain connectivity and predict changes in floodplain connectivity and main channel habitat in response to improved process flows that are a potential measure under a new license. The requested revisions would use results from GE-04 to expand the range of habitat conditions evaluated in FA-02 and improve the assessment of ongoing Project impacts to anadromous salmonid habitat, including ESA-listed Chinook and Steelhead. The expanded effort would include the following elements:</p> <p><i>[...continues to provide expansion of model to floodplain areas and associated details; integration of the duration and magnitude of flow, mainstem bed elevation, and presence of log jams/LWD; and identification of dikes, rip-rap, and other hydromodifications (pp A29-A31)]</i></p> <p>The approach described above would provide an assessment of anadromous salmonid habitat conditions that is currently missing in FA-02. City Light's proposed 2-D hydraulic model is focused on the main channel and currently connected side channels. USIT's requested approach would improve the understanding of Project impacts on floodplains by assessing connectivity and flow in off-channel habitats under existing conditions, predicting how connectivity and flow would change in response to potential alternative Project operations scenarios, and using additional analyses of shear stress to evaluate how well different potential scenarios maintain floodplain habitats. Additionally, the approach would assess changes in main channel habitat conditions. For instance, changes in sediment aggradation and scour patterns, expansion of gravel bars, development of vegetated islands, formation of side channels, and increases in woody debris quantity would result in changes to flow depth, velocity, and cover. Using results from USIT's requested studies for GE-04, the expected geomorphic changes could be incorporated into the 2-D hydraulic model to predict the expected outcomes on anadromous salmonid habitat conditions. Further analyses could translate the habitat estimates into fish capacity estimates.</p> <p>USIT understands that City Light has heard our request for a structured review process to evaluate potential project alternatives with model development. USIT is anticipating a refined schedule update in the RSP filing. An understanding of the combined functions of habitat and flows would provide the basis for a robust monitoring and adaptive management program to guide implementation over the term of the next license. The relicense studies could inform key metrics and trigger points useful in the development of future management plans.</p>	Please see comment responses NMFS-C28, NPS-C08, and SSIT-C03.

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209.	Upper Skagit Indian Tribe	03/08/2021	pp. A31-A32	USIT-C19	Sections 6.2.11, 6.2.16  (USIT-08)	FA-02	<p><b>Instream Flow Study.</b> For response, please refer to comments in this filing for GE-04 Skagit River Geomorphology – Response to PSP Section 6.2, as well as comments for TR-02 Wetland Assessment – Response to PSP Section 6.2.</p> <p>USIT requests revisions to FA-02 as it relates to main channel and floodplain impact and response modeling. Improved model accuracy for floodplain areas is needed to understand ongoing Project impacts to small-magnitude process flows that provide seasonal connectivity of off-channel habitats. Additionally, expected channel responses resulting from large-magnitude channel forming flows, including channel bed elevation and log jam density, should be mimicked with the 2-D hydraulic model to assess expected changes in off-channel connectivity and main channel habitats. As described above and in comments in this filing for GE-04, USIT requests a Process Flow study plan. The Process Flow study plan incorporates the instream flow model (FA-02) with the Geomorphology Studies (GE-04), including revisions requested by USIT, as well as related studies that will provide ancillary inputs (GE-03, TR-01, and TR-02).</p> <p><b>Potential Floodplain Connectivity of Off-Channel Aquatic Habitat.</b> Please refer to Section 6.2.11 for detailed responses.</p>	Please see comment responses NMFS-C28, NPS-C08, SSIT-C07, and SSIT-C08.
210.	Upper Skagit Indian Tribe	03/08/2021	p. A32	USIT-C20	Sections 6.2.11	FA-02 Section 2.1	<p><b>Study Goals and Objectives.</b> City Light’s proposed study plan includes development and calibration of the 2-D hydraulic model, but does not include model application to assess potential alternative Project operations scenarios. USIT is very concerned that City Light has not includes a schedule and process for applying the model to assess potential changes in Project operations. Without model runs to assess potential operations scenarios, USIT and other LPs will not have the information needed to develop license requirements, including an understanding of Project impacts on anadromous salmonid habitat and options to improve habitat conditions. During the PSP meetings City Light agreed to include a schedule and process for LPs and City Light to identify and evaluate model scenarios (Appendix C pg. C448). USIT requests the RSP reflect this accommodation.</p>	Please see comment responses USFWS-C04 and SSIT-C03.
211.	Upper Skagit Indian Tribe	03/08/2021	p. A32	USIT-C21	N/A	FA-02 Section 2.5	<p><b>Study Area.</b> As described in our comments on GE-04, USIT believes there is adequate existing information that indicates the need to extend the study area downstream of the Sauk River, likely to the estuary. USIT’s requested changes to FA-02 would improve the ability of the 2-D hydraulic model to assess Project impacts on process flows, including connectivity, habitat conditions, and maintenance of floodplain channels. Project reductions in spring peak flows at the USGS gage near Concrete illustrate the importance of assessing floodplain channels in relation to Project operations.</p>	Please see comment responses ARTU-C04 and NMFS-C19.
212.	Upper Skagit Indian Tribe	03/08/2021	pp. A32-A33	USIT-C22	N/A	FA-02 Section 2.6.1.2	<p><b>Methodology – Model Topographic Data.</b> Currently connected floodplain areas, as well as areas that may become connected under potential alternative Project operations, should be modeled using the same mesh resolution as the main channel. Based on City Light’s description to use topographic LiDAR in floodplain areas where existing topo-bathymetric LiDAR (“green LiDAR”) does not exist, they may need to collect additional topo-bathymetric data for floodplain areas. Accurate topo-bathymetry will be necessary to accurately model connected and potentially connected off-channel habitats. Data to refine the topo-bathymetric LiDAR should be collected to ensure connections between off-channel habitats and the main channel are accurately represented in the model mesh. This data collection could be coordinated with City Light’s Wetland Assessment (see comments in this filing for TR-02).</p>	Please see comment response NPS-C08.  City Light does not propose to collect additional topo-bathymetric data for floodplain areas at the present time. As described in the FA-02 Instream Flow Model Development Study Plan, Section 2.6.1.2, the study will rely on 2017 and 2018 topobathymetric LiDAR, which covers the majority of the floodplain. Terrain data for floodplain fringes not covered by topobathymetric LiDAR will be developed from 2016 topographic LiDAR.
213.	Upper Skagit Indian Tribe	03/08/2021	p. A33	USIT-C23	N/A	FA-02 Section 2.6.1.3	<p><b>Model Geometry Development.</b> The model mesh for connected and potentially connected off-channel habitats should produce the same level of accuracy and detail as that used for the main channel.</p>	Please see comment response NPS-C08.

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							Using results of the GE-04 studies and in consultation with LPs, the model should be manipulated to mimic expected channel responses from process flows that are a potential measure under a new license. Model mesh elevation and hydraulic roughness zones would be changed to reflect channel aggradation, bank erosion, wood loading, and geomorphic changes in side channels and off-channel habitats. Removal of dikes, rip-rap and other hydromodifications could also be considered, where restoration projects are reasonably foreseeable future actions over the course of new license, to inform the cumulative effects analysis (40 CFR § 1508.7).	Changes in model mesh and hydraulic roughness to mimic expected response to process flows or removal of dikes, rip-rap or other hydromodifications could be examined along with other alternative scenarios in a subsequent phase of the relicensing process.  Regarding the process and schedule for City Light and LPs to identify and evaluate model scenarios please see comment response SSIT-C03.
214.	Upper Skagit Indian Tribe	03/08/2021	p. A33	USIT-C24	N/A	FA-02 Section 2.6.1.4	<u>Model Boundary Conditions.</u> Model boundary conditions should be extended downstream of the Sauk River, likely to the estuary. This is necessary to account for Project impacts to spring peak flows, floodplain connectivity, and the mobilization and transport of fine-grained sediments to the estuary (Rothleitner, 2017).	Please see comment responses ARTU-C04 and NMFS-C19.
215.	Upper Skagit Indian Tribe	03/08/2021	pp. A33-A34	USIT-C25	N/A	FA-02 Section 2.6.1.5	<u>Field Monitoring.</u> Field monitoring for model calibration and validation needs to include currently connected and potentially connected off-channel habitats. Automatic water level recorders (piezometers) should be installed in a subset of floodplain channels throughout the study reach to ensure the 2-Dhydraulic model is accurately modeling surface connectivity between main channel and off-channel habitats, and to account for hyporheic and groundwater influence. The extensive network of piezometers installed in the Barnaby Reach represents a high analytical standard, but scaled-back levels of data collection would also prove informative for model calibration and validation. Selection of monitoring sites and data collection could be coordinated with City Light's Wetland Assessment (see comments in this filing for TR-02) and other ideas generated in the technical work group assembled for this study.  Off-channel areas should be included in the Substrate Mapping and Cover Mapping. The ongoing NPS landform mapping study (Riedel et al., in prep) may be useful for predicting expected changes in substrate and hydraulic roughness in response to channel maintenance flows, though NPS should be consulted on the utility of this suggestion. The Cover Mapping would provide useful information for assessing habitat value for anadromous salmonids.  Substrate and cover mapping could be coordinated with City Light's Wetland Assessment (see comments in this filing for TR-02)	Please see comment response NPS-C08.  The extensive field monitoring program for the FA-02 Instream Flow Model Development Study (Section 2.6.1.5) will provide the data required to calibrate the instream flow model to mainstem water levels with good accuracy up to an approximately 4- or 5-year recurrence interval flood event. This, in turn, will support reliable assessment (conducted in GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study) of the relationship between mainstem flow and potential side channel or off channel surface connectivity. No expansion of the field monitoring program is proposed.  Substrate and cover mapping will be conducted for the mainstem Skagit River and for significant side channels directly connected to the mainstem and with hydraulic condition determined by mainstem flows. No substrate or cover mapping of other areas is proposed.
216.	Upper Skagit Indian Tribe	03/08/2021	p. A34	USIT-C26	N/A	FA-02 Section 2.6.1.6	<u>Model Calibration and Validation.</u> To understand Project impacts to process flows, the 2-D hydraulic model will need to accurately assess high flow conditions in the floodplain, including for flows above those observed during the current license period. During the PSP meetings, City Light indicated that it has collected data for an event with an approximate return period of 1.5 years at Newhalem and 2.5 years at Marblemount. USIT believes that collection of data during a larger event would improve model accuracy for assessing process flows. City Light should continue collecting data on high flows throughout the study period. Even if the information could not be fully incorporated into the model for the relicense study, it could inform uncertainty of model outputs. If the model continues to be used following the relicense studies (e.g. as a basis for monitoring and adaptive management under management planning efforts), collection of additional high flow data could be used to refine the model accuracy for future model application.  More importantly, in its ongoing efforts to collect calibration and validation data, City Light has not incorporated USIT's previous requests to calibrate and validate the model in floodplains and off-channel habitats. If City Light limits data collection to	City Light intends to continue operation of its network of mainstem water level recorders for the study period and in the event of a large flood will make every effort to collect mainstem water level data and document flood extent within the study reach.  Please also see comment responses USIT-C22 and USIT-C25.

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							<p>events referenced above, the model accuracy in floodplain areas may be inadequate, restricting our ability to understand Project impacts in these important habitats.</p> <p>Collection of topo-bathymetry and monitoring of surface water level in off-channel habitats will be necessary for model calibration and validation.</p>	
217.	Upper Skagit Indian Tribe	03/08/2021	p. A34	USIT-C27	N/A	FA-02 Section 2.6.2	<p><u>Consultation and Report Preparation.</u> The final workshop proposed by City Light is for model calibration and discussion of future model application. USIT is very concerned that City Light's proposed schedule does not include a schedule and process for LPs to participate in model application, including identification and valuation of model scenarios. During the PSP meetings City Light agreed to include this in the RSP (Appendix C448).</p> <p>USIT's requested changes to the 2-D hydraulic model would need to be included as part of the workshop schedule and this should be reflected in the RSP.</p>	Please see comment response Ecology-C19.
218.	Upper Skagit Indian Tribe	03/08/2021	p. A34	USIT-C28	N/A	FA-02 Section 2.8	<p><b>Schedule.</b> The schedule should be revised to accommodate the above request for LP participation in model application, including identification and evaluation of model scenarios.</p> <p>Opportunistic monitoring for high flow events should be extended throughout the study period. City Light proposes to end this effort in July 2021.</p>	Regarding schedule, please see comment response Ecology-C19. Proposed data collection to support development, calibration and validation of the instream flow model is robust and includes continuous water level and concurrent discharge data at six locations throughout the study reach. Additionally, data will be collected at three discharges covering the range of discharges and hydraulic conditions of primary interest to fisheries management, as well as at one high flow discharge (beyond the continuous water level and discharge data).
219.	Upper Skagit Indian Tribe	03/08/2021	p. A35	USIT-C29	N/A	FA-02	<p><b>Application to License Development.</b> Side channels and off-channel habitats in the floodplain of the Skagit River provide spawning and rearing habitat for a variety of anadromous salmonid species and have been identified as important limiting factors for rearing habitat in the Skagit Chinook Recovery Plan (SRSC and WDFW, 2005). USIT is concerned that ongoing Project operations are impacting floodplain habitats by directly reducing connectivity to existing habitats and indirectly by limiting the development and maintenance of these habitat types. The Project reduces connectivity to these habitats through alterations in the timing, duration, and magnitude of high flows, by obstructing sediment transport downstream of the project, and by reducing the quantity of woody debris in channels. The combined effect of these three factors can have considerable consequences on connectivity of floodplain channels. The requested modifications to FA-02 are needed to account for Project-related impacts to these important salmonid habitats.</p> <p>The 2-D hydraulic model would also provide information to help set fish migration flows. Model results would help identify opportunities to release adequate flows during the appropriate migratory seasons. Migratory flow needs include both spring peak flows for juveniles migrating to the salt water and flow pulses that coincide with adult migration to spawning grounds in the fall. These flow conditions would be considered with those described above related to process flows. Indeed, the two are to a degree inseparable. For instance, in response to a spring flow peak, juvenile Chinook may respond by either initiating migration to salt water or by accessing newly connected off-channel habitats in pursuit of a freshwater opportunity for growth, and a conferred survival advantage for its upcoming salt water journey. Considering Project-related reductions in spring peak flows downstream of the Sauk River (see comments on GE-04), which coincides with juvenile migration for all anadromous salmonid species in the Skagit River, as well as the most productive off-channel</p>	Please see comment responses ARTU-C03, ARTU-C04, and Ecology-C19. City Light agrees that the model "will be critical in developing monitoring programs and responses over the term of the next license in a robust adaptive management program" and has proposed developing the model to address current relicensing information needs, in addition to evolving as necessary over the term of the next license to support adaptive management.

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							<p>habitats in the Skagit basin (SRSC and WDFW, 2005), it is important to extend the study below the Sauk River confluence.</p> <p>In addition to floodplain habitats, specific types of main channel habitats, including low-velocity edges and backwater alcoves, also provide important Chinook rearing habitat (SRSC and WDFW, 2005). The Project has caused incision and simplification of the channels downstream of Gorge Dam, impacting these main channel habitats used by Chinook and other anadromous salmonids. The simplified channels also reduce spawning habitat and increase scour risk, whereas improved sediment transport and increased wood quantity would provide spawning habitats that remain protected from scouring forces over a wide range of flow conditions (Senter and Pasternack, 2011). The requested revisions to FA-02, when combined with results from other requested studies, including revisions and additions to GE-04, would be able to assess the complex interactions of flow, sediment, and wood in terms of geomorphic change. Understanding these interactions will aid in understanding how Project operations influence overall aquatic productivity as highlighted in comments to FA-01 and the Riverine and Riparian Productivity Study Request included in this filing. These studies would more accurately identify specific Project impacts while providing the necessary tools to assess potential operational alternatives and shared interests in a forward-looking approach to better balance City Light's needs with those of USIT and the Salmon and Steelhead they are seeking to protect. Future use and calibration of this model will be critical in developing monitoring programs and responses over the term of the next license in a robust adaptive management program.</p>	
220.	Upper Skagit Indian Tribe	03/08/2021	p. A36	USIT-C30	Sections 6.2.10, 6.3.3, 6.3.10  (USIT-01, USIT-02, USIT-03, USIT-04)	FA-04	<p>The Upper Skagit Indian Tribe (USIT) submitted four Study Requests (SR) under the topical binning of fish passage and three other Study Requests that address additional data gaps associated with aquatic habitat productivity and connectivity. The four studies related to City Light's FA-04 include:</p> <ol style="list-style-type: none"> <li>(1) Feasibility Analysis of fish Passage at the Skagit River Hydroelectric Project (Fish Passage Feasibility);</li> <li>(2) Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon and Sockeye Salmon above Gorge Dam (Tributary Habitat Productivity);</li> <li>(3) Evaluating Existing Fish Passage: Spill and entrainment Through Ross, Diablo, Gorge Dams and Appurtenant Facilities Through the Project Area at the Skagit River Hydroelectric Project (Spill and Entrainment); and</li> <li>(4) Assessment of Gorge Dam Removal.</li> </ol> <p>USIT's requested studies related to fish passage include:</p> <ol style="list-style-type: none"> <li>(5) Reservoir Secondary Productivity;</li> <li>(6) Littoral and Riparian Habitat Productivity; and</li> <li>(7) Water Quality.</li> </ol> <p>All of these requested studies are covered in detail in the associated sections of our comments below.</p> <p>City Light released its Proposed Study Plan (PSP) in December of 2020. Chapter 6 (Response to Study Requests) indicates how City Light intends to address each study request as was summarize in table 6.0-1 (p. 6-2-19). To summarize, City Light rejected: Spill and Entrainment; Quantifying Habitat Potential and Gorge Dam Removal. It approved with modification Fish Passage Feasibility. As shown below, City Light did not meet the requirements of 18 C.F.R. §5.11 in its rejection of USIT's study requests.</p>	<p>Regarding revisions to the FA-04 Fish Passage Technical Studies Program, please see comment responses ARTU-C02. Regarding entrainment, please see comment response NPS-C76. City Light proposes forming a three-member Independent Expert Panel, multiple collaborative workshops and the integral participation of a fish passage engineer from NMFS in the planning and implementation of the FA-04 study.</p> <p>Regarding Assessment of Gorge Dam Removal, Reservoir Secondary Productivity, and Littoral and Riparian Habitat Productivity see comment responses USIT-C49, NPS-C72, and NPS-C75.</p>

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							<p>During the Proposed Study Plan (PSP) meetings, USIT and other License Participants (LPs) presented information to clarify the technical and policy basis for their study request and resolve concerns about study methodology and adequacy of existing data. City Light, USIT, LPs, and FERC staff participated in over a dozen meetings to address these study discrepancies and seek accommodations. In response to presentations given by USIT and LPs during PSP meeting # 5 on Feb. 9, 2021 (Appendix B, pp. B109 – B202), City Light agreed to expand FA-04 to include fish passage feasibility for upstream and downstream movement in all three reservoirs according to their Issue Resolution Form (IRF) on Feb. 23, 2021 (Appendix C page C460). However, the IRF was vague in how City Light aimed to incorporate the associated changes, as well as when the studies would be completed. Therefore, USIT will address components of the fish passage feasibility IRF, below. City Light also provided an IRF on Feb. 23, 2021 stating the intent to address habitat potential above Ross Reservoir in a new study request to be submitted in the Revised Study Plan (Appendix C p. C462). As with the IRF detailing changes to FA-04, City Light's habitat potential IRF is vague and will be addressed in section 6.3 below.</p> <p>City Light proposes to be the principal investigator in charge of FA-04. While it is common practice for the Applicant to be the lead for a study plan under the Integrated Licensing Process, USIT has significant concerns with City Light being the "Lead investigator." USIT request that the "Lead Investigator" should be a neutral entity consistent with applicable guidance implementing the Data Quality Act. See "Federal Energy Regulatory Commission Information Quality Guidelines Implementing Section 515." Further, when this issue was expressed to City Light during the final PSP meeting, its CEO clarified its reason for being the "Lead Investigator" was to ensure that specific time frames were complied with. Understanding that time frames are merely scheduling matters, USIT requests that City Light maintain authority over the administration of the study but defer to NMFS and USFW for the study design and implementation. This would enhance objectivity, which is critical to USIT given the significance of the study, the length of the license, and the Treaty rights impacted by the Project.</p> <p>USIT is requesting the adoption of all the Tribe's Study Requests submitted in October of 2020, and further requests additional details on scope and timing of the fish passage technical study programs be documented in the RSP. As we have now completed the PSP meetings USIT cannot accept the level of uncertainty and ambiguity on Study Plan accommodations to date for something they consider critical in the process. These Study Requests will provide vital data to assist in the protection and rebuilding efforts of all anadromous and native riverine fish impacted by the project.</p>	
221.	Upper Skagit Indian Tribe	03/08/2021	p. A37	USIT-C31	N/A	FA-04	USIT understands that City Light documented an accommodation during the PSP meeting via the IRF stating City Light will now conduct a fish passage feasibility study for all three dams and reservoirs studying the feasibility of upstream and downstream passage as opposed to its original phased approach. Therefore, USIT will not provide comments in this now antiquated section of the report, and instead focus remaining comments to the FA-04 Fish Passage Technical Studies Program (SCL PSP Appendix D pg. 413 – 432) and address rejected SRs with comments from their associated sections 6.3.3, 6.3.4, 6.3.5 and 6.3.10 below.	Please see comment responses ARTU-C02.
222.	Upper Skagit Indian Tribe	03/08/2021	p. A38	USIT-C32	N/A	FA-04 Section 1.2	<b>Relicensing Process.</b> On p. 1-2, City Lights states: "In 2019-2020, City Light convened a series of Resource Work Groups (RWG) to engage agencies and other licensing participants (LP) in the Study Plan Development	City Light has carefully reviewed all study requests submitted by LPs, considered feedback provided by LPs during the PSP Meetings and subsequent topic-based discussion meetings, and

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							<p>Process. This study plan reflects RWG discussion and study requests and comments submitted by LPs.”</p> <p>This document does not accurately reflect the discussions of either Resource Working Groups or the Steering Committee, nor is the PSP a satisfactory document in response to the SRs submitted by USIT, state and federal agencies resource agencies. In fact, USIT lead the creation of an alternative process known as “The B Caucus” which included all Tribes, LPs, affected Agencies both Federal and State, as well as Local governments. USIT lead the creation of resources Caucus as a result of City Lights failure to accurately document the discussions of both Resource Working Groups and the Steering Committee, and even misrepresenting outcomes, which when USIT requested corrections to the notes its request was not honored.</p>	reexamined its approach to the relicensing study process. In response to recommendations from the LPs and in the spirit of collaboration, City Light has added five additional studies and expanded a number of previously proposed studies in this RSP. In some cases, these studies do not necessarily fall within the FERC Study Criteria, and City Light does not believe these studies are required for the relicensing. Rather, City Light has proposed to expand its study plan program to take an ecosystem approach and to demonstrate its commitment to working with LPs and to compromise with its partners to accommodate their information needs beyond the relicensing process.
223.	Upper Skagit Indian Tribe	03/08/2021	p. A38	USIT-C33	N/A	FA-04 Section 2.2	<b>Resource Management Goals.</b> The Resource management goals provide by USIT, state and federal resource agencies were not summarized in this section; instead, a refence is provided to a separate section of the same report on which agencies submitted their resource management goals. Given the statutory authorities of tribes and resources agencies USIT requests these management goals be included in the Revised Study Plans (RSP) under Resource Management Goals.	LPs’ Resource Management Goals are included in the record and cross-referenced in each study plan.
224.	Upper Skagit Indian Tribe	03/08/2021	pp. A38-A42	USIT-C34	N/A	FA-04 Section 2.3	<p><b>Background and Existing Information.</b> On p. 2-3 City Light states: “Fish use survey results in the bypass reach (Envirosphere 1989; USIT 2016) and Bull Trout genetics studies (Smith 2010; Small et al 2016) support the conclusion that the lowermost barrier at 0.6 miles upstream of the powerhouse historically blocked the upstream movement of salmon and Bull Trout in the Skagit River.”</p> <p>On p. 2-5 City Light states: “City Light acknowledges that anadromous fishes use the lower reach of the Gorge bypass, upstream to the lowermost potential passage barrier” (Envirosphere 1989).”</p> <p>During the ILP process City Light licensing manager also acknowledged historic anadromous fish passage above the Gorge Bypass reach. The Envirosphere 1989 report is often misrepresented as the report documenting two definitive barriers in Gorge Bypass. Key statements from the 1989 Envirosphere Report Section 4.0 Gorge Bypass Reach Fisheries Report, Fish Barrier Analysis Results 4.5.2 key are quoted below.</p> <p>Several block quotes from Envirosphere (1989) and discussion on passage through the ‘boulder gardens’.</p> <p>City Light cites “USIT 2016” as further evidence that anadromous fish never ascended above the 0.6-mile boulder garden cascade in the Gorge Bypass. The May 2016 survey was conducted with staff from the National Park Service, Washington Department of Fish and Wildlife (WDFW), and City Light. The survey was completed 55 days after the last recorded spill which occurred on March 15 and lasted for an hour with a flow of 220 CFS. The partial survey was conducted in an upstream direction starting from the bridge in Newhalem and ended just above 0.6 boulder garden cascade. It needs to be stated that given time constraints for safety training and processes the survey was limited to a partial survey and was terminated just upstream of the 0.6 barrier. The lower section had aquatic connectivity to the Skagit from backwater and hyporheic</p>	Please see comment-responses ARTU-C02.

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							<p>surface flow expression, but as surveyors worked upstream aquatic habitat became sparse and eventually lost surface connection downstream with only isolated pool habitat still wet. The results of the survey recorded 4 adult steelhead, steelhead redds, older dried redds, and numerous Coho fry and O. mykiss juveniles of two size classes all in the lower section below the boulder garden cascade and only O. mykiss juveniles above the boulder garden cascade. See Figure 1 below from the PSP meeting presentations for additional information from this survey. The inference drawn by City Light that this survey information could draw conclusions on the survey date's passage feasibility or that the results could be used to represent historic conditions is severely erroneous. [Figures 1 and 2]</p> <p>On p. 2-4 City Light states:                      "However, there have never been any credible documented observations of anadromous fishes in the bypass reach above the two potential upstream barriers."</p> <p>In May 2018 USIT, City Light, and NPS fish use survey in the Gorge Bypass recorded Coho juvenile salmon above the 0.6 cascade boulder garden. We question why the tribal and agency fish uses surveys do not meet City Lights standards for credible information, and refer to Figure 2 for additional information from these surveys presented at the PSP meetings.</p>	
225.	Upper Skagit Indian Tribe	03/08/2021	p. A42	USIT-C35	N/A	FA-04 Section 2.4	<b>Project Operations and Effects on Resources.</b> Project operations that dewater the almost 3 miles of the Skagit River effect cultural resources and causes direct impacts to sediment transport, suspended solids, nutrient pathways, LWD delivery and transport, thermal modifications, reduce or severely impacted native riverine fish migration, spawning and rearing habitat. Without passage structures, the Project blocks nearly all movement (aside from downstream movement through spill and entrainment) of aquatic organisms seeking to express normal migrating and foraging behavior up and down the waters of the Skagit River thereby reducing species viability and productivity.	Please see comment responses ARTU-C02.
226.	Upper Skagit Indian Tribe	03/08/2021	p. A42	USIT-C36	N/A	FA-04 Section 2.5	<b>Study Area.</b> USIT understands that City Light has formerly changed the Study Area to include all three reservoirs and dam structures based on IFR: LP Request for Investigation and Analysis of fish passage (Appendix C-C459).	Please see comment responses ARTU-C02.
227.	Upper Skagit Indian Tribe	03/08/2021	p. A42	USIT-C37	N/A	FA-04 Section 2.6	<b>Methodology.</b> City Light proposed to drop phase 1 of the PSP and USIT anticipate the project will start during year 1 of study period and results will be ready by Initial Study Report (ISR) as stated previously. "The scope will generally follow, and be consistent with the tasks in NMFS Study Request 4." USIT requests that City Light adopt in full SR submitted by NMFS, USIT and others for the RSP. As stated in comments to FA-01 within this filing (and tied in with other comments such as GE-01 and aquatic productivity), USIT and other LPs are requesting a hydrodynamic model (e.g. CE-QUAL-W2) to evaluate how Project operations influence aquatic habitat conditions within and below the reservoirs. Such model would be instrumental in determining conditions out-migrating smolts will face when exiting the system.	Please see comment responses ARTU-C02.
228.	Upper Skagit Indian Tribe	03/08/2021	p. A42	USIT-C38	N/A	FA-04 Section 2.7	<b>Consistency with Generally Accepted Scientific Practice.</b> As stated previously USIT does not object to City Light being the Lead to ensure that their schedules are met, but USIT strongly requests that NMPS or USFWS be the Lead Investigator for all substantive measures of the Study Plan including but not limited to Scope and Methods.	City Light proposes forming a three-member Independent Expert Panel, multiple collaborative workshops and the integral participation of a fish passage engineer from NMFS in the planning and implementation of the FA-04 study.
229.	Upper Skagit Indian Tribe	03/08/2021	p. A42	USIT-C39	N/A	FA-04 Section 2.8	<b>Schedule.</b> USIT cannot determine what the proposed study plan schedule is based on limited and contradicting information, however USIT requests the earliest start and completion date as possible or for the City Light to follow SR schedules identified by tribes and resource agencies.	Please see comment responses ARTU-C02.



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230.	Upper Skagit Indian Tribe	03/08/2021	p. A43	USIT-C40	N/A	FA-04	<b>Application to License Conditions.</b> The intention of the study request is to develop criteria for determining feasibility of passage (both upstream and downstream) based on biological and engineering considerations, assemble physical, biological, and environmental data for the project structures, then develop fish passage concepts and planning level cost estimates, at each facility. The output from this study will be a Fish Passage Feasibility Report that will address feasibility of safe, timely and effective passage of target species at all three project locations independently and as part of a comprehensive fish passage concept through the Project. This report will inform other necessary considerations and assessment needs should the feasibility of passage meet the established criteria. This work supports the development of Project modifications or operation alternatives as it relates to tribal management goals and assist USIT in future consultations with the Federal Power Act's Section 18 agencies.	Please also see comment responses ARTU-C02.
231.	Upper Skagit Indian Tribe	03/08/2021	p. A43	USIT-C41	Sections 6.2.10, 6.3.3, 6.3.10, 6.3.4, 6.3.5  (USIT-02, USIT-03, USIT-04, USIT-05, USIT-06)	N/A	USIT requests Reservoir Entrainment, Reservoir Secondary Productivity, Reservoir Tributary Habitat Potential, Reservoir Littoral Habitat and Riparian Habitat Quality, and Gorge Dam Removal studies that City Light rejected be added to the Revised Study Plan due to continued Project operational impacts to fishery resources in the Skagit River	Please see comment responses NPS-C76, NPS-C72, and NPS-C75.
232.	Upper Skagit Indian Tribe	03/08/2021	p. A43-A47	USIT-C42	Section 6.3.3  (USIT-03)	N/A	<p>The impact of reservoir spill and entrainment on fishes in the Project's reservoirs (and the Skagit River below Gorge dam) is a Project impact that is still of concern to USIT and LPs (please see Appendix B179 for USFWS's PSP meeting #5 presentation on entrainment). USIT is therefore recommending that City Light modify their ongoing existing compliance monitoring, and accommodate scheduled reporting to fit into the ILP process, or commit to conducting the SR submitted by USIT and other state and federal resource agencies. USIT, with financial support from the NCC, has purchased Teknologic autonomous receivers (Teknologic Engineering LLC, Edmonds, WA) for anadromous salmon research programs in the basin that are currently not in use. USIT therefore is offering to collaborate with City Light to expand the monitoring of the existing or accepted SR in the RSP by lending this equipment to reduce project costs and address data needs by USIT and other state and federal resource agencies which should effectively mitigate the cost concerns addressed in 18 CFR § 5.9(b)(7).</p> <p><i>[pp. A43-A45 Continues to provide discussion on the inadequacies of existing information to provide FERC with the necessary information to meet NEPA requirements ("FERC's reliance on data from a decade-old survey of fish entrainment provided by the applicant without any updated information, field studies, or independent verification was "unreasoned" and violated NEPA"). They acknowledge that the 2012 Biological Evaluation-Supplement: Impacts of Entrainment on Bull Trout is insightful, but "is not adequate to accurately estimate entrainment of ESA listed Bull Trout let alone other native riverine species of concern".</i></p> <p><i>The discussion continues to emphasize inadequacies of the study, including a lack of size classes (i.e., juveniles and smaller) evaluated, no addressing of regulating outlets (bypass or outlet valves); temporal analysis (i.e., migratory behavior); effects of pressure/temperature; effects of operational scenarios; detection efficiency or range of acoustic receivers; evidence of Redside Shiner colonization downstream. ]</i></p> <p>p. A46 Fishery resource agencies have been collecting sporadic fish presence studies in the Gorge Bypass Reach when conditions and access can be obtained through the utility after spill events. Due to safety protocols and lack of coordination between City Light</p>	Please see comment response NPS-C76.

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							<p>and LPs efforts to study fish movement during these spill events have been plagued with protracted temporal gaps. These supplemental surveys have often been completed months after the reach has been drained of water, resulting in limited sampling of isolated pool habitats. However, fishery managers have documented native char, O. mykiss and Eastern Brook Trout movement into the Gorge Bypass after spills. Without knowledge of upstream fish movement into the bypass after spill, it is not possible to determine if fish presence in the bypass is due to upriver movement seeking rearing/spawning habitat after spill or fish from the reservoirs surviving a spill event over Gorge. Eastern Brook Trout presence, regardless, is an ecological concern through hybridization and competition with native char and salmonids. Because fish are known to have been entrained through the dam/structures, there is a data gap about the type of effects and the mortality associated with operations. New information is needed, therefore, to fully understand entrainment and mortality at this unique facility. Spill duration and resident time with seasonal specific fish presence studies, hydraulic, and environmental conditions could supplement existing studies to see how the duration and volume of spill may influence fish behavior and movement. Currently, we can only state that these observed fishes are entrained through the dam and structures and that some are surviving downstream over the Gorge Dam. Therefore, the numbers impacted, their distribution, and survival to spawning is unknown.</p> <p><i>[USIT continues to provide further explanation/justification.]</i></p>	
233.	Upper Skagit Indian Tribe	03/08/2021	pp. A47-A55	USIT-C43	Section 6.3.4 (USIT-05)	N/A	<p>USIT requested City Light examine reservoir and tributary productivity as part of evaluating fish passage, and USIT is requesting those studies again, as they were rejected (Tributary Habitat Potential, Reservoir Secondary Productivity, Littoral and Riparian Habitat quality, and Fish Population Dynamics). Within the context of fish passage, understanding impacts of Project operations on aquatic productivity is critical to optimize salmon reintroduction efforts by conditioning the license to develop Project operations for increased reservoir habitat quality. Project operations such as drawdowns can limit fish access to reservoir tributaries but they can also degrade reservoir productivity and habitat conditions. The Project can also directly block salmonid access to reservoir tributaries through elevated turbidity and large drawdowns (see comments to FA-06 for details)... Therefore, evaluating aquatic productivity (including prey availability and food web relationships) as well as tributary habitat potential are both critical to evaluating fish passage scenarios... USIT is thereby requesting City Light to revisit the Secondary Productivity and Tributary Habitat Potential study requests and include them (in their entirety) as part of the Revised Study Plan (USIT Study Request pages A3-15 – A3-23 and A3-56 – A3-76). Conducting these studies in their entirety will allow for meaningful license conditions that will increase habitat quality for ESA listed salmonid species.</p> <p>City Light failed to incorporate the Quantifying Habitat and Production Potential of ESA-listed Chinook Salmon, Steelhead, Bull Trout, Coho Salmon and Sockeye Salmon above Gorge Dam (Tributary Habitat Productivity) into the PSP as detailed in PSP section 6.3. However, in their 2/23/21 IRF, City Light lumped this study request with the Reservoir Secondary Productivity Study Request maintaining that their new study will address both reservoir and tributary habitat potential (Appendix C461). We are therefore including Tributary Habitat Productivity in the evaluation of City Light's rejection of the aquatic productivity study request. The details provided by City Light in their IRF are quite limited, and in general, based on the IRF and PSP, City Light mischaracterized the nature of USIT's study requests. Consequently, City Light's proposed study will fall short of satisfying the goals and objectives set forth in USIT's Study Requests (USIT Study Request pages A3-15 and A3-57). Moreover, City Light states in the IRF that fish spawning and rearing habitat upstream of the</p>	Please see comment responses NPS-C72 and NPS-C75.

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							Project reservoirs are not impacted by Project operations. USIT disagrees with this statement, and has provided numerous lines of evidence and issues of concern regarding potential (please refer to USIT Study Request filings A3-15 and A3-56 as well as PSP meeting presentations Appendix B189 – B228).	
234.	Upper Skagit Indian Tribe	03/08/2021	pp. A47-A55	USIT-C44	Section 6.3.4 (USIT-05)	N/A	<p><b>Tributary Habitat Potential.</b> Central to successful fish passage feasibility discussions is determining tributary habitat potential for spawning salmon above the Project infrastructure. UIST is therefore requesting the Quantifying Habitat and Production Potential of ESA-listed Chinook, Salmon, Steelhead, Bull Trout, Coho Salmon, and Sockeye Salmon Above Gorge Dam (Tributary Habitat Potential) Study Request be included, in its entirety (for all species listed), in the RSP (please see 10/26/2020 USIT Study Request filing page A3-15). This analysis should be conducted for all tributaries of Gorge, Diablo, and Ross reservoirs in addition to the entire area of useable tributary and mainstem Skagit River habitat in Canada above Ross reservoir. The Project blocks approximately 175.7 miles of stream and river habitat (3rd order or larger) available to salmonids for spawning and rearing (Appendix B196 – B199). The amount of available habitat would nearly double the amount of tributary habitat available to spawning salmon and steelhead currently accessed below Gorge dam (Appendix B200 – B201). Such an increase in available habitat could have significant implications to salmon recovery in the Skagit basin and the Salish Seas. As this habitat is located in headwater streams with little anthropogenic influence, evaluating its potential is an opportunity that should not be overlooked (similar to the magnitude and success of reintroducing salmon into the upper Elwha River, WA).</p> <p>The mischaracterization of USIT's study request aimed at determining productivity potential is further demonstrated by City Light's IRF proposal to use a population modeling exercise, without a clear justification as to why this exercise is the most appropriate tool (Appendix C461). To provide meaningful comments, more details on City Light's proposal put forth in the IRF are needed. Regardless, this level of modeling exercise is not the request put forth by USIT or other LPs and is likely not an appropriate modeling exercise at this time. For example, it is unclear how the proposed methods in the IRF will associate with fine scale habitat conditions to Project operations. USIT believes that accurate estimates of production potential need to be based on as much high-quality empirical data as possible, fed into an Intrinsic Potential or NetMap model, and USIT would like to note those models are only as informative as the accuracy of the empirical data being collected. The utility of the current data being collected and proposed to be collected needs to be fully evaluated (in a QAPP) therefore to ensure it is of the best quality and most appropriate utility (i.e. "the right tool for the job") to answer the required questions.</p> <p>The use of insufficient data is highlighted in the current habitat modeling being conducted. Currently, the USGS work cited by City Light in the IRF is utilizing NetMap with a 10m digital elevation model. This level of resolution has been raised by LPs as an issue, and it is not recommended by the manufacture, rather, LiDAR is recommended to obtain meaningful results (<a href="http://www.netmaptools.org/Pages/NetMap_LiDAR_10m_comparison.pdf">http://www.netmaptools.org/Pages/NetMap_LiDAR_10m_comparison.pdf</a>). Merely relying upon fish densities and limited habitat parameters for habitat suitability (as it appears City Light is proposing to do) may be a poor indicator of habitat quality; therefore, USIT urges City Light to explore the utility of a drift feeding model that integrates both the comprehensive physical habitat and biological production effects to production (Rosenfeld et al. 2014; Rosenfeld et al. 2016). It has been noted that mechanistic, bioenergetics-based models provide more robust and rigorous estimates of habitat suitability for drift feeding stream fishes than traditional habitat suitability models (Naman et al. 2019). Due to their utility in determining impacts of flow on</p>	Please see comment-responses ARTU-C02. City Light is confident that the FA-07 Reservoir Tributary Habitat Assessment will provide the information needed to assess the feasibility of attempting to establish fish passage at the three Project developments and the viability of a potential fish introduction program upstream of the dams.

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							fish production, this model development would be useful for many other studies aimed at examining the impact of flow and prey availability (e.g. FA-01 water quality, FA-02 instream flow, GE-04 geomorphology study requests, and the Riverine and Riparian Productivity Study Request USIT submitted). It is therefore suggested for City Light to revisit the goals and objectives of the Tributary Habitat Potential to ensure the correct modeling exercise is being chosen, and the most accurate (and appropriate) data possible is being collected to answer the goals and objectives of determining the habitat potential of tributary habitat above Project infrastructure.	
235.	Upper Skagit Indian Tribe	03/08/2021	p. A49	USIT-C45	Section 6.3.4  (USIT-05)	N/A	<b>Application to License Development.</b> Conducting tributary habitat potential studies (in the manner requested in the Tributary Habitat Potential Study Request) will allow for informed discussions regarding the magnitude of habitat available for salmon reintroductions into the Skagit system above Gorge dam. It will inform structure and design of reintroduction programs, allow for integration of biological interactions/data with a CE-QUAL-W2 model to determine optimal hydraulic conditions for out-migrating juveniles, biological monitoring criteria, and tie into existing management of resources	Please see comment response USIT-C44.
236.	Upper Skagit Indian Tribe	03/08/2021	pp. A49-A53	USIT-C46	Section 6.3.4  (USIT-05)	N/A	<b>Reservoir Secondary Productivity.</b> The purpose of the USIT Reservoir Littoral, Benthic, and Pelagic Invertebrate Productivity (Secondary Productivity Study Request submission page A3-56) was to evaluate reservoir habitat potential by investigating how Project operations impact reservoir invertebrate dynamics. Understanding secondary productivity is important when considering Project operational impacts to both resident fish management and for understanding habitat potential for fish passage. Within the context of fish passage, understanding how operations impact habitat quality will be important during discussions of reintroducing salmon above Gorge as operations that limit habitat potential directly impact those efforts.  <i>[Continues to provide 4 pages of justification for study, including an excerpt from SD2, and figures]</i>	Please see comment response NPS-C72.
237.	Upper Skagit Indian Tribe	03/08/2021	p. A53	USIT-C47	Section 6.3.4  (USIT-05)	N/A	<b>Application to License Development.</b> Understanding the Project operational dynamics governing secondary productivity within the Project reservoirs will also be paramount when developing a successful fish passage and introduction programs. That is, by fully understanding how the Project influences productivity, license conditions can be developed to optimize reservoir secondary productivity and hydraulic conditions to benefit salmonid species- resulting in a more robust ecosystem and more successful introduction of salmon into the area fueling species recovery. City Light's claim that the results of a secondary productivity study request will not be able to inform license conditions is incorrect. As demonstrated there is a clear nexus, for example, between drawdowns and productivity. During the formation of license conditions, stipulations can therefore be put into place that reduce the impact of operations on productivity by: <ul style="list-style-type: none"> <li>▪ Changes in drawdown frequency and intensity</li> <li>▪ Altered hydraulic regimes</li> <li>▪ Enhance water temperatures</li> <li>▪ Restoration activities to increase littoral habitat and its complexity</li> <li>▪ Defining of habitat conditions</li> <li>▪ Framework to monitor and adaptively manage within the license</li> </ul> <p>It is worth stating that the Reservoir Secondary Productivity Study Request is linked to many other studies- increasing its importance and relevance of data collection to inform other license requirements including but not limited to the following studies (e.g. specific links):</p> <ul style="list-style-type: none"> <li>▪ FA-01 Water Quality (e.g. the need for bathymetry and hydrodynamic modeling)</li> </ul>	Please see comment response NPS-C72.

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							<ul style="list-style-type: none"> <li>▪ Littoral and Riparian Habitat Quality Study Request (e.g. habitat quality)</li> <li>▪ Tributary Habitat Potential Study Request (e.g. habitat quality/potential)</li> <li>▪ USGS food web research (e.g. fully understanding food web relationship implications)</li> <li>▪ FA-03 Reservoir Fish Stranding (e.g. habitat quality)</li> <li>▪ FA-04 Fish Passage Feasibility (e.g. habitat quality)</li> <li>▪ GE-01 Shoreline Erosion (e.g. habitat quality)</li> <li>▪ OM-01 Operations model (e.g. operations needed for specific hydraulic conditions)</li> <li>▪ TR-09 Beaver Studies (e.g. habitat quality)</li> </ul>	
238.	Upper Skagit Indian Tribe	03/08/2021	pp. A53-A54	USIT-C48	Section 6.3.5 (USIT-06)	N/A	<p>Littoral and Riparian Habitat Quality. USIT is requesting City Light include, in entirety, the Littoral and Riparian Habitat Quality Study Request (USIT Study Request page A3-77) into the RSP. Project operations effect nearshore habitat through erosion, sediment deposition, and the inundation and dewatering of riparian and wetland communities during drawdown and water level fluctuations. NPS observations of nearshore habitat complexity indicate that this could be a limiting factor for the biological communities in these waterbodies. These effects have also been verified by Gorge Drawdown fish surveys, discussed above, and visual observations in Ross reservoir. Within the context of fish passage, understanding how operations impact habitat quality will be important during discussions of reintroducing salmon above Gorge as operations that limit habitat potential directly impact those efforts.</p> <p>City Light states that the FA-03 Reservoir Fish Stranding and Trapping Risk Assessment will fulfill the concerns raised in the Littoral and Riparian Habitat Quality Study Request. While the desktop exercises, with associated field ground truthing, will be useful in detailing habitat conditions (at a very high level), it will be insufficient to satisfy Littoral and Riparian Habitat Quality objectives- such as evaluate specific habitat characteristics including quantification of woody habitat, identification of restoration activities, and providing an assessment of habitat conditions (USIT Study Request page A3-77; Appendix B207). In this manner, it is clear that City Light mischaracterized or misrepresented USIT's study request and concerns regarding littoral and riparian habitat in the Project's reservoirs. Additionally, City Light states there is no Project effect as indicated by the existing information, but Project level effects include dewatering of the littoral habitat during drawdowns, sediment deposition, and erosion impact habitat quality. Moreover, City Light further maintains that there is "no specific adverse effect demonstrated by the wealth of data already collected within the Project area." This statement contradicts statements made by City Light in the PAD where City Light claims that "shoreline erosion has the potential to affect terrestrial vegetation including rare plant communities along the shoreline, wetlands, riparian areas, cultural resources, wildlife or aquatic habitat, and recreation resources (e.g. trails and campgrounds)" (City Light 2020). These statements are further corroborated by the fact that 8.25 square miles of the 18.25 square miles of the total, full pool surface area in Ross Reservoir is dewatered annually, and significant drawdowns in Gorge Reservoir have resulted in potentially 20 fish kills since 1999.</p> <p>Given the noted impact, it will be important to assess the nexus between Project operations and reservoir littoral habitat. This can be accomplished by satisfying the goals and objectives listed in USIT's original Study Request filling. Suggested methods can also be found in the Littoral and Riparian Habitat Quality filling but include shoreline surveys (e.g. course woody debris habitat complexity) and habitat mapping (details on Study Request page A3-82).</p>	Please see comment response NPS-C75.

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239.	Upper Skagit Indian Tribe	03/08/2021	pp. A55-A58	USIT-C49	Section 6.3.10  (USIT-04)	N/A	<p>USIT submitted the Study Request “Assessment of Gorge Dam Removal”, and City Light responded with their PSP in Table 6.0-1 that the study was rejected. In the PSP document and subsequent PSP meeting processes City Light has failed to address requirements set forth in § 5.11 (4) (“If the potential applicant does not adopt a study request an explanation of why the request was not adopted, with reference to the criteria set forth in §5.9(b)), as it was not a subject of discussion in the PSP meetings nor is there any written record citing what FERC criteria was used to deny the study. USIT therefor requests City Light adopts the Gorge Dam Removal study request in their RSP, and is requesting that commitments for continued dialogue during the ILP process between parties to resolve discrepancies, include this critical study request and tribal information need. (p. A55)</p> <p>Continues to “clarify the intention of the stated goal of the SR”. Also goes on to provide quotations from City Light and the SD1 ‘demonstrating’ erroneous statements by City Light, “therefore, USIT asserts the framing by City Light that FERC somehow has reached a determination on this alternative at this juncture is misleading and needs rectification.” (p. A56)</p> <p>In the current phase of ILP process for #553 the Applicant and LPs are compiling existing information, identifying resources of concerns, assessing these with the Project nexus and how additional information can be used to modify future operations for the benefit of the watershed and its uses. The USIT and other resource agencies have submitted substantial documentation on the projects ongoing operational impacts to aquatic and more specifically fishery resources. This new information improves the administrative record on existing information and should support a robust NEPA review of the project. In addition, the USIT submitted a confidential filing with FERC in regards to existing culturally sensitive information, project nexus, and continued resource impacts under ongoing operations.</p> <p>Continues to summarize further quotations from the SD2 and City Light for justification of this study due to a “combination of their [USIT] cultural filling as well as the significant volume of existing natural resources information presented in tribal, state and federal resource agencies fillings and presentations demonstrates a clear significant resource impact associated with the operations of Gorge Dam.” (p. A57)</p> <p>Continues to provide further justification, citing City Light’s 2018 Integrated Resource Management Progress Report.</p> <p>USIT Requests the Assessment of Gorge Dam Removal be incorporated into the RSP with the modification of conducting the objectives associated 3-7 as the primary role of the study as the objectives 1 and 2 have largely been agreed by City Light in other PSPs.</p> <p>This SR is mandated due to the fact that Gorge Dam encroaches upon land held in reservation status for the purposes set forth in the treaty of Point Elliot, as established by USIT’s ICC decision which held that USIT’s eastern boundary of ceded lands include the “middle of Gorge dam” and (8 Ind. Cl. Com. 475). This adjudicate fact raises the question of how USIT is able to exercise the right to fish in this reserved area when George dam is a physical barrier limiting its Treaty protected right to fish.</p>	<p>City Light provided rationale for not adopting the Upper Skagit Indian Tribe’s request for a dam removal study in Section 6.3 of the PSP and has also included this rationale in Section 6.3 of the RSP.</p> <p>City Light is currently working with the Upper Skagit Indian Tribe through the use of a Protective Agreement to obtain access to their confidential filing.</p>
240.	Upper Skagit Indian Tribe	03/08/2021	p. A59	USIT-C50	Section 5.9	FA-05	<p>USIT requests a task be added to the study to evaluate the structural water delivery system and the feasibility of existing structures to provide the appropriate water</p>	<p>The facilities for delivery of water from Gorge Dam into the Gorge bypass reach consist of a gated</p>

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							<p>quantity and quality to support beneficial uses of the reach. The PAD (pg. 3-10 – 3-23) does not include a descriptive section for Gorge Dam as it does for the other two dams, nor does PAD Table 3.4-1 explain mechanisms for water delivery into the bypass. USIT understands that water can currently be added to the bypass via two pathways, spillway release and through a valve near the base of the dam.</p> <p>USIT requests an addition to this study plan for assessing the biological and engineering feasibility for source water and structure. Then implement other study needs with existing study plans moving forward, for example water quality (FA-01), and fish entrainment (FA-04) be developed for the structure and source of water to be used to satisfy instream flows in the bypass. USIT requests the evaluation of migration and passage include Sockeye Salmon, as well as steelhead sub-adults and kelts, which have not been explicitly agreed to by City Light.</p>	<p>spillway, log chute, and two outlet valves as described in Section 3.4.3 (pg. 3-22 and 3-23) of the PAD. Engineering and operational studies to determine the appropriate means for delivering water to the bypass reach will be performed, if needed.</p>
241.	Upper Skagit Indian Tribe	03/08/2021	p. A60	USIT-C51	N/A	FA-05 Section 1.2	<p><b>Relicensing Process.</b> City Light has not committed to address comments submitted on the PAD for its RSP. USIT described significant concerns about City Light's summary and interpretation of existing information as it relates to current and historic fish use upstream of the Project dams.</p>	<p>City Light appreciates and notes the comments on the PAD. The intent is to evaluate these comments in combination with the results of relicensing study information and to update information summarized in the PAD in the license application as is determined appropriate.</p>
242.	Upper Skagit Indian Tribe	03/08/2021	pp. A60-A61	USIT-C52	N/A	FA-05 Section 2.1	<p><b>Study Goals and Objectives.</b> Hydraulic modeling should not be used to assess fish passage until more reliable approaches have been exhausted. Field observations by trained professionals are the preferred approach, because nothing can model a fish's ability to ascend a challenge better than the fish itself. The primacy of direct observations of fish is supported by WDFW guidelines (WDFW, 2019) Observations of steelhead trout and Coho Salmon as cited by USIT (Appendix B p. B164) upstream of City Light's purported passage barriers (Envirosphere, 1989; PAD section 4.5.1.1) have been made by trained professionals. Considering these observations, the next logical conclusion is that Chinook Salmon and Sockeye Salmon can also ascend the purported barriers, as these species have similar leaping and swimming ability as Coho Salmon (Powers and Osborn, 1985). Interestingly, these contemporary field observations align with historical accounts presented in City Light's own documents (Envirosphere, 1988), which acknowledge passage of Chinook Salmon and steelhead trout to the base of Gorge Dam. The more interesting and important question pertains to the upstream extent of anadromous fish migration. City Light has presented no reliable evidence to help answer this question. Therefore, the existing information proves that Gorge Dam blocks upstream passage of Chinook Salmon, Coho Salmon, and steelhead trout, and likely blocks passage of Sockeye Salmon. Absent additional information, the only reasonable assumption is that anadromous fish historically passed upstream of Ross Dam.</p> <p>Remaining questions pertain to the upstream extent of Pink Salmon and Chum Salmon migration, as well as for younger life stages that have reduced swimming and leaping ability compared to adults. Considering that contemporary and historical evidence indicates 3 or 4 anadromous species were able to ascend the bypass reach before it was dewatered by the Project, USIT believes a hydraulic model is an inappropriate and unnecessary approach to apply to the question of upstream fish passage. Questions of Chum Salmon and Pink Salmon passage should be investigated with more reliable methods, such as barrier assessments and field observations during planned controlled flow releases into the bypass, which should occur as part of the instream flow calibration. Use of the bypass hydraulic model should be limited to those applications for which it is needed and can reliably perform, such as the instream flow analysis. Use of the bypass hydraulic model should be limited to those applications for which</p>	<p>Hydraulic modeling is proposed to generate hydraulic data to support evaluation of fish passage in the Gorge bypass reach by study team fish passage specialists. The primary sources of information to support fish passage evaluation will be field observations of the barriers, including monitoring and/or observations of conditions during both the proposed controlled releases from Gorge Dam and any operational- or maintenance-related spill releases that may occur during the study period. The hydraulic model will provide a tool to assist in interpolating between and extrapolating from field observations of hydraulic conditions and is expected to provide a valuable means for visualizing depths and velocities through the barriers for a range of flows. These data can be used to assess the passability of various fish species and associated life stages of interest.</p> <p>An additional objective of the hydraulic model is to evaluate instream flows as it relates to available aquatic habitat for various fish species and associated life stages of interest (i.e., HSC).</p> <p>Regarding the process, schedule, and application of the model to evaluate the impacts of alternative flow management or Project operation scenarios, please see comment response Ecology-C22.</p>

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							it is needed and can reliably perform, such as the instream flow analysis. City Light's proposed study plan includes development and calibration of the 2-D hydraulic model, but does not include model application to assess potential alternative Project operations scenarios on instream flows and spawning and rearing habitat. USIT is very concerned that City Light has not included a schedule and process for applying the model to assess potential changes in Project operations on flow and fish habitat. Without model runs to assess potential operations scenarios, USIT and other LPs will not have the information needed to develop license requirements, including an understanding of Project impacts on anadromous salmonid habitat and options to improve habitat conditions. During the PSP meetings City Light agreed to include a schedule and process for LPs and City Light to identify and evaluate model scenarios (Appendix C448). USIT requests the RSP reflect this agreement.	
243.	Upper Skagit Indian Tribe	03/08/2021	p. A61	USIT-C53	N/A	FA-05 Section 2.3	<b>Background and Existing Information.</b> Information was presented by LPs during the PSP meetings that indicate Project-related activities may have altered the hydraulic and passage conditions by placing fill in the bypass reach (Appendix B109). These impacts should be considered as part of the passage assessments, including the potential that existing conditions do not accurately represent species-specific historic distribution.	Hydraulic modeling to support evaluation of fish passage under FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study will be conducted for existing Project conditions including the existing geometry of the Gorge bypass reach. Investigation of hydraulic conditions with modified bypass reach geometry could be considered as appropriate.
244.	Upper Skagit Indian Tribe	03/08/2021	p. A61	USIT-C54	N/A	FA-05 Section 2.4	<b>Project Operations and Effects on Resources.</b> City Light does not acknowledge Project impacts on sediment and wood in the bypass. Due to proximity to the dam, reductions in the quantity of sediment and wood are severe. This may have considerable impact on channel hydraulics and passage conditions, as well as habitat conditions for spawning and rearing fish. Project maintenance for protecting infrastructure in the reach has also compromised habitat quality as fishery resources have long been ignored in this reach.	GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study includes an analysis of Project impacts on sediment and wood in the bypass reach.
245.	Upper Skagit Indian Tribe	03/08/2021	pp. A61-A62	USIT-C55	N/A	FA-05 Section 2.6	<b>Methodology.</b> As described above, the hydraulic model should not be used as the primary approach for determining species-specific and life stage-specific passage. Passage throughout the bypass has already been documented for Chinook Salmon, Coho Salmon, and steelhead trout. Based on swimming and leaping ability, Sockeye Salmon can likely access the entire bypass reach. As the primary means of assessing passage, field observations for Chum Salmon, Pink Salmon, and younger life stages should be conducted during planned controlled flow releases into the bypass. This should include measurements at potential passage impediments and direct observations of fish. Whether flow releases should be timed to coincide with adult migration is a sensitive question that will require additional discussion between City Light and LPs during development of the study methods. It would be problematic to release flows that allow upstream adult migration, but not maintain adequate flow to keep eggs viable throughout incubation.	Please see comment response USIT-C52.
246.	Upper Skagit Indian Tribe	03/08/2021	p. A62	USIT-C56	N/A	FA-05 Section 2.6.1.2	<b>Model Topographic Data.</b> Field assessment of human placed fill should be conducted to identify potential artificial impediments to passage. Adequate measures of fill location and volume should be included to allow the model geometry to be manipulated to evaluate how fill removal would influence passage conditions. Much of the artificial fill in the bypass was likely placed by City Light during Project development, including construction of the rail line to Diablo Dam. Other Project actions related to transmission line towers and maintenance may be responsible for some of the fill.	Please see comment response USIT-C53.
247.	Upper Skagit Indian Tribe	03/08/2021	p. A62	USIT-C57	N/A	FA-05 Section 2.6.1.3	<b>Model Geometry Development.</b> As described above, City Light does not acknowledge Project impacts on sediment and wood in the bypass, which may have important implications for channel hydraulics, passage conditions, and habitat for spawning and rearing fish. While it is premature to identify PMEs, enough is known about the	Please also see comment response USIT-C53, USIT-C54, SSIT-C07, and SSIT-C08.



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							importance of sediment and wood for aquatic habitat, as well as the severe reductions caused by Project dams, to expect that sediment and wood augmentation will be a license requirement. City Light should evaluate increase sediment and wood quantities in the bypass. This could be done by manipulating the model geometry to account for changes in bed elevation or hydraulic roughness. Amount and location of wood and sediment, as well as sediment sorting patterns could be informed by releasing sediment and wood in the bypass reach, releasing flows from Gorge Dam, the measuring the resultant transport and distribution within the channel. As described above, removal of artificial fill should also be evaluated.	
248.	Upper Skagit Indian Tribe	03/08/2021	p. A62	USIT-C58	N/A	FA-05 Section 2.6.1.8	Hydraulic Data for Fish Passage Analysis. As described above, the hydraulic model should not be used as the primary method for determining passage.	Please see comment response USIT-C52.
249.	Upper Skagit Indian Tribe	03/08/2021	p. A62	USIT-C59	N/A	FA-05 Section 2.8	<b>Schedule.</b> The schedule for this study needs to be coordinated with the fish passage feasibility study. If this study determines Chum, Pink, or Sockeye can ascend to Gorge Dam, those species need to be included in the fish passage feasibility and reservoir productivity studies.	Species under consideration for study will be discussed with LPs and appropriate coordination will be made with other studies and schedules as determined necessary.
250.	Upper Skagit Indian Tribe	03/08/2021	p. A64	USIT-C60	N/A	FA-06 Section 1.3	<b>Study Plan Development.</b> USIT would like to orientate City Light to the extensive evaluation of the existing information for fish genetics present in USIT's PAD comments (page A1-18) as well as in other LP Study Requests. Based on that review, it is evident that the existing information is not sufficient for characterizing fish genetics within the context of the Project relicense. Much of the current genetics data is laden with sample bias and the collection is not consistent with commonly accepted scientific practices	Existing Project genetics studies were conducted by genetics experts from federal and state fish management agencies (WDFW and USFWS) responsible for the management of fisheries resources in the Project vicinity. City Light considers the studies to be rigorous and adhere to commonly accepted scientific methods.  As detailed in Section 6.2 of the RSP, City Light proposes FA-06 Reservoir Native Fish Genetics Baseline Study. One objective of City Light's study plan is to synthesize the available existing information to foster a shared understanding among City Light and LPs. The study plan references the existing source publications/datasets proposed for inclusion in this synthesis task. The study also includes the collection of data to fill data gaps identified as part of the desktop exercise to synthesize and analyze existing information. City Light plans to work with LPs, and consult with the Expert Panel, to identify gaps in existing data and determine the best path forward for filling those gaps.
251.	Upper Skagit Indian Tribe	03/08/2021	p. A65	USIT-C61	N/A	FA-06 Section 2.1	<b>Study Goals and Objectives.</b> City Light needs to clarify that the goal of the study is to determine how Project operations such as drawdowns, lack of passage infrastructure, and entrainment influence the genetics and population dynamics of both reservoir fish populations but also fish populations below Gorge Dam (as has been highlighted in numerous study request comments, for reference, as well as comments to FA-04 in this filing). With that, the utility of existing genetics data below Gorge as well as the collection of new genetics data from fishes below Gorge should be incorporated as to elucidate how Project infrastructure blockages to fish passage impact genetic and population relationships throughout the Skagit Basin. FA-06 aims to address complex issues. Therefore, it is advised to abandon the phased, 2-year approach and beginning collecting field data in conjunction with the existing data analysis. City Light needs to refer to the shortcomings of most of the current genetics data (e.g. Smith 2010, Kassler and Warheit 2012, and Small 2016) highlighted by LPs in study request submissions (e.g. USIT PAD comments, USFWS Study Request 6,	City Light has revised the study plan to better clarify the goals of the study. City Light also proposes to form an expert panel as part of the study to assist in its implementation. A task of the expert panel will be to assist in the development of standard sampling and data quality protocols to support study implementation. City Light does not consider this study phased. Synthesis of the wealth of existing data is intended to ensure that identification of data gaps and subsequent field collection activities are productive and efficient.  Please see comment responses USIT-C62 and USIT-C60.

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							<p>WDFW ResSR4, NPS PAD comments), and remove them from the Year 1 portion from the study goals and objectives. At a minimum, there needs to be a detailed quality control procedure to ensure the integrity of the genetics existing information as well as its utility in these studies, or that an independent scientific team review and provide oversight with this study.</p> <p>For the objectives listed in Year 2, it will be necessary to glean genetics data from areas below the Project infrastructure as comparison to data above Gorge Dam. That is, the field-based component of the genetics evaluation should include collection of data from the entire Skagit River as well as neighboring drainages to “out-compare” Skagit genetic relationships to. Additionally, fish habitat use and migration timing need to be added to the objectives in order to evaluate how Project operations such as drawdowns (i.e. reservoir fluctuations) and entrainment risk impact fish movement and population demographics. Indeed, the Scoping Document-2 (SD-2) highlights the concern of reservoir flections on reservoir fishes: [provides block quote].</p> <p>Given City Light’s current plan, it will not be possible to discern Project impacts to fish movement and population demographics by relying solely upon estimating an effective population size. Rather, USIT is requesting City Light collect empirical abundance data (for all age classes), habitat use data, and migration timing data from population monitoring methods such as hydroacoustic and mark-recapture methods.</p>	
252.	Upper Skagit Indian Tribe	03/08/2021	pp. A65-A67	USIT-C62	N/A	FA-06 Section 2.3	<p><b>Background and Existing Information.</b> States there are other hypotheses for the redirection of flow of the Skagit River and origination of fish from the Fraser River (provided in USIT’s PAD comments (page A1-18); NPS PAD comments p. 7; USFWS PAD comments p. 17), and that Riedel 2007 or 2012 are not cited correctly.</p> <p>The data used by City Light to describe reservoir fish genetics is dated when compared to current genetic SNP or RADseq methods (Adams et al. 2019, Bohling et al. 2019, and Small et al. 2019). The reliance on old data without any updated information, field studies, or independent verification has been noted to be “unreasoned” and in violation of NEPA (e.g. American Rivers v. FERC, 895 F3d 32, 49-50 (D.C. Cir. 2018)). Moreover, as mentioned above (as well as page A1-18 of USIT’s PAD comments), there were sampling bias in the existing information and inconsistencies with commonly accepted scientific practices. Discussion of the issues with the existing information can be found in other agency submissions: USFWS’s Study Request 6: Population Structure of Native Fish in the Project Area pages 3 – 4, NPS Enclosure 1: PAD Comments page 7, and WDFW ResSR4 Study Request comment letter page 208. It is clear that City Light did not seek additional rationale for the relationships noted in the genetic data, nor did they conduct a quality control check of the data before making their claims. It is also concerning that the PSP does not include a process for ensuring and maximizing the quality and integrity of the data used in detailing existing information. Because of these concerns, it is necessary to establish a new genetics baseline for fish in the Skagit River as well as compare that to nearby drainages. Lastly, City Light does not address the data gaps associated with reservoir fish habitat use, abundance, and migration timing (particularly for juvenile and sub-adult salmonids). This data gap needs to be addressed as a primary reason for developing the study- i.e. to elucidate details regarding reservoir fish populations and their relation to productivity constraining Project operations.</p> <p>City Light failed to include “Project Operations and Effects on Resources” section on this Proposed Study Plan. This is a necessary component of the PSP that has been included in other study requests and needs to be rectified. The Project blocks fish passage thereby preventing fish from expressing all life history traits as well as preventing genetic dispersal. This is of concern with Bull Trout (see USFWS PAD</p>	<p>Please see comment responses USIT-C60 and NPS-C11.</p> <p>City Light proposes FA-06 Reservoir Native Fish Genetics Baseline Study Plan to further an acknowledged shared interest. The objectives of the study plan are to develop in-depth baseline information needed to inform long-term reservoir fish management objectives for the Project, rather than informing development of license conditions. City Light is also proposing FA-04 Fish Passage Study and FA-08 Fish Entrainment Study to address concerns related to fish passage and entrainment at the Project.</p>

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							comments page 18). In the case with entrainment, passage of invasive and novel species can negatively impact fish below Gorge (please refer to comments to FA-04 in this filing, NPS, USFWS, and WDFW study requests on reservoir fish population dynamics as well as USIT's Study Request page A3-24 for more). Additionally, operations such as drawdowns and high turbidity can impact fish movement, dispersal patterns, and access to tributaries (often resulting in large fish kills, please refer to comments to FA-04). High turbidity is a function of reservoir shoreline erosion (GE-01) and sediment deposition (GE-03). Further discussion of Project impacts that block fish access to tributaries (e.g. through sedimentation and backwater effects) can be found in NPS's PSP #4 presentations on sediment and backwater Appendix B53, B63, and B73). Because of the impacts of Project infrastructure and operations to fish dispersal, genetics, life history expression, abundance, habitat use, and migration timing, it is critical to explore how Project operations may be impacting reservoir fish populations. Indeed, several studies have highlighted issues with reservoir fishes. Those issues and the impact of Project operations on fish populations was explored in more detail within section 6.3.4 of the FA-04 comment response.	
253.	Upper Skagit Indian Tribe	03/08/2021	p. A67	USIT-C63	N/A	FA-06 Section 2.5	USIT disagrees with splitting the study process into two parts. Given the shortcomings of the current data and gaps in population demographics, it will be important to begin collecting data during Year-1 to ensure all data is collected. A QAPP or quality control plan should be established first to establish what, if any, samples should be carried forward. It is also suggested to establish the genetics baseline with the most up to date methods in use. USIT does not believe City Light's plan to monitor fish population dynamics through estimating effective population size will provide meaningful results to decipher Project operational impacts to fish movement, abundance, and habitat use. For detailed methodology suggestions and rationale for the needed data please refer to USFWS PAD comments (beginning page 17), USFWS Study Request 6.	Opportunistic tissue sampling will be completed in Year 1, if possible, from ongoing license and other relicensing study activities. Additional field data collection for additional tissue samples will be completed in Year 2 after existing information (including the availability of existing samples and resulting from Year 1 opportunistic sampling) has been thoroughly analyzed and data gaps identified. Collecting data in Year 2 is prudent in order to identify specific, targeted field study objectives and efficient tissue sample collection. Additional genetic analyses and potential management actions may be identified as part of the reservoir fish and aquatics management plan, which will be developed in part to reflect the findings of FA-06 Reservoir Native Fish Genetics Baseline Study.
254.	Upper Skagit Indian Tribe	03/08/2021	p. A67	USIT-C64	N/A	FA-06 Section 2.5.1	<u>Salmonid Genetic Expert Panel</u> . The Expert Panel should include more professionals including biologists, fisheries scientists, and aquatic ecologists, in addition to geneticists, to ensure the results are properly related back to Project operational impacts, fisheries management concerns, as well as general ecological concerns. Additionally, USIT requests the expert panel be chosen by the LPs (in conjunction with City Light) to maintain neutral consultation on the study in addition to allowing agencies with management obligations to the resources ensure management goals are upheld (as opposed to City Light's lack of management authority). City Light only proposes three meetings of the Expert Panel. It is unclear if this will be sufficient, and USIT suggests not limiting the results by a constrained number of Expert Panel meetings. Lastly, the Expert Panel should review the utility and integrity of the existing information for this study.	The study plan provides that members of the Expert Panel will be selected in consultation with the LPs. The Expert Panel will comprise resource agency specialists and/or experts with regional expertise on the genetics of the three native salmonid species of interest. City Light believes the current scope of three meetings with the Expert Panel is sufficient for the purposes of this study. Input from the Expert Panel will provide guidance before the desktop exercise is undertaken, after the existing datasets have been analyzed, in the identification of data gaps, and to review any results that come about from filling the data gaps.
255.	Upper Skagit Indian Tribe	03/08/2021	p. A67	USIT-C65	N/A	FA-06 Section 2.5.1	<u>Year-1 Tasks</u> . As mentioned, data integrity for much of the listed existing datasets proposed is questionable. It is therefore critical for City Light to incorporate a quality assurance plan to review the data (and associated sampling meta data) with LPs for sample bias and utility in the current study. Such bias and integrity issues have been highlighted by USIT and LPs in the PAD comments and various study requests, but includes field grading of samples, collection of samples in a manner not consistent with commonly accepted scientific practices, and elimination of hybrid samples from analysis	Please see comment response USIT-C60.

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256.	Upper Skagit Indian Tribe	03/08/2021	pp. A67-A68	USIT-C66	N/A	FA-06 Section 2.5.2	<p><u>Year-2 Tasks.</u> It has been discussed that a full baseline genetics assessment for all fish species within the Project need to be reevaluated as part of this study. For example, a full baseline genetics assessment for reservoir fish has not been completed for the local populations in both U.S. and Canada (USFWS PAD comments, page 17). City Light should therefore add all key reservoir salmonid species to the list of additional genetic baseline analysis, including Dolly Varden, O. mykiss and Bull Trout. Additionally, City Light should look to other nearby basins to compare genetic baselines of the Skagit River (as detailed in USFWS PAD comments beginning page 16). Lastly, methods for establishing genetic baselines should follow the most currently used methodology (e.g. SNP or RADseq methods (Adams et al. 2019, Bohling et al. 2019, and Small et al. 2019)).</p> <p>City Light's plan to evaluate effective population size is appreciated. However, it does not satisfy all the concerns LPs have regarding fish migration timing and habitat use. Nor will it address the concerns discussed in SD2 due to limitations in scope and scale of the proposal. USIT is therefore requesting City Light to incorporate other population dynamics monitoring methods to understand how Project operations limit fish habitat use, migration timing, and abundance. Details of this population monitoring as well as the Nexus to Project operations can be found in WDFW Study Request ResSR4 (page 203), NPS Study Request 9 (page 91), and USFWS Study Request 6. It should be noted that in comments to FA-04, USIT has offered the use of Teknologic autonomous receivers (Teknologic Engineering LLC, Edmonds, WA) to track spill and entrainment. These receivers can also be used to track fish habitat use and migration timing in the reservoirs reducing study expenses for City Light</p>	Bull Trout, Rainbow Trout, and Dolly Varden are included as species of interest for this study plan. Please see comment responses USIT-C60 and NPS-C11.
257.	Upper Skagit Indian Tribe	03/08/2021	p. A68	USIT-C67	N/A	FA-06 Section 2.8	Schedule. City Light needs to be more specific in the timeline provided as to ensure there is enough time for deliberation within the Expert Panel.	City Light has revised the study plan so that Meeting 1 with the Expert Panel will take place in June 2021, which will allow for two months of deliberation for consolidation of data and analyses to begin in June 2021.
258.	Upper Skagit Indian Tribe	03/08/2021	pp. A68-A69	USIT-C68	Section 6.3.5	N/A	<p>City Light also relies heavily upon the existing Food Web research- stating that it will answer LP concerns regarding fish population dynamics. As discussed in USIT's PAD comments (A1-34 – A1-35), PSP Presentation #6 (Appendix B203), as well as USIT's response to FA-04, the Food Web study is limited in its ability to discern population level relationships due to (but not limited to) low sample sizes and other sampling constraints (including a lack of sampling in Gorge reservoir).</p> <p>City Light states that they are exploring, with the NCC, options to estimate the size structure of Redside Shiner in Ross Lake. However, members of the NCC are unaware of this commitment made by City Light. It would be beneficial for City Light to demonstrate on promises of full transparency and refer the reader to the options that are being explored.</p> <p>Although City Light states there is a program to ensure reservoir fishes are not constrained from accessing reservoir tributaries, data gaps exist regarding juvenile and sub-adult tributary access needs. It is therefore important to fully understand habitat use and migration of all age classes, for all reservoir fish species before concluding that the current programs are sufficient.</p>	<p>As is detailed in Section 6.3 of the RSP, City Light believes that existing knowledge, data from ongoing efforts conducted in coordination with LPs, along with data from its proposed studies and the Food Web study, will provide information sufficient to address the LPs' concerns as reflected in the fish habitat use and population dynamics study requests.</p> <p>Regarding continued exploration with the NCC regarding methods for estimating the size of the Redside Shiner population in Ross Lake, City Light clarifies that the USGS are exploring the possibility of this task as part of the Food Web Study being conducted under the current license. City Light will share this information with the NCC as it becomes available.</p>
259.	Upper Skagit Indian Tribe	03/08/2021	p. A77	USIT-C81	N/A	GE-03	<p><u>Cultural Resource Issues Addressed by Requested Study.</u> Understanding deposition in reservoirs is directly related to City Light's NHPA Section 106 responsibility to identify and assess cultural resources potentially affected by its undertaking. In reservoir draw down zones, as elsewhere, factors that reduce archaeological and cultural resource site visibility, such as reservoir sediment</p>	City Light is currently funding an erosion study that is being implemented by the NPS and has committed to implementing a tributary delta sedimentation study as part of the current license compliance activities. City Light anticipates use of

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							deposits, can skew the results of cultural resource surveys, like those that will be developed for the Archaeological Resources Mitigation and Management Plan (ARMMP). Data on thickness of deposits assists in planning for identification survey methods and in assessing reservoir effects to cultural resource sites. Bathymetric data for reservoir bottoms would inform drafting a revised HPMP and ARMMP, by addressing how future surveys will be done during unanticipated or exceptional draw down exposures, the infrequent periods when surveys become practical. Bathymetric data aids too in identifying areas and landforms with a high probability for the presence of cultural resource sites. Based on decades of observations of cultural resource sites in the Ross Lake draw down zone, some surface sediment textures appear to correlate with heavily eroded landforms and others with landforms buried by reservoir deposits, and in other cases it remains uncertain. Systematically collected quantitative data would greatly assist the monitoring procedures and protocols that will be built into the cultural resource ARMMP.	this information in development of the HPMP in collaboration with LPs.
260.	Upper Skagit Indian Tribe	03/08/2021	p. A78	USIT-C82	Section 6.2.14 (USIT-08)	GE-03	<p>In its study request Geomorphology and Anadromous Salmonid Habitat, USIT requested measurements of the amount and texture of sediment stored in Project reservoirs.</p> <p>On p. 6-41 City Light states:                      “documenting sediment accumulation in the reservoirs, especially in Ross Lake, is unnecessary to inform the development of license conditions that deal with the adequacy of spawning habitat or gravel needs downstream of the Project.”</p> <p>USIT’s request is intended to understand geomorphic conditions, such as channel incision and coarsening, which City Light does acknowledge in its response. Additionally, City Light makes no mention of impacts to the Skagit estuary related to fine-grained sediment, which was included in USIT’s study request. As described in comments below related to GE-03, as well as in comments for GE-04, mapping sediments in the reservoirs would help understand whether and how much additional sediment is needed downstream of Gorge Dam to improve geomorphic processes and habitat conditions. It would also help assess potential methods for moving sediment downstream of the reservoirs, which would necessarily have a direct relationship to the needs of spawning habitat downstream of the Project.</p>	See Section 6.2.14 of the RSP for response on estimating sediment accumulation in Project reservoirs.
261.	Upper Skagit Indian Tribe	03/08/2021	p. A78	USIT-C83	N/A	GE-03 Section 2.5	<b>Study Area.</b> USIT requests an expansion of study scope to include a complete survey of all three reservoirs.	See section 6.2.14 of the RSP for response on estimating sediment accumulation in Project reservoirs.
262.	Upper Skagit Indian Tribe	03/08/2021	pp. A78-A79	USIT-C84	N/A	GE-03 Section 2.6.1	<b>Field Data Collection.</b> City Light proposes to collect data on reservoir sedimentation at four discreet sites in the three Project reservoirs, which were chosen by City Light due to operational issues. USIT requests an expansion of study scope to include a complete survey of all three reservoirs, particularly on Ross Reservoir, where most of the sediment is stored but only one of six major stream deltas are proposed for examination. Additionally, City Light proposes to limit data collection to bathymetry, but a sub-bottom survey is needed to understand the annual impact of the Project and determine where different types of sediment are accumulating. The methodology for a comprehensive measurement of the sediment in the reservoirs has been demonstrated at other FERC Projects, including Lake Chelan P-637 and Nisqually River P-1862.	See comment response ARTU-C04.
263.	Upper Skagit Indian Tribe	03/08/2021	p. A81	USIT-C85	N/A	GE-04	<b>Agreements Reached During PSP Meetings.</b> City Light’s PSP does not include a study of Project runoff alteration, which is a common analysis used in other FERC projects (e.g. Henry M. Jackson P-2157) to assist in the understanding of project impacts to geomorphic conditions. USIT included the Indicators of Hydrologic Alteration/Range of Variation (IHA/ROV) analysis in its Geomorphology and Anadromous Salmonid Habitat study request and maintains that it should be included	An analysis of process flows is included in GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study.

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							<p>in City Light's RSP and relicense studies (R2 Resource Consultants, 2008). During the PSP meetings City Light agreed to include the IHA/ROV analysis in its RSP (Appendix C469).</p> <p>The IHA/ROV analysis would be used to develop periodic flow levels that achieve the three types of process flows referenced above. This includes channel flushing flows or flow pulses (e.g. seasonal), channel maintenance flows, and channel forming flows (Wald, 2009). Combined with related studies requested in comments in this filing for FA-01, FA-02, GE-03, TR-01, TR-02, and the Aquatic &amp; Riparian Productivity Study Request, the IHA/ROV analysis would be used to inform opportunities to improve habitat for anadromous salmonids.</p>	
264.	Upper Skagit Indian Tribe	03/08/2021	p. A82	USIT-C86	Section 6.2.11 (USIT-08)		<p><b>Instream Flow Study.</b> In its study request Geomorphology and Anadromous Salmonid Habitat and in USIT comments on the PAD (pg. A3-111 – A3-127 and A1-41 – A1-44, respectively), USIT requested that City Light's 2-D instream flow hydraulic model be developed with the capability to assess process flows, including connectivity to off-channel habitats. City Light responded to a request by WDOE to analyze process flows but did not acknowledge USIT's similar request. City Light responded to WDOE's request:</p> <p>On p. 6-36 City Light states:                      "if certain process flow releases are identified as a potential PME during the evaluation of alternative operational scenarios (which will take place following the completion of relevant studies), City Light will conduct the necessary modeling to assess potential resource benefits of the process flows and their influence on Project operations and other resource-based flow demands."</p> <p>City Light's response is illogical because it will be necessary to assess potential resource benefits as part of determining whether process flows should be considered for PMEs. USIT believes it has provided adequate evidence between study requests and this filing to indicate Project impacts on process flows and potential to benefit resources, including anadromous salmonids, by improving process flows. Studies are needed to determine the specific combinations of flow, wood, and sediment to maximize the resource benefits, considering other constraints such as energy development and downstream impacts to development.</p>	Please see comment response NMFS-C28.
265.	Upper Skagit Indian Tribe	03/08/2021	pp. A82-A85	USIT-C87	Section 6.2.14 (USIT-08)		<p><b>Sediment Budget.</b> This section included several block quotations from the City Light PSP (annotated as "...")</p> <p>In its study request Geomorphology and Anadromous Salmonid Habitat, USIT requested an assessment of expected changes in sediment input from bank erosion under potential process flow scenarios. City Light includes the following response:                      ...                      City Light's proposal is not designed to identify ways to improve current Project operations and management. It is limited to an assessment of current conditions of flow, wood, and sediment, which will not provide the information needed to assess expected resource benefits under potential process flow scenarios.</p> <p>During the PSP meetings, USIT and other LPs requested field data collection of bank sediment texture in the Skagit River downstream of Gorge dam (Appendix B39), which is needed to estimate sediment input from bank erosion. City Light provided this response:                      ...                      City Light's response did not address the request to measure bank sediment texture. It does not appear that FA-02 proposes to collect the requested information. This</p>	<p>An analysis of process flows is included in the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River (Geomorphology) Study Plan.</p> <p>Collection of bank sediment texture is included in the Geomorphology Study Plan.</p> <p>The Geomorphology Study includes an assessment of fish passage barriers in tributaries downstream from Gorge Dam due to low water/sediment deposition conditions.</p> <p>Please see comment response NCCC-06 for more information on City Light's proposed SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River.</p>

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							<p>information is necessary to predict channel migration and sediment loading from bank erosion. For example, banks composed of fine sediment respond differently than banks composed of coarse sediment in terms of erosion rate, and it is important to know the size distribution of sediments being recruited to the channel.</p> <p>USIT requested assessments of fish passage barriers in tributaries downstream of Gorge Dam.</p> <p>On p. 6-41 City Light states:                      “No study request provided any evidence of fish passage issues at tributary junctions in the Skagit River downstream of the Project due to sediment deposition (18 CFR § 5.9(b)(5)). Even if evidence of such issues existed, the barriers would likely be intermittent, transitory, and difficult to ascertain”</p> <p>During the PSP meetings, USIT presented evidence indicating likely impediments to adult salmonid migration (Appendix B236). The assertion that barriers would likely be intermittent, transitory, and difficult to ascertain is not supported. The evidence presented during the PSP meetings illustrates that passage impediments likely occur, predictably and often for several weeks or more uninterrupted, during the summer base flow period when Chinook Salmon and Pink Salmon are attempting to enter tributaries to spawn. USIT’s requested studies would inform the flow conditions necessary to improve these passage impediments.</p> <p>USIT requested City Light extend its proposed substrate mapping downstream of the Sauk River confluence. USIT also requested assessment of Project impacts on suspended sediment contributions to the Skagit estuary. City Light responded:                      ...                      As described in greater detail in comments for City Light’s proposed study plan GE-04, the existing information indicates that Project impacts likely extend downstream of the Sauk River and into the Skagit estuary. However, the existing information was not designed to isolate Project impacts from non-Project impacts and new information is needed to help identify the most efficient methods to improve resource benefits, which include process flows in the river and delivery of fine-grained sediments to estuary marsh habitats, which are used by ESA-listed Chinook and other anadromous salmonids</p>	
266.	Upper Skagit Indian Tribe	03/08/2021	A85-A86	pp. USIT-C88	Section 6.2.15 (USIT-08)		<p><b>Channel Forming Flows.</b> This section included several block quotations from the City Light PSP (annotated as “...”)</p> <p>In its study request Geomorphology and Anadromous Salmonid Habitat, USIT requested a new Process Flow study plan to understand the Project’s ongoing impacts to geomorphic process and anadromous salmonid habitat. City Light did not acknowledge the request for a new study plan and responded to certain aspects of the request.                      ...                      ...                      City Light misinterprets the study request. USIT did not describe and does not have an intention or expectation to recreate historical conditions. Rather, the Project has a large influence on flows and it will be informative to understand the specific changes brought by ongoing Project operations, including timing, magnitude, and duration of flows.</p> <p>The Tribe requested several new or revised analyses as part of the Process Flow study plan. City Light provides the following response.</p>	Please see comment response NMFS-C28.

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							<p>On p. 6-42 City Light states:                      “City Light will be using information collected in the Geomorphology Study regarding initiation of gravel movement and depth of scour/fill in redds along with the 2-D hydraulic model (developed as part of the FA-02 Instream Flow Model Development Study) to examine the relationship between flow and substrate movement... The 2-D hydraulic model may also be used to analyze side channel connectivity and habitat.”</p> <p>The Tribe agrees that the information proposed by City Light should be collected, but additional information is needed to understand the Project’s ongoing impacts to process flows and anadromous salmonid habitat. This includes a sediment transport or morpho-dynamic model and a 2-D hydraulic model capable of accurately assessing side channel and off-channel connectivity, including how connectivity would be expected to change in response to new process flows. City Light’s proposed study plan does not achieve these needs. USIT’s comments in this filing for GE-04 and FA-02 describe an approach that would assess the range of Project impacts to channel flushing flows, channel maintenance flows, and channel forming flows.</p>	
267.	Upper Skagit Indian Tribe	03/08/2021	A86-A87	pp. USIT-C89	Section 6.2.16 (USIT-08)	GE-04 Section 2.1	<p><b>Potential Floodplain Connectivity of Off-Channel Aquatic Habitat.</b> <i>[This section included several block quotations from the City Light PSP (annotated as “...”)]</i></p> <p>In its study request Geomorphology and Anadromous Salmonid Habitat, USIT requested a new Process Flow study plan to understand the Project’s ongoing impacts to geomorphic process and anadromous salmonid habitat. City Light did not acknowledge the request for a new study plan, and responded to certain aspects of the request                      ...                      ...                      ...</p> <p>As described in comments in this filing for FA-02, City Light’s proposed 2-D hydraulic model will not accurately assess connectivity and flow in floodplains and off-channel habitats. A network of piezometers would provide important information for calibrating the 2-D hydraulic model and would not necessarily require a large and expensive effort. Even a relatively small number of piezometers located in key locations along the river would provide useful information to understand the Project’s impacts on surface flow and hyporheic connectivity between the main channel and off-channel habitats. City Light’s proposal to install piezometers for specific mitigation measures fails to provide the information needed to understand ongoing Project impacts that occur throughout the river system.</p> <p>City Light did not respond to USIT’s request to collect topo-bathymetric data to refine the 2-D hydraulic model and improve accuracy for assessing connectivity between the main channel and off-channel habitats. Assuming City Light would respond by proposing to collect the requested information only for specific mitigation measures, USIT reiterates that it is necessary to assess the ongoing Project impacts that occur throughout the river system. City Light did not respond to USIT’s request to assess Project impacts on the maintenance of off-channel habitats and did not consider how connectivity would be expected to change in response to new process flows. USIT’s comments in this filing for GE-04 and FA-02 describe an approach that would assess the range of Project impacts to channel flushing flows, channel maintenance flows, and channel forming flows.</p>	Please see comment responses NMFS-C28, NPS-C08, USIT-C25, USIT-C22, and SSIT-C07.
268.	Upper Skagit Indian Tribe	03/08/2021	pp. A87-A90	USIT-C90	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16	GE-04 Section 2.1	<p><b>Study Goals and Objectives.</b> City Light’s stated goal is to characterize how Project-related changes in peak flows affect geomorphic processes. This greatly diminishes</p>	An analysis of process flows has been added to the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study Plan.



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					(USIT-08)		<p>the role of Project impacts to sediment and wood on degradation of geomorphic processes and salmonid habitat downstream of Gorge Dam.</p> <p>USIT requested a study to assess Project-related impacts on process flows (see study request Geomorphology and Anadromous Salmonid Habitat A3-111 – A3-127). The term process flow refers to the complex interactions among sediment, wood, and flow that create and maintain stream channels and floodplains. In addition to GE-04, several of City Light's other proposed studies include components relevant to process flows. USIT believes it would be beneficial for City Light and LPs alike if the several related components were incorporated into a comprehensive Process Flow study plan for the RSP and relicensing studies. Process flows, as broadly defined by Wald (2009), constitute an overarching framework around which several interconnected analyses could be synthesized. City Light has not included this comprehensive approach in its PSP.</p> <p><i>[Continues to provide an extensive bulleted list of "overarching components of the requested Process Flow study plan," followed by justification, and a figure (pp. A88-A90).]</i></p>	
269.	Upper Skagit Indian Tribe	03/08/2021	pp. A90-A93	USIT-C91	N/A	GE-04 Section 2.5	<p><b>Study Area.</b> USIT requests studies for geomorphology, process flows, and anadromous salmonid habitat to extend downstream of the Sauk River, including the tidal estuary. City Light did not incorporate these requests into its PSP, asserting that attenuation of Project effects on flow, and therefore instream habitat, with increasing distance downstream, makes it impossible to separate the Project's influence from other past and ongoing activities downstream of the Sauk River. [...] According to City Light, there is a wealth of existing information for the Skagit River that is particularly detailed for the area downstream from the Sauk River confluence (PSP, pg. 6-41; PSP, GE-04, Section 2.3). USIT maintains that new information is needed to understand Project impacts on anadromous salmonid habitat downstream of the Sauk River.</p> <p>It is not known how far downstream the Project influences river and floodplain habitat. [...] Studies are needed to determine the downstream limits of Project effects on river geomorphology, process flows, and habitat.</p> <p>During the PSP meetings, City Light agreed to include a new study plan in the RSP to synthesize existing data and use the ISR to inform the need for new data collection (Appendix C463). USIT believes the existing information presented to City Light in the study requests and PSP meetings has already synthesized the data and indicated likely Project effects downstream of the Sauk River.</p> <p>While existing information indicates that ongoing Project impacts are occurring above the background noise of other cumulative effects, the data is not adequate to identify the full range and extent of Project impacts. More refined and targeted studies are needed to help inform the best options for alleviating ongoing Project impacts below the Sauk River and into the estuary. The RSP should identify how proposed studies will be expanded in scope. Suggestions are incorporated throughout this comment filing. The data synthesis proposed by City Light during the PSP meetings should have been conducted as part of the PAD (Appendix C463). To ensure the needed information is available for development of the license application, any remaining synthesis of existing information should occur in time to follow the schedules outlined in City Light's existing proposed study plans (i.e. studies begin spring or summer 2021). [Figures 2, 3 and 4]</p>	Please see comment response NCCC-06 for more information on City Light's proposed SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River.

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270.	Upper Skagit Indian Tribe	03/08/2021	pp. A93-A95	USIT-C92	N/A	GE-04 Section 2.6.2	<p><u>Methodology - Geomorphic Change.</u> USIT requests development of a morpho-dynamic model, such as MAST 1-D (De Rego et al., 2020), to assess Project impacts on geomorphic change. Sediment is critical to the response of rivers to dams (Grant, 2012). Changes in bed elevation caused by sediment transport initiate bank erosion and connect off-channel habitat (Pfeiffer et al. 2019). There was little change in bed elevation at two USGS gages below the Project, indicating a lack of sediment transport (Figure 5). Recent gravel filling of the main channel of the Skagit River at tributary junctions illustrates this problem due to a lack of long duration peak flood events on the main stem Skagit River since 2002 (Figure 6).</p> <p>While GE-04 and FA-02 propose to collect data on bed scour, sediment texture, and sediment entrainment, they would not assess sediment transport. This is a key difference between City Light's PSP and USIT's study requests. Several options are available including HEC-RAS sediment transport or morpho-dynamic models such as MAST 1-D (De Rego et al., 2020). The HEC-RAS sediment model is 1-D and assumes rigid banks. USIT requests the use of morpho-dynamic models for their ability to incorporate lateral channel erosion, local avulsion, and vegetation encroachment. Morpho-dynamic models would allow geomorphic processes to be understood in relation to ongoing Project impacts. The models could be applied to a subset of geomorphic response reaches, including areas downstream of the Sauk River confluence. Another approach would be to collect empirical data through flow releases during the 2-year study period, but this approach could be costly in terms of lost generation capacity and would require robust field data collection (see FERC Project #2157 monitoring plan for process flow releases).</p> <p>City Light proposes to assess USGS gage rating curve changes for Skagit River at Newhalem, Skagit River near Marblemount, and Skagit River near Rockport to evaluate potential channel incision or aggradation. City Light should include USGS gages downstream of the Sauk River confluence for this analysis, including for Skagit River near Concrete (USGS 12194000), Skagit River near Sedro Woolley (USGS 12199000), and Skagit River near Mount Vernon (USGS 12200500).</p> <p>City Light proposes to use aerial photograph interpretation to estimate channel migration and sediment input from bank erosion, and to develop descriptive channel metrics, but this analysis is limited to the period covering the current license. USIT requests the analysis include older aerial photographs to provide an assessment of conditions observed outside the current license period. This is not to recreate historic or pre-Project conditions, rather to understand potential channel responses and habitat benefits associated with flow, sediment, and wood conditions that have not been observed during the current license period, which will help identify new approaches of operating the Project to provide resource benefit. The bank protection mapping by Beamer et al. (2000) has been updated and City Light should incorporate this more recent assessment into their analysis (Hartson and Shannahan, 2015). The newer information should be used, or an explanation provided as to why City Light does not find this data sufficient for its needs.</p> <p>City Light should collect data on channel bed armoring to inform the analysis of channel evolution stage. Existing information and observations suggest the Project is maintaining the Skagit River in an arrested state of degradation, characterized by an incised and coarsened channel bed (stage 3s of Cluer and Thorne, 2014). This has wide ranging implications for salmonid habitat quality, most notably connectivity of floodplain and off-channel habitats.</p>	<p>Please see comment responses NMFS-C28 and ARTU-C04.</p> <p>The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study includes an analysis of older historical aerial photographs and bed armoring and will incorporate any new studies into the analysis.</p>

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							The analyses requested above should be extended downstream of the Sauk River (see comments on the Study Area section that indicate Project impacts likely extend downstream of the Sauk River)	
271.	Upper Skagit Indian Tribe	03/08/2021	pp. A95-A96	USIT-C93	N/A	GE-04 Section 2.6.3	<p><u>Aquatic Habitat</u>. USIT requests the information from the GE-04 study be integrated with the 2-D hydraulic model (see comments in this filing on FA-02) in a new Process Flow study plan to predict how different combinations of sediment, wood, and flow would be expected to improve main channel and off-channel habitats. City Light's PSP does not adequately investigate the potential for process flows to alleviate ongoing Project impacts to anadromous salmonid habitat downstream of Gorge Dam. <i>[continues with justification]</i></p> <p>USIT requested field measurements at tributary junctions to assess impediments to adult salmonid passage. As described in comments on Section 2.6.2, sediment deposits have formed at tributary junctions due to Project impacts on sediment transport. Evidence of passage impediments can be seen in aerial photographs where loss of surface expression results in several hundred feet of channel with shallow flow and no cover (Figure 7). <i>[continues with justification and figure of aerial imagery]</i></p> <p>Tributary passage assessments should be conducted for all anadromous fish-bearing tributaries during base flows that coincide with adult salmonid migrations. The assessments could be straightforward, measuring the channel length that is below a minimum depth threshold, which could be determined using literature values. The data would also provide useful baseline metrics for assessing the benefit of process flows. Additionally, City Light could supplement redd survey data collected by WDFW then compare timing of spawning activity across tributaries exhibiting a range of upstream passage conditions.</p> <p>The analyses requested above should be extended downstream of the Sauk River (see comments on the Study Area section that indicate Project impacts likely extend downstream of the Sauk River)</p>	Please see comment response NMFS-C28 and ARTU-C04.
272.	Upper Skagit Indian Tribe	03/08/2021	pp. A96-A97	USIT-C94	N/A	GE-04 Section 2.6.4	<p><u>Side Channels and Off-Channel Habitat</u>. To understand Project impacts on side channel formation, USIT requests interpretation of aerial photographs from prior to the current license period, and more importantly the use of morpho-dynamic modeling. City Light proposes to rely solely on aerial photograph interpretation to assess side channel formation and change over time, yet they acknowledge that side channels may not be visible in aerial photographs. Indeed, aerial photographs are typically taken in summer, making it difficult to identify side channels. City Light's unproven approach risks providing little or no meaningful results. Moreover, the proposed aerial photograph interpretation is limited to the period of the current license. This would not provide the ability to assess the effect of peak flows outside the range observed during the current license. Sediment transport and channel aggradation are key processes in the formation of side channels, yet City Light's proposal does not provide an approach to understand the flows necessary to initiate transport of sediment. <i>[continues with justification]</i></p> <p>City Light does not include an assessment of off-channel habitat formation. USIT has requested this as part of the 2-D hydraulic model study (see comments in this filing on FA-02). Additionally, USIT has requested an expanded effort to identify and assess off-channel habitats, including those not currently connected but that could become connected under potential process flow scenarios (see comments in this filing on TR-02). Off-channel habitats are a priority for recovery of Skagit Chinook (SRSC and WDFW, 2005), as well as other salmonids. Reconnecting existing habitats and</p>	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study aerial photograph analysis will include older aerials and an analysis of process flows and off-channel connectivity. Please see comment response NCCC-06 for more information on City Light's proposed SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River.

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							<p>improving the geomorphic processes that form new off-channel habitats is key to Chinook recovery.</p> <p>The analyses requested above should be extended downstream of the Sauk River. As indicated in comments for Section 2.5, Project impacts likely extend to the Skagit estuary. The habitat between the Sauk River confluence and Skagit estuary is among the most productive areas for Skagit Chinook (SRSC and WDFW, 2005). Improving these habitats would be of immense benefit to all Skagit salmonids.</p>	
273.	Upper Skagit Indian Tribe	03/08/2021	pp. A97-A98	USIT-C95		<p>GE-04 Section 2.6.5</p>	<p><u>Substrate/Sediment</u>. USIT requests a morpho-dynamic model to assess ongoing Project impacts to sediment input from channel migration, floodplain scour, and sediment transport (see comments for Section 2.6.2). To support estimates of sediment input from bank erosion, City Light should sample channel bank material. When combined with estimates of sediment sequestered in the reservoirs (see comments in this filing for GE-03), the information requested for GE-04 would provide an understanding of Project impacts on sediment loading in the Skagit River downstream of Gorge Dam.</p> <p>City Light acknowledges that the Project impacts process flows downstream of Gorge Dam, but they have not proposed studies that would adequately assess how sediment recruitment would change under different process flow scenarios. [...]</p> <p>City Light proposes to use bank material sampling undertaken as part of the landform mapping study being conducted by NPS, but this will not provide the measures of grain size needed to understand potential changes in sediment recruitment from banks (Riedel et al., in prep). City Light should sample channel bank material.</p> <p>USIT requests a sediment augmentation study, which would inform the potential to improve existing geomorphic conditions, including aggradation of channel beds, which would help increase connectivity of off-channel habitats. A reasonable first step in assessing the effectiveness of sediment augmentation would be before and after measurements of channel bed elevation downstream of the sediment release point. <i>[provides further details on "sediment augmentation study"]</i></p> <p>The analyses requested above should be extended downstream of the Sauk River (see comments on the Study Area section that indicate Project impacts likely extend downstream of the Sauk River).</p>	Please see comment response NMFS C-28 and ARTU-C04.

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274.	Upper Skagit Indian Tribe	03/08/2021	pp. A98-A99	USIT-C96	N/A	GE-04	<p><u>Estuary Sediment Load.</u> USIT requested studies of Project impacts on delivery of fine-grained sediment to the Skagit estuary. Impacts occur from sequestration of sediment in the reservoirs and from reduced sediment inputs due to reduced bank erosion downstream of Gorge Dam. City Light does not acknowledge Project impacts to the estuary and has rejected the requested study. <i>[continues with justification]</i></p> <p>City Light responded to USIT's request that they will analyze sediment contributions to the estuary using existing information (PSP, p. 6-41), but they do not explain in any of their proposed study plans how existing information can be used to differentiate Project impacts from non-Project impacts. The Tribe is not aware of any existing information that can be analyzed in this manner, including that listed in Section 2.3, Background and Existing Information (GE-04). Also, City Light has not acknowledged the relevance of spring-time reservoir refilling and loss or process flows.</p> <p>Bathymetry and sub-surface sampling in the reservoirs would provide a means to estimate the annual amount of fine-grained sediment sequestered by the Project (see comments in this filing for GE-03 and FA-01). Comparing measures of total suspended solids upstream and downstream of the reservoirs would provide an understanding of the timing of Project-related impacts, including the influence of spring-time reservoir refilling (see comments in this filing for FA-01). USIT's requested revisions to GE-04 would provide information on Project impacts to bank erosion and mobilization of sediment stored in floodplains.</p>	City Light acknowledges this issue of sediment load in the estuary and has proposed a data synthesis in GE-04 to synthesize available geomorphic information below the Sauk. In addition, City Light is proposing SY-01 Synthesis Study as the starting point for examining the potential contribution of reservoir capture to suspended sediment concentrations in the Skagit estuary.
275.	Upper Skagit Indian Tribe	03/08/2021	pp. A99-A100	USIT-C97	N/A	GE-04 Section 2.6.6	<p><u>Large Wood.</u> USIT requests a full accounting of the reduction in wood loading as a result of ongoing Project impacts. This includes wood trapped behind the dams and reduced recruitment from bank erosion downstream of Gorge Dam. USIT also requests a wood augmentation study. <i>[continues with justification]</i></p> <p>USIT requests annual wood inputs to the reservoirs be measured and related to conditions upstream in tributaries to help assess annual variability. <i>[continues with justification]</i></p> <p>USIT requests a study to identify and assess alternative wood transport or augmentation options. Ongoing wood management by City Light has been poorly documented, or data has not been readily shared with LPs, and it remains unclear how much large wood is transported downstream of Gorge Dam and the condition of wood that is transported. City Light does not transport any of the small wood, which it refers to as "lower quality woody debris," that enters the reservoirs, and has not acknowledged USIT's requests to transport this wood downstream.</p> <p>USIT requests an evaluation of Project-related reductions on wood recruitment from reduced bank erosion and floodplain scour downstream of Gorge Dam. City Light's proposed study relies solely on aerial photograph interpretation of bank erosion during the period of the current license. <i>[continues to reiterate the 'limitations' described above and the preference/request for morpho-dynamic modeling, and expansion of inventory to the Sauk River]</i></p>	Please see comment responses SSIT-C14 and NMFS-C28.

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							<p>City Light proposes to assess wood input by tributaries but does not describe a method. This information could be useful to help understand the downstream extent of Project impacts.</p> <p>USIT requests a wood augmentation study, which would inform the potential to improve existing habitat conditions for anadromous salmonids and could potentially provide empirical evidence of the downstream extent of Project impacts on wood loading and transport. <i>[continues with details of the wood augmentation study]</i></p> <p>The analyses requested above should be extended downstream of the Sauk River (see comments on the Study Area section that indicate Project impacts likely extend downstream of the Sauk River).</p>	
276.	Upper Skagit Indian Tribe	03/08/2021	pp. A102-A104	USIT-C98	Section 6.3.8 (USIT-08)	GE-04	<p><b>Sediment Transport Modeling.</b> In its study request Geomorphology and Anadromous Salmonid Habitat, USIT requested sediment transport and bank erosion models (i.e. morpho-dynamic model) to assess expected geomorphic responses to new process flows. USIT maintains that this information is needed to inform license requirements and has described an approach above in comments for GE-04 how City Light could incorporate morpho-dynamic modeling, with additional revisions to their proposed study plan, to provide the information necessary to understand the Project's impacts on process flows and anadromous salmonid habitat. <i>[provides quoted response from City Light]</i></p> <p>USIT believes a 1-D morpho-dynamic model, including both sediment transport and bank erosion, developed for a subset of response reaches between the Gorge Dam and Skagit estuary would provide the information needed to assess Project impacts on process flows. This would alleviate City Light's concern over cost and appropriateness of modeling the entire Skagit River, while still providing needed information to inform development of license requirements. City Light's reference to the Barnaby Reach analysis is not appropriate. That analysis was designed to consider reach-scale restoration options and is not capable of assessing system-wide impacts caused by a hydropower project. City Light seems to have misinterpreted aspects of USIT's study request <i>[... provides two quotes from City Light]</i>.</p> <p>Limiting the analysis to tributary-derived sediment deposits and bank erosion does not provide information on the flows that mobilize bedload sediment, which is a key aspect of the study request. City Light acknowledges their proposed approach is limited to assessing scour of spawning gravels. USIT agrees it is important to understand scour of spawning gravels, but an analysis of channel maintenance flows and channel forming flows needs to consider bedload mobilization across the full channel width.</p> <p>Rather than adopt the requested Process Flow study plan, City Light describes a "forward-looking" approach <i>[...provides quote from City Light]</i>.</p>	Please see comment response NMFS-C28. Sediment transport modeling has been added to the GE-04 Skagit River geomorphology study plan.
277.	Upper Skagit Indian Tribe	03/08/2021	p. A128	USIT-C128	N/A	N/A	<p><b>Riverine and Riparian Productivity (Rejected Study Request).</b> The Upper Skagit Indian Tribe (USIT) is requesting that City Light revisit our study request, The Impacts of Project Operations on Aquatic &amp; Riparian Biological Productivity Downstream of Gorge Dam (Riverine and Riparian Productivity) (Study Request page A3-128). As clearly illustrated in comments to numerous PSPs in this filing (e.g. FA-01, FA-02, FA-04, GE-04, TR-01, and TR-02), Project operations negatively impact water quality narrative criteria and aquatic habitat quality inhibiting aquatic productivity in a cascading manner. For this reason, it will be critical to address how impacts to water quality and aquatic habitat conditions cascades up (through bottom-</p>	Please see comment response NPS-C72.

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							up mechanisms) to aquatic productivity beginning at primary producers and culminating at fish productivity.	
278.	Upper Skagit Indian Tribe	03/08/2021	p. A128	USIT-C129	Section 6.3.4	N/A	<p><b>Aquatic Productivity.</b> This study request has many ties to other PSP comments included in this filing. However, one component not addressed is the influence of ramping rates on stranding and trapping risk by juvenile salmonids below Gorge dam. The current methods for estimating stranding and trapping mortality due to down ramping are antiquated. They, for example, have not been adjusted to account for changes in salmon spawn timing, nor emergence timing. Details regarding the shortcomings of the current methods can be found in the Riverine and Riparian Productivity Study Request (page A3-132). The effect of existing Project operations on fish in the Skagit River was highlighted in the Scoping Document-2 (SD-2):</p> <p>On p. 38 SD-2 states:                      “Effects of existing and any potential changes in project facilities and operation (e.g., reservoir levels) on resident fish habitat and populations, including foraging, movements, population connectivity, and spawning in the Skagit River, project reservoirs, and tributaries:”</p> <p>This study request provides a mechanism to relate sublethal water quality, geomorphology, and process flows impacts discussed in FA-01, FA-02, TR-01, and GE-04 to fish growth and overall viability. Because of this, USIT is requesting the methods highlighted in the original Study Request (beginning page A3-133) be adopted by City Light in either a new study request or as components of existing study requests (e.g. periphyton production as a component to FA-01) in the RSP.</p> <p>In addition to the methods outlined in the Riverine and Riparian Productivity Study Request (pages A3-133 – A3-134), USIT urges City Light to explore the utility of a drift feeding model that integrates both the comprehensive physical habitat and biological production effects to production (Rosenfeld et al. 2014; Rosenfeld et al. 2016). It has been noted that mechanistic, bioenergetics-based models provide more robust and rigorous estimates of habitat suitability for drift feeding stream fishes than traditional habitat suitability models (Naman et al. 2019). Due to their utility in determining impacts of flow on fish production, this model development would be useful for many other study requests aimed at examining the impact of flow and prey availability (e.g. water quality, instream flow, and geomorphology study requests).</p>	Please see comment response NPS-C72.
279.	WDFW	03/08/2021	p. 3	WDFW-C01	Section 6.3.10	N/A	Regarding the “Assessment of Gorge Dam Removal” Study Request, WDFW continues to support the general idea of the USIT study request to better understand the ongoing impacts from Gorge Dam.	Please see comment response USIT-C49.
280.	WDFW	03/08/2021	p. 12	WDFW-C04	Section 5.8	FA-04	<b>Fish Passage Technical Studies Program (FA-04) PSP, first paragraph, first sentence.</b> Although the actual FA-04 PSP does not expand the information collection to fish passage feasibility for Diablo and Ross Dams and productivity in Ross reservoir, the sentence captures the direction of Seattle City Light (SCL or Licensee) verbally during Federal Energy Regulatory Commission (FERC) PSP Meetings and in written follow up by SCL with their Fish Passage Issues Resolution Form (IRF) (Appendix B). WDFW recommends that SCL describes the entire productivity in the Ross Reservoir, not just a select few tributaries. SCL should include the Upper Skagit River into Canada, even if SCL just conducts a desktop exercise.	Please see comment-responses ARTU-C02.
281.	WDFW	03/08/2021	pp. 12-14	WDFW-C05	Section 5.8	FA-04	<b>FA-04 PSP, third paragraph, first sentence.</b> “The study will be conducted in a phased manner” and Bullet (2) under Phase 1. The sentence does not describe the direction expressed by SCL verbally during Federal Energy Regulatory Commission (FERC) PSP Meetings and in written follow up by SCL with their Fish Passage Issues Resolution Form (IRF) (Appendix B). SCL stated that they saw no need to proceed with a phased approach, because they viewed the fish passage barriers in the bypass	Please see comment-responses ARTU-C02. City Light eliminated the proposed phased approach for studying fish passage.

Table No.	Organization	Date	Comment Letter Page	Comment ID No.	PSP Introduction (if §6, relevant ID No. used in PSP of entity's own study request)	Study Plan(s)	Comment	Response
							<p>reach as partial fish barriers. The FA-04 PSP would currently require the evaluation of the fish barriers in the bypass reach to reach the conclusion of complete or partial fish passage barriers. SCL saw the fish barriers as partial, so they can skip the evaluation to determine the type of barrier and move forward with the feasibility of fish passage for all dams and the collection of data for productivity of Ross Reservoir without the phasing. WDFW concurs with SCL on their finding of partial fish passage barriers in the bypass reach and their lack of need to phase.</p> <p>Along with the collection of data for the fish passage feasibility and Ross Reservoir productivity, SCL should find the passage window of flows for upstream migration of different species, not the status of the barrier, complete or partial. The original evaluation in EnviroSphere (1989) of the bypass reach settled passage evaluation.</p> <p>“At this location, a boulder cascade barrier with a nine-foot vertical drop has been documented where neither the plunge pool depth nor vertical height of the drop were predicted, based on accepted methodologies for assessing fish passage (Powers and Osborne 1985), to allow for upstream passage of any salmonid species except steelhead and perhaps Chinook Salmon under higher flows. A second boulder cascade series presumed to represent a velocity barrier of less restrictive conditions occurs at approximately 1.3 miles upstream of the powerhouse (EnviroSphere 1989). EnviroSphere (1989) concluded, “...passage through the Gorge reach would be difficult for fish. Fish migration would only occur during a limited range or ‘window’ of flows. Discharges below this flow range would prevent the formation of localized plunge pools necessary for leaping. Discharges above this flow range would result in velocity barriers through narrow canyon sections.”</p>	
282.	WDFW	03/08/2021	pp. 14-16	WDFW-C06	Section 5.8	FA-04	<p><b>FA-04 PSP, Phase 1, Bullet (3).</b> WDFW needs additional species beyond those mentioned in FA-04 PSP because with higher flows in the bypass reach, the flow windows allow for passage through less leaping distance.</p> <p>FA-04 PSP will evaluate the natural partial fish passage barriers at three different flows, up to 1,200 cubic feet per second (cfs). SCL will then model the rest of the flows, which should include the ability to evaluate even higher flows for passage. EnviroSphere (1989) framed their evaluation of the partial barriers during the base and lower flows regimes, around 5 cubic feet per second (cfs). WDFW remains unsure about passage flow windows during spills or higher instream flow regimes, but Washington Department of Ecology (DOE) would need this information for setting instream flows. EnviroSphere (1989) alluded to an increase in plunge pool elevation during a 1,000 cfs flow at the 0.6-mile (from the Gorge Powerhouse) partial fish passage barrier, which decreased a 9-foot jump to a 4/5-foot jump for a fish, with greater pool depth. WDFW would recommend an evaluation of flow windows for many more fish species with only a 5-foot jump and a deeper pool to launch. WDFW needs evaluations and analyzation of window flows for passage from 1,000 cfs and greater with all the anadromous fish species. WDFW would include Chinook salmon (<i>Oncorhynchus tshawytscha</i>), pink salmon (<i>O. gorbuscha</i>), chum salmon (<i>O. keta</i>), sea-run bull trout (<i>Salvelinus confluentus</i>), Coho salmon, sockeye salmon (<i>O. nerka</i>), steelhead (<i>O. mykiss</i>), sea-run cutthroat (<i>O. clarki clarki</i>), and Pacific lamprey (<i>Entosphenus tridentatus</i>). SCL should consult with federal, state, local government agencies and fish and wildlife co-managers (tribal governments) for additions to the species list for passage flow analysis.</p> <p>As WDFW would consider any of the bypass barriers, a partial fish passage barrier, WDFW needs the assemblage of fish species that can navigate the passage and the flow windows that allow passage. As a general rule without formal barrier evaluation, The Fish Passage Inventory, Assessment, and Prioritization Manual (WDFW 2019) considers a stream reach with a sustained gradient <math>\geq 20\%</math> for <math>\geq 160</math> meters without</p>	Please see comment-responses ARTU-C02. Also, see the revised FA-04 Fish Passage Technical Studies Program Plan for City Light’s proposed approach to development of a fish species list for the feasibility assessment.



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							<p>resting areas or a single, near vertical drop of greater 3.7 meters (12.1 feet) in height, a complete fish passage barrier. EnviroSphere (1989) lists the two “natural” partial fish barriers with gradients of 3.8% and 5.9%, with the largest vertical drop of 9 feet. If increasing flow, increases the plunge pool elevations and decreases the required jump height to around 2m (6.5 feet), the smallest predicted decrease, Chinook, Coho, and sockeye salmon may have the ability to navigate the partial fish barrier as well (WDFW 2019). Beyond the examination of the 9-foot drop at low flows, WDFW would note that often, more than one passage route occurs in a cascade/boulder complex that would reduce the large leap, to a few smaller leaps, and would allow more fish species to make the upstream journey.</p> <p>In regard to fish that EnviroSphere (1989) did not address for passage, Coho salmon, WDFW would emphasize a May 31, 2018 fish survey, not recorded in the PAD or PSP, where surveyors found two Coho salmon fry in the landslide pool (Appendix A, USIT 2020, SCL 2018). The landslide pool resides just upstream of the landslide and the most upstream partial fish passage barrier, which would suggest that Coho may make the upstream journey to Gorge Dam plunge pool and propagate in the reaches upstream. According to the partial barrier location in the EnviroSphere (1989), the PAD does not correctly mark the EnviroSphere (1989) partial fish barriers on Figure 4.5-15, the satellite image.</p>	
283.	WDFW	03/08/2021	pp. 16-18	WDFW-C07	Section 5.9	FA-05	<p><b>FA-05 PSP Skagit River Gorge Bypass Reach Hydraulic and Instream SP Flow Model Development Study, first paragraph, first sentence.</b> The “evaluation of passage” does not capture the direction expressed by SCL verbally during Federal Energy Regulatory Commission (FERC) PSP Meetings and in written follow up by SCL with their Fish Passage Issues Resolution Form (IRF) (Appendix B). SCL should evaluate the window of flows for upstream passage for each anadromous species in the bypass reach. SCL stated that they saw no need to proceed with a phased approach, which evolved passage evaluation, because they viewed the fish passage barriers in the bypass reach as partial fish barriers. In the PSP, the FA-05 Study Plan would require the evaluation of the fish barriers in the bypass reach to reach the conclusion of complete or partial fish passage barriers. SCL saw the fish barriers as partial, so they would move forward with the collection of hydraulic data for the hydraulic model to find the windows of flow for upstream passage of all anadromous species without the phasing. WDFW concurs with SCL on their finding of partial fish passage barriers in the bypass reach and their lack of need to phase.</p> <p>SCL should discover which passage window of flows allow the upstream migration of all anadromous species, not whether the bypass fish barrier completely or partially blocks passage of fish. The original evaluation in EnviroSphere (1989) of the bypass reach settled passage evaluation:</p> <p>“At this location, a boulder cascade barrier with a nine-foot vertical drop has been documented where neither the plunge pool depth nor vertical height of the drop were predicted, based on accepted methodologies for assessing fish passage (Powers and Osborne 1985), to allow for upstream passage of any salmonid species except steelhead and perhaps Chinook Salmon under higher flows. A second boulder cascade series presumed to represent a velocity barrier of less restrictive conditions occurs at approximately 1.3 miles upstream of the powerhouse (EnviroSphere 1989). EnviroSphere (1989) concluded, “...passage through the Gorge reach would be difficult for fish. Fish migration would only occur during a limited range or ‘window’ of flows. Discharges below this flow range would prevent the formation of localized plunge pools necessary for leaping. Discharges above this flow range would result in velocity barriers through narrow canyon sections.”</p>	City Light acknowledges that the fish passage barriers in the bypass reach should be regarded as potential barriers. The FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study Plan has been revised accordingly.

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284.	WDFW	03/08/2021	pp. 18-21	WDFW-C08	Section 5.9	FA-05	<p><b>FA-05 PSP Third Paragraph, (6) Bullet.</b> WDFW needs to evaluate window of flows for the passage of all anadromous species in the bypass reach and beyond Chinook and Coho salmon and steelhead mentioned in FA-05 PSP. Higher flows would allow passage with less leaping distance and allow a larger subset of anadromous species in the bypass reach to make it.</p> <p>SCL would collect hydraulic data for the hydraulic (instream flow) model that would evaluate the natural partial fish passage barriers at three different flows, up to 1,200 cfs. SCL will then model the rest of the flows, which should include the ability to evaluate even higher flows for passage. EnviroSphere (1989) framed their evaluation of the partial barriers during the base and lower flows regimes, around 5 cubic feet per second (cfs). WDFW remains unsure about passage flow windows during spills or higher instream flow regimes, but Washington Department of Ecology (DOE) would need this information for setting instream flows. Each species will need a window of flows for migration through the barriers and the application or creation of a species and life stage specific HSC to the model. DOE will need to know which species can pass at which flows and which reach can they migrate to so that the Team knows where to evaluate habitat for that species through flows.</p> <p>EnviroSphere (1989) alluded to an increase in plunge pool elevation during a 1,000 cfs flow at the 0.6-mile from the Gorge Powerhouse partial fish passage barrier, which decreased a 9-foot jump to a 4/5-foot jump for a fish, with greater pool depth. WDFW would recommend an evaluation of flow windows for many more fish species with only a 5-foot jump and a deeper pool to launch. WDFW needs evaluations and analyzation of window flows for passage from 1,000 cfs and greater with all the anadromous fish species. WDFW would include Chinook salmon (<i>Oncorhynchus tshawytscha</i>), pink salmon (<i>O. gorbuscha</i>), chum salmon (<i>O. keta</i>), sea-run bull trout (<i>Salvelinus confluentus</i>), Coho salmon, sockeye salmon (<i>O. nerka</i>), steelhead (<i>O. mykiss</i>), sea-run cutthroat (<i>O. clarki clarki</i>), and Pacific lamprey (<i>Entosphenus tridentatus</i>). SCL should consult with federal, state, local government agencies and fish and wildlife co-managers (tribal governments) for additions to the species list for passage flow analysis.</p> <p>As WDFW would consider any of the bypass barriers, a partial fish passage barrier, WDFW needs the assemblage of fish species that can navigate the passage and the flow windows that allow passage. As a general rule without formal barrier evaluation, The Fish Passage Inventory, Assessment, and Prioritization Manual (WDFW 2019) considers a stream reach with a sustained gradient <math>\geq 20\%</math> for <math>\geq 160</math> meters without resting areas or a single, near vertical drop of greater 3.7 meters (12.1 feet) in height, a complete fish passage barrier. EnviroSphere (1989) lists the two partial fish barriers with gradients of 3.8% and 5.9%, with the largest vertical drop of 9 feet. If increasing flow, increases the plunge pool elevations and decreases the required jump height to around 2m (6.5 feet), at the very least, Chinook, Coho, and sockeye salmon may have the ability to navigate the partial fish barrier as well (WDFW 2019). Beyond the examination of the 9-foot drop at low flows, WDFW would note that often more than one passage route occurs in a cascade/boulder complex that would reduce the large leap, to a few smaller leaps, and would allow more fish species to make the upstream journey.</p> <p>In regard to fish that EnviroSphere (1989) did not address for passage, Coho salmon, WDFW would emphasize the May 31, 2018 fish survey, not recorded in the PAD, where surveyors found two Coho salmon fry in the landslide pool (Appendix A, USIT 2020, SCL 2018). The landslide pool resides just upstream of the landslide and the most upstream partial fish passage barrier, which would suggest that Coho could make</p>	<p>City Light has revised FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study Plan to clarify that the process to identify species of interest for the passage assessment will occur in consultation with fish management agencies and Indian Tribes. The revision also includes Coho salmon to the species list. The model will be developed with field data collected under planned flows of 50, 500, and 1,200 cfs. The model will also collect field data on opportunistic, unplanned flows resulting from spill at Gorge Dam, which will allow City Light to utilize the instream flow model to evaluate flows at which the barriers may be passable by various anadromous species at a range of flows beyond 1,200 cfs. Note that the intent of the three proposed planned flows was for model development and not identification as the flows for which species-specific passage modeling would occur. City Light anticipates that the model will be able to identify if specific species can pass the barriers and at what specific flows.</p> <p>Regarding the error in the PAD related to the locations of the fish passage barriers, City Light acknowledges the error and plans to correct this in all future documents.</p>

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							the upstream journey to Gorge Dam plunge pool and propagate in the reaches upstream. WDFW would also point out the additional observations recorded by fish biologists mentioned in the USIT presentation on slide 14 of the Power Point presentation (See Below Paragraph.). USIT reports 4 steelhead and 1 steelhead red above the lower partial fish barriers, the most difficult for fish to migrate through, during two different surveys conducted years apart. According to the EnviroSphere (1989), the PAD does not correctly mark the EnviroSphere (1989) partial fish barriers on Figure 4.5-15, the satellite image.	
285.	WDFW	03/08/2021	p. 22	WDFW-C09	Section 6.3.3 (WDFW-04)	N/A	<b>Reservoir Entrainment Study Request.</b> SCL has not created or offered a study plan that represents our study request or even an entrainment study plan of their own. WDFW has submitted "Evaluating Existing Fish Passage: Spill and Entrainment through Ross, Diablo, Gorge dams and appurtenant facilities through the Project Area at the Skagit River Hydroelectric Project (Spill and Entrainment) Study Request," in the PAD comments. WDFW does not find SCL's existing information sufficient or accurate enough to deduce the complete impacts from entrainment, particularly from spill. WDFW files comments and recommendations pursuant to Section 10(j) of the Federal Power Act. WDFW requests that FERC require SCL to create a study plan from the WDFW study request as submitted in the PAD and named above.	Please see comment response NPS-C76.
286.	WDFW	03/08/2021	pp. 22-28	WDFW-C10	Section 6.3.3 (WDFW-04)	N/A	<b>Reservoir Entrainment, Rejection by SCL to create a Study Plan, second paragraph, 1st sentence. (1) Sufficient Information.</b> WDFW has concerns about the adequacy of the existing information, because the PSP does not address fish passage related to spill, non-native fish colonization in the reservoirs and downstream in the Skagit River, insufficient information derived only from a small numbers of adult bull trout with hydroacoustic tags that did not include analysis of other species or juveniles, and the lack of analysis on range or detection efficiency on their acoustic receivers to guarantee the accuracy of their conclusions. SCL also made estimates on entrainment and mortality/injury with Ross Dam information on the other two dams. WDFW cautions the use of the Ross information, for example, Gorge Project includes over a 2+-mile long concrete-lined intake tunnel with varying pressures, surfaces, and angles that lead to the penstocks and turbines, a much longer intake tunnel than at Ross Dam. In consideration of a relicensing study that would direct SCL on a scope for later adaptive management plan in a license article, SCL should identify and emphasize structures, like a 2-mile intake tunnel for possible, unknown high mortality and injury to fish. SCL should use a relicensing study to fine tune a scope of an adaptive management license article, if SCL could not realistically fit the study request within the relicensing study period. SCL should not reject the study request out of hand.  WDFW does not find the information sufficient, because SCL derived their information from an insufficient study on a few, large bull trout. SCL's methodology does not meet the usual or common way to conduct a study for entrainment, when the unscreened Project structures and turbines provide the only means for downstream passage for fish. SCL must also account for passage frequency, non-native migration, mortality, and injury. WDFW would view our study request as appropriate to support the intention of Washington Administrative Code (WAC) 220-660-250, Washington (RCW 77.57.070 and 77.57.010) that requires water users to screen all intakes of surface water diversions to prevent entrainment of fish into the diversions where fish risk injury or death. These Washington codes and laws also require passage structures around blockages in rivers and streams for fish to migrate downstream and upstream. In addition, The Bull Trout Recovery Plan (USFWS 2015) described the need to address connectivity and recommends including connectivity between reservoirs, both upstream and downstream, for all life history forms to bolster depressed genetic diversity and population productivity. Between Washington State laws and the Bull	Please see comment response NPS-C76.

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							<p>Trout Recovery Plan, SCL will need to do a more accurate study, particularly when SCL has estimated and made assumptions of the bull trout population. More than one assumption leads to less accuracy. With non-native species, such as eastern brook trout and ESA species-listed species, SCL should use more precise and intensive survey and study that lead to more accurate passage number and mortality/injury.</p> <p>To support their existing information, the 2012 Biological Evaluation-Supplement: Impacts of Entrainment on Bull Trout; detailed physical properties of existing project facilities that influence entrainment and spill (SCL 2012). This evaluation, while insightful, is not adequate to accurately estimate entrainment of Bull Trout, let alone other native riverine species of concern. The study does not uphold the scientific rigor demanded by studies such as this; nor were the methods consistent with commonly accepted practices present in the literature. Specifically lacking in the evaluation- the large area of detection and uncertainty of fishes specific location over the 1–2km distance, a representative size class of tagged individuals that occur in the project area, lack of assessment of detection efficiencies over a range of operations (i.e., spill), no hydraulic or environmental assessment to assess infrastructure locations to preferred habitat and changes over full operating conditions, and only conducting the study in one reservoir. Since that evaluation, SCL has submitted a Quality Assurance Project Plan to further evaluate entrainment, but as with the previous study, it is lacking methodology which will be informative of realistic entrainment and spill (SCL 2019). The existing study utilized acoustic tags to track fish movement throughout Ross reservoir, which has limited exploration of entrainment possibilities. With only Ross Project examined, the spatial and temporal extent of the study was too small and the number of samples were limited.</p> <p>The 2012 Supplement (SCL 2012) synthesized the study design and results of the acoustic tagging of adult Bull trout. In their synthesis, it is evident the study is not adequate. First, juvenile and smaller size class fish were omitted from the analysis, making the analysis not fully inclusive of age and size. Often juvenile fish become entrained because of the given space between the “screen” of the trash rack on intake structures. To determine if trash racks could keep bull trout from entering the Project infrastructure SCL relied upon theoretical measurements of adult bull trout morphology- a technique that is not sufficient. This study looked strictly at adults from spawning locations and no other life history stages. Swimming ability of different age/size fish vary. The effects of entrainment can be vastly different based on the size and life history types of salmonids as well varies between species of fish. If either adults or small juveniles move downstream via entrainment or spill and can't move back to the parent reservoir or back up into upper watershed, researchers may measure a mortality rate. Depending on the numbers of fish, this could cause a population to collapse and/or could cause genetic depressions or productivity issues within parent reservoirs. So, if SCL doesn't include juveniles or other species in the study, they can't address population/productivity impacts. This leaves a large data gap, which includes the rate of juvenile and prey species entrainment and mortality. This will be particularly important when considering the movement of other juvenile salmonids through the Project area as well as non-native/invasive species such as eastern brook trout.</p> <p>The study also did not address regulating outlets (bypass or outlet valves). In the current operations, these valve outlets are seldom used except for maintenance test cases at Ross and Diablo, but Gorge Powerhouse uses the outlet valve to control releases into the bypass reach when SCL needs to maintain anadromous fish protection flows in the Skagit River below Gorge Powerhouse. If future operations</p>	

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							<p>are altered, which may add consistent flow to the bypass at Gorge Dam, this infrastructure will become a more significant fish passage route that needs study.</p> <p>The results analysis did not fully expand on timing of presence at the reservoir outlets. Does fish behavior and migration differ throughout the year making them more susceptible to entrainment at certain times? The study also did not take into account the variance of hydraulic and environmental conditions in the fore bay. Without an assessment of each of the three reservoirs forebay's environmental and hydraulic conditions to assess if seasonal conditions and specific locations of downstream infrastructure are self-mitigating, SCL must assume they are not. The results did not expand on pressure/temperature data from the tags. Did the fish prefer certain thermal strata in the water column? If so, is it coincident with a reservoir outlet or spill periods? The SCL study also failed to account for the unique tunnels (angles and material) and pressures between Ross, Gorge, and Diablo, as well as within each of the dams, further misleading their results and conclusions. The species, size, and number of entrained fish may differ significantly between units at the same site as different units have different characteristics. The operating time, flow volume, and relative location of the various units may be important in determining the entrainment rate of each. In general, the longer a unit is operated and the greater the flow volume per unit time, the more fish are entrained.</p> <p>The SCL (2012) report also failed to examine detection efficiency or range of the acoustic receivers, making it impossible to be certain of their conclusions. Understanding detection range and efficiency of acoustic receivers is paramount in any entrainment or movement study. The interpretation of acoustic data without detection efficiency makes it impossible to make reliable behavioral inferences, as SCL has attempted to do (Kessel et al. 2014). Only Ross Project was examined, and Gorge and Diablo entrainment rates were inferred. With the drastically different turnover rates of each reservoir, unique intakes and spill gates, lack of baseline hydraulic and environmental conditions to assess seasonal presence of species of concern, WDFW and USIT would expect fish migration and behavior to differ between the reservoirs. In conclusion, a more robust sampling design for more species (e.g. O. mykiss, native charr, redbelt shiner, and eastern brook trout) and size classes at all reservoirs is needed to evaluate entrainment and spill.</p>	
287.	WDFW	03/08/2021	pp. 28-29	WDFW-C11	Section 6.3.3 (WDFW-04)	N/A	<p><b>6.3.3 Reservoir Entrainment, Rejection by SCL to create a Study Plan, second paragraph, 1st sentence, (2).</b> "the proposed methods result in an extensive scope of work that could not meaningfully be completed within the timeframe allowed by the ILP and therefore would not inform the development of license conditions (18 CFR § 5.9(b)(5);..."</p> <p>WDFW opposes the reasoning, because whether SCL can conduct the study in the time frame, does not constitute a FERC requirement for a study request. WDFW rejects the assertion that SCL cannot complete or accomplish the purported, too large and complicated study request. If SCL does not have the time within the relicensing period, then they should change the scope of the relicensing study to focus the topic, instead of not addressing the issue. SCL could determine which structure(s) and reservoir may have the greatest injury or mortality to entrained fish, particularly when they assumed fish populations and mortality rates for one reservoir and then estimated the rates for the other two reservoirs. SCL could then incorporate the more detailed portion of the Spill and Entrainment methodology in an adaptive management license article to focus on one or a couple of structures. The LPs will need information to write management plans and license articles. WDFW finds this approach to and dismissal of the LPs' study request topics of concern counterproductive. WDFW has</p>	Please see comment response NPS-C76.

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							concerns about the adequacy of the existing information, because the PSP does not address fish passage related to spill.	
288.	WDFW	03/08/2021	pp. 29-30	WDFW-C12	Section 6.3.3 (WDFW-04)	N/A	<p><b>Reservoir Entrainment, Rejection by SCL to create a Study Plan, second paragraph, 1st sentence, (2).</b> Existing information shows that turbine and spillway entrainment rates are low and unlikely to result in population-level effects on reservoir fish species.</p> <p>SCL has based this conclusion for the entire three-dam project on an almost 10-year old hydroacoustic study with a small number of adult bull trout on only Ross Dam. WDFW would warn SCL about past court cases, when an old entrainment study did not suffice in the court of law. Although specific to entrainment, WDFW believes the overall need of information to conduct a National Environmental Policy Act (NEPA) effects analysis applies to many of the study requests that SCL has refused to conduct. Failure to obtain this information creates the risk that the FERC's evaluation and decision will not meet NEPA requirements. WDFW would direct SCL to examine, e.g., American Rivers v. FERC, 895 F3d 32, 49-50 (D.C. Cir. 2018). In the decision, FERC's reliance on data from a decade-old survey of fish entrainment provided by the applicant, without any updated information, field studies, or independent verification was "unreasonable" and violated NEPA.</p>	Please see comment response NPS-C76.
289.	WDFW	03/08/2021	p. 30	WDFW-C13	Section 6.3.3 (WDFW-04)	N/A	<p><b>Reservoir Entrainment, Rejection by SCL to create a Study Plan, third paragraph, last two sentences.</b> "...because they are resident species which do not sound in an attempt to exit the reservoirs. Larger species and life-stages are strong enough to avoid being entrained into the turbines."</p> <p>WDFW disagrees with both sentences. Resident species do migrate, particularly rainbow and bull trout. WDFW remains unsure on how SCL know that a rainbow trout doesn't have a desire to migrate downstream to go to the river, to the estuary, or to the Puget Sound and beyond, particularly when SCL spills. Adult swim better than juveniles, but we know already know that adult fish have passed through the turbines, so those adults did not make the last sentence true. SCL should support their assumptions in these two sentences.</p>	Please see comment response NPS-C76.
290.	WDFW	03/08/2021	pp. 30-31	WDFW-C14	Section 6.3.3 (WDFW-04)	N/A	<p>"City Light also calculated Bull Trout spillway mortality from 2013–2018 based on (1) annual spill duration at each dam, (2) time acoustically-tagged Bull Trout spent near the spillways at each dam, (3) assumed adult Bull Trout population abundance in each reservoir, and (4) assumed spillway mortality rates of 100 percent at Ross Dam, 55 percent at Diablo Dam, and 10 percent at Gorge Dam,..."</p> <p>WDFW would point out that SCL made two assumptions to calculate the bull trout mortality: assumed population and abundance in each reservoir and assumed spillway mortality rates. As stated by (Algera et al. 2020), "Higher risk ratios were estimated for analyses based on studies with lower susceptibility to bias and those that measured actual fish mortality, rather than inferred mortality from survival estimates or detection histories." When SCL has made two assumptions during their mortality calculation, WDFW thinks that SCL has compounded the risks, accuracy, and underestimation of the fish mortality. As we discussed before, SCL has used solely adult, large sized bull trout in their study for existing information, which does not represent the fish population of the reservoirs. SCL should use various species, sizes of fish, and age classes to understand entrainment in spill and at the intake for all three reservoirs to understand mortality, injury, and passage numbers.</p>	Please see comment response NPS-C76.
291.	WDFW	03/08/2021	pp. 31-33	WDFW-C15	Section 6.3.5 (WDFW-14)	FA-03	<p><b>Reservoir Habitat and Fish Populations.</b> SCL has not created or offered a study plan that represents our study request or even a littoral and riparian habitat study plan of their own. WDFW has submitted "Littoral and Riparian Habitat Quality Study Request" in the PAD comments. WDFW files comments and recommendations</p>	City Light is proposing a FA-07 Reservoir Tributary Habitat Assessment Study to evaluate the productivity potential of reservoir tributaries the potential for introducing salmon and steelhead

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							<p>pursuant to Section 10(j) of the Federal Power Act. WDFW requests that FERC require SCL to create a study plan from the WDFW study request as submitted in the PAD and named above.</p> <p>Project operations effect nearshore habitat through erosion, sediment deposition, and the inundation and dewatering of riparian and wetland communities during drawdown and water level fluctuations. NPS observations of nearshore habitat complexity indicate that this could be a limiting factor for the biological communities in these waterbodies. These effects have also been verified by Gorge Drawdown fish surveys, discussed above, and visual observations in Ross reservoir, and they are further documented in Seattle City Light's TR-09. Within the context of fish passage, understanding how operations impact habitat quality will be important during discussions of reintroducing salmon above Gorge as operations that limit habitat potential directly impact those efforts.</p> <p>Seattle City Light states that the FA-03 Reservoir Fish Stranding and Trapping Risk Assessment will fulfill the concerns raised in the Littoral and Riparian Habitat Quality Study Request. While the desktop exercises with associated field ground truthing will be useful in detailing habitat conditions at a very high level, it will be insufficient to satisfy Littoral and Riparian Habitat Quality objectives such as evaluate specific habitat characteristics including quantification of woody habitat, identification of possible restoration activity areas, and providing an assessment of habitat conditions. In this manner, it is clear that SCL mischaracterized WDFW's study request and concerns regarding littoral and riparian habitat in the Project's reservoirs. Additionally, SCL states there is no project effected indicated by the existing information, but Project level effects include dewatering of the littoral habitat during drawdowns, sediment deposition, and erosion impact habitat quality. SCL further maintains that there is "no specific adverse effect demonstrated by the wealth of data already collected within the Project area." This statement contradicts statements made by City Light in other documents such as the Beaver Habitat Assessment (TR-09) as well as the PAD where SCL claims that "shoreline erosion has the potential to affect terrestrial vegetation including rare plant communities along the shoreline, wetlands, riparian areas, cultural resources, wildlife or aquatic habitat, and recreation resources (e.g., trails and campgrounds" (SCL 2020). These statements are further corroborated by the fact that 8.25 square miles of the 18.25 square miles of the total, full pool surface area in Ross Reservoir is dewatered annually, and significant drawdowns in Gorge Reservoir have resulted in potentially 20 fish kills since 1999.</p>	<p>above Gorge Dam. For other elements of this request, please see City Light's response in Section 6.3 of the RSP.</p> <p>Reservoir water surface elevations fluctuate as the result of Project and non-Project (e.g., flood-control related operations stipulated by the U.S. Army Corps of Engineers [USACE]) actions, and this variation affects the shoreline.</p> <p>City Light believes that much of the information sought by WDFW in WDFW-14 is available as existing information or will be available as the result of studies proposed by City Light, and some will be derived, if appropriate, in the context of management plans that arise out of the relicensing.</p>
292.	WDFW	03/08/2021	pp. 33-34	WDFW-C16	Section 6.3.5 (WDFW-14)	N/A	<p><b>Application to License Development.</b> Understanding the impact of Project operations on Littoral and Riparian habitat quality will allow for meaningful license conditions to improve habitat conditions including:</p> <ul style="list-style-type: none"> <li>▪ Changes in drawdown frequency and intensity</li> <li>▪ Altered hydraulic regimes</li> <li>▪ Restoration activities to increase littoral habitat and its complexity</li> <li>▪ Defining of habitat conditions</li> <li>▪ Framework to monitor and adaptively manage within license</li> </ul>	Please see comment response NPS-C75.
293.	WDFW	03/08/2021	p. 34	WDFW-C17	Section 6.3.5 (WDFW-14)	N/A	<p>"The studies requested to address near-shore habitat quality are requests for baseline data gathering that could not be adequately completed within the ILP study timeframe."</p> <p>WDFW opposes this reasoning, because whether SCL can conduct the study in the time frame, does not constitute a FERC requirement for a study request. WDFW rejects the assertion that SCL cannot complete or accomplish the purported, too large and complicated study request. If SCL does not have the time within the relicensing</p>	City Light provides additional rationale for not adopting in full the requested study in Section 6.3 of the RSP. Please also see comment response NPS-C75.

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							period, then they should change the scope of the relicensing study to focus the topic to develop a later study a license article, instead of not addressing the issue. The LPs will need information to write management plans and license articles. WDFW finds this approach to and dismissal of the LPs' study request topics of concern counterproductive.	
294.	WDFW	03/08/2021	pp. 35-37	WDFW-C18	Section 6.3.5 (WDFW-14)	N/A	<p>“City Light believes that the LPs’ proposals represent extensive data gathering exercises aimed at detecting a Project effect where none is indicated by existing information (18 CFR § 5.9(b)(5)).”</p> <p>Documentation by Riedel (1990) a document made for SCL during the last relicensing clearly shows one of the impacts of reservoir fluctuations by project operation as erosion:</p> <p>“The cyclic nature of reservoir drawdowns imparts a cyclic nature to reservoir shoreline erosion. Every year banks and bank colluvium is eroded from bluffs and beaches near the full pool elevation and is carried to lower depths as the reservoir level falls in autumn and winter. Continued large fluctuations in reservoir level prevent stable shoreline profiles from developing.” (Lawson 1985)</p> <p>Riedel (1990) also showed the massive scale of this erosion on all three reservoirs, which degrades and prevents aquatic and riparian habitat: [Table 8]</p> <p>The prevention of stable shorelines reduces and degrades littoral, aquatic, and riparian habitat, hence habitat important to fish, and waterfowl:</p> <p>“Erosion of shores at full pool elevation is a more severe problem than for areas below full pool for several reasons. First, erosion at full pool results in the loss of terrestrial [riparian] habitat and recreational facilities” (Riedel 1990).</p> <p>“We found that lakes with high water level fluctuations (WLF) had significantly more coarse littoral substrata with less coverage of macrophyte vegetation [littoral habitat] in the shallows than in lakes with low WLF. Lakes with high WLF also had greater proportions of motile diatom species and omnivorous benthic invertebrates in shallow waters, altered taxonomic and trophic structure of benthic consumers and more homogeneous algal and benthic invertebrate assemblages” (Evtimova and Donohue 2015).</p> <p>WDFW would not have SCL conduct a relicensing study to discover an impact from erosion. SCL has already documented the effects of erosion during their last 1990 relicensing and will continue the erosion study under GE-02 Study Plan. WDFW needs information collected on impacted littoral and riparian habitats quantity and quality. WDFW requests that FERC require SCL to provide a study plan that will quantify their ongoing impacts to littoral and riparian habitats around the reservoir in the total fluctuation zone because of already documented erosion due to ongoing project operations.</p>	See response to comment WDFW-C15.
295.	WDFW	03/08/2021	pp. 37-39	WDFW-C19	N/A	FA-04	<p><b>FA-04 PSP General Comments.</b> At the PSP FERC meetings, SCL removed the “phasing” of the study plan to conduct an “evaluation of passage.” SCL captured their intentions in a written follow up by SCL with their Fish Passage Issues Resolution Form (IRF) (Appendix B). SCL recognized that they should move forward to evaluate the window of flows for upstream passage for each anadromous species in the bypass reach, because the latest barrier analysis in EnviroSphere (1989) recognized that steelhead should have the ability to migrate through the barriers at some flow, which make them partial barriers. SCL stated that they saw no need to proceed with a phased</p>	Please see comment responses ARTU-C02.



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							<p>approach, which involved passage evaluation, because they viewed the fish passage barriers in the bypass reach as partial fish barriers. In the PSP, the FA-04 PSP would require the evaluation of the fish barriers in the bypass reach to reach the conclusion of complete or partial fish passage barriers. At the PSP meetings, SCL saw the fish barriers as partial, so they would move forward with the feasibility of fish passage for all dams and the collection of data for productivity of Ross Reservoir without the phasing. WDFW concurs with SCL on their finding of partial fish passage barriers in the bypass reach and their lack of need to phase.</p> <p>SCL should discover which passage window of flows allow the upstream migration of different species, not the status of the barrier, complete or partial. The original evaluation in EnviroSphere (1989) of the bypass reach settled passage evaluation:</p> <p>“At this location, a boulder cascade barrier with a nine-foot vertical drop has been documented where neither the plunge pool depth nor vertical height of the drop were predicted, based on accepted methodologies for assessing fish passage (Powers and Osborne 1985), to allow for upstream passage of any salmonid species except steelhead and perhaps Chinook Salmon under higher flows. A second boulder cascade series presumed to represent a velocity barrier of less restrictive conditions occurs at approximately 1.3 miles upstream of the powerhouse (EnviroSphere 1989). EnviroSphere (1989) concluded, “...passage through the Gorge reach would be difficult for fish. Fish migration would only occur during a limited range or ‘window’ of flows. Discharges below this flow range would prevent the formation of localized plunge pools necessary for leaping. Discharges above this flow range would result in velocity barriers through narrow canyon sections.”</p> <p>SCL, WDFW, and the LPs agree with the findings of barrier status in the EnviroSphere (1989). The bypass contains partial fish passage barriers that need the collection of hydraulic information to describe the window of flow for different species.</p>	
296.	WDFW	03/08/2021	pp. 39-42	WDFW-C20	N/A	FA-04	<p><b><u>FA-04 PSP, WDFW needs additional species beyond those mentioned in FA-04 PSP for passage flow analysis. Higher flows create the flow windows that allow for passage with less leaping distance.</u></b> FA-04 PSP will evaluate the natural partial fish passage barriers at three different flows, up to 1,200 cfs. SCL will then model the rest of the flows, which should include the ability to evaluate even higher flows for passage. EnviroSphere (1989) framed their evaluation of the partial barriers during the base and lower flows regimes, around 5 cfs. WDFW remains unsure about the exact window of flow for passage of different species during spills or higher instream flow regimes. DOE would need this information for setting instream flows. EnviroSphere (1989) alluded to an increase in plunge pool elevation during a 1,000 cfs flow at the 0.6-mile (from the Gorge Powerhouse) partial fish passage barrier, which decreased a 9-foot jump to a 4/5-foot jump for a fish, with greater pool depth. WDFW would recommend an evaluation of flow windows for many more fish species with only a 5-foot jump and a deeper pool to launch. WDFW needs analyzation of window of flows for passage from 1,000 cfs and greater with all the anadromous fish species. WDFW would include Chinook salmon (<i>Oncorhynchus tshawytscha</i>), pink salmon (<i>O. gorbuscha</i>), chum salmon (<i>O. keta</i>), sea-run bull trout (<i>Salvelinus confluentus</i>), Coho salmon, sockeye salmon (<i>O. nerka</i>), steelhead (<i>O. mykiss</i>), sea-run cutthroat (<i>O. clarki clarki</i>), and Pacific lamprey (<i>Entosphenus tridentatus</i>). SCL should consult with federal, state, local government agencies and fish and wildlife co-managers (tribal governments) for additions to the species list for passage flow analysis.</p> <p>As WDFW would consider any of the bypass barriers, a partial fish passage barrier, WDFW needs the assemblage of fish species that can navigate the passage and the</p>	Please see comment responses ARTU-C02. Also, see the revised FA-04 Fish Passage Technical Studies Program Plan for City Light's proposed approach to development of a fish species list for the feasibility assessment.

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							<p>windows of flow that allow passage for those different species. As a general rule without formal barrier evaluation, The Fish Passage Inventory, Assessment, and Prioritization Manual (WDFW 2019) considers a stream reach with a sustained gradient <math>\geq 20\%</math> for <math>\geq 160</math> meters without resting areas or a single, near vertical drop of greater 3.7 meters (12.1 feet) in height, a complete fish passage barrier. EnviroSphere (1989) lists the two low-flow barriers with gradients of 3.8% and 5.9%, with the largest vertical drop of 9 feet. If flow increase in the bypass reach, the plunge pools should increase in elevation and decreases the required jump height to around 2m (6.5 feet). At the very least, Chinook, Coho, and sockeye salmon may have the ability to navigate the partial fish barrier as well (WDFW 2019). Beyond the evaluation of the 9-foot drop at the upstream partial fish barrier at low flows, WDFW would note that often more than one passage route occurs in a cascade/boulder complex that would reduce the large leap, to a few smaller leaps, and would allow more fish species to make the upstream journey.</p> <p>In regard to fish that EnviroSphere (1989) did not address for passage, Coho salmon, WDFW would emphasize a May 31, 2018 fish survey, not recorded in the PAD or PSP, where surveyors found two Coho salmon fry in the landslide pool (Appendix A, USIT 2020, SCL 2018). The landslide pool resides just upstream of the landslide and the most upstream partial fish passage barrier, which would suggest that Coho could make the upstream journey to Gorge Dam plunge pool and propagate in the reaches upstream. According to the EnviroSphere (1989), the PAD did not correctly mark the EnviroSphere (1989) partial fish barriers on Figure 4.5-15, the satellite image.</p>	
297.	WDFW	03/08/2021	pp. 42-43	WDFW-C21	N/A	FA-04	<p><b><u>FA-04 PSP does not evaluate Pacific lamprey passage and contains an incomplete record of resident species below, between and above the partial fish passage barriers.</u></b> WDFW needs additional information of resident species and lamprey in the bypass reach through fish surveys so that DOE can create or apply their Habitat Suitability Curves (HSCs) to the Instream Flow Model. Although resident fish may or may not have the ability to migrate upstream, depending on the species, WDFW would need information on presence of unnoted resident fishes, because we most likely cannot estimate their presence through passage evaluation. DOE would also apply or create any resident species HSC to determine instream flows, particularly for spawning habitat during anadromous fish shoulders or less active time periods. WDFW recommends that SCL particularly focus on Pacific lampreys, Washington State Priority Species, and Salish sucker, a State Species of Greatest Conversation Need, because of their special statuses. WDFW also recommends that SCL conduct these surveys because of the focus on salmonids during most past surveys and the lack of surveys for the non-salmonid species. A survey for lamprey would require a different type of survey, because of the different habitat needed by the larval lamprey that often buries itself in fine sand and silt.</p> <p>A passage survey would include some of the same collection of data, but would also include attachment sites and climbing ability of each lampreys. Much like the Federal Power Act, WDFW has a responsibility to consider all fish species, including resident fish and non-salmonids. The bypass reach may provide passage for an anadromous non-salmonid, the Pacific lamprey, a Washington State Priority Species. WDFW also fully offers our help with survey protocols for Pacific lamprey or passage evaluation for lamprey.</p>	Please see comment responses ARTU-C02. Also, see the revised FA-04 Fish Passage Technical Studies Program Plan for City Light's proposed approach to development of a fish species list for the feasibility assessment.
298.	WDFW	03/08/2021	pp. 43-44	WDFW-C22	N/A	FA-04	<p><b><u>FA-04 PSP does not evaluate the upstream and downstream windows of flow for resident and anadromous fish species at the exit of the Gorge Dam plunge pool.</u></b> WDFW needs additional information to evaluate a third partial fish passage barrier at the exit of the plunge pool. WDFW recommends an evaluation of a window of flows for upstream and downstream fish passage at the exit of the Gorge Dam plunge pool.</p>	Please see comment responses ARTU-C02.

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							WDFW would want to know which flows can pass fish, both resident and anadromous, downstream and upstream and if any structures delays fish from exiting or entering the pool. WDFW would also want to know the capacity of the pool and the length of time that fish may remain in the pool without passage. EnviroSphere (1989) described the plunge pool with the following. "Due to the absence of surface flows over the lower lip of this pool, fish in this unit are essentially isolated from the rest of the bypass reach." WDFW would need this information to determine stream flows necessary for fish survival, fish passage flow, and application or creation of HSCs to the instream flow model.	
299.	WDFW	03/08/2021	pp. 44-45	WDFW-C23	N/A	FA-04	<b>FA-04 PSP Historic Background and Passage Information.</b> WDFW believes that more information will inform the genetic discussion for passage issues in the newly proposed study plan by SCL, Reservoir Native Fish Genetics Baseline (FA-06) Draft Study Plan. WDFW would emphasize that species behavior could explain the separate genetic differences, among many things. SCL has most intensely look at one species, bull trout, a species known for high spawning site fidelity. WDFW would point to the Baker River Hydroelectric Project (Baker Project) where two separate populations exhibit sympatry with little genetic exchange into the more accessible population. WDFW could explain the genetic differences between the upstream and downstream populations with little survival through the Gorge Powerhouse turbines or through spill. The entrained fish could not survive the dewatered condition of the bypass reach or as SCL has asserted many times, entrainment does not occur much at the intake or the spill. In the end, SCL has some evidence, but no certainty to explain the genetic differences. WDFW does agree that the Upper Skagit populations has some sort of Founders effect. WDFW does think that the creation and execution of a Spill and Entrainment Study Plan could better explain what we don't know about downstream passage, survival, and delay mortality. To repeat what a fish biologist about said about Dolly Varden trout below the Project, he said that WDFW has not really looked, but you would expect them to occur below the Project. I would couple that remark with their phenotypes look very similar to bull trout.	Please see comment responses ARTU-C02.
300.	WDFW	03/08/2021	pp. 45-46	WDFW-C24	N/A	FA-04	<b>Historic Anecdotal Information.</b> SCL has selected many quotes from historic journals and reports. WDFW has seen some reports of steelhead at Stetattle Creek and Chinook at Reflector Bar (below Diablo Dam) (Brennan and McCauley 1936) as one of them. WDFW would like to point to one legal contract with the City of Seattle and Washington Department of Fisheries (WDF) and the Washington Department of Game (WDG) (late 1946- early 47). Both parties made a Statement of Fact in the legal document. "constructed three dams ... destruction of the salmon, steelhead and cutthroat trout runs to a small extent in the area above the Gorge Dam and to a considerable extent in the portion of the Skagit River extending downstream from the Gorge Dam to the confluence of the Cascade River" (City of Seattle late 1946-early 1947).  In the same document under the part titled, "Action to be Taken for the Protection of Fish Life in that Portion of the Skagit River Affected by the Construction of Ross, Diablo and Gorge Dams,... 1.: Very few spring chinook salmon ever spawned above the site of the Gorge Dam. Some steelhead spawned above the site of the Gorge Dam (City of Seattle late 1946-early 1947)." In the bypass reach, "Large annual runs of chinook, silver and pink salmon and steelhead and cutthroat trout have utilized that the area of the Skagit River lying between the Gorge Dam and Marblemount, Washington and its tributaries for the perpetuation of their kind. Small runs of chum and dog salmon have done likewise (City of Seattle late 1946-early 1947)." WDFW assumes that SCL understands and knows of this legal contract, because the City of Seattle signed this contract to fund the WDFW Hatchery in Marblemount as mitigation.	Please see comment responses ARTU-C02.

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301.	WDFW	03/08/2021	pp. 46-50	WDFW-C25	N/A	FA-04	<p><b>Latest Barrier Evaluation (Envirosphere 1989).</b> FA-04 PSP does not record an older fish bypass reach survey covered in WDFW's Revised Study Request. WDFW emphasizes the May 31, 2018 survey referred throughout these comments in Appendix A (SCL 2018) (Upper Skagit Indian Tribe [USIT] 2020). Although SCL has dropped the phased approach to FA-04 PSP, WDFW underscores the finding in this survey, which exemplifies the reason SCL should evaluate passage flows and document species in reaches around the three partial barriers, instead of their determination of initial passage status of the barrier. The LPs already know that anadromous fish have made it above the partial barrier and Gorge Dam. SCL has referred consistently of the small population of steelhead at Stetattle Creek in their PSP (SCL 2020) and in other formal documents. For a fish survey done in a more contemporary time, WDFW would highlight the discovery of Coho salmon fry in the landslide pool above the most upstream natural partial fish passage barrier. During the PSP FERC meetings with SCL, SCL has recognized the partial fish barrier status of these passage barriers. WDFW would also point out the additional observation recorded by fish biologist mentioned in the USIT presentation on slide 14 of the Power Point presentation (See Below Paragraph.). USIT reports 4 steelhead and 1 steelhead red above the lower partial fish barriers, the most difficult for fish to migrate through, during two different surveys conducted years apart.</p> <p>The PAD and FA-04 PSP (SCL 2020) quotes some historic sources that try to describe fish passage through the bypass reach and historic anadromy or lack there of above Gorge Dam. Eventually, SCL relies on the Envirosphere (1989) to describe the partial fish passage barriers in the bypass reach, which describes the ability of some species to pass, while some species have difficulty with the upstream migration. In this narrative in the PAD, Envirosphere (1989) describes the areas with possible upstream fish passage problems:</p> <p>“At this location, a boulder cascade barrier with a nine-foot vertical drop has been documented where neither the plunge pool depth nor vertical height of the drop were predicted, based on accepted methodologies for assessing fish passage (Powers and Osborne 1985), to allow for upstream passage of any salmonid species except steelhead and perhaps Chinook Salmon under higher flows. A second boulder cascade series presumed to represent a velocity barrier of less restrictive conditions occurs at approximately 1.3 miles upstream of the powerhouse (Envirosphere 1989).” Envirosphere (1989) concluded, “...passage through the Gorge reach would be difficult for fish. Fish migration would only occur during a limited range or ‘window’ of flows. Discharges below this flow range would prevent the formation of localized plunge pools necessary for leaping. Discharges above this flow range would result in velocity barriers through narrow canyon sections.”</p> <p>The above quote from Envirosphere (1989) exemplifies the importance of finding the “window” of flows for upstream migration for each species. SCL has proposed to use hydraulic measurements for the hydraulic and instream flow modeling to discover these flow windows for steelhead, Coho salmon, and Chinook salmon. WDFW recommends that SCL find the “window” of flows for as many anadromous fish species as possible. SCL cannot know which species has or does not have a window of flows until they take the hydraulic measurements and create the modeling. DOE will need this flow window information to select flows for upstream and downstream migration and compare the migration flows with habitat flows to find instream flows that will maximize the habitat for the desire species regimes during different times of the year.</p>	Please see comment responses ARTU-C02.

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							<p>The PAD (SCL 2020) noted the historic accounts of fish populations above the “barriers,” such as steelhead runs, possible current steelhead passage, and questioned the life strategy of some of the <i>O. mykiss</i> above the barriers. Did the surveyors find rainbow trout or steelhead fry? As stated in the PAD (SCL 2020), the result showed some evidence for historic steelhead passage, but more importantly, showed steelhead had the ability to pass:</p> <p>“Under high flow conditions small numbers of steelhead may have historically been able to move upstream of these barriers (Smith and Anderson 1921; EnviroSphere 1989; NMFS 2012; NMFS 2018). During the previous Project relicensing, City Light conducted an assessment of historical records containing WDFW accounts in the Project vicinity (EnviroSphere 1988). From review of the historical records, EnviroSphere concluded that, ‘Some historical evidence suggests that small runs of steelhead trout migrated as far as Stetattle Creek...’. Given potential passage by steelhead above the lowermost barrier, it cannot be determined with current information whether the juvenile Rainbow Trout observed upstream of the passage barriers in the recent bypass reach fish use surveys were derived from anadromous steelhead that had ascended the bypass reach barriers and spawned above them but below Gorge Dam, or represented Rainbow Trout that emigrated from Gorge Lake; it is presumed the Brook Trout and native char were passed downstream from Gorge Lake.”</p> <p>SCL then claims in the PAD that all salmon remain excluded from the reaches above the 0.6-mile (from the Gorge Powerhouse) partial fish passage barrier. The reader assumes that SCL recognizes that steelhead, a salmonid, but not a salmon, can migrate above the partial barriers, when EnviroSphere (1989) referred to smalls runs of steelhead at Stetattle Creek:</p> <p>“However, a steep and narrow boulder falls and cascade about 0.6 miles upstream of the powerhouse constitutes a natural barrier to the upstream passage of salmon ([PAD] Figures 4.5-15 and 4.5-16), and a similar feature is located farther upstream in the bypass reach, approximately 1.3 miles above the powerhouse ([PAD]Figure 4.5-15) (Powers and Orsborn 1985).”</p>	
302.	WDFW	03/08/2021	pp. 50-53	WDFW-C26	N/A	FA-04	<p><b>Proper Location the “Natural” Partial Fish Passage Barriers.</b> Figure 4.5-15 on Page 4-164 in the PAD, documents the SCL’s interpretation of the location of the partial fish passage barriers. Figure 4.5-16, in the PAD, shows a picture of the 0.6-mile low-flow barrier on the next page (SCL 2020). For SCL to evaluate the flow windows for passage through the barriers, with which fish species may successfully navigate the partial barriers, a surveyor would need to understand where to conduct the evaluation of the barriers in the bypass reach.</p> <p>EnviroSphere (1989) states the location of the most upstream natural partial barrier, 1.22-1.34 miles upstream of the powerhouse, the best: “(5) Plunge Pool/Cascade Section. This steep, narrow section is similar to section (3) [most downstream low-flow fish barrier] and represents a second [as swimming upstream] possible barrier to fish migration. This section is characterized by short, deep boulder pools interspersed by boulder and block cascades. During baseflow conditions, the upper half of this section experiences subsurface flows. This highly confined section is formed by a large, active landslide along the north bank which impinges against the south canyon bedrock walls...”</p> <p>EnviroSphere (1989) describes the next section upstream from the (5) Plunge Pool/Cascade Section (the section with the most upstream natural partial barrier), the section quoted from above: “(6) Landslide Dam Pool. This long pool results from a</p>	Please see comment responses ARTU-C02.

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							<p>landslide dam associated with the section immediately downstream. This dam results from the movement of boulders and cobbles originating from an active natural landslide into the stream channel. The landslide is associated with Afternoon Creek [largest tributary to the bypass reach], a steep stream located in the north bank at the lower end of this unit. This pool is the deepest naturally occurring unit within the Gorge bypass reach, with a maximum depth of about 20 ft at summer baseflow discharge..."</p> <p>As noted by EnviroSphere (1989), the first partial fish barrier, the most downstream, resides at 0.6 miles from the Powerhouse and the second partial fish barrier, the farthest upstream, resides 1.22-1.34 miles upstream of the powerhouse. EnviroSphere (1989) also notes a landslide just upstream of the most upstream natural partial fish barrier as described above. If a reader looks at Figure 4.5-15 in the PAD, SCL describes and maps the partial fish barrier just downstream of the landslide as the lowest partial fish passage barrier, when EnviroSphere (1989) clearly names this barrier, the second or most upstream low-flow fish barrier. WDFW remains uncertain about the most upstream partial barrier in Figure 4.5-15 in the PAD, which EnviroSphere (1989) missed or did not name. SCL will need to determine the exact locations of the two "natural" partial fish passage barriers, so that they can collect information. According to EnviroSphere (1989) barriers, SCL should have located the other, most downstream, partial fish barrier between the partial fish barrier near the landslide and the Powerhouse on the satellite image. Either SCL claims to have another partial fish passage barrier upstream of the most upstream barrier mentioned in EnviroSphere (1989) or they remain unsure about the location of the partial barriers. With all the confusion on the location and passage of partial fish passage barriers, WDFW makes this Revised Study Request to evaluate the location of the two "natural" partial fish passage barriers.</p>	
303.	WDFW	03/08/2021	p. 53	WDFW-C27	N/A	FA-04	<p><b>“Phase 2” Methodology Comments--Feasibility Analysis for Fish Passage at all Dams and Productivity analysis at Ross Reservoir.</b> SCL dropped the phased approach or required evaluation of fish barriers as “complete” or partial.” SCL expressed the decision at the PSP FERC meetings and with a written IRF (Appendix B) that summarized the meeting statement that they would move forward with the feasibility of fish passage for all dams and the collection of data for productivity of Ross Reservoir without the phasing.</p>	Please see comment responses ARTU-C02.
304.	WDFW	03/08/2021	pp. 53-56	WDFW-C28	N/A	FA-06	<p><b>FA-06 Reservoir Native Fish Genetics Baseline Draft Study Plan.</b> In this draft study plan, Seattle City Light (SCL) describes a plan to re-analyze available microsatellite genetic data of salmonids native to the project area, the upper Skagit River, which has been impacted by three SCL dams. At a high level, the plan consists of 1) forming an Expert Panel whose purpose is to review, consult, and advise, 2) consolidation and re-analysis of available microsatellite datasets, and 3) reporting of results. Proposed activities are spread out over two years.</p> <p>1. A critical problem with this draft study plan is that the project goals are vague, described as “characterize baseline genetic conditions” and “provide the basis necessary to inform planning of long-term ... fish management objectives” (section 2.1). With such vague goals, it is difficult to assess whether the described plan will meet the goals. The project goals should be clear and more specific, for example, to characterize the genetic relationships among populations of native trout and charr in the project area, to accurately and precisely estimate genetic diversity within those populations, to gain the best possible understanding of the origins of native trout and charr in the project area, and to gain the best possible understanding of the genetic interactions of native charr species in the project area.</p>	<p>City Light has revised the study plan to better clarify the goals of the study.</p> <p>Please see comment responses USIT-C60, USIT-C63, USIT-C64, WDFW-C31, and NPS-C11.</p>

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							<p>2. That said, it's obvious that the real problem is that there is disagreement among the licensing partners about the interpretation of the available genetic studies. Indeed, the draft plan states that the available knowledge is "adequate ... for the purposes of relicensing" (section 1.3) and thus this genetics study plan is being undertaken to hopefully achieve consensus or agreement among the licensing partners. I think it would be more effective to take that on as the overarching goal of the project, e.g., the goal is to achieve agreement among licensing partners on the status and origins of native trout and charr in the project area. If that is the overarching goal, it seems like the draft plan approaches achieving that consensus the wrong way. Instead of saying that members of the expert panel potentially will be from licensing partners, members should absolutely be from the licensing partners from whom consensus is desired or needed. Academics or other non-licensing partner geneticists could fill the role of independent geneticists review available information and maybe re-analyze the available data.</p> <p>3. Because the draft study plan focuses on the wrong goal, it seems likely to cause unnecessary delays in achieving that goal. I have no doubt that reanalysis of the microsatellite data will reveal the same patterns and relationships among collections that has already been reported – what I see as the important relationships are very strong and unlikely to change with the subtly different analyses proposed in the draft study plan. I suppose it's possible that having someone else, i.e., a presumably independent outside geneticist, re-analyze the available microsatellite under the watchful eye of potentially licensing partner geneticists will change everyone's minds, but I really doubt it. Instead, I think the licensing partners already have ideas about what is missing – I know I do. Indeed, the draft study plan infers that at least two of the licensing partners have already identified deficiencies in available genetic information (Section 1.3, NPS-05 and USFWS-06, inferred from the title of their study requests). And it would seem SCL also has identified deficiencies as well. In Section 1.3, SCL "acknowledges a shared interest in developing a more in-depth genetics baseline..." though it's unclear what in-depth means. Why not directly have licensing partners participate in collaborative efforts to address specific genetic goals such as those I suggested in bullet #1? Start with a discussion of what licensing partners see as deficiencies in what is now known about the genetics instead of waiting a year while someone re-analyzes the data only to find out the same things that have already been reported and still have the same holes in the dataset that licensing partners are upset about.</p> <p>4. At the very least, the study plan needs to provide details about the requests from licensing partners and how and why their requests or proposals have been modified (Section 13).</p>	
305.	WDFW	03/08/2021	pp. 56-57	WDFW-C29	N/A	FA-06	The draft plan makes no mention of evaluating the tissue collections for suitability for use as population baseline data. This should be the first activity undertaken. Tissue collections should be representative of putative biological populations, i.e., from spawning tributaries. Available metadata should be evaluated to ensure that the samples taken do indeed represent fish that spawned or were spawned in a particular tributary. All known spawning tributaries should be represented.	Please see comment response USIT-C63.
306.	WDFW	03/08/2021	p. 57	WDFW-C30	N/A	FA-06 Section 2.1	Under Year 1 – it's not clear what "standardized" means in this context. Maybe SCL means microsatellite allele calls. If so, they should be aware that all the microsatellite allele calling was standardized in available datasets, including those of Smith (2010), who worked with partners at WDFW to standardize allele calls even though genetic data were visualized in a different lab with a different sequencer. All O. mykiss genotyping was done at WDFW and all allele calls are standardized.	Data that will be used in this study will be consolidated and reviewed. Part of the review process will be to determine whether standardization will be necessary for a comprehensive analysis. City Light does not assume standardization will be necessary, but it will be done so for the analysis if needed.

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307.	WDFW	03/08/2021	p. 57	WDFW-C31	N/A	FA-06 Section 2.1	Under Year 1 – it’s not clear why relatedness should be calculated and it’s not clear why the power to determine specific relationships (as opposed to an index of relatedness) is needed.	Relatedness is a useful measure to evaluate, over time, the genetic structure and integrity of a population. Measures of relatedness documented in this study can inform future management actions through the reservoir fish and aquatics management plan.
308.	WDFW	03/08/2021	pp. 57-58	WDFW-C32	N/A	FA-06 Section 2.1	Under Year 2 – here it says “Collect data to address” genetic metrics for Dolly Varden. As I understand things, the biggest gap for Dolly Varden is a lack of representative tissue collections from putative Dolly Varden populations, yet nowhere in this study plan does it talk about doing more of this critical field work and how it would be done. If the tissues don’t exist, it will be impossible to collect more genetic data.	In the study plan, City Light states that an initial review of available data and studies for Dolly Varden suggest existing information is inadequate to characterize the genetic diversity and integrity of this species in the Project reservoirs. Recommendations for a field study of this species will be made as part of this study. The study plan has been revised to state that based on the synthesis of data for this species, a proposed field sampling plan for Year 2 tissue collection will be proposed in consultation with LPs.
309.	WDFW	03/08/2021	p. 58	WDFW-C33	N/A	FA-06 Table 2.5-1	This table says that charr hybrids will be excluded. This is appropriate for analyzing the individual species. However, nowhere in this study plan is there described any effort to better understand the charr hybridization. Quantifying hybridization should be a priority. With genomic data we can accurately and precisely identify hybrid classes (e.g., F1 hybrid, backcross, F2, etc.) and we can estimate the time since the hybridization occurred. A better understanding of the hybridization should be a goal of this study plan.	The extent and potential population effects of hybridization among native char and Brook Trout is included as a likely topic to be included in the reservoir fish and aquatics management plan.
310.	WDFW	03/08/2021	pp. 58-59	WDFW-C34	N/A	FA-06 Section 2.5.2.2	The paragraph describing k-means clustering using DAPC is, compared to other genetic methods, unusually light on detail. Such an analysis is appropriate, but it should also be paired with a STRUCTURE analysis, which uses a different algorithm to find clusters and explicitly allows genetic mixing of clusters (i.e., members could be “hybrids” of clusters). The described analysis is also deficient, saying k will be set to three. This is fine to test a hypothesis about relationships among reservoirs, but it ignores the well-known typical hierarchical relationships among salmonid populations. In addition, there is reason to hypothesize that introgression from Ross Lake fish has occurred in Diablo and Gorge, since Ross Lake stock hatchery fish have been planted in Diablo and Gorge for around ten years. Thus, DAPC and STRUCTURE testing should be used to explore all the genetic structuring from k = 1 to at least k = the number of putative biological populations (if not more) and evaluated for statistical support for different values of k.	The types of analysis included in the study plan is not exclusive; STRUCTURE analysis can also be performed and was added to the study plan.
311.	WDFW	03/08/2021	p. 59	WDFW-C35	N/A	FA-06 Section 2.5.2.2	The first sentence of the third paragraph says that populations will be pooled unless there are significant deviations from HWE. This is not appropriate. Instead, tissue collections should be representative of putative spawning populations and then hypotheses tested about whether they are genetically different. Pooling may happen after all tests of differentiation fail to detect a difference, not “by default” as written in the draft study plan.	As written in the study plan, population collections will be combined unless there are statistically significant departures from the HWE, i.e., they will only be pooled if there are no differences detected.
312.	WDFW	03/08/2021	p. 59	WDFW-C36	N/A	FA-06	The sentence on page 2-6 starting “Yet, it is recommended that individual-based...” seems open ended and irrelevant.	The study plan has been revised to clarify this statement.
313.	WDFW	03/08/2021	p. 59	WDFW-C37	N/A	FA-06	Page 2-6, Lineage Relationships – SCL has not made a case for estimating relatedness or full sibling family numbers or the false detection rate. Why is SCL proposing to look at these measures?	Please see comment response WDFW-C31.
314.	WDFW	03/08/2021	pp. 59-60	WDFW-C38	N/A	FA-06 Section 2.5.3.1	The first full sentence says that an initial review of existing data “indicates” that genetic diversity of Dolly Varden hasn’t been characterized. This suggests that a review of the studies was undertaken. I asked for copy and was told by Andrew Bearlin that such a document doesn’t exist. More to the point, my understanding is	An initial review of available data was undertaken. The tasks outlined in Year 1 include a thorough analysis of existing data to confirm that data are unavailable for Dolly Varden. If available



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							that the real work that needs to be done for Dolly Varden is to obtain representative tissue collections from all putative Dolly Varden populations.	information is not identified, it is the intent of City Light, as stated in the study plan, that a proposed field sampling plan for Year 2 tissue collection will be proposed in consultation with LPs. Tissue collections are planned for Year 2 to ensure that this effort is efficient and informed by the results of the Year 1 existing information analysis.
315.	WDFW	03/08/2021	p. 60	WDFW-C39	N/A	FA-06 Section 2.5.3.1	Effective Population Size – there is no reason to wait until Year 2 to estimate Ne. Estimated Nb, which can be calculated with a single genetic sample and for which no age data is required, is an acceptable, perhaps preferred alternative for monitoring (Luikart et al. 2021). The most commonly used method to estimate Nb is based on linkage disequilibrium (i.e., LDNE, (Waples and Do 2008). LDNE estimates of Nb will be upwardly biased when samples consist of individuals of different ages, but a bias correction using demographic data, such as life span and age at maturity, can easily be applied to reduce the bias (Waples et al. 2014).	Effective population size (Ne) will be estimated following compilation of all available (existing and recently collected) data and analysis. Ne is a measure needed to evaluate the genetic diversity and recovery of protected species of interest and will be evaluated for trends over time.
316.	WDFW	03/08/2021	p. 60	WDFW-C40	N/A	FA-06	Footnote 4 – contradictorily says that population level effects of hybridization among charrs are unknown then says there is no indication that hybridization is negatively affecting populations. What data are behind such a statement? Does SCL have abundance estimates of Dolly Varden and Bull Trout from all putative populations?	City Light has revised this footnote in the study plan to state only that population level effects are unknown.
317.	WDFW	03/08/2021	p. 61	WDFW-C41	N/A	FA-06 Section 2.7	This paragraph suggests that analyses to date are not based on well-established methods viewed as best practices. Further, one would assume then that the proposed methods described in the draft study plan are viewed as best practices. However, SCL provides no evidence that either the previous analyses were inadequate or that their proposed methods are viewed as best practices. When asked for a written critique of previous analyses, mostly conducted by WDFW geneticists, SCL reiterated their belief that the existing work adequately characterizes baseline populations for native fish (excepting Dolly Varden). Thus, I am confused about this paragraph and it further solidifies my view that the draft study plan needs to be clear about their goals (see above).	The study plan states that “the existing genetics information that would be used to develop the standardized database is associated with articles published in scientific journals or studies conducted by members of academic organizations or resource agency specialists. As a result, City Light considers the information to be reliable.” The study plan does not suggest that analyses and data to date are not based on well-established method and best practices.
<b>Project Operations</b>								
318.	American Rivers / Trout Unlimited	03/05/2021	pp. 10	ARTU-C09	Section 6.3.9	OM-01	<b>Climate Change.</b> Five Licensing Participants (NPS, USFWS, USIT, WDFW, and Skagit Drainage and Irrigation District Consortium) submitted five study requests with the goal of analyzing the long-term effects of climate change on Project operations. Specifically, the study requests seek updated regional projections on changes in the region’s hydrology and to improve the existing Distributed Hydrology Soil Vegetation Model (DHSVM) used by the Licensee. The Licensee has not adopted any part of these study requests. Conservation Groups maintain that the DHSVM model must be improved using the suggestions put forward in study requests NPS-14, USFWS-14, USIT-11, and WDFW-12. We also agree with these Licensing Participants that there is a need to perform a more comprehensive and collaborative review of the most current and technically-sound climate projections for the region. Specificity and clarity are needed from the Licensee to address the methods proposed for modeling and analyzing the long-term effects of climate change on Project operations under the next license. The effects of climate change on the Pacific Northwest region have been profound over the last decade, and Conservation Groups strongly believe that the best possible practices must be engaged to study potential future impacts of a rapidly changing hydrologic regime in relation to the Project and the resources that it affects.	The OM-01 Operations Model Study will use historical inflows to simulate likely future conditions, as if the inflow will occur in the same pattern in the future as occurred in the past. Also as noted in Operations Model Stud Plan, Section 2.3, as part of the hydrologic data compilation, City Light will request input from LPs to make sure relevant hydrologic information is considered. Typically, a contiguous long-term hydrologic period is selected to ensure the evaluation of wet, dry, and normal conditions; including extended multi-year conditions, such as multi-year droughts. Additional model sensitivities relative to changes in inflow hydrology due to potential climatic conditions can be employed in the modeling process as needed. These sensitivities analyses would be simulated with the Operations Model by modifying the hydrologic input data utilized by the model.
319.	Ecology	03/08/2021	pp. 20-21	Ecology-C30	N/A	OM-01	<b>Operations Model Development (PSP Study OM-1).</b> Identify model scenarios, model validation data, and model input data.	Review and determination of model input and validation data is part of the OM-01 Operations Model Study Plan. Operations data is not typically

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							<p>Section 2.1 of the Operations Model Study Plan includes the following Goals and Objectives: "Simulation of various potential Project operation scenarios considered during the relicensing process will aid in decision-making regarding the effects of various operating scenarios on water allocation, flood control, fish and wildlife habitat, instream flows, reservoir levels, wetland and floodplain connectivity, recreation, hydropower generation, and other matters affected by flow releases from the Project."</p> <p>The Operations Model Development Study is a primary tool in determining potential project operations and operational constraints. The study indicates that training sessions will be held by SCL for running model scenarios. It does not account for the likelihood that many scenarios may be needed and what the process will be for those to get done. The study does not include what model runs or Scenarios SCL will conduct.</p>	<p>available for the entire license period. The model will be developed, calibrated and verified utilizing available operations data for a period that represents the current physical configuration of the Project. City Light will establish the appropriate representative period with input from the LPs.</p> <p>Once this development process is complete, and it is determined that the model adequately represents the Project, the model will then be utilized to simulate scenarios over a longer and more varying hydrologic period. The Operations Model Study Plan has been revised to now include four workshops covering model development, hydrology, alternative scenarios, validation, and training of LPs to execute the model and review output. Modeling scenarios will be consistent with City Light's non-consumptive and storage water rights.</p>
320.	Ecology	03/08/2021	p. 21	Ecology-C31	N/A	OM-01	<p>The Operations Model Study describes the input data for model development and validation as: "... the Operations Model will be evaluated by comparing the Operations Model output to the period of the historical record that represents current operations, specifically, mean daily flows, reservoir elevations or storage, generation, etc., over an appropriate representative period of recent operations."</p> <p>It is not clear what specific period of record is contemplated and whether it represents an appropriate range of historical data and whether it includes trends in hydrologic conditions. The study also does not include all project inflow sources.</p>	<p>Please see comment response Ecology-C30. City Light will establish the appropriate representative period with input from the LPs.</p>
321.	Ecology	03/08/2021	p. 21	Ecology-C32	N/A	OM-01	<p>Other data sources for the Operations Model, and likely to be model run/scenarios include:</p> <ul style="list-style-type: none"> <li>▪ Project Inflow and Outflow Data</li> <li>▪ Other Studies (such as Bandaragoda)</li> <li>▪ Instream Flow Study (Mainstem and Bypass Reach)</li> <li>▪ Process Flow Study (duration, magnitude, ramping)</li> <li>▪ Water Quality</li> </ul>	<p>These are potential input data sources and model outputs for the Operations Model. Please see comment response Ecology-C30.</p>
322.	Ecology	03/08/2021	pp. 21-22	Ecology-C33	N/A	OM-01	<p>Operations Model Scenarios likely to be needed by Ecology and LPs include, but are not limited to, the following:</p> <ul style="list-style-type: none"> <li>▪ Wet, Normal, Drought, and Extended Drought Conditions for Base Case scenario</li> <li>▪ Reservoir/Lake Levels</li> <li>▪ Changes and Trends in Hydrograph - Precipitation Patterns, Snowpack, Glacial Melt</li> <li>▪ Cultural Site/Resource Protection</li> <li>▪ Instream Flows, Process Flows, and Recreation Flows</li> <li>▪ Water Quality</li> <li>▪ Flood Management</li> <li>▪ Tributary Impacts</li> <li>▪ Storage Capacity</li> <li>▪ Power Generation</li> </ul>	<p>The Operations Model will be capable of simulating the alternative scenarios listed. Please see comment response Ecology-C30.</p>
323.	Ecology	03/08/2021	p. 22	Ecology-C34	N/A	OM-01	<p>The current schedule, proposed in the PSP is out of date and needs to be revised.</p>	<p>The OM-01 Operations Model Study Plan has been revised to reflect the current schedule.</p>
324.	Ecology	03/08/2021	p. 22	Ecology-C35	N/A	OM-01	<p>If SCL continues to move forward with a feasibility analysis of a pump storage project, it must be included as an operational influence to flows. See comment on Pump Storage.</p>	<p>The Operations Model will be capable of simulating Project operations associated with potential pump-back operations should this</p>

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								scenario become a future alternative during relicensing.
325.	Ecology	03/08/2021	pp. 23-24	Ecology-C37	N/A	N/A	<p><b>Pump Storage – See also Study 1.5 in Part 1, Water Quality.</b> Develop a study plan related to pump storage. Determine how a proposed pump storage project will impact flows, storage, and operations in reservoirs and downstream reaches.</p> <p>SCL included a statement in its PAD and PSP regarding a feasibility analysis of a possible pump storage project. SCL did not provide any information about the possible project or the feasibility analysis it might conduct. Currently, there is limited information available in the Pre-Application Document (SCL 2020a) and no specific study or analysis is proposed in the PSP (SCL 2020b) to address the operations or potential impacts of pump storage.</p> <p>Depending on its operation, a pump storage project can result in changes in reservoir retention time, reservoir elevation levels, flow capacities and flow rates. Any pump storage project needs to be evaluated for its impact on project operations as a whole.</p> <p>The projects do not currently have water rights related to or authorizing pump storage, and there may be requirements for a new water right or changes to an existing water right. A pump storage project would directly affect the operations model and may impact other models being used in the relicensing studies.</p> <p>Sufficient detail about a potential pump storage project must be provided with the application in order to be included in the 401 Certification. We highly recommend SCL consult with Ecology's Water Resources Program staff prior to developing a feasibility study. In addition, there are a number of other permits and requirements associated with a potential pump storage project and a feasibility study would be incomplete without identifying these other elements of a project.</p>	Please see section 1.1.5 of the RSP for more details on the pump-back project.
326.	Skagit County Board of Commissioners	03/03/2021	p. 5	SCBC-C03	Section 6.2.18	OM-01	<p><b>Flood Timing Study Request.</b> We endorse the Flood Timing Study Request dated September 15, 2020, filed with the Commission by the Skagit County Diking and Irrigation District Consortium (“SDIDC”) and the Skagit County Dike and Drainage District Flood Control Partnership (“Partnership”), and request that it be required in the Final Study Plan. This study, which is intended to supplement SCL’s proposed Operations Model Study Plan, will incorporate trend analysis to analyze and respond to the effect of climate change on inflows to the Project and consider alternative scenarios, all of which may have significant impacts on our community. Collectively, the SDIDC and the Partnership provide flood protection for the Cities of Burlington, Mount Vernon, and La Conner, and protect the water supply for the City of Anacortes, Oak Harbor, and Naval Air Station Whidbey.</p>	City Light recognizes the need to model a range of alternative operating scenarios for the Project as part of relicensing, many of which will be identified by LPs. However, the OM-01 Operations Model Study Plan is aimed at describing how the model will be developed and applied. Identifying and evaluating specific alternative operating scenarios, such as those identified by SDIDC, will take place later in the relicensing process in consultation with the LPs. Although this study plan has not been revised to address these study requests, the requests will be accommodated by the overall process, as further explained in Section 6.2 of the RSP. Please also see comment response Ecology-C30. Additionally, the Study Plan has been updated to include a framework for evaluating alternative Project operation scenarios. Modeling scenarios will be consistent with City Light’s non-consumptive and storage water rights.
327.	Skagit County Board of Commissioners	03/03/2021	p. 6	SCBC-C04	Section 6.2.19	OM-01	<p><b>Irrigation Water Supply Study Request.</b> We also endorse the Irrigation Water Supply study request dated October 19, 2021 filed with the Commission by SDIDC, which will explore the possibility of coupling instream flow augmentation to benefit aquatic habitat with much-needed irrigation water for Skagit Delta farmers. SDIDC represents twelve Drainage and Irrigation Improvement Special Purpose Districts in</p>	Please see comment response SCBC-C03.

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							Skagit County. These special purpose districts oversee drainage and irrigation- related matters on over 60,000 acres of prime farmland in Skagit County, representing the substantial majority of the Skagit Valley's farmland. This study, which is also intended to supplement the proposed Operational Model Study Plan, has the objective of evaluating scenarios and feasibility of storing and releasing water for supplemental irrigation.	
328.	Skagit County Drainage and Irrigation District Consortium / Skagit County Dike and Drainage District Flood Control Partnership	03/04/2021	pp. 1-3	SDIDC-C01	Section 6.2.18 (SDIDC-01)	OM-01	<p>From the beginning, we made it very clear that SCL needs to evaluate trends in flood timing as part of the FERC relicensing process. We articulated this request in several meetings, submitted a formal issue form, as requested by SCL, in April of 2019, and submitted a formal study request in September of 2020.</p> <p>To date, SCL has made no attempt to engage with representatives from our organizations regarding detailed methods of analysis for flood timing, specifically trends in inflow hydrographs. The draft Operations Model Plan published (April 2020) as part of the Proposed Study Plan stated that (see page 2-2):</p> <p>“As part of this data compilation, City Light will request input from LPs to make sure all relevant hydrologic information is considered. For example, the data and literature will include the recent study entitled Hydrology, Stream Temperature, and Sediment Impacts of Climate Change in the Sauk River Basin (Bandaragoda et al. 2020), which includes the hydrology, stream temperature and sediment impacts of climate change in the Skagit River Basin.”</p> <p>Other than a reference to Bandaragoda et al. 2020, the draft Operations Model Plan did not provide any detailed methodology regarding how inflow hydrographs would be developed to inform the Operations Model. Bandaragoda et al 2020 summarized recent modeling work completed in the Skagit, and in particular the Sauk River watershed, as it pertains to climate change hydrology, temperature, and sediment, but it did not include a detailed analysis of inflow hydrographs to the SCL Skagit Project or a detailed evaluation of trends in the timing and volume of early season inflow hydrographs to the SCL Skagit Project. Furthermore, the draft Operations Plan did not refer to the use of the DSHVM model to develop inflow hydrographs. The draft Operations Plan also stated that a workshop would be conducted in December of 2020 to allow LPs adequate time to provide input on hydrology and climate change elements of the Operations Model (see page 2-5). This meeting has yet to be scheduled.</p> <p>Our Study Request (SDIDC 01) was developed in good faith and submitted well in advance of the October 24, 2020 deadline to ensure adequate time for discussion with SCL staff regarding flood timing and analytical methods. The intention of our Study Request was to clarify methods for evaluating recent trends in inflow hydrographs and establish a method for determining appropriate inflow hydrographs for subsequent operational modeling scenarios. Key elements of our study request as it pertains to critical data gaps are:</p> <ul style="list-style-type: none"> <li>▪ An evaluation of inflow hydrology using continuous simulations, with the existing DHSVM or similar hydrologic model and validated with a conservation of mass analysis or other acceptable methods, to accurately capture seasonal shifts in flood events and increases in high inflow days in October and November;</li> <li>▪ An analysis of reservoir operations and optimization of flood mitigation based on a trend analysis of recent baseline hydrologic data. Conduct this analysis to determine changes in the return frequency of flood events with more statistically more frequent return periods, such as Q10, Q25, and Q50, that have significant</li> </ul>	Please see comment response SCBC-C03. In addition, City Light believes the existing DHSVM model is adequate for analysis of potential future hydrologic regimes due to climate change and the effects such changes may have on Project operations and environmental resources. Additional model sensitivities relative to changes in inflow hydrology due to potential climatic conditions can be employed in the modeling process as needed. These sensitivities analyses would be simulated with the Operations Model by modifying the hydrologic input data utilized by the model.

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							<p>flood risks to downstream communities and the potential to impact flood protection infrastructure;</p> <ul style="list-style-type: none"> <li>An analysis of how recent trends may affect the frequency of lower-magnitude floods that could be effectively managed by changes reservoir operations and existing flood infrastructure;</li> <li>Shorter time-step analysis of reservoir operations using the CHEOPs model instead of the daily-time step model used in the Lee et al 2016 study to inform near real-time management decisions made by flood managers and the Corps of Engineers during a flood event; and</li> <li>Use of a hydraulic model such as existing and/or proposed two-dimensional instream flow models (SCL has proposed use of HEC-RAS 5) that have a shorter-time step and rigorous routing capabilities; instead of the coarse scale model used in the Lee et al 2016 study and route flows to Concrete to ensure flood risk reduction can be accurately evaluated.</li> </ul> <p>Unfortunately, SCL denied our study request. Denial of our Study Request is inconsistent with the language in the draft Operations Plan, which suggested that SCL will work with LPs to develop to ensure all relevant hydrologic information is considered. Denial of our Study Request is also inconsistent with the requirements of 18 CFR 5.9 because SCL did not provided any methods to describe how the DHSVM model will be used to generate inflow hydrographs, how the selected inflow hydrographs would be validated, how the DHSVM model will be coupled with the CHEOPs model to evaluate operational scenarios, or describe methods to evaluate trends in early season high inflow events. SCL also suggested that they denied our study request on the basis of climate change; however, our request to study inflow hydrographs was not based on climate change modeling, but rather a trend analysis of recent inflow hydrograph data. These trends have already been identified by other studies conducted in the Skagit watershed by Bandaragoda et al 2020 for Thunder Creek between 2010 and 2014 and recent work completed by Puget Sound Energy.</p> <p>It is critical that SCL perform an evaluation of inflow hydrographs using methods that can be validated with hydrologic data. Without a complete understanding of inflow hydrographs and recent trends it will be impossible to complete an evaluation operating scenarios and flood storage.</p>	
329.	Swinomish Indian Tribal Community	03/08/2021	p. 24	SITC-C12	Section 6.2.19	OM-01	<p><b>H. Confirming Denial of Skagit Diking and Irrigation District Consortium's Study Requests on Consumptive Use for Agriculture.</b> On October 19, 2020 the Skagit County Drainage and Irrigation District Consortium LLC ("SCDIDC") filed a study request with the Commission requesting that it require City Light to include an analysis in City Light's proposed Operations Model Study of reserving and storing water at the Skagit Project specifically for release of water for consumptive agricultural use. The Tribe wrote to the Commission on December 7, 2020 requesting that the Commission expressly deny the SCDIDC's request for inclusion of irrigation water storage and release in City Light's proposed Operations Model Study because it is outside of the Commission's authority, outside the scope of the Integrated License Process, and would be inconsistent with Washington water law if approved.</p> <p>City Light's water right is a non-consumptive water right, and agricultural irrigation is a consumptive use. Through Government-to-Government meetings it is the Tribe's understanding that it is the standard practice of both the Commission and Ecology, which manages the state's water resources and administers the state's water rights, to address only non-consumptive water uses in relicensing. SCDIDC's request for a study that considers new consumptive uses of water is inconsistent with the standard practice of both agencies. On December 8th the PSP was released, and included in Table 6.0-1 is the indication that the SCDIDC proposed study was approved. In a</p>	City Light has revised language in the RSP and OM-01 Operations Model to clarify that modeling scenarios will be consistent with City Light's non-consumptive and storage water rights.

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							<p>letter dated December 22, 2020, City Light wrote to Swinomish, agreeing that “the way we addressed the SCDIDC request in the proposed study plan (PSP) could lead to an understanding that we would include the analysis requested by SCDIDC. City Light will clarify our response to the SCDIDC request in the revised study plan which will be filed with the Commission on or before April 7, 2021.”</p> <p>The Tribe appreciates City Light acknowledging that any evaluation of a consumptive use of water, particularly one that is completely unrelated to the impacts from the Project, is inappropriate and should not be included in the RSP and request that City Light reflect this clarification in the RSP.</p>	
330.	USFWS	03/08/2021	pp. 22-23	USFWS-C15	Section 6.3.9 (USFWS-14)	OM-01	<p><b>OM-01 Operations Model Study.</b> SCL’s Operations Model Study proposes the development of a model to represent existing Project operations, which can be used to simulate potential future operations under a variety of operating scenarios. SCL proposes to invite LPs to participate in consultation workshops to assist with model development, validation, and execution. According to the study plan, LPs will have the opportunity to develop and evaluate alternative Project operation scenarios.</p> <p>As outlined in its PSP, SCL proposed consultation workshops to begin in January 2021. As this has not occurred, SCL issued an Issue Resolution Form entitled “Schedule for Modeling of Requested Scenarios from LPs” on February 16, 2021 providing an updated schedule for model development milestones. The first Operations Model workshop is scheduled for March 2021 with additional workshop dates to be identified in the RSPs. The USFWS appreciates SCL’s commitment to hold these workshops and looks forward to participating in them.</p> <p>One aspect of future operations modeling that is of particular interest to the USFWS is evaluating the effects of climate change on hydrology and Project operations. SCL has demonstrated an awareness and ability to adapt to a changing hydrologic regime by using regional climate projections (e.g. Frans et al. 2016; Bandaragoda et al. 2020) to inform its existing DHSVM model. We appreciate SCL’s commitment to continue to periodically update climate projections. In our study request “USFWS-14, Impact of a Changing Hydrologic Regime on the Operations of the Skagit Hydroelectric Project (#553),” the USFWS suggested modifications to improve SCL’s existing DHSVM model to better inform the future Operations Model. Proposed modifications include increasing domain resolution from the current 150 m DEM grid, developing snow transport and deposition capability into the glacier module, and improving the groundwater component to include deeper aquifers. SCL provided no response in the PSP regarding its ability or willingness to make these improvements to the DHSVM model. We continue request that these refinements be made to the DHSVM model, as they will enhance the precision of the Operations Model.</p> <p>When describing the Operations Model Study in its PSP, SCL makes no explicit linkage of the model to FA-05 Bypass Reach Instream Flow Model Study. The PSP describes how stage discharge relationships developed in the Instream Flow Model will be incorporated into the Operations Model to assess how power generation may affect flows downstream of Gorge Powerhouse. The USFWS expects a similar integration between the Operations Model and Bypass Reach Instream Flow Model to adequately assess how spill events at Gorge Dam may affect flows in the Bypass Reach. The USFWS requests that SCL provides clarification of this issue in the RSP. With regards to the Instream and Bypass Reach Instream Flow Models, please see our comments in this letter about these study plans. We have concerns that the dataset for model development may not cover the range of hydrologic information necessary to adequately calibrate the models. We are also concerned that using less than a year’s worth of data to calibrate and validate the models will be insufficient. Therefore, the</p>	<p>The OM-01 Operations Model Study Plan has been updated to reflect that the Operations Model will be integrated with both Instream Flow Models (FA-02 Instream Flow Model Development Study and FA-05 Gorge Bypass Reach Hydraulic and Instream Flow Model). The Operations Model will be updated to integrate with both Instream Flow Models, once those models are complete. The workshop schedule has been revised. Please see comment response Ecology-C30 and SCBC-C03 for additional information.</p> <p>City Light believes the existing DHSVM model is adequate for analysis of potential future hydrologic regimes due to climate change and the effects such changes may have on Project operations and environmental resources. Additional model sensitivities relative to changes in inflow hydrology due to potential climatic conditions can be employed in the modeling process as needed. These sensitivities analyses would be simulated with the Operations Model by modifying the hydrologic input data utilized by the model.</p>

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							schedule of Operations Model workshops and simulations may need to be amended to allow for the extra time for the development of flow models.	
331.	Upper Skagit Indian Tribe	03/08/2021	p. A106	USIT-C99	Section 5.1.4	OM-01	<p>Operations under the current license have periodic updates based on tributary inflows (below project) to maintain targeted spawning in the current area of affect. Seasonal fishery flow restrictions have been adjusted as new fishery information becomes available, while the morphology of the river and reservoirs undergo constant and episodic physical changes. As a result, a base case representation of current operations will be difficult to define and City Light is taking a subjective approach. Furthermore, City Light stated they haven't yet assembled all the operations and hydrology data so data gaps that might exist over the period of record are unknown.</p> <p>City Light participated with LPs in a series of meetings to discuss topic-based issues which pushed back the timeline included in this section of the PSP. The schedule has been updated and addressed by City Light during the PSP meetings (Appendix C448). The schedule leaves little time to review City Light's modelling report and products. LP's will be limited in time to evaluate the suitability of the model and understand its performance prior to attempting to run alternate scenarios. Alternate scenarios need to be included in the study plan to provide certainty that needed information will be available to inform license requirements and to provide time to refine those alternates to best suit the needs of the resources.</p> <p>It is stated that this will be a 1-year study plan and that variance from the FERC-approved study plan will be discussed in the final report. Yet, as per the schedule in the proposed plan, the study has already begun, the model has been developed and the base case will be established before any study plan has been approved.</p>	Please see comment response Ecology-C30. Additionally, flows below the Project would be incorporated with the OM-01 Operations Model as part of the integration with the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study and FA-02 Instream Flow Model Development Study, which is on a 2-year schedule.
332.	Upper Skagit Indian Tribe	03/08/2021	pp. A107-A108	USIT-C100	N/A	OM-01 Section 2.1	<p><b>Study Goals and Objectives.</b></p> <p>On p. 2-1 City Light states: "The goal of the Operations Model Study is to develop a Base Case scenario representation of Project operations. For purposes of Operations Model development, the Base Case represents the Project's operations under the current FERC license."</p> <p>OM-01 needs to be developed in coordination with other studies to ensure that when studies identify potential license conditions that would lead to Project operations outside the Base Case scenario, the operations model can accurately assess the new operational conditions. By example, this includes the ability for controlled high flow releases over Gorge Dam to provide geomorphic process flows.</p> <p>On p. 2-1 City Light states: "Simulation of various potential Project operation scenarios considered during the relicensing process will aid in decision-making regarding the effects of various operating scenarios on water allocation, flood control, fish and wildlife habitat, instream flows, reservoir levels, wetland and floodplain connectivity, recreation, hydropower generation, and other matters affected by flow releases from the Project."</p> <p>The degree to which the project operations, and therefore the operations model, affects such a wide variety of resources and project related uses as stated requires sufficient time to carefully consider and discuss alternate scenarios amongst all the LPs and reach agreements across a wide variety of interests and resource responsibilities. Furthermore, once alternate scenarios have been run, additional refinement will be needed to provide enough information to provide confidence that any proposed operation will be appropriate.</p>	City Light recognizes the need to model a range of alternative operating scenarios for the Project as part of relicensing, many of which will be identified by LPs. Although the OM-01 Operations Model Study Plan was not revised to address specific alternative operational scenario requests, the requests will be accommodated by the overall process, as further explained in Section 6.2 of the RSP. Please see comment response Ecology-C30 and SCBC-C03 for additional information.

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							<p>Not only is time insufficient but the outputs from the alternate scenarios will serve as inputs to the instream flow studies (FA-02 and FA-05) as well as informative to fish passage, water quality, productivity, habitat, sedimentation and erosion, cultural resources, wetland assessments, flood control and recreation. USIT is concerned that a full evaluation of the project impacts in the new license cannot begin until agreement of scenarios has taken place and initial model runs have been conducted at a minimum.</p> <p>On p. 2-1 City Light states:            “The Base Case has specific relevance in FERC relicensing proceedings as it represents the baseline conditions to which other scenarios of potential future operations are compared. In addition to the Base Case, defined by current FERC license requirements, a Current Operation Baseline scenario will be developed to simulate the voluntary fish-protection flows released from the Project.”</p> <p>Again, this is a useful tool and a starting point to a study but does not constitute a study by itself and does not evaluate project impacts to the natural resources and therefore will not be useful to FERC. USIT needs more certainty that LPs will be given sufficient time to fully consider the complexity of the modelling and substantial influence of power generation operations on all the other resource evaluations being conducted during this relicense.</p>	
333.	Upper Skagit Indian Tribe	03/08/2021	p. A108	USIT-C101	N/A	OM-01 Section 2.3	<p><b>Background and Existing Information.</b> There is clearly plenty of Project data recorded or calculated based on information here. City Light refers to a hydrology dataset (Bandaragoda et al., 2020), presumably assembled for the use of DHSVM but that study would not be used for this study because of interpretations of FERC policies, yet City Light has publicly stated they are not constrained by FERC guidance alone. Because this study doesn't include alternate scenarios, nor does it seek to use the model to examine specific project impacts it is difficult to understand what data City Light has or proposes to use. City Light needs to begin immediately discussing with LPs about the hydrologic data that needs to be assembled and what alternate scenarios and project related impacts need to be addressed using the operations model.</p> <p>The operations data would be useful in examining trends in inflows that are affecting the Project operations. USIT expects all new and relevant climate data applicable to the Skagit and City Light's Project operations will be used to test future operating scenarios.</p>	Please see comment response USIT-C100. Additionally, as noted in OM-01 Operations Model Study Plan, Section 2.3, as part of the hydrologic data compilation, City Light will request input from LPs to make sure relevant hydrologic information is considered. Please see comment response ARTU-C09 for additional information.
334.	Upper Skagit Indian Tribe	03/08/2021	p. A108	USIT-C102	N/A	OM-01 Section 2.6	<p><b>Methodology.</b> Head loss and turbine efficiency should be addressed in the modelling. City Light has mentioned that the buildup of sediment at the Diablo tailrace has significantly diminished the output Diablo Powerhouse (PAD 5.3.4.1). The sensitivity of the model to this buildup needs to be examined as it applies to water flow from Diablo to Gorge Reservoir.</p>	The OM-01 Operations Model will be capable of simulating alternative headloss conditions. Please see comment response USIT-C100.
335.	Upper Skagit Indian Tribe	03/08/2021	p. A108	USIT-C103	N/A	OM-01 Section 2.6.1.1	<p><b>Model Validation.</b> The PSP is not explicit about what time frame will be used for model validation, only that a representative period of recent operations will be used. City Light has mentioned verbally that four years of data will be used to calibrate and validate the model, yet the fish protection flows have been in place much longer. There is currently no metric for which four years will be used or how that will be sufficient to accurately predict years that exhibited greater extremes in precipitation and temperature due to the well documented decadal patterns of PDO and ENSO. City Light's response has been that longer periods could be used to incorporate a wider variety of conditions. City Light needs to evaluate how the model performs and in what conditions it typically underpredicts or overpredicts.</p>	Please see comment response Ecology-C30.
336.	Upper Skagit Indian Tribe	03/08/2021	pp. A108-A109	USIT-C104	N/A	OM-01 Section 2.6.1.4	<p><b>Consultation Process with Licensing Participants.</b> Given the complexities of running, refining and reporting on alternate scenarios that will sufficiently demonstrate Project impacts, City Light should include LP consultation for alternate scenarios within the</p>	The workshop schedule in the OM-01 Operations Model Study Plan has been revised. Please see



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							study and commit resources to ensure that base case and alternates are given ample time for analysis and refinement. Under the current study plan and schedule, it is difficult to tell how much time will be allotted for alternate scenarios. Discussing alternatives is currently suggested to begin in April 2021. The model is not scheduled to be available to LPs until Q1 2022 and alternate scenarios potentially beginning in Q1-Q2 2022. City Light's draft operations proposal is slated for Q3-Q4 2022 with a final draft filed Dec 2022. There are many unpredictable aspects to this schedule and the time allotted for alternate scenarios is somewhat dependent on how quickly City Light can successfully establish their base case model run. This schedule may leave as little as 6 months. For comparison, City Light was supposedly scheduled to finish validation and establish the base case by March 2021 with the preliminary study results not being available until Q4 2021 – Q1 2022. This is a time frame of 9-12 months just to report on their base case scenario.	comment responses USIT-C100, Ecology-C30, and SCBC-C03 for additional information.
337.	Upper Skagit Indian Tribe	03/08/2021	p. A125	USIT-C127	N/A	N/A	<p><b>Unaddressed PAD Comment – Impacts of Project Flood Control Operations on Salmonid Habitat.</b> USIT requests City Light include a study to account for the indirect impacts of Project flood control operations on anadromous salmonid habitat downstream of Gorge Dam. USIT provided comments on the PAD related to this issue (pg. A1-32). City Light did not address USIT's comments in the PSP.</p> <p>The Project stores runoff in Ross Reservoir during flood events, which reduces the magnitude of flood peaks and delays arrival of the flood peak to downstream areas. As a result, the spatial extent, depth, and scouring force of flood flows is reduced, and there is additional time to prepare for flood events, which fosters increased development within floodplains by reducing economic loss from flood damage and reducing the safety risk of occupying the floodplain. Floodplain development degrades anadromous salmonid habitat by several activities, including filling wetlands, building roads and structures, removing vegetation, and armoring channel banks. These activities directly remove or isolate habitats from the riverscape, as well as interrupt the geomorphic processes that create and maintain channel and floodplain habitats.</p> <p>Ross Reservoir provides the largest flood regulation capacity in the Skagit Basin and the only flood regulation upstream of the Baker River, thus the Project impacts flood elevations and floodplain inundation patterns along the entire Skagit River corridor. The Skagit Hydro Project and the Baker Hydro Project combine to reduce the magnitude of the 1% annual chance exceedance (ACE) flood event in the Skagit River near Concrete, WA by 24% (USACE, 2014). The result is increased development in the floodplain and degradation of habitats used by anadromous salmonids.</p> <p>According to a Biological Opinion (BO) regarding implementation of the FEMA National Floodplain Insurance Program (NFIP), economic development in Puget Sound floodplains jeopardizes recovery of ESA-listed Chinook and Steelhead (NMFS, 2008). The relationship between Project flood control operations and the jeopardy decision made in the NFIP BO is not direct, but there is clearly a connection between the Project and impacts to ESA critical habitat. Project impacts could be partially accounted for in a rather straightforward approach by recognizing that Project-related reductions in magnitude of the 1% ACE flood event result in a decrease in spatial extent of the FEMA regulatory floodplain, in turn removing the protective measures afforded by the NFIP BO to habitats that fall within the regulatory floodplain.</p> <p>A more robust approach would be to develop a flood hydraulic model to account for specific changes in flood extent, depth, and scouring flow as a result of Project flood control operations. The model results could then be used to identify specific areas</p>	The OM-01 Operations Model Study Plan will include flow modeling scenarios that incorporate the current flood control rule curve and will allow for investigation of changes in this rule curve to determine the potential impacts of such proposed changes. As described in Section 6.2 of the RSP, the Instream Flow Model Development Study will also provide information on connectivity to the floodplain in the study area over a range of flows. The Geomorphology Study proposes identification of targeted reaches for additional information gathering, however, a floodplain hydraulic model is not proposed.

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							within the floodplain that are made more economically viable for development. USIT acknowledges this approach would require making some assumptions in order to isolate Project-related causes from other actions that foster floodplain development but considering the large volume of flood storage in Ross Reservoir, it would be almost certain to produce valuable information.	
<b>Recreation and Aesthetics</b>								
338.	American Rivers / Trout Unlimited	03/05/2021	pp. 8-9	ARTU-C06	Sections 6.2.20	RA-01	<p><b>Recreation.</b> The National Park Service (NPS) and United States Forest Service (USFS) submitted requests to study the effects of Project-induced recreation on sites both within and outside of the Licensee's determined Project boundary. The Licensee does not propose to adopt the integral elements of these study plans. There remains fundamental disagreement between the Licensee and Licensing Participants regarding the scope of recreation studies. NPS and USFS have requested that the Licensee's RA-01 Recreation Use and Facility Assessment (Recreation Assessment) Study Plan be adapted to include study of federally managed recreation sites within and adjacent to the Project boundary. The Licensee maintains that RA-01 will study only "FERC-approved/jurisdictional and City Light-managed recreation facilities," as well as some non-Project managed boat launches. While the qualities of the Project reservoirs and the Ross Lake National Recreation Area and North Cascades National Park (RLNRA/NCNP) are certainly unique, the Project's location on federal lands is not. Several FERC-licensed hydropower projects operate on federal land. For example, Portland General Electric Company (PGE), the utility which owns and operates the Clackamas River Hydroelectric Project (FERC Project No. 2195-161), acknowledges that project-induced recreation occurs at federally owned sites in the project vicinity and has taken over management of some USFS sites on the Clackamas River.</p> <p>The study requests from NPS and USFS do not ask that the Licensee accept responsibility for federal sites, but simply ask for an analysis of the effects of Project-induced recreation use on these sites. The Licensee asserts that "these [requested] sites are not City Light facilities, nor are they FERC-approved facilities. City Light does not operate, maintain, or promote the use of these facilities." In its rationale, the Licensee also cites 18 CFR § 5.9(b)(5), which requires that study requests "explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements." There is no mention of project boundaries or ownership as a precluding factor in this requirement. As stated by Commission staff during the PSP meetings and subsequent recreation-specific meetings, site ownership does not preclude licensees from taking responsibility for necessary studies. Conservation Groups agree that ownership does not determine the nexus between the Project and recreation use, and we maintain that there is a clear nexus between the presence of the Project and recreation use both within and adjacent to the Project boundary. Several Project features, including the reservoirs, directly attract recreation use at developed campgrounds, boat-in campsites, trails, overlooks, and day-use sites. For this reason, the Licensee must adapt its Recreation Assessment study plan to include all requested sites. This data will serve to inform the Commission's analysis under the National Environmental Policy Act (NEPA) to determine the extent of recreation effects, existing use, and future demand. In the Commission's Scoping Document 2, the Commission includes in its list of issues to be addressed in the NEPA analysis, "Effects of existing and any potential changes to project facilities, operations, and maintenance activities on recreational use and access in the project area, including NPS recreation facilities in the Ross Lake National Recreation Area." This information is also needed to inform the license application, development of PMEs, and recreation management plans.</p>	City Light recognizes LPs' requests for information at many of these additional recreational sites. In response to these requests, City Light has significantly expanded its RA-01 Recreation Use and Facility Assessment (Recreation Assessment) Study Plan to include the majority of additional recreation sites requested by the LPs. City Light acknowledges that both the Project and the surrounding RLNRA/North Cascades National Park attract visitors to the area and that both City Light and the NPS have responsibilities for managing this use. While City Light does not concede that all of the locations included in the study are Project-induced recreational sites, City Light has expanded its Recreation Assessment to accommodate the LPs and provide information to aid in the long-term management of these sites. Refer to City Light's revised Recreation Assessment appended to the RSP for more details.

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339.	American Rivers / Trout Unlimited	03/05/2021	p. 9	ARTU-C07	Sections 6.2.20	RA-01	Additionally, Conservation Groups are concerned with the proposed start date of the Licensee's Recreation Assessment study. The study is set to begin in April 2021 – one month before the Commission is due to issue its study plan determination and nearly two months before the initiation of any voluntary formal dispute resolution processes. Conservation Groups recommend that the Licensee restructure the Recreation Assessment study timeline to align with the ILP and to delay the start of the study until after the Commission issues its study plan determination.	City Light has revised the RA-01 Recreation Use and Facility Assessment schedule to start in May 2021 following FERC's study plan determination. In addition, City Light has modified the study schedule with physical assessments in summer/fall 2021 and visitor surveys/observational surveys (i.e., public interaction elements) in 2022.
340.	American Rivers / Trout Unlimited	03/05/2021	p. 9	ARTU-C08	Sections 6.2.20	RA-01	Further, several tribes involved in the relicensing process have requested that the Licensee study the impacts of recreation on cultural resources within and adjacent to the Project boundary. Increased recreation use throughout the state of Washington has had negative consequences on tribal cultural and historical resources including, but not limited to, theft and destruction of culturally significant vegetation, vandalism of culturally and spiritually sacred sites, increased presence of litter and human waste which harm natural resources, and forms of human overland travel which affect migration and health of fish and wildlife. Project-induced recreation is not exempt from having impacts on cultural resources, and Conservation Groups support the requests to study these impacts.	As noted in comment response ARTU-C06, City Light has significantly expanded its RA-01 Recreation Use and Facility Assessment Study Plan to inventory visitor use in additional areas. This information is expected to help inform potential risks to cultural resources sites.
341.	American Whitewater	03/08/2021	p. 5	AW-C05	Section 5.16	RA-02	<b><u>RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study, Section 5.16.</u></b> The summary of the Proposed Gorge Bypass Reach Safety and Whitewater Boating Study states that “no formal study requests specific to this study in the Gorge bypass reach were filed with FERC.” We ask that this statement be modified to reflect the fact that American Whitewater is on the record with an expressed interest in this study. Because the study was collaboratively developed with Seattle City Light prior to the due date for proposed studies, and largely addressed our interests, we did not file a separate study request but included the collaboratively-developed study as an enclosure with our comments. As stated, the comment in the Proposed Study Plan implies that no party expressed a need for this study. Please clarify this in the Revised Study Plan to note that American Whitewater, National Park Service, and Washington Department of Ecology identified the need for this study and worked collaboratively with Seattle City Light to develop it.	City Light acknowledges and appreciates the hard work American Whitewater and other LPs contributed in the collaborative development of the RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study (Bypass Safety and Whitewater Boating). All the study plans include standard language in Section 1.2, Relicensing Process that “This study plan reflects RWG and LP discussion and study requests and comments submitted by LPs.” The subsequent section (Section 1.3, Study Plan Development) is focused on describing formal study plan requests and PSP comment filings related to the study.
342.	American Whitewater	03/08/2021	pp. 5-6	AW-C06	Section 6.0	N/A	<b><u>Summary of Formal Study Requests and City Light's Responses, Table 6.0-1, Page 6-4.</u></b> At line 8 in the table Summary of Formal Study Requests and City Light's Responses, please include American Whitewater as supporting Ecology-02 Instream/Recreation Flow Study. As noted above, American Whitewater is on the record with an expressed interest in instream flow needs for recreation. In our comments we noted an interest and support for evaluation of instream flow needs for recreation both between the Gorge Dam and Gorge Powerhouse and downstream of the Gorge Powerhouse.	City Light acknowledges American Whitewater's support for Ecology-02 Instream/Recreation Flow Study along with interest in evaluating recreation instream flows in the Gorge Bypass and mainstem of the Skagit downstream of the Gorge powerhouse.  City Light appreciates American Whitewater's recommendation to better understand boatable flow needs in the reach downstream of the Gorge Powerhouse. To meet this request, City Light has developed a new study, RA-05 Lower Skagit River Recreation Flow Study. Please see the Recreation Flow Study for detailed study objectives and methods.
343.	American Whitewater	03/08/2021	pp. 8-10	AW-C10	Section 6.2.20	RA-01	<b><u>Recreation Facilities and Visitor Use Study, Section 6.2.20.</u></b> Our primary disagreement with Seattle City Light on this study is one of scope. As stated in the Proposed Study Plan, “City Light's Recreation Assessment Study Plan is focused on the FERC-approved/jurisdictional and City Light-managed recreation facilities.” The study plan criteria at 18 CFR § 5.9(b)(5) notes that study requests must include an explanation for “any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied.” These project-induced effects are not limited to the project boundary or ownership of the underlying lands by the	Please see comment response ARTU-C06 and AW-C05.

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							<p>licensee and recognition of indirect effects is explicitly stated. We are aware of several cases where the outcome of relicensing was issuance of a license where sites that were previously managed by a federal agency were brought into the project boundary and are now managed by the licensee. It would be premature to assume a similar outcome here, but given the potential for this outcome, studies need to be completed to provide the information necessary for an informed decision. All participants are aware that it is the Commission's policy with respect to recreational development at licensed projects to "seek, within its authority, the ultimate development of [recreational] resources, consistent with the needs of the area to the extent that such development is not inconsistent with the primary purpose of the project."</p> <p>For the past century, and well before the establishment of North Cascades National Park, Seattle City Light has promoted their hydroelectric project and recreational amenities on surrounding federal lands as a place to be experienced and enjoyed. The Seattle City Light website states that "in addition to generating electricity, our facilities provide opportunities for recreational activities such as camping, fishing, and hiking." These activities are not limited or even generally associated with the small subset of facilities listed in Seattle City Light's Proposed Study Plan. Those who camp, fish, or hike are generally not doing so in the company town of Newhalem, which is the location of the majority of proposed sites for study. The Project and its reservoirs attract visitors, and these visitors have impacts on federal lands and associated facilities and this has a clear project nexus.</p> <p>Project operations also impact use and enjoyment of the Skagit River by our members. In a report on reservoir operations, Seattle City Light notes that "the operating regime of the Skagit Project allows for a longer whitewater boating season on the upper Skagit by providing sufficient late-summer flows. This results in peak use during August and September, which is not typical for whitewater opportunities, and probably leads to higher total use than would occur with unregulated flows." Project operations result in a project-induced effect of enhanced opportunities for paddlesports on the Skagit River from the Gorge Powerhouse to the Sauk River confluence and beyond and accompanying use of recreational facilities to access the river that Seattle City Light has invested in. American Whitewater supports the studies as submitted by the National Park Service and USDA Forest Service. The information requested, and the sites proposed for evaluation, is necessary to inform the Commission's analysis under the National Environmental Policy Act to determine the extent of recreation effects, existing use, and future demand. The information will inform the license application; development of protection, mitigation, and enhancement measures; and a future recreation management plan.</p>	
344.	American Whitewater	03/08/2021	p. 10	AW-C11	Section 6.2.20	RA-01	<p>While American Whitewater supports the full list of sites identified by the National Park Service and USDA Forest Service in their study requests, we highlight the following sites of particular interest to the whitewater paddling community, the nature of project-induced effect, how they are used by whitewater paddlers, data gaps specific to whitewater paddlers, and how information could be used to inform future license conditions:</p> <p><b>Site Name: Ross Reservoir Boat-in Camps (e.g. Little Beaver and Lightning Creek)</b></p> <ul style="list-style-type: none"> <li>Nature of project related or project-induced effect: Reservoir fluctuations and levels impact use of and access to campsites along the reservoir shoreline; the reservoir provides access to backcountry paddling opportunities; shoreline campsites on the reservoir provide a setting and staging area to camp the evening before and following a trip hike in to one of these creeks.</li> </ul>	Please see comment response ARTU-C06.

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							<ul style="list-style-type: none"> <li>How the site is being used: These campsites are utilized by whitewater boaters who desire access to hike-in whitewater runs on Little Beaver Creek and/or Lightning Creek.</li> <li>Data gap needs to be filled: Quantifying use and current condition is important to understand adequacy of existing campsite facilities and when they are being used.</li> <li>How will the information be used to inform license conditions: Future license conditions could include investment in camping areas along the reservoir; better understanding timing and extent of use would also inform impacts of reservoir operations on recreational users resulting in license conditions designed to minimize these impacts.</li> </ul>	
345.	American Whitewater	03/08/2021	p. 10	AW-C12	Section 6.2.20	RA-01	<p><b>Site Name: Lightning Creek Trail, Little Beaver Trail, Thunder Creek Trail</b></p> <ul style="list-style-type: none"> <li>Nature of project related or project-induced effect: These trails all begin at the project reservoirs and provide access to creeks flowing into the reservoir that are utilized by whitewater boaters.</li> <li>How the site is being used: Trail use for hiking including those who enjoy opportunities for backcountry paddling.</li> <li>Data gap needs to be filled: Based on observations of our community the diversity and extent of use has increased on these trails. Quantifying this use and assessing current condition is important to better understand adequacy of existing trails.</li> <li>How will the information be used to inform license conditions: Future license conditions could include investment in the trails or associated infrastructure at trailheads.</li> </ul>	City Light does not consider these trails Project-related as the Project does not control the flows on these backcountry creeks used by whitewater boaters. However, at the request of American Whitewater and NPS, City Light has modified the RA-01 Recreation Use and Facility Assessment Study Plan to include trail counters on these trails.
346.	American Whitewater	03/08/2021	pp. 10-11	AW-C13	Section 6.2.20	RA-01	<p><b>Site Name: Colonial Creek, Gorge, Goodell Creek, and Newhalem Campgrounds</b></p> <ul style="list-style-type: none"> <li>Nature of project related or project-induced effect: Visitors to the Project and associated amenities use these campgrounds.</li> <li>How the site is being used: These sites are used by Project visitors including those who recreate on the reservoir and the Skagit River immediately downstream of the Project. Whitewater boaters are among those who use these sites with Goodell Creek being particularly popular for weekend raft trips.</li> <li>Data gap needs to be filled: Based on observations of our community, the diversity and extent of use has increased in these campgrounds. Quantifying this use and assessing current condition is important to better understand adequacy of existing campgrounds.</li> <li>How will the information be used to inform license conditions: Future license conditions could include investment in campgrounds that provide the public with overnight accommodations to enjoy project facilities and recreational opportunities associated with the Project.</li> </ul>	Please see comment response ARTU-C06.
347.	American Whitewater	03/08/2021	p. 11	AW-C14	Section 6.2.20	RA-01	<p><b>Site Name: Goodell Creek, Copper Creek, and Marblemount Boat Launches</b></p> <ul style="list-style-type: none"> <li>Nature of project related or project-induced effect: The higher late-season flows resulting from regulated flows provided by the hydroelectric project allow the kayaking and rafting season to be extended into late summer and early fall. This use is unusual in that most recreational rivers, including nearby rivers such as the Suiattle and Sauk, do not have boatable flows in late summer, especially after July.</li> <li>How the site is being used: These sites are used year-around but are particularly popular in the summer for those interested in kayaking or rafting on the Skagit River. They are used by the boating community and commercial outfitters.</li> <li>Data gap needs to be filled: Use of these sites needs to be quantified and existing condition needs to be assessed.</li> <li>How will the information be used to inform license conditions: Seattle City Light has invested in these sites in the past making capital investments to ensure they continue to provide a high quality user experience. Copper Creek Boat Launch is on Seattle City Light property and Marblemount Boat Launch is in the Project Boundary. These sites would likely require additional capital investment at some</li> </ul>	Please see comment response ARTU-C06. In addition, City Light has proposed a new study, RA-05 Lower Skagit River Recreation Flow, that will utilize an internet-based survey instrument to gather information related to Skagit River recreation uses. As part of this survey instrument, City Light will include questions related to visitors' preferences, attitudes, and uses similar to questions included in the RA-01 Recreation Use and Facility Assessment Study Plan.

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							point over the term of a new license. Specific to the Marblemount Boat Launch Seattle City Light states that “this facility is associated with the USFS’ Mt. Baker-Snoqualmie National Forest, is not a FERC-approved recreation facility, and the USFS, not City Light, is responsible for the management, maintenance, and operation of the facility.” Given project induced effects, Seattle City Light has made past investments in the site and it is in the Project Boundary; it is reasonable to assume that maintenance and/or management of the site could become a future license condition.	
348.	American Whitewater	03/08/2021	p. 12	AW-C15	Section 6.2.20	RA-01	<p><b>Site Name: Damnation Creek</b></p> <ul style="list-style-type: none"> <li>Nature of project related or project-induced effect: The higher late-season flows resulting from regulated flows provided by the hydroelectric project allow the kayaking and rafting season to be extended into late summer and early fall. This use is unusual in that most recreational rivers, including nearby rivers such as the Suiattle and Sauk, do not have boatable flows in late summer, especially after July.</li> <li>How the site is being used: This is a boat-in day-use site typically used by groups as a lunch stop on commercially outfitted trips.</li> <li>Data gap needs to be filled: Use of these sites needs to be quantified and existing condition needs to be assessed.</li> <li>How will the information be used to inform license conditions: Seattle City Light has invested in this site in the past making capital investments to address impacts from use and provide a high quality user experience. This site would likely require additional capital investment at some point over the term of a new license.</li> </ul>	Please see comment response ARTU-C06.
349.	American Whitewater	03/08/2021	p. 12	AW-C16	Section 6.2.20	RA-01	<p><b>Site Name: S Bends Portage</b></p> <ul style="list-style-type: none"> <li>Nature of project related or project induced effect: The higher late-season flows resulting from regulated flows provided by the hydroelectric project allow the kayaking and rafting season to be extended into late summer and early fall. This use is unusual in that most recreational rivers, including nearby rivers such as the Suiattle and Sauk, do not have boatable flows in late summer, especially after July.</li> <li>How the site is being used: This is the primary portage route around the S Bends (aka Shovel Spur Rapids) for those who do not want to run the section with the most challenging whitewater.</li> <li>Data gap needs to be filled: With higher use the portage route is rough and resource degradation issues are emerging at the shoreline and the trail used to access the river.</li> <li>How will the information be used to inform license conditions: With increased use over time it's likely that this portage route will require capital investment to address resource degradation and enhance user experience at some point over the term of a future license.</li> </ul>	City Light appreciates American Whitewater’s interest to better understand recreation needs in the reach downstream of the Gorge Powerhouse. To meet this request, City Light has developed the RA-05 Lower Skagit River Recreation Flow Study Plan. Whitewater use patterns and condition of the S Bends portage will be evaluated in the Recreation Flow Study.
350.	American Whitewater	03/08/2021	pp. 12-13	AW-C17	Section 6.2.20	RA-01	<p>We provide the information above to supplement information provided by the National Park Service and USDA Forest Service and address the issue raised in the Proposed Study Plan where Seattle City Light contends that “the study requests do not provide sufficient evidence of Project-related effects to recreation resources for those sites located outside of the Project Boundary. As noted above, we don’t believe location within the Project Boundary is the appropriate standard for determination of a project-induced effect. We agree that Seattle City Light does not operate, maintain, or promote the use of these facilities, but this is not the standard as described in 18 CFR § 5.9(b)(5).</p> <p>Seattle City Light states that “NPS and USFS have not demonstrated how the inventory and evaluation of recreation facilities (i.e., accessibility compliance, facility capacity, and use impacts) is necessary to inform license conditions as these sites are entirely within the control of NPS and USFS, i.e., there is no nexus between the</p>	Please see comment response ARTU-C06.

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							Project and the requested resource study.” We disagree with this statement. Sites we have described above, and those in the larger table of sites and accompanying maps submitted with Study Plan Requests from National Park Service and USDA Forest Service clearly have a project nexus. These sites are directly associated with project lands and waters, the existence of the Project promotes visitation and is in fact encouraged by promotional materials from Seattle City Light, and project operations and associated modification of the flow regime directly affects opportunities for river recreation on the reach of the Skagit River downstream of the Project.	
351.	American Whitewater	03/08/2021	pp. 13-14	AW-C18	Section 6.2.21	N/A	<p><b>Recreation Flow Study, Section 6.2.21.</b> The discussion in this section references Washington Department of Ecology’s interest in understanding instream flow needs for recreation. In the Revised Study Plan we request that Seattle City Light also reference American Whitewater’s interest in this study. Our comments note a need to better understand instream flow needs for recreation in the reach downstream of the Gorge Powerhouse and in the reach between Gorge Dam and the Gorge Powerhouse.</p> <p>Regarding flows for recreation downstream of the Gorge Powerhouse, Seattle City Light states that it “believes existing information is available to demonstrate recreation uses in the mainstem Skagit downstream from the Project under existing flows and will provide analysis of this information for Ecology’s review during development of City Light’s license application. It cites a guidebook listing the “9-mile river segment from Goodell Creek to Copper Creek as runnable year-round with flows ranging from 1,500 to 5,000 cfs.” To ensure the appropriate flow range is quantitatively defined, American Whitewater recommends an internet-based flow survey followed by interviews of selected participants. Given the high use of this reach by the public and commercial outfitters, we believe this would be an efficient way to collect the necessary data to inform the License Application and Water Quality Certification.</p> <p>The Proposed Study Plan incorrectly states that the “American Whitewater does not list the segment from Marblemount to Rockport as a whitewater boating opportunity on their webpage.” This river reach is recorded in our National Whitewater Inventory, the geospatial database of whitewater river reaches available through our website.</p>	<p>City Light appreciates American Whitewater’s recommendation to better understand boatable flow needs for recreation in the reach downstream of the Gorge Powerhouse. To meet this request, City Light has developed the RA-05 Lower Skagit River Recreation Flow Study Plan.</p> <p>The Recreation Flow Study will utilize an internet-based survey to collect information on recreation flow preferences for the mainstem Skagit River from the Goodell Creek Boat Launch to the Howard Miller Steelhead Park. Please see the Recreation Flow Study for detailed study objectives and methods.</p> <p>City Light’s RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study will evaluate flow needs for recreation in the reach between Gorge Dam and the Gorge Powerhouse.</p>
352.	American Whitewater	03/08/2021	p. 14	AW-C20	Section 6.3.11	N/A	<p><b>Climbing Study, Section 6.3.11.</b> Seattle City Light states that “the study request does not demonstrate any nexus between Project operations and effects on climbing resources (18 CFR § 5.9(b)(5)).” Project operations and dewatering of the Skagit River between Gorge Dam and Gorge Powerhouse clearly affect opportunities for bouldering in this reach. Bouldering in river reaches bypassed by a hydroelectric project is not uncommon and clearly only possible where project operations provide an environment where this is possible. Project reservoirs and project lands affect access to opportunities of interest to the regional climbing community and could appropriately be addressed in a future Recreation Management Plan.</p>	City Light has not proposed a climbing study but will be collecting information on the types of recreation use in the Project vicinity in RA-01 Recreation Use and Facility Assessment Study Plan.
353.	American Whitewater	03/08/2021	p. 15	AW-C22	N/A	RA-02	<p><b>RA-02 Gorge Bypass Reach Safety and Whitewater Boating Proposed Study Plan.</b> This Proposed Study Plan states that “no formal study requests related to this study were filed with FERC. The next sentence goes on to reference the interest of the Washington Department of Ecology in the information provided by this study. American Whitewater asks that our interest be included in this Revised Study Plan given that we submitted a draft of this plan with our written comments and have consistently engaged in the development of this plan. As written, it appears that American Whitewater has not expressed a need for the information provided by this study when, in fact, we served in a leadership capacity to develop this Proposed Study Plan.</p>	<p>Please see comment response AW-C05.</p> <p>City Light appreciates American Whitewater’s concern regarding the logistics and safety associated with reliance on opportunistic spills for Levels 2 and 3 in the RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study. For the Level 2 investigation, City Light is coordinating with other studies co-located in the Gorge bypass reach to identify opportunities to schedule a spill event for interdisciplinary study. Because the potential range of whitewater flows for the Level 3</p>

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							We have raised this issue in past meetings, but we want to ensure that adequate information is collected during any field investigations for Levels 2 and 3; we have some concern that data collection will be "limited to opportunistic flows in the Gorge bypass reach" and "spill events will not be scheduled specifically for this study." We are optimistic that our studies can be coordinated with the Bypass Instream Flow Model Development Study and support that approach but trying to catch storm events presents logistical and potential safety concerns. We are optimistic that we can find the right opportunities but if those opportunities do not materialize for any number of reasons, it may be necessary to modify the study to conduct it in conjunction with a spill event.	investigation is unknown at this time, it is difficult to coordinate with other studies. In the Level 2 Interim Report, City Light will evaluate the ability to meet Level 3 study objectives using opportunistic spills or scheduled releases.
354.	North Cascades Conservation Council	03/08/2021	p. 3	NCCC-C04	6.2.20	RA-01	On its website and in advertising, SCL claims that the Skagit Project attracts many forms of recreation and draws participants locally, nationally and internationally. It is therefore necessary to study the full suite of recreation activities on Project and adjacent lands affected by the project. This has been proposed by the NPS and the USFS but rejected by SCL. SCL insists that it is only required by FERC guidelines to study its own recreation sites.	Please see comment response ARTU-C06.
355.	NPS	03/05/2021	p. 39	NPS-C29	Section 6.2.20 (NPS-15)	RA-01	<b>RA-01: Recreation Use and Facility Assessment.</b> <b>Survey Start Date.</b> SCL's proposed schedule for implementation of the RSP identifies a survey start date of April 2021. FERC's Study Plan Determination is due in May. We recommend that the SCL RSP's start date be delayed until the parties agree on details of the SCL RSP or the FERC Study Plan Determination and Dispute Process is complete.	Please see comment response ARTU-C07.
356.	NPS	03/05/2021	pp. 40-43	NPS-C30	Section 6.2.20 (NPS-15)	RA-01	<b>Geographic Scope and Nexus.</b> There are two types of project effects to recreational facilities and use of such facilities within the Project vicinity that create a Project nexus. First, Project-induced recreational activity or demand that can be attributed to the presence of Project features which create a recreation need or attract use to the area. Ross Reservoir, for example, attracts visitors and creates a demand for "flat" water based recreational facilities. Second, effects caused by operation of the Project including reservoir drawdown and flow regulation below Gorge Powerhouse. Reservoir drawdowns may, for example, prevent access to boat ramps or docks at camping sites.  <b>Project-Induced Recreation.</b> The Project induces recreation use within, and in the vicinity of, the Project boundary and the Skagit River downstream of Gorge Powerhouse. The Project induces recreation irrespective of (a) land ownership or present FERC jurisdiction of the facility or (b) the Project Boundary. The geographic scope of the SCL RSP however, is largely limited to only SCL managed facilities within the current Project boundary and does not adequately address many of the NPS and FS managed facilities that are used by visitors to the Project including campgrounds, trails and overlooks. Flow management below Gorge Powerhouse induces extended boating use of the Skagit Wild and Scenic River downstream, later in the summer season and into the fall, compared to unregulated rivers nearby (e.g., Sauk River). The nexus for each additional site recommended in the FS/NPS RSR is summarized in Attachment 1 (Table 1) and explained further below (Site Specific Nexus Analysis Section).  <i>Project-Induced Recreation is not Constrained by Ownership or Control of a Site.</i> The SCL RSP states: "With regard to those [sites proposed in the FS/NPS RSR] located within the Project Boundary, these sites are not City Light facilities, nor are they FERC-approved facilities. City Light does not operate, maintain, or promote the use of these facilities. Most of the facilities at issue, whether within or outside the Project Boundary, are associated with the NPS's RLNRA and/or North Cascades National Park that were created by Congress nearly 50 years after the Project was	Please see comment response ARTU-C06.



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							<p>established. Moreover, the NPS, not City Light, is responsible for the management, maintenance, and operation of these recreation facilities as part of the larger and broader RLNRA/North Cascades National Park (pg. 6-47)."</p> <p>Many FERC projects occupy federal lands including the Hells Canyon NRA, Lake Chelan NRA and the Ross Lake NRA in the Pacific Northwest. This is not unique. Many other FERC proceedings have included sites on federal lands within and in the vicinity of a project, including campsites, day-use areas, and trails as part of recreation studies (e.g., Bucks Creek (P-619), Boundary Dam (P-2144), Henry Jackson (P-2157), Clackamas River (P-2195), Yuba River (P-2246), Middle Fork American (P-2079), DeSabra-Centerville Project (P-803)). Excluding federally managed campsites, day-use areas, trails and other facilities would be an unusual departure from previous relicensing of projects in the West primarily located on federal land. Such studies have included federal recreation sites, even when some of the sites were not sites the licensee maintained under their current license. The FS/NPS RSR is modest when compared with other FERC studies on other projects (See Table 6 in the Cost Section.)</p> <p>In its response to FERC's Additional Information Request in 1989 SCL stated: "The reservoirs created by the Skagit Project have significant influence on the type of recreation facilities present, and therefore, upon recreation management of the NRA. The three reservoirs cover an area of 12,850 acres which represent recreation settings that are highly desired for fishing and flatwater boating activities. As a result, the reservoirs have a type, and perhaps a level of recreational development that would not have occurred in the absence of the Project" (SCL, 1989. Pg. 1-72).</p> <p>What was true in 1989 remains true today and will remain so going forward into the next Project license term.</p> <p>SCL rejects a primary objective of the FS/NPS RSR to determine the effects on recreation resources including the extent of Project-induced recreation at recreational sites in the vicinity of the Project because they are federally managed, including sites located on Project reservoirs. Instead, SCL proposes to limit its study effort to sites that will address only a small portion of the recreation use occurring in the Project boundary and vicinity. For example, 47% of the SCL survey sites are located in the town of Newhalem (See Figure 14 in the Cost Section) and no surveys are proposed for sites like the day use areas of Colonial Creek Campground. In short, the SCL RSP study does not adequately describe the recreation use at the Project. Additional information is needed to inform and identify project effects to recreation resources within the Project boundary and vicinity (see also the "What the Information Will Be Used For" section below).</p> <p>Current control by SCL or current FERC jurisdiction over a recreation site does not constitute a criterion for establishing a nexus between a site and the Project. The Project nexus is based on whether there are operational or Project-induced recreation effects at a site including consideration of the following factors:</p> <ol style="list-style-type: none"> <li>1) Many visitors are drawn to the Project vicinity to enjoy and experience the outdoor recreational and scenic opportunities provided by the Project. Project features are a primary driver that bring many people to the area. The consequence of recreationalists attracted to the area by the Project is overflow of people into recreational sites on federal lands. The Project's three reservoirs, including the 23-mile Ross Lake, attract users and induces recreation use of sites on federal lands that are adjacent to the reservoirs and within the Project Boundary and vicinity.</li> </ol>	

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							<p>This influences not only the amount of use but also the number and type of recreation facilities on the reservoirs and in the Project vicinity.</p> <p>2) Visitors to the Project use more than just the boat launches which are the only water-based facilities included in the Licensee's study. Visitors are attracted to the shoreline, day use areas, shoreline campgrounds, and the trails and viewpoints, both inside and adjacent to the Project boundary. Visitors want to recreate near the Project's reservoirs, to camp, fish, paddle, swim, hike and enjoy scenic views (Swanson &amp; Johnson, 2007).</p> <p>3) The Project-induced recreation effects have been documented in previous reports. The statement below clearly describes the Project-induced recreation effects between the recreational attractions and opportunities created by the Project, and the developed facilities and amount of use at those facilities including campsites, campgrounds, day use areas, parking lots, boat launches, trails, and overlooks.</p> <p>SCL stated in its response to FERC's Additional Information Request in 1989: "The Skagit Project provides a significant recreation resource in terms of the large reservoirs created by the Project. The development of the campgrounds, boat launches and other facilities on the impoundments can be attributed to the presence of the Project. Most of the existing recreation sites on the impoundments were originally developed by the Forest Service prior to creation of the National Park complex. Since 1968, the NPS has expanded, reconstructed, or upgraded many of the original facilities and has constructed new facilities. These facilities represent a significant operation and maintenance responsibility for the NPS" (SCL, 1989, pg. 1-73).</p> <p>Table 2 affirms SCL's statement and displays the significant limitations in the study scope if the study remains primarily focused on SCL operated sites. The study needs to also address the Project-induced recreation effects on FS and NPS lands to give an accurate accounting of effects, existing use, and future recreation use and demand.</p> <p>4) It is generally known that visitors to the Project engage in several activities during their visit (Swanson &amp; Johnson, 2007). For example, visitors to the Colonial Creek Campground are drawn to the campground because of the presence of Diablo Reservoir and often engage in other activities such as fishing and/or taking day hikes during their stay.</p> <p>5) Lack of ownership by the licensee or FERC jurisdiction over a recreational facility in an existing license also has not prevented a site from being included in a study or incorporated into a new Project license. The inclusion of requirements for the Licensee to assume some level of responsibility for managing recreational facilities constructed and managed by the NPS or FS prior to or during the term of the original licenses under their new license by FERC is not unique. Most original licenses for FERC projects licensed in the 1950's did not require the licensee to construct recreational facilities. Many of the recreational facilities related to the Project were constructed by the FS prior to the establishment of the Park (see dates of construction in Table 1).</p> <p>There is extensive precedent where licensees have assumed some level of responsibility for operation and maintenance of federally owned recreational facilities constructed prior to or during the term of their original licenses in their new license. Examples include: the nearby Baker Project (P-2150), Clackamas Project (P-2195), Boundary (P-2144) and, of course, the Skagit River Project (P-553, See Attachment 2). SCL's argument that there is not a nexus between the Project and federally owned recreational facilities in the Project vicinity is without merit.</p>	

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357.	NPS	03/05/2021	pp. 43-44	NPS-C31	Section 6.2.20  (NPS-15)	RA-01	<p><i>The Project Boundary Does Not Constrain Project-induced Use or Operational Effects and Should Not Limit the Scope of the Study.</i> We are not aware of any procedural, regulatory or scientific basis for limiting the scope of the Recreation Visitor Use and Facilities Study to sites within the Project boundary. The Project boundary does not limit Project related effects to recreation resources any more than it does to aquatic or terrestrial resources within or outside of the Project boundary.</p> <p>FERC recognized that: "Project effects on environmental resources may extend beyond the Project boundary. Therefore, it is not necessarily appropriate to use the Project boundary to limit the geographic scope of studies. The geographic scope of each study should be commensurate with the effects of the Project on the resource in question." (ILP Study Criteria, Pg. 14, FERC, 2012) SCL's position that the Project boundary should constrain the scope of the SCL RSP contradicts the following statement in the 2020 PAD: "The Project serves as a launching point for a range of recreation opportunities that extend far beyond the Project Boundary" (PAD Pg. 4-307 [SCL 2020]). This statement clearly describes a nexus between recreational attractions and opportunities created by the Project, and other recreational activities undertaken during a visit to the Project.</p> <p>In addition, recreational use trends identified in 1989 indicated likely shifts in the availability of different types of recreational opportunities, resulting in potential changes in use patterns and/or displacement of certain types of users. The general implication with respect to the Project-induced recreation at facilities in the Ross Lake NRA was a likely situation where limits on facility and use capacity might displace some camping and river recreation to other areas, most likely nearby areas administered by the FS (SCL, 1989. Pg-1-71).</p> <p>Presently, visitor use is increasing and at capacity during the summer months and weekends. Since the current license was issued, visitor use has increased three-fold and both the human population as well as importance of water-based recreation is increasing (NPS, 2020). When facilities on the Project reservoirs are at capacity, visitors utilize adjacent FS sites as 'base camps' to access the reservoirs over multiple days. Recreation infrastructure outside of the Project boundary supports Project-related recreation and helps meet visitor demands.</p> <p>A FERC Project boundary serves a number of administrative purposes including establishing the lands and facilities over which FERC has jurisdiction and the basis for determining fees for occupancy of lands of the United States by the Project. As stated above, the Project boundary does not delineate an analytical boundary (ILP Study Criteria, Pg. 14, FERC, 2012). Project boundaries are commonly modified for a variety of reasons. In the Baker and Clackamas proceedings referenced above, the project boundary was expanded to include FS recreational facilities over which the licensees would assume some level of responsibility to operate and maintain over the term of their new license. Paragraph 15 of the License Order for SCL's Boundary Project states: "Seattle proposes to modify the project boundary around the reservoir to better reflect updated measurements of the ordinary high water level, incorporate 543 acres of lands to be used for wildlife and recreation..." SCL's assertion that the Project boundary constrains the analysis of Project effects or prevents establishing a nexus between a recreational facility and the Project is unsupported by precedent or current FERC policy and regulations.</p>	Please see comment response ARTU-C06.
358.	NPS	03/05/2021	pp. 44-45	NPS-C32	Section 6.2.20  (NPS-15)	RA-01	<p><u>Project-operational Effects.</u> The Project is operated to meet multiple objectives including power generation, flood control, and mitigation of downstream impacts to aquatic resources. SCL manages Project outflows and reservoir elevations as required by the existing Project license to address these requirements. Fluctuating lake levels</p>	City Light's proposed recreation studies are designed to elicit additional information about Project effects on recreation use in the area.

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							from on-going operations or maintenance directly impacts recreation use. For example, in 2019 all campsites on Ross Reservoir had to be closed for an extended period, including the summer months, due to low lake levels, which not only impacted recreation on the reservoirs, but also decreased access to recreation opportunities on trails adjacent to the reservoir. There have also been times during which low and/or fluctuating lake levels at Diablo and Ross reservoirs have stranded boaters. For example, on the weekend of July 4th, 2020, two boats were stranded at the Colonial Creek dock due to an unannounced drop in the Diablo Lake level (See Figure 1). As noted above, Project flow regulation affects recreational boating and other activities on the Skagit River and within the Wild and Scenic River corridor downstream of the Gorge Powerhouse (see Figure 2). SCL also utilizes federal recreation facilities for Project operations. April 2020 PAD: "City Light routinely uses the Marblemount Boat Launch to conduct fish spawning surveys in the Skagit River. Marblemount Boat Launch is also heavily used by fishers and recreational boaters." (SCL, 2020 Pg. 37)	
359.	NPS	03/05/2021	p. 45	NPS-C33	Section 6.2.20 (NPS-15)	RA-01	<p><u>Site Specific Nexus Analysis.</u> The nexus between the Project and different types of recreation sites is described below. Site specific nexus explanations for every recommended additional study site are also summarized in Attachment 1 (Table 1).</p> <p><i>Campgrounds.</i> Developed Campgrounds on the Reservoirs: There are three developed campgrounds either completely or partially within the Project boundary: Gorge (adjacent to Gorge Reservoir), Colonial Creek (adjacent to Diablo Reservoir), and Hozomeen (adjacent to Ross Reservoir). These reservoir campgrounds are accessible by motor vehicle and provide access to the reservoirs. Visitors are attracted to these campgrounds due to the presence of the reservoirs. As a part of their camping experience, visitors fish, boat, swim, picnic, and walk along trails near the Project reservoirs. Colonial Creek (developed by the FS) and Gorge (developed by SCL) campgrounds existed prior to the creation of Ross Lake National Recreation Area. Colonial Creek campground includes day-use areas on the north and south sides of the highway where visitors can be near and in the water (See Figures 3 and 4). As part of License Article 412, SCL has provided funding for upgrades and general operation and maintenance of these campgrounds and associated facilities.</p>	Please see comment response ARTU-C06.
360.	NPS	03/05/2021	pp. 46-47	NPS-C34	Section 6.2.20 (NPS-15)	RA-01	<p>Developed campgrounds Near the Project: SCL RSP States: The study requests [FS/NPS RSR] do not provide sufficient evidence of Project-related effects to recreation resources for those sites located outside of the Project Boundary (Pg. 6-47). Developed campgrounds along the river and surrounding area on NPS and FS lands often serve as overflow areas for visitors to the Project. Camping along the Project reservoirs is highly desirable and campgrounds are often full during the peak season. Visitors then elect to camp at other nearby locations including the Newhalem, Goodell Creek, Marble Creek and Lone Fir campgrounds (See Figure 5). Use of these sites is induced by the Project. These campgrounds are used as base camps as visitors then return to Project reservoirs and river for boating, swimming, fishing, sightseeing, and hiking.</p>	Please see comment response ARTU-C06.
361.	NPS	03/05/2021	p. 47	NPS-C35	Section 6.2.20 (NPS-15)	RA-01	<p>Lake-side Campsites: There are 22 lakeside and island campsites along Ross and Diablo reservoirs (see Figures 6 and 7). SCL is not recommending any of these sites be included in their proposed study. These campsites are located on Project reservoirs and provide access for viewing the lake, walking on trails near the lake, camping, boating, fishing, and swimming. Visitors are attracted by the presence and operation of the Ross and Diablo Reservoirs. These campsites are not accessible via vehicle and are only accessible by boat or trail. Most users arrive at the campsites via boats (Table 3). Reservoir fluctuations and lake levels can also affect use at these lakeside campsites. For example, all campsites along Ross Reservoir were closed for an extended period, including the summer months, in 2019 due to low reservoir levels. Some of these sites were present before Ross Lake NRA was created. In the current</p>	Please see comment response ARTU-C06.

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							license, SCL provides capital improvements and operation and maintenance funding for the reservoir campsites. These sites are located completely within the Project boundary.	
362.	NPS	03/05/2021	pp. 48-52	NPS-C36	Section 6.2.20 (NPS-15)	RA-01	<p><i>Trails.</i> The SCL RSP states: “These non-Project trails [proposed trails to be added to the SCL RSP by the FS/NPS RSR] do not directly access the reservoirs and do not connect FERC-approved Project recreation facilities. In fact, nearly all these non-Project recreation trails connect to non-Project recreation facilities. Some of these trails are within or partially within the Project Boundary (i.e., recreation sites managed by NPS as part of the RLNRA and North Cascades National Park), but some also extend well beyond the Project Boundary to non-Project campgrounds, trailheads, and lakes in the Project vicinity” (SCL, 2020, Pg 6-49).</p> <p>Visitor use of these trails is induced by the Project. Some of these trails provide direct access to Project lands and waters and other trails receive additional use because of the Project. Figure 7 shows the percentage of visitors who use trails to access the lakeside campsites (NPS, 2020).</p> <p>Attachment 1, Table 1 identifies how the Project induces recreation use of these trails. These trails provide access to the Project reservoirs, Project dams, and/or views of the Project reservoirs and facilities. Visitors use these trails to hike, view the Project reservoirs and dams, and for access to the reservoirs for camping, fishing, swimming, and boating. Visitors are drawn to the lake and as part of their trips to the Project, visitors also use nearby trails. In some cases, visitors may choose the trail because it follows the reservoir, providing scenic views and access to water. Some of these trails were constructed by SCL or the FS prior to the creation of North Cascades National Park Complex, and some of these trails were developed as required by Article 412 of the current License (Attachment 2).</p> <p>For example, many visitors to Ross Reservoir who do not have a boat utilize the Ross Dam Trail (see Figure 8). This trail provides direct access to Ross Dam and Reservoir. Another example is the East Bank Trail that follows the east side of the reservoir providing views of the lake. Visitors are drawn to this trail because of the reservoir. Side trails provide access to the shoreline of the reservoir. For other trails further up the Ross reservoir, the Project reservoir and Ross Lake Resort’s water taxi enables easier water access to these trails. For example, instead of hiking many miles along the East Bank Trail, users can utilize the water taxi to access and then hike Desolation Peak Trail (See Figure 9) or the Devils Dome Trail. Use would be less without the continued operation of the Project reservoir and water taxi. In August 2020, 220 trips were taken via the water taxi, with visitors often utilizing the trails along the reservoir. In 2020, 90% of visitors to remote Ross Lake Resort did not stay at the cabins in the resort; these visitors took the water taxi, portaged their boats, or rented boats to access this lakeside facility and enjoy its surrounding area.</p>	Please see comment response ARTU-C06.
363.	NPS	03/05/2021	pp. 52-55	NPS-C37	Section 6.2.20 (NPS-15)	RA-01	<p><i>Day-Use Areas.</i> We are also recommending the study include additional day-use areas within the Project boundary near the North Cascades Environmental Learning Center and at the Gorge Creek and Diablo Lake overlooks. Colonial Creek also has day-use areas and this is covered above in the developed campground section.</p> <ul style="list-style-type: none"> <li>▪ North Cascades Environmental Learning Center. In addition to including use numbers from the visitors who stay at the Learning Center, the FS/NPS RSR recommends capturing the use numbers at the reservoir and beach area near the Learning Center. Visitors who are not taking part in the Learning Center programming are using day use sites, including overflow parking along the access</li> </ul>	Please see comment response ARTU-C06.

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							<p>road, for day-use activities (See Figure 10). These visitors are attracted to the Project reservoir for swimming, fishing, boating, sight-seeing, and picnicking.</p> <ul style="list-style-type: none"> <li>▪ Gorge Creek Overlook. The Gorge Creek Overlook on State Route 20 provides views of Gorge Creek Falls, Gorge Lake, and Gorge Dam. Visitors stop here to view the Project facilities and landscape. Portions of the site are located within the Project Boundary. The overlook trail was enhanced as part of the current license (Article 412) to provide a short accessible trail with views of the Project facilities.</li> <li>▪ Diablo Lake Overlook. The Diablo Lake Overlook on State Route 20 provides views of Diablo dam and Project reservoirs. Visitors to the Project reservoirs stop here to view the lakes and Diablo Dam. Other visitors stop on their way to other recreation areas and the view at the overlook may be their only connection to the Project (See Figure 11).</li> <li>▪ Rainy Lake Picnic Area. The Rainy Lake Picnic Area is located at Washington Pass, the highest drivable elevation point along State Route 20, east of the Project. Visitors to the Project reservoirs stop here to take in the dramatic views, picnic, and use the restroom either during their visit to the Project or in route to or from their visit to the Project (see Figure 12).</li> </ul>	
364.	NPS	03/05/2021	p. 56	NPS-C38	Section 6.2.20 (NPS-15)	RA-01	<p><i>River Recreation Downstream of the Project.</i> Evidence of direct Project-induced effects to river recreation sites is the extension of the recreation season based on the ongoing operation of the Project which affects boating opportunities on the Skagit River below Newhalem. The operating regime of the Project results in sustained downstream river flows throughout the summer season because of continuous power production and the large storage capacity of the Project. Natural (unregulated) flows, without the Project, would be significantly lower in late summer, after runoff peaks from the late-spring/early summer snowmelt have receded and basin-wide precipitation has diminished (SCL, 1989, Pg. 1-75).</p> <p>The regulated Project flows are utilized in the upper reaches of the river by both private and commercial users for rafting, as well as canoeing and kayaking. The higher late-season flows allow the river rafting season to be extended into late summer and early fall and contribute to power and nonpower boating in the lower reaches of the Skagit River. This use is unusual in that most recreational rivers, including nearby rivers such as the Suiattle and Sauk, do not have boatable flows in late summer, especially after July. In contrast, from 1984 through 1986, 60 to 65 percent of the total annual boating use on the Skagit River in the NRA occurred from August through October (SCL, 1989, Pg. 1-75). This pattern continues today, with the number of commercial boating trips during August through October being 60% of all trips (See Attachment 1, Table 4). The flow management also creates more stable winter flows for recreation use on the Skagit Wild and Scenic River.</p> <p>We recommend adding the river sites (Goodell Creek Boat Launch, Damnation boat-in site, Copper Creek Boat Launch, and Marblemount Boat Launch) to the proposed study due to Project effects on these sites. The extended season increases the amount of visitor use. Based on this Project nexus, these river sites were included in Article 412 of the current License and the sites managed by the FS are located in the current project boundary.</p>	Please see comment response ARTU-C06.
365.	NPS	03/05/2021	p. 57	NPS-C39	Section 6.2.20 (NPS-15)	RA-01	<p>What the Information Will be Used For. The SCL RSP will only collect information at a small fraction of the recreation facilities within the Project Boundary and vicinity and will not address Project-induced recreation and its relationship to current or future demand for recreational facilities related to the Project. Information produced by the FS/NPS RSR will:</p> <ol style="list-style-type: none"> <li>1. Address Project-operational effects and Project-induced recreation use in the Project vicinity and will provide an accurate accounting of recreation effects to</li> </ol>	Please see comment response ARTU-C06.

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							<p>inform FERC's NEPA document. FERC's Scoping Document 2 (SD2) (FERC, 2020) identifies the following issues for recreation access and land use:</p> <ul style="list-style-type: none"> <li>• "Effects of existing and any potential changes to Project facilities, operations, and maintenance activities on recreational use and access in the Project area, including NPS recreation facilities in the Ross Lake National Recreation Area.</li> <li>• The adequacy and capacity of existing recreational facilities to meet current and future demand.</li> <li>• The consistency of continuing Project operation, and any proposed Project modifications, with recreation management goals and objectives of Federal and state comprehensive plans for the Project area."</li> </ul> <p>In order for FERC to understand the recreation effects and current and future demand for recreation opportunities in the Project vicinity and apply that information to the NEPA analysis, recreation facilities that currently provide access to the Project or have a nexus to the Project due to Project-operational effects or Project-induced recreation, need to be included in the study. SCL may not currently control or directly manage some of these recreation facilities, but if the facilities the FS/NPS has identified are not included, it will be difficult to understand the current demand, let alone the future demand. Including these facilities in the proposed study will help inform license conditions and protection, mitigation, and enhancement measures. In a new license, SCL could take over or share maintenance responsibilities for these facilities that are affected by Project-induced recreation or Project-operational effects.</p> <p>2. Inform the license application and license articles including the Recreation Management Plan and Interpretation and Education Management Plan for the Project.</p> <ul style="list-style-type: none"> <li>• The visitor surveys will help identify current visitor issues and desired experiences.</li> <li>• The use counts and future use projections will help identify recreation demand.</li> <li>• The impact assessment will help identify where and what visitor impacts are occurring and identify locations where actions may need to be taken to reduce effects.</li> <li>• The accessibility assessment will help identify what facilities need improvements and should be modified or added to improve access.</li> </ul>	
366.	NPS	03/05/2021	pp. 58-59	NPS-C40	Section 6.2.20 (NPS-15)	RA-01	<p><b>Methodology.</b>  <u>Determining Project-Related Use from Non-Project Related Use.</u> SCL says of the FS/NPS RSR: In addition, the study requests do not identify methods in which a study could reasonably ascertain Project-related effects from non-Project related effects. Therefore, there is no technically defensible method of determining Project effects for the identified sites outside of the Project Boundary (18 CFR § 5.9(b)(5))." Pg. 6-47.</p> <p>Table 1 identifies the nexus for each site including how the Project induces use at those sites. The FS/NPS proposed survey instrument has been revised from the FS/NPS RSR and is shown in Attachment 3. We have developed additional information explaining the rationale for each question including why it was selected and what information it will provide. Two new proposed questions in the survey are designed to even better help identify Project-induced effects.</p> <p>The FS/NPS proposed survey instrument will obtain survey data from recreation visitors intercepted at a suite of locations across the study area. Responses to a set of survey questions can be used to identify those survey respondents whose recreation trips were induced by the presence of Project facilities and operations. Project-induced recreation will be assessed using a hierarchical review of respondent answers.</p>	<p>City Light has edited the survey instrument in the RA-01 Recreation Use and Facility Assessment Study Plan to include some of the NPS requests including consolidating some questions, additional response options to existing questions, and adding two new questions related to campground preferences and accessibility. Beyond these edits, City Light believes the questions in its study plan survey instrument are appropriate and needed to address the study needs.</p> <p>Regarding adding a map for visitors to mark up, City Light believes the existing question asking visitors generally where they visited or plan to visit is adequate. City Light is concerned that the map option would provide unreliable or erroneous data points in comparison to City Light's question (i.e., high likelihood that visitors mark places that they never end up visiting which provides misleading</p>

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							<p>Responses to questions 12, 13, and 6 can be used in isolation to identify Project-induced recreation. Questions 12 and 13 assess if access to, and views of, the reservoirs were the reason for the trip. Similar questions are common in recreation economics research to attribute recreation visits to the existence of a recreation resource. Consistent with accepted practices, responses of “come back another time” or “stayed home or go to work” to either question indicate attribution of the recreation trip to the Project resource. In question 6, respondents will report their top 3 motivations for the present trip. Response options can be modified as needed. Those respondents identifying Project-specific items (e.g., recreating on or around reservoirs or the Skagit River) as one of the top three motivations will be reported as Project-induced recreation. As the second step in the hierarchical approach, Project-induced recreation can also be inferred from examining the combined responses to questions 1, 3, and 7. Using a provided map, each survey respondent will identify in questions 1 and 3 the locations where they received the survey instrument and where they recreated on the present trip. The set of sites reported by the respondent will be used to ascertain whether they 1) visited only Project recreation facilities, 2) visited only non-Project facilities, or 3) visited a mix of the two. Those who reported visiting Project facilities (response group 1 or 3) would be likely Project-induced recreation, subject to their response to other survey questions. Those in response category 2 could be Project-induced recreation if the visitor intended to visit Project facilities or resources but were unable to do so (see the final hierarchical decision below). Respondents will identify the activities they engaged in as well as their single primary recreation activity on the present trip in question 7. The response options in question 7 can be revised as needed to improve specificity. Those respondents who identified participation and primary activities related to Project facilities or operations, coupled with responses to questions 1, 3, and 6 will be classified as Project-induced recreation. Finally, joint responses to questions 8, 10, and 11 can be assessed to identify any instances where crowding (or concerns about crowding) may have influenced recreation behavior to the extent where the visitor was in the area because of Project facilities and resources but was not identified as Project-induced recreation above. For example, a respondent who stated they moved to a new location in Question 10c and in Question 8 identified that they wanted to recreate on the reservoir shoreline is likely Project-induced recreation.</p>	<p>data points). The focus of the study and survey instrument is to identify site-specific visitor uses and preferences at study sites. The visitor survey instrument will generally collect information on where else visitors may visit, the intent of the study is to survey visitors and uses directly at the majority of the study sites rather than relying on speculative or conjecture via the NPS map approach. City Light has significantly expanded the study sites at the request of the NPS and USFS presumably to cover sites within or adjacent to the Project Boundary of interest to the NPS and USFS.</p> <p>Finally, City Light has concerns that a map of high enough resolution would be feasible given the broad geographic study area and may become a distraction from the focus of the survey on more site-specific questions and data in the survey instrument.</p>
367.	NPS	03/05/2021	pp. 59-60	NPS-C41	Section 6.2.20 (NPS-15)	RA-01	<p><u>Survey Sample Size, Survey Team, and Observation Counts.</u>  <i>Sample Size.</i> The sample size proposed by the FS/NPS RSR is based on 1) the need to expand the geographic scope of the study as described in the previous sections of this document and 2) the objectives laid out in the SCL RSP. First, the FS/NPS propose to collect statistically representative data for each of the additional areas. As such, a representative sample size is required at each of these sites. As described in our proposal, a sample size of 384 surveys is widely recognized as the necessary sample size to describe a large population of potential respondents (i.e. &gt;5,000 potential respondents) at a 95% confidence level (Fox, etc. 2009).</p> <p>Second, the FS/NPS do not agree that the objectives stated in SCL's RSP can be achieved by collecting only 384 surveys. As mentioned above, a sample size of 384 is a rule of thumb to achieve estimates of a population &gt;5,000 potential respondents with a 95% confidence interval. However, this sample size and confidence level does not assume subdivisions of the data. Subdividing these data reduces the confidence level of estimates and researchers must consider stated research objectives when devising a sampling plan. To this point we find SCL's response regarding an objection to increase the study sample size inconsistent with the stated objectives in section 2.6.2.3. They state, “While City Light may summarize these attributes by type of facility or area and develop Project recreation use summaries, the overall purpose is to characterize these attributes for the Project as a whole.” However, section 2.6.2.3</p>	<p>As noted in City Light's comment response ARTU-C06, City Light has agreed to expand the study sites. As such, City Light has also revised the RA-01 Recreation Use and Facility Assessment (Recreation Assessment) survey methods to two survey areas (SR 20 corridor and Ross Lake) similar to NPS's 2005 study. Given these two distinct survey areas, City Light has modified the sample size approach to 384 surveys at the SR 20 corridor and Ross Lake survey areas each, or 786 target surveys total. City Light did not adopt the NPS' observational count methods (8-hour counts at 15-minute intervals) as City Light's observational spot count methods are consistent with many FERC recreation studies with similar geographic survey areas and Project layout. Further, the NPS' requested observational methods are overly burdensome (i.e., requires staff stationed at each study site for a full or near-full day). Nonetheless, City Light acknowledges the NPS' concern and has modified the Recreation</p>



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							<p>of the study plan states, "City Light will conduct observations and visitor surveys to gather information to address the study goals, objectives, and issues at each of the recreation facilities/study sites listed in Table 2.6-6." The study plan further states, "To identify recreation visitor's attitudes, beliefs, and preferences at Project recreation resource areas, City Light will conduct a roving use survey using a stratified two-stage (geographic and temporal) probability sampling approach." As such, the study plan states objectives to provide survey results at finer resolution than at the "Project area as a whole" and the statement, "Information from the visitor surveys and observation counts will provide insight into individual areas and facilities, but is not intended to have a statistically valid sample size for each facility or resource area." is inconsistent with the stated objectives.</p> <p>Based on the need for expanding the geographic scope of this study along with the stated objectives of the study plan, we suggest SCL adopt the FS/NPS' recommended sample sizes.</p> <p>This is a large and complex FERC project consisting of a river and three reservoirs, one of which is 23 miles long. Ross Reservoir has limited motor vehicle access – experiences at that site are different than the more easily accessible reservoirs along State Route 20. Not all FERC projects are the same; while SCL points to some studies that have used 384 sample size for the FERC project area, other larger projects, like the Skagit, have broken the area into different subsets and more samples due to the complexity of the project (i.e. Middle Fork American (P-2079), DeSabra-Centerville Project (P-803)).</p>	Assessment Study Plan sampling frequency by including additional observation and survey days on weekend and weekdays during the peak season to capture a broader range of use when use is highest (i.e., from 14 to 18 days during the roughly 2-month-long peak season from July through Labor Day).
368.	NPS	03/05/2021	p. 60	NPS-C42	Section 6.2.20 (NPS-15)	RA-01	<p><i>Survey Teams.</i> The need for three survey teams is based on the premise of the need to expand the geographic scope of the study as described in the previous sections of this document. The FS/NPS propose to collect statistically representative data for each of the additional areas proposed in the expanded study area. As such a representative sample size is required at each of these sites, we suggest a cost-efficient way to collect these data is with three survey teams.</p>	Given City Light's significantly revised (i.e., increased) study site list in the RA-01 Recreation Use and Facility Assessment Study Plan at the request of the NPS, City Light is evaluating the survey team needs and will employ the appropriate number of survey staff consistent with the methods and target number of surveys.
369.	NPS	03/05/2021	pp. 60-61	NPS-C43	Section 6.2.20 (NPS-15)	RA-01	<p><i>Observational Data Collection.</i> The observational data collection methods, as described in the SCL RSP and on phone calls (4/16/2020 and 7/24/2020) with the SCL/FS/NPS research team, do not provide data of high enough resolution to provide estimates of use as described in the SCL RSP. Section 2.6.2.1 of the SCL RSP describes the variables that will be collected by the researchers at each study site:</p> <ul style="list-style-type: none"> <li>▪ Date</li> <li>▪ Time observation started and ended</li> <li>▪ Location/study site</li> <li>▪ General weather conditions (sunny, partly cloudy, cloudy, rain/snow)</li> <li>▪ Observed vehicles (single vehicle)</li> <li>▪ Observed vehicles with trailers</li> <li>▪ Observed trailers (no vehicle)</li> <li>▪ Observed docked boats (as visible from the study site)</li> <li>▪ Observed people</li> <li>▪ Observed types of shoreline recreation activities (as visible from the study site)</li> <li>▪ Observed types of reservoir/water-based recreation activities/watercraft (if reservoir/water views exist, as visible from the study site)</li> <li>▪ Observed user conflict</li> </ul> <p>SCL RSP Section 2.6.3.1 describes the various crosstab analyses that will be estimated from these data: "...for each recreation facility listed in Table 2.6-9, City Light will calculate the average existing use levels for several recreation parameters (e.g.,</p>	City Light believes the methods for observational data collection is consistent with the majority of FERC recreation studies of this kind and will provide the resolution necessary to meet the FERC study needs. Further, City Light believes the observation count methods in its RA-01 Recreation Use and Facility Assessment Study Plan will effectively provide adequate data for City Light, NPS, and USFS to identify where potential use levels are approaching or at capacity. Adverse use impacts, site capacity, or other management issues identified during the assessment can be flagged for further study under management programs anticipated to be developed for future recreation management at the Project and vicinity.

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							<p>people, vehicles, facility occupancy) by day type (i.e., weekend, weekday, holiday), and by time of day (i.e., morning, afternoon) during the survey season.” Under the SCL RSP, researchers would only collect one observation at each study location on a given sampling day on 12 sampling days during the peak season and 18 sampling days during the off-peak season. As such, there will be 12 observations collected during the peak season and 18 observations during the off-peak season for each of the variables listed above. Simply stated, these are not enough observations to provide an estimate of interest listed above.</p> <p>There have been many studies to estimate visitor use conducted on public lands and the methods proposed by the FS/NPS follow these commonly used practices. A single observation per sampling location does not provide the hourly data needed to characterize any variation of use levels throughout a day. For example, counts early in the morning may be low as visitors travel to the park. Likewise, counts from 10:00AM – 2:00PM may be higher when visitors are recreating at a site. The daily and hourly ebb and flow of use conditions need to be captured with enough observational periods per sampling location for the analyses proposed in the SCL RSP to yield meaningful results.</p> <p>Other FERC proceedings for more complex projects have also used time-blocks for observation counts Middle Fork American (P-2079). Table 2-6-3 – NPS does not have day-use data for Gorge Overlook. Table 2.6-7. This Table only includes a limited number of sites. Please include a list of sites that were used to develop this estimate. The estimates do not adequately represent Project-induced recreation use.</p>	
370.	NPS	03/05/2021	p. 61	NPS-C44	Section 6.2.20 (NPS-15)	RA-01	<p><u>Impact Assessment.</u> In consideration of SCL’s comments to our proposal to conduct a Phase II impact analysis, we are dropping this request. Rather, we recommend that two factors be captured in the Use Impact Form for sites at Colonial Campground, Gorge Campground, Diablo Overlook, Gorge Overlook, Ross Lake Trailhead, and the Environmental Learning Center. The additional factors include observed safety considerations and observed extent and impacts of visitors utilizing areas outside of the designated area (i.e. visitors parking outside of designated parking areas for access to the sites). Figure 13 shows the extent of visitor utilizing one popular day-use area and campground on Diablo reservoir.</p>	Thank you for consideration in removing the Phase II impact analysis. The intent of the use impact assessment is to evaluate the physical conditions related to visitor use impacts and not make subjective assessments of safety considerations. City Light will also collect data related to parking outside of designated parking areas as part of the observational use counts and not as part of the use impact assessments.
371.	NPS	03/05/2021	pp. 61-62	NPS-C45	Section 6.2.20 (NPS-15)	RA-01	<p><u>Identify Future Use and Demand Opportunities.</u> Recreation use has grown three-fold since the current license was issued. The Project is located within driving distance of two metropolitan areas – Seattle and Vancouver, Canada. The populations of both cities have grown considerably in the last decade and are expected to continue to grow at a fast paced annual rate (1.10% for Seattle, 0.83% for Vancouver).</p> <p>Demographics in the country and region are also changing. The FS/NPS recommend as part of the unmet demand assessment, SCL evaluate the changing demographics in the communities from which the Project is drawing; identify what changes to the facilities may be needed due to cultural changes; and define other potential barriers to visitor use that could be addressed in license implementation.</p>	City Light believes its future use and demand methods will broadly address the demographic parameters noted by the NPS. The methods in the RA-01 Recreation Use and Facility Assessment Study Plan focus on standardized and reliable sources of data including population growth rates and population activity growth rates, which provide a broad and general idea of future uses and demand.
372.	NPS	03/05/2021	pp. 62-63	NPS-C46	Section 6.2.20 (NPS-15)	RA-01	<p><u>Recreation Needs Assessment.</u> We recommend a recreation needs assessment be developed that evaluates opportunities and synthesizes the recreation study data to identify potential measures to meet existing and future visitor needs that are consistent with applicable land management guidance, safely accommodate existing and future recreation use, and address Project-operational and induced effects. The needs assessment will be the basis for developing the protection, mitigation, and enhancement measures that are included in the license application. Recreation needs analysis have been developed for many other FERC proceedings (e.g., Bucks Creek</p>	City Light will synthesize existing data and data collected as part of City Light’s RA-01 Recreation Use and Facility Assessment and other relicensing studies to inform a recreation needs analysis in City Light’s license application. After City Light completes its proposed relicensing studies and all data are available, the information will provide as

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							<p>(P-619), DeSabra-Centerville (P-803), Boundary Dam (P-2144), Henry Jackson (P-2157)).</p> <p>The NPS Ross Lake General Management Plan identified some recreation needs that have a Project nexus. As part of the recreational needs assessment, a study element should be included to conduct analyses to see how these needs could be met as part of the Project purposes:</p> <ul style="list-style-type: none"> <li>Continued public use at Colonial Creek recreational area is at risk due to sedimentation into Diablo Reservoir. FERC's Scoping Document 2 identifies the following issue "Effects of Project-related sedimentation and any proposed sediment management activities on access to recreation facilities in the Ross Lake NRA (SD2, Pg. 41, FERC, 2020)." To address the effects of sedimentation, we recommend conducting a site analysis to identify alternative locations for the Colonial Creek campground, boat launch, and day-use area that will provide similar amenities to the public.</li> <li>Conduct site design analysis to explore conceptual design alternatives for redesigning Ross Dam Trail parking lot (See Figure 8) and Hozomeen campground to better meet visitor needs. The goal of a redesign at Hozomeen campground is to provide a more organized camping experience and move the camping closer to the reservoir.</li> <li>Investigate feasible locations for new camping and trails near the Diablo Reservoir, Gorge Reservoir, Newhalem, and Skagit River area to meet the growing demand for visitor access and use.</li> </ul>	a basis for consultation with the NPS and USFS to develop PME related to recreation resources.
373.	NPS	03/05/2021	pp. 63-64	NPS-C47	Section 6.2.20 (NPS-15)	RA-01	<p><u>Existing Information and Need for Additional Information.</u> The Existing Information and Need for Additional Information Section of the FS/NPS RSR is incorporated by reference. This section summarizes what we are proposing for each type of facility and what information exists.</p> <p>To reduce costs and utilize existing information, the NPS/FS are not proposing inventory and condition assessments. The FS/NPS are also not proposing use counts for overnight facilities when this information exists. As explained in the FS/NPS RSR, existing information is available for the facility conditions and overnight use counts on NPS and for some FS sites. lands. While overnight use counts within the NRA are well established (NPS 2020), a study is needed to quantify existing day-use and estimate future day and overnight use over the term of the next license. Day-use is generally estimated using vehicle traffic counters but use at specific reservoirs and facilities is not known. Recreation in the NRA has grown three-fold in the last 25 years and increased by more than 25% in the last 4 years (NPS, 2020). This increase is expected to continue due to the continued demand for water-based recreation activities and increase of population in the I-5 corridor and surrounding areas. The level of existing and future use is needed to help inform the adequacy of recreation access and facilities and help inform development of the Recreation Resource Management Plan and the Interpretation and Education Management Plan as part of the new license. Further, while the condition information for facilities is generally known, accessibility and visitor impact assessments are needed to help inform potential improvements and changes to these facilities. As shown in Figures 4, 8, 10, 11, and 12, visitors are expanding the impact area at some sites and parking along State Route 20 and in other areas not intended for parking. More information on the extent of this use and associated effects are needed.</p>	Please see comment response ARTU-C06. City Light recognizes and appreciates NPS and USFS considering cost when requesting study sites and elements, particularly when existing data is available.
374.	NPS	03/05/2021	p. 64	NPS-C48	Section 6.2.20 (NPS-15)	RA-01	<p><u>Developed Campgrounds.</u> We recommend an accessibility assessment, visitor use impact assessment, and use surveys at certain developed campgrounds. To reduce costs we support utilizing existing overnight use data rather than conducting use counts at NPS campgrounds. Existing information on the site condition can also be</p>	Please see comment response ARTU-C06.

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							utilized and a new condition assessment is not recommended at NPS campgrounds. The exception to this is the campgrounds on National Forest System lands. Use information is not available for these FS sites and therefore is requested as part of this study.	
375.	NPS	03/05/2021	p. 64	NPS-C49	Section 6.2.20 (NPS-15)	RA-01	<i>Reservoir-side and Island Campsites.</i> We recommend an accessibility and visitor impact assessment be conducted at campsites along the shoreline and on the islands of the reservoirs to identify sites where enhancements are needed to improve accessibility and address visitor impacts. To reduce costs, we recommend utilizing existing overnight use data and not conducting use counts at these sites. We do recommend that the survey include a map with these sites and allow visitors to identify if they plan to visit these sites during their trip. To reduce costs, and since it is likely visitors to these sites will be intercepted at other selected locations, we do not recommend surveys be conducted at these sites. General condition information is available and is not recommended as part of this study.	Please see comment response ARTU-C06.
376.	NPS	03/05/2021	pp. 64-65	NPS-C50	Section 6.2.20 (NPS-15)	RA-01	<i>Trails.</i> SCL has recommended two short trails in the town of Newhalem be included in the study. Neither of the proposed trails provide access to any of the Project reservoirs and grossly underestimate the visitor use of trails because of visits to the Project. Ross Lake NRA contains 29 trails, totaling 134 miles. The PAD identified 23 representative trails that are within or partially within the Project boundary. In addition to the two short trails SCL has proposed, we are recommending 18 representative trails completely or partially within the Project boundary be included in the analysis. We recommend some of the trailheads be assessed for accessibility and visitor impact and a smaller subset of nine trails be assessed for accessibility. To save costs, we recommend a subset of nine of these trails be assessed for day-use visitor information via trail counters. Trail counters provide a more efficient method of counting visitor use along the trails than visitor counts (Pettebone, etc. 2010). If SCL prefers to use direct observation versus trail counters, the NPS accepts this methodology. To save costs, we recommend that surveys be handed out at only two of the locations that provide entry way to other trails and facilities. We recommend that trail counters capture the use at the other representative trails. For the surveys, we also recommended that a map be provided that shows all 23 representative trails identified in the PAD and that participants can identify the location(s) that they visited. To save costs, we recommend existing information be utilized for the condition assessment.	Please see comment response ARTU-C06.
377.	NPS	03/05/2021	p. 65	NPS-C51	Section 6.2.20 (NPS-15)	RA-01	<i>Day-Use Areas.</i> As stated above, visitor use counts are needed at the developed day-use facilities and overlooks. For day-use sites like the beach at Diablo Reservoir near the Environmental Learning Center and at Colonial Creek Campground, the overnight use is well known but the day-use from other visitors has not been collected or analyzed. Accessibility assessments and visitor impact assessments are also needed at these sites to identify areas for potential modifications to improve the accessibility to the facilities and identify measures to protect resources while meeting the recreation demand.	Please see comment response ARTU-C06.
378.	NPS	03/05/2021	p. 65	NPS-C52	Section 6.2.20 (NPS-15)	RA-01	<i>River Access Sites.</i> We recommend that the river access sites on NPS and FS lands be included in the visitor use survey. To reduce costs, we recommend only one of the three sites in the NRA be utilized for collecting surveys and use counts. The proposed survey instrument includes asking visitors questions about their experience, why they come to the area, and effects of the river flows. Collecting use counts throughout the season will show how the use changes throughout the season including any change in visitor use patterns in the late summer and fall. The NPS and FS have river use data for commercial use but we do not have use information for the independent public boaters. We also recommend that accessibility and visitor use impacts be assessed at these sites.	Please see comment response ARTU-C06.

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379.	NPS	03/05/2021	p. 65	NPS-C53	Section 6.2.20 (NPS-15)	RA-01	<u>Report and Data.</u> FS/NPS would like to receive a copy of the raw data along with the summary and analysis provided in the report.	City Light will provide the raw data to the NPS.
380.	NPS	03/05/2021	pp. 66-67	NPS-C54	Section 6.2.20 (NPS-15)	RA-01	<p><b>Cost and Level of Effort.</b>  <u>Examples of Other Studies and Their Associated Costs.</u> The FS/NPS have demonstrated that SCL's proposed sample plan does not achieve the research objectives as stated in the SCL RSP. The sampling design and administration methods proposed by the FS/NPS RSR achieve the SCL RSP's research goals and will provide SCL and FERC with comprehensive, representative, and defensible data for NEPA analysis and to complete the licensing process for the Skagit Project. These proposed methods are a higher level of effort than what is being currently proposed in SCL RSP and our estimate of \$550,000 is based on experience developing contracts for similar research. The FS/NPS are proposing a total of 2,304 surveys to be collected at 6 recreation areas.</p> <p>Following are two examples of awarded contracts for visitor survey studies with similar sample sizes as proposed for the Skagit Project study and one example of a study to document visitor use levels:</p> <p>First, a study for Yellowstone National Park (contract #P16PD05167) was awarded to Resource Systems Group (RSG) in fiscal year 2016 at a cost of \$161,516 to collect up to 2,000 mail-back surveys from visitors at the park's 5 entrance stations (i.e. 400 surveys distributed at each entrance station). The final report for this study shows that RSG contacted 2,265 visitor groups of which 2,030 agreed to participate. Questionnaires were completed and returned by 1,257 visitor groups, resulting in a completion rate of 62% among those visitor groups that agreed to participate in the study.</p> <p>Second, another visitor study was awarded in Yellowstone in fiscal year 2017 (contract #140P2118C0008) to Otak at a cost of \$217,500. The objectives of this study included capturing visitor travel patterns spatially and temporally, evaluating visitors' travel timelines, identifying experiential data related to Yellowstone's Fundamental Resources and Values and preferences for specific management strategies. The contractor administered two survey methods concurrently throughout the summer of 2018 in the park to complete this study: 1) an intercept survey distributed at each of the park's 5 entrances and 2) a geofence/tablet based survey to capture visitors' response in real time as they experienced different locations and conditions during their trip. The sample size for the intercept survey was n=2,738 respondents and for the geofence survey n=1,425. This study can be referenced at: Visitor Use Study (2018) - Yellowstone National Park (U.S. National Park Service) (nps.gov).</p> <p>Third, a recent study at Arches National Park was conducted during fiscal year 2019 by RSG under contract #140P2119F0101 and awarded for \$354,016. This Project collected a variety of visitor use data along the travel corridors of Arches including visitor use levels along roadways (vehicle volume), key parking locations (vehicle accumulation), along trails (volume), and at key attraction sites (pedestrian use levels). The contract scope of work specified:</p> <ul style="list-style-type: none"> <li>▪ Automated trail use counts (up to 4 locations; September-November 2019);</li> <li>▪ Trail counter calibration counts (16 hours per counter location, up to 4 trail counter locations; September 2019);</li> <li>▪ Park-owned TRAFx vehicle counter calibration counts at two secondary entrance roads (16 hours per counter location, 2 vehicle counter locations; September</li> </ul>	City Light has revised the RA-01 Recreation Use and Facility Assessment to reflect the estimated cost for completing the study and subsequent reporting per the methods identified in the study plan.

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							<p>2019). Calibration data will classify commercial use vehicles when and where observation methods are able to discern;</p> <ul style="list-style-type: none"> <li>Photo frame counts (1 photo frame each at the Windows, Delicate Arch, and Devil's Garden, 10 days per site, 7 hours per day; September 2019);</li> <li>Whole area counts (1 whole area each at the Windows, Delicate Arch, and Devil's Garden, 10 days per site, 7 hours per day; September 2019);</li> <li>Parking accumulation counts and turnover data in informal and formal parking areas at the Windows, Delicate Arch, and Devil's Garden (10 days per site, 7 hours per day; September 2019). Accumulation and turnover data will classify commercial use vehicles when and where observation methods are able to discern;</li> <li>Parkwide personal vehicle and commercial vehicle travel routes (10 sampling days, 7 hours per day; September 2019), and site-level pedestrian travel times via delay cards at the Windows, Delicate Arch, and Devil's Garden (3 sampling days per site, 7 hours per day; September 2019).</li> </ul> <p>In addition, the contractor performed the following analyses for these data:</p> <ul style="list-style-type: none"> <li>Correlation analyses across locations and use levels (regression models development);</li> <li>Analyses of visitor volumes and effects upon specific sites (including trend comparisons with historic visitor-informed standards/threshold, to the extent possible);</li> <li>Scenario analyses of transportation and visitor use/access scenarios that consider visitor flow to achieve a variety of conditions.</li> </ul> <p>In summary, these awarded contracts demonstrate that a visitor survey with a sample size of approximately 2,000 respondents administered in a national park setting can be completed at an approximate cost of \$200,000 and a study to capture detailed data of visitor use levels and movements can be completed at a cost of approximately \$350,000. As such we feel that our estimate of \$550,000 for the combined methods proposed by the FS/NPS RSR is reasonable based on similar contracts awarded on a competitive basis.</p>	
381.	NPS	03/05/2021	pp. 67-69	NPS-C55	Section 6.2.20 (NPS-15)	RA-01	<p><u>Study Scope Comparison.</u> Two primary differences between the SCL and the FS/NPS studies are the geographic scope and number of sites. Table 5 compares the number of sites proposed in the SCL study and FS/NPS study. The site differences vary by type of study component. The SCL study scope is very narrow and the proposed site expansion by FS/NPS more accurately reflects the Project-induced effects and Project-operational effects as described below.</p> <p>Table 6 shows the geographic scope and scale of representative FERC projects from the western part of the country. The Skagit River Project is a large, complex Project with a river and three reservoirs and one of those reservoirs, Ross Lake, is 23 miles long. The number of sites that are included in the FS/NPS RSR are comparable and often less than what was addressed for recreation studies during relicensing of these other projects. Further, many of these other projects conducted a Visitor Use Survey and Resident Surveys. FS/NPS is only requesting the Visitor Use Survey. Other relicensing studies also have conducted comprehensive needs analysis and looked for new opportunities for trails and water access sites, as we propose.</p>	Please see comment response ARTU-C06.
382.	NPS	03/05/2021	pp. 70	NPS-C56	Section 6.2.20 (NPS-15)	RA-01	<p><u>Newhalem Area Sites Proposed by SCL.</u> To further reduce costs, we recommend combining most of the Newhalem area sites proposed for data collection by SCL and collecting use counts and surveys at just two representative sites (Figure 14: Gorge Powerhouse parking area and the Newhalem parking area (Main Street)). Many of the SCL-proposed sites in the Newhalem area are clustered together, so visitors are likely</p>	City Light has revised the RA-01 Recreation Use and Facility Assessment Study Plan to consolidate the Newhalem study sites as it pertains to the visitor and observation surveys by focusing the study sites on the existing parking areas that

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							to be visiting multiple sites and could be intercepted at the two parking areas. This would eliminate six sites from the survey, further reducing costs. The surveys could include a map with all the site locations and visitors could identify which places in the Newhalem area they visited.	provide access to the Newhalem recreation and educational facilities.
383.	NPS	03/05/2021	p. 71	NPS-C57	Section 6.2.20 (NPS-15)	RA-01	<b>Modifications.</b> Below is a summary of our modifications of the scope and methodology proposed in the FS/NPS RSR: Elimination of the second phase of the impact study. FS/NPS is recommending the addition of two factors to the Use Impact Form for selected sites to capture areas being utilized beyond the designated sites including observed safety and extent of impacts. These sites include Colonial Campground, Gorge Campground, Diablo Overlook, Gorge Overlook, Ross Lake Trailhead, and the Environmental Learning Center (see Impact Assessment in the Methodology Section).	Please see comment response ARTU-C06.
384.	NPS	03/05/2021	p. 71	NPS-C58	Section 6.2.20 (NPS-15)	RA-01	Clarification on the scope of the proposed accessibility and impact assessments for trails. For the majority of trails, the proposed accessibility assessments would largely be focused on the trailheads except for a handful of trails with greater potential to be accessible. FS/NPS is also reducing the number of trailheads to be assessed, if those trails are unlikely to be accessible. The trailheads that provide access to and from the reservoirs remain in the request as these could be utilized by people with disabilities (See Table 1).	Please see comment response ARTU-C06.
385.	NPS	03/05/2021	p. 71	NPS-C59	Section 6.2.20 (NPS-15)	RA-01	Removal of three trails (Panther Creek, Hozomeen Viewpoint Trail, and the Pacific Northwest Trail) and the addition of one informal trail from Goodell Creek Campground to the town of Newhalem (See Table 1).	Please see comment response ARTU-C06.
386.	NPS	03/05/2021	p. 71	NPS-C60	Section 6.2.20 (NPS-15)	RA-01	Reduction of the number of sites proposed in Newhalem area (see Table 1 and Cost Section).	Please see comment response ARTU-C06.
387.	NPS	03/05/2021	p. 71	NPS-C61	Section 6.2.20 (NPS-15)	RA-01	<u>Consultation with Seattle City Light.</u> The NPS and FS have participated in three meetings with SCL and FERC to discuss the SCL RSP. At one of these meetings, NPS conducted a slide presentation, illustrating the effects of Project-induced recreation. At the time of writing our comments, SCL has made no modifications to the SCL RSP based on our comments previously submitted. However, the meetings have led to a better understanding of how FERC, SCL, and FS/NPS view nexus. FS/NPS continue to be interested in collaborating with SCL and would welcome additional meetings ahead of SCL's filing of the Revised Study Plan.	City Light also looks forward to continued collaboration with the NPS, USFS, and interested LPs.
388.	NPS	03/05/2021	p. 73	NPS-C62	N/A	RA-02	<b><u>RA-02 Gorge Bypass Reach Safety and Whitewater Boating Proposed Study Plan.</u></b> The NPS requests to be part of the team assessing access, safety, and other resource issues at all 3 phases of study. The NPS requests to be present during the field days in Levels 2 and 3. The NPS is concerned about the potential for fish stranding. All LPs should be given the opportunity to observe the study. Advance notice of 14 days would be optimal, but it is understandable that SCL may not be able to accommodate this. However, we need to agree on the notification process and number of advance days.	The team of expert boaters for Levels 2 and 3 will be selected in collaboration with American Whitewater. The primary focus of the boating team during Levels 2 and 3 in the RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study will be to evaluate instream flow needs for whitewater boating, the whitewater difficulty, safety issues and comment on future demand for the opportunity. Observation locations are small and limited at highway pull-outs for the Level 2 land-based reconnaissance. For logistical and safety reasons, the number of observers needs to be limited.  Levels 2 and 3 present the opportunity to collect information from selected representatives of the boating community with expertise on navigability, flows and whitewater difficulty. City Light wants to maximize this opportunity to get input from

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								boaters during this field work. As a result, the boating team will observe the bypass reach as a cohesive unit separate from the agency and LP group. Observations and recommendations from the boating team will be included in the reports for Levels 2 and 3. NPS and other LPs will have the opportunity to review and comment on the reports.  City Light requests NPS and other LPs interested in observing the bypass channel during Levels 2 and 3 to provide an email request with name, organization and contact information. Space will be limited for logistical and safety reasons so not all requests will be accommodated.
389.	NPS	03/05/2021	p. 73	NPS-C63	N/A	RA-02	Geologic hazards need to be considered in the assessment (rock falls, snow avalanche, etc.).	City Light's team of boaters will consider potential navigational hazards in the river channel during the Level 2 and 3 assessments.
390.	NPS	03/05/2021	p. 73	NPS-C64	N/A	RA-02 Section 2.6.2	Level 2: Field Reconnaissance. The NPS recommends that the same boaters be utilized for each of the Level 2 and Level 3 flows to allow cross comparing of the flows (Whittaker, etc. 1993).	City Light agrees with this recommendation and this was City Light's intention. City Light will work with American Whitewater to identify a team of boaters and participants will be asked to commit to Level 2 and 3 for continuity. City Light edited the Level 3 study language to state this goal, but noting that unforeseen events or conflicts may prevent complete consistency between the Level 2 and 3 boating team representatives.
391.	NPS	03/05/2021	p. 74	NPS-C65	N/A	RA-03 Section 2.4	<b>RA-03: Project Facility Lighting Inventory.</b> The NPS recommends that the goal of the study include determining how best to minimize light trespass into sensitive areas adjacent to the project boundary.	The proposed edit is outside the scope of this inventory. While the RA-03 Project Facility Lighting Inventory will provide an inventory of lighting with potential actions to reduce light pollution where applicable, it does not propose to include an analysis of how those actions may potentially reduce effects on resources.
392.	NPS	03/05/2021	p. 74	NPS-C66	N/A	RA-03 Section 2.6	We recommend site visits be made both during the day and night. It is usually not possible to capture all the required information during one or the other. Night visits allow observation of the extent the light is projecting and its effects.  For data collection of lamps, we recommend the following information be collected: <ul style="list-style-type: none"> <li>▪ CCT (color temperature of lamp) The use of lamps with a CCT ≤3000k are preferred</li> <li>▪ Luminaire control methods. Please add dimmer, timer, and motion sensor to the list of options.</li> <li>▪ Documentation on whether or not the light is on at night (requires night site visit).</li> </ul> Notes section (any other helpful information and any observed effects to resources).	City Light has edited the RA-03 Project Facility Lighting Inventory Study Plan to include both daytime and nighttime visits and to include the additional field data collection related to lamps.
393.	NPS	03/05/2021	p. 75	NPS-C67	N/A	RA-04 Section 2.6	<b>RA-04: Project Sound Assessment.</b> In SCL's 1989 Report, SCL states in its response to FERC's Additional Information Request in 1989 SCL: "The reservoirs created by the Skagit Project have significant influence on the type of recreation facilities present, and therefore upon recreation management of the NRA. The three reservoirs cover an area of 12,850 acres which represent recreation settings that are highly desired for fishing and flatwater boating activities. As a result, the reservoirs have a type, and perhaps a level of recreational development that would not have occurred in the absence of the Project" (SCL, 1989. Pg. 1-72).	Noise from recreational boating is assumed to be a component of the soundscape that will be measured and recorded during the long-term 7-day unattended noise measurements.  City Light has revised the RA-04 Project Sound Assessment Study Plan to extend the modeling study area to calculate the locations where Project-related noise equals the measured L90 at the



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							<p>These statements describe how the Project induces recreation use. Given this relationship, the NPS recommends that the Project Sound Study address recreational boating use on the Project reservoirs. This information is also needed for FERC's NEPA analysis. An issue that was identified in the Scoping Document 2 was "Effects of existing and any potential changes to project facilities and operations and boat activity including recreational boating on noise levels within the Ross Lake National Recreation Area."</p> <p>The NPS also recommends carrying modeling propagation out to the point of inaudibility, considering established natural sound levels at measurement sites in NRA.</p>	nearest noise measurement location (i.e., the sound level exceeded 90 percent of the time; L90 is generally considered to represent the background level of noise of an environment).
394.	NPS	03/05/2021	p. 75	NPS-C68	N/A	RA-04 Section 2.5	<p>The NPS recommends that continuous measuring occur over a 25 day period per the standard protocol developed by NPS for noise audibility and sound levels in national parks utilizing the ANSI-ASA_S3-SC1.100_S12.100-2014, Methods to Define and Measure the Residual Sound in Protected Natural and Quiet Residential Areas (established in Lynch, E., Joyce, D., &amp; Fristrup, K. (2011)).</p> <p>The NPS recommends conducting sound monitoring at multiple points of the year, spring in particular, to capture effects of the Project related to helicopter use for operational purposes and boat use. Fall monitoring may also be helpful at assessing impacts at townsites as well.</p>	City Light has revised the RA-04 Project Sound Assessment Study Plan to add a 7-day long-term unattended noise measurement during the spring period, in addition to the existing 7-day long-term unattended measurement during the peak/summer season.
395.	NPS	03/05/2021	p. 75	NPS-C69	N/A	RA-04 Section 2.6.4	<p>The NPS recommends calculating L<sub>Anat</sub> which is the percentile sound level that corresponds to the percentage of an hour where noise occurred. For a given hour (or other specified time period), L<sub>Anat</sub> is calculated to be the sound level exceeded x percent of the time, where x is defined as <math>x = (100 - PH/2) + PH</math> and PH is the percentage of the hour that contained noise.</p> <p>NPS recommends that hourly sound source audibility be a component of the analysis, as well as calculation of LA<sub>50</sub>, as it will clarify the likely sources (including those that are loud, but also encompassing those that may be less loud but are nevertheless persistently audible) of sound measured during the study period.</p>	The current scope of the study is consistent with CEQ regulations in 40 CFR 1500 and US DOE NEPA implementation guidelines that recommend resources be studied commensurate with the magnitude of potential impacts to/from that resource. City Light will make the study data available to the NPS.
396.	NPS	03/05/2021	p. 75	NPS-C70	N/A	RA-04 Section 2.6.5	<p>NPS recommends carrying noise contours out to the point at which they attenuate to natural sound levels (as established in previous measurements near the Project boundary), or at the least, to the LA<sub>90</sub> percentile level. This will provide a clearer picture of the effects of project-related noise emissions on the acoustic environment of surrounding lands.</p>	City Light has revised the RA-04 Project Sound Assessment Study Plan to include Project-related noise level calculations to the point at which they equal the L90 measured at the nearest noise monitoring location.
397.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 4	NNTC-C08	Section 6.2.20	RA-01	<p><b><u>Recreation Use and Facility Assessment (RA-01) &amp; Recreation Study Requests Not Adopted.</u></b> NNTC supports the Recreation Facilities and Visitor Use Study Requests proposed by the National Park Service and U.S. Forest Service, which asked City Light "to evaluate recreation sites managed by City Light, NPS, and USFS that are within the Project Boundary or in the vicinity of the Project Boundary." SCL adopted some of these as part of the PSP. For instance, City Light states in the PSP that it has included "non-Project recreation facilities on Ross and Diablo lakes that provide direct access to Project reservoirs", while other non-recreation sites proposed by NPS were not included.</p> <p>The reservoirs did not exist before the Project, and with them has come increased recreation, which impacts areas other than those directly surrounding the reservoirs. As stated in previous filings, Nlaka'pamux traditional territory includes portions of the North Cascades on both sides of the U.S.-Canada border, including the Ross Lake area. During the current license, and as part of the settlement agreement reached with City Light in 1993, Nlaka'pamux surveyors conducted a traditional cultural property</p>	Please see comment response ARTU-C06.

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							<p>survey in the Ross Lake area, revealing sites that are eligible for listing on the National Register of Historic Places.</p> <p>NNTC urges City Light to include in the Revised Study Plan the sites/areas proposed by NPS in the Ross Lake Reservoir Recreation Area that are not already part of the PSP. These studies are necessary for learning which recreation impacts are Project-induced and therefore for understanding the effects of Project-induced recreation on sites of significance to NNTC.</p> <p>The sites requested by NPS in the Ross Lake area are: Ross Lake reservoir-19 lake-side campsites, Hozomeen Campground, Winnebago and Hozomeen Boat Launches, and Ross Lake Resort Ross Dam Trail, East Bank Trail, Panther Creek Trail, Happy Panther Trail, Lightning Creek Trail, Devil's Dome Loop Trail, Desolation Peak Trail, Little Beaver Trail, Big Beaver Trail, Hozomeen Viewpoint Trail, Hozomeen Lake Trail, and Pacific Northwest Scenic Trail.</p>	
398.	Nlaka'pamux Nation Tribal Council	03/08/2021	pp. 4-5	NNTC-C09	Section 6.2.20	RA-01	<p>City Light provides several reasons for not studying these sites. First, SCL states that the study requests “do not provide sufficient evidence of Project-related effects to recreation resources for those sites located outside of the Project Boundary” Second, the requests “do not identify methods in which a study could reasonably ascertain Project-related effects from non-Project related effects.” Finally, City Light contends that, for “those located within the Project Boundary, these sites are not City Light Facilities, nor are they FERC-approved facilities.”</p> <ul style="list-style-type: none"> <li>▪ With respect to the study requests not providing evidence of Project-related effects to recreation resources, NPS stated during the PSP meetings that the purpose of the studies is to determine which recreation is Project-induced. While not all recreation may ultimately be determined to be Project-induced, there is sufficient nexus to conduct the study, particularly because it could inform license requirements, management plans, and other joint management efforts among all those with jurisdiction.</li> <li>▪ Regarding SCL's argument that the study requests do not identify methods to ascertain Project-related effects from non-Project related effects, the proposed questionnaires contain questions about whether the visitors chose to recreate in the area on or around the reservoirs and to use a boat-in campsite, as well as questions regarding what the person's primary activity was. This approach is sufficient to determine why people are drawn to the area.</li> <li>▪ Finally, whether the facilities are run by SCL or are FERC-approved may be one consideration relevant to deciding whether the recreation is Project-induced, but is not determinative—if the question is why a person chooses to recreate in an area and if that person is drawn in by the reservoir, the agency managing the facility is not the only relevant consideration.</li> </ul> <p>Determining which recreation activities are Project-induced is crucial to the development of inter- agency management plans to protect cultural resources. NNTC is willing to have a site-by-site discussion regarding the sites in the Ross Lake Area requested by NPS, if it would assist SCL in determining whether to include these sites in the Revised Study Plan.</p>	See comment response ARTU-C06.
399.	Nlaka'pamux Nation Tribal Council	03/08/2021	p. 5	NNTC-C10	Section 6.2.20	RA-01	<p>In the PSP, City Light recognizes NNTC's concern that “important and culturally-sensitive resources could be affected by a number of activities” – such as erosion, recreation, and trail maintenance. While City Light questions which of these activities are Project-related— “some...are potentially Project-related, such as shoreline and reservoir erosion, while others are not clearly Project-related, like recreation and trail maintenance in higher elevations above the drawdown and outside of the APE on land</p>	City Light believes the cultural resources studies included as part of the RSP will identify potential resource impacts within the APE.

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							managed by the NPS”— effects to culturally significant sites will continue to occur during the next license, and it is critical that the studies obtain data on the extent of the Project-induced recreation impacts.	
400.	Nlaka’pamux Nation Tribal Council	03/08/2021	pp. 5-6	NNTC-C11	Section 6.2.20	RA-01	During the cultural resources studies discussed above (CR-02 and CR-04), SCL will carry out its obligation to identify cultural sites and traditional cultural properties, and in doing so enable the Commission to fulfill its obligations under the National Historic Preservation Act (“NHPA”) and National Environmental Policy Act (“NEPA”). Understanding the scope of Project effects on those resources during the next license will require an inter-disciplinary approach by City Light, which City Light acknowledges. The recreation activities have a nexus to the Project sufficient to approve the study request: the reservoirs, which were created by the Project, unquestionably draw recreation to the Project area that would not otherwise exist.	City Light believes the combination of the RA-01 Recreation Use and Facility Assessment Study and the cultural resources studies proposed in the RSP will inform the analysis of Project effects on cultural and recreational resources.
401.	Nlaka’pamux Nation Tribal Council	03/08/2021	p. 6	NNTC-C12	Section 6.2.20	RA-01	As for the recreation impacts, the Commission’s Scoping Document 2 added Project-related recreation impacts on traditional cultural properties and cultural sites. The Commission will therefore need data on which recreation impacts on cultural resources are Project-related to prepare its NEPA analysis. The same information will assist the Commission in ensuring it meets its obligation under the NHPA. The PSP language and several statements made by staff during the PSP meetings indicate that City Light acknowledges that at least some recreation activities have a nexus to the Project (“A collaborative effort that crosses jurisdictional and agency boundaries is desired in order to protect the resources over the long term and mitigate effects resulting from City Light activities caused by power generation, recreation, and maintenance of recreation facilities.”). The question to be answered during these studies is which recreation activities—in addition to those already accepted by City Light—are Project-induced.	Please see comment response NNTC-C11.
402.	Nlaka’pamux Nation Tribal Council	03/08/2021	p. 6	NNTC-C13	Section 6.2.20	RA-01	If the Commission were to approve the study plan without the NPS recreation study requests, the Commission would not satisfy its NEPA and NHPA requirements. As the Commission staff who attended the PSP meetings in January and February are aware, there is a disagreement about whether these recreation studies have a nexus to the Project and how nexus is defined. The results of these studies are needed to understand which recreation is Project-induced, which will in turn determine which recreation impacts on cultural resources is Project-induced.	Please see comment response ARTU-C06.
403.	North Cascades Institute	03/08/2021	p. 4	NCI-C03	Section 6.2.20	RA-01	<b>Recreation and Aesthetics.</b> North Cascades Institute supports the National Park Service (NPS) and United States Forest Service (USFS) submitted requests to study the effects of Project-induced recreation on sites within and outside of the Project boundary. The Licensee does not propose to adopt the core elements of these study plans. The Institute supports NPS and USFS request that the Licensee’s RA-01 Recreation Use and Facility Assessment (Recreation Assessment) Study Plan be adapted to include study of federally managed recreation sites within and adjacent to the Project boundary. The study requests from NPS and USFS seek an analysis of the effects of Project-induced recreation use on these sites. Site ownership does not preclude licensees from taking responsibility for necessary studies.  North Cascades Institute agree with the caucus that ownership does not determine the nexus between the Project and recreation use, and we maintain that there is a clear nexus between the presence of the Project and recreation use both within and adjacent to the Project boundary. Several Project features, including the reservoirs, directly attract recreation use at developed campgrounds, boat-in campsites, trails, overlooks, and day-use sites. For this reason, we ask that the Licensee adapt its Recreation Assessment study plan to include all requested sites. This data will serve to inform the Commission’s analysis under the National Environmental Policy Act (NEPA) to determine the extent of recreation effects, existing use, and future demand.	Please see comment response ARTU-C06.

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404.	Upper Skagit Indian Tribe	03/08/2021	p. A110	USIT-C105	N/A	RA-03 Section 2.4	<b>Project Operations and Effects on Resources.</b> Lighting also has the potential effect to cultural resources and like RA-04, results of this study could inform cultural resource studies CR-01 and CR-04 and the preliminary assessments of effect to be prepared as part of them.	The analysis of potential effects will occur as part of the Draft License Application.
405.	Upper Skagit Indian Tribe	03/08/2021	p. A110	USIT-C106	N/A	RA-03 Section 2.6	<b>Methodology.</b> Consultation with the USIT could also inform any consideration of historic values, as these are referenced in the Response to question #26 in Appendix A Table 1.0 (PSP)	City Light welcomes the Upper Skagit Indian Tribe's input on historical values that may be affected by lighting. City Light will also use existing documented information and/or consult with Cultural Resources staff to determine the historic values of the luminaire. City Light will take historic values and lighting needs into consideration of illumination reduction measures to minimize the impact of light.
406.	Upper Skagit Indian Tribe	03/08/2021	p. A111	USIT-C107	N/A	RA-04	USIT recommends that RA-04 should be modified to increase the data collection season in order to capture low recreation level ambient sound and to collect data for use in Sec. 106 assessments of effect to historic properties.	Please see comment response NPS-C68.
407.	Upper Skagit Indian Tribe	03/08/2021	p. A111	USIT-C108	N/A	RA-04 Section 2.6	<b>Methodology.</b> Given that a goal of this study is to inform cultural resources investigations and that cultural resources are potentially affected by the project acoustic environment (sections 2.2 and 2.4), the methodology needs to incorporate a step or procedure to assure that sound data from the study is made available for use in Sec. 106 assessments of effect to historic properties. Page 2-3.  The USIT agrees with the goals of the study, including the collection baseline information to inform cultural studies and to assess project effects to historic properties, as noted in sections 2.1 and 2.2 on page 2-1. Acoustics introduced by project operations potentially affect traditional cultural properties of the USIT. However, nowhere in the methodology, or elsewhere in the proposal is there a procedure or step that fosters the goal for sound data to be useful to cultural studies and Sec. 106 assessments. Is the study designed in collect acoustic data amenable to cultural resources assessments? If so, this should be brought forward.	City Light will provide the RA-04 Project Sound Assessment raw data to the Upper Skagit Indian Tribe.
408.	Upper Skagit Indian Tribe	03/08/2021	pp. A111-A112	USIT-C109	N/A	RA-04 Section 2.6.3.1	<b>Ambient Noise Measurements (Long-term).</b> On p. 2-4 City Light states:  "Measurements will occur during the summer to coincide with the highest recreation levels and minimize the adverse effects of meteorological conditions (rain, wind) which can adversely affect noise measurements."  Another measurement period is recommended that coincides with lower recreation levels to maximize other seasonal conditions. The pre-hydro project natural and traditional acoustic character of the Project area was dominated by the sounds of the Skagit River flowing in its channel, by tributary flows, by waterfalls, and by meteorological conditions and events. Ambient sound relates to USIT's interest in assessing soundscape changes to the historic use and character of its traditional cultural places and resources (including fish, animals, plants, spirits, songs, stories), beginning with hydro development of the Skagit River.  The methodology proposes that ambient sound is to be measured for a 7-day period during high recreation periods so as to avoid meteorological conditions. Ambient sound in the project sound assessment area (Attachment B) is important to the USIT, and this includes during times of the year coinciding with the lowest recreation levels and meteorological conditions. It's recommended that an additional period be added to measure low-recreation level ambient sound. This would assist the USIT in assessing the historic character of its traditional cultural landscapes and resources (including fish, animals, plants, and spirits).	Please see comment response NPS-C68.

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409.	U.S. Forest Service (USFS)	03/08/2021	pp. 1-31	USFS-C01	Section 6.2.20 (USFS-01)	RA-01	<i>See NPS-C30 thru NPS-C61 comments for the identical comments.</i>	See comment responses to NPS-C30 – NPS-C61.
<b>Terrestrial Resources (Including Terrestrial-Related Erosion and Geologic Hazards)</b>								
410.	North Cascades Institute	03/08/2021	p. 5	NCI-C06	N/A	N/A	<b>Wildlife.</b> There is continued need to study how to maintain and protect the wildlife and recreation lands purchased by the Licensee under the provisions of the current license. This includes those lands that were selected outside of the project boundary because they constituted the most effective way to achieve mitigation for ongoing environmental impacts.	City Light believes that existing data and the information that will be forthcoming from the proposed studies will be sufficient to analyze the potential effects of management actions on the wildlife mitigation lands for the purposes of complying with NEPA or ESA—and these documents can be supplemented or amended if conditions or actions change substantially.  City Light has agreed to develop a management plan for wildlife habitat lands in collaboration with the LPs.
411.	Sauk-Suiattle Indian Tribe	03/08/2021	pp. 4-5	SSIT-C12	Section 6.3.16 (SSIT-02)	GE-02	<b>GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Corridor Study.</b> The Sauk-Suiattle Tribe submitted a study request for an analysis of habitat conditions at stream crossings in the Transmission Line Corridor for the Skagit, Sauk, and Stillaguamish River basins (SSIT-03 Impacts of Transmission Line Right of Way (ROW) on Aquatic Habitat and Riparian Zone for the Skagit River Hydroelectric Project). SCL has agreed to include SSIT-03, in part, in study GE-02. The Tribe wants to make sure that this study is intended to include all stream crossings from the Skagit Project to the Bothell Substation. Recovery of ESA listed species is on a Puget Sound wide basis and the Tribe has an interest in Transmission Line Corridor impacts in basins outside of the Skagit Basin and Stillaguamish Basin. Through further discussion in the PSP meetings, it is our understanding that SCL will include in the RSP:  <ul style="list-style-type: none"> <li>▪ Inventory all road crossings, including update of GPS locations</li> <li>▪ Field verify fish-use potential (physical criteria - width &gt; 2', gradient &lt; 20% for 160 m)</li> <li>▪ Compile all maintenance records for crossings</li> <li>▪ Update all data existing data older than 5 years</li> <li>▪ Assessments following WDFW 2019 guidelines <ul style="list-style-type: none"> <li>• Level B culvert analysis</li> <li>• Non-culvert crossings (chapter 4) and miscellaneous obstructions (chapter 6)</li> </ul> </li> </ul>	GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study will include all stream crossings within the Project Boundary including the entire transmission line ROW.  The study plan includes: <ul style="list-style-type: none"> <li>▪ Inventory all road crossings, including update of GPS locations</li> <li>▪ Field verify fish-use potential (physical criteria – scour width &gt;2 feet, gradient &lt;20 percent)</li> <li>▪ Compile available maintenance records for crossings</li> <li>▪ Update fish passage data that is older than 5 years</li> <li>▪ Assessments following WDFW 2019 guidelines <ul style="list-style-type: none"> <li>• Level B culvert analysis as appropriate</li> <li>• Non-culvert crossings (chapter 4) and miscellaneous obstructions (chapter 6).</li> </ul> </li> </ul>
412.	Sauk-Suiattle Indian Tribe	03/08/2021	p. 5	SSIT-C13	Section 6.3.16 (SSIT-02)	GE-02	The Sauk-Suiattle Tribe also included a feasibility analysis for moving towers within CMZs out of the CMZs in their study request. SCL has declined to include this portion of SSIT-03 in GE-02 stating that it was a request for a PME and not the right time in the ILP process to make that request. The feasibility analysis would provide the necessary information to develop a PME for moving towers out of CMZs and thereby reducing project impacts on fish habitat. The Tribe requests SCL include feasibility analysis for moving towers in CMZs in the RSP. If SCL decides not to include the feasibility analysis the Tribe requests FERC include it in the Final Study Plan determination.	City Light continues to believe that a feasibility analysis for moving towers within channel migration zones (CMZ) is appropriate to include as part of PME or management plans which will be developed in collaboration with LPs.
413.	Skagit County Board of Commissioners	03/03/2021	p. 2-3	SCBC-C01	Section 6.3.12 (SC-02)	N/A	<b>Skagit County's Mitigation Lands Study Request Is Required By The Federal Power Act and NEPA To The Extent Seattle's Opportunistic Mitigation Land Acquisition Activity Is To Continue.</b> Since 1995, Seattle City Light ("Seattle") has purchased approximately 3,300 acres of land in Skagit County as principal mitigation for the Project's fisheries impacts. Availing itself of its right as a municipal entity under state law to remove mitigation land from local tax rolls, Seattle has resultantly	To clarify, the 3,300 acres of land purchased in Skagit County are not part of the Skagit River Hydroelectric Project license. Nonetheless, they are an important component of the shared strategy by Skagit County, WDFW, and Tribes to protect and restore salmon habitat in the basin. These

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							<p>shifted a nearly \$4 million property tax burden to other landowners in Eastern Skagit County. Much of the mitigation land was already effectively protected from development through local zoning and other environmental regulations, and Seattle's land acquisition program, from our perspective, has furnished marginal benefit to fisheries. It is also worth observing that much of the land Seattle has acquired is zoned for productive agriculture and forestry. We note that Skagit County government did not consent to Seattle's mitigation lands acquisition program in the first place.</p> <p>Seattle's mitigation land acquisition program has effectively allowed Seattle to avoid the much-higher level of salmon investment imposed on other hydroelectric operators around the Pacific Northwest that have been licensed by the Commission since 1995, with Seattle spending a mere \$12 million on its mitigation land/ habitat program since 1995, equating to \$16k/mW on the 711 mW Skagit Project - approximately 37 times less than the regional average of \$623,911, and approximately 59 times less than the \$1 million/mW that Puget Sound Energy was required to spend on the Baker River system pursuant to its 2008 FERC license, which Skagit County citizens are repaying through our local power rates. [See, Dam FERC License Spending Comparison, attached to letter] It is in light of this vast discrepancy in financial commitment to resource protection that we ask the Commission to consider Seattle's response to the license participants' study requests with reference to 18 C.F.R. § 5.9(b)(7).</p> <p>Since Seattle's last Project license, three Skagit anadromous species (Chinook, Steelhead, Bull Trout) as well as Southern Resident Killer Whales (SRKW) have been listed under the U.S. Endangered Species Act, with other species trending toward ESA listing and fishery closures increasingly the norm.</p> <p>Skagit County and its citizens have done a tremendous amount to shoulder our share, bearing the intertwined burden of regulations that heavily impact farming and forestry; locally- funded habitat improvement; and the large-scale conversion of the productive land base, all in the interest of anadromous species restoration. This is in addition to the unacceptably inequitable contribution to anadromous species restoration now being repaid through our local power rates. From our perspective, it should not be the case that our own local power utility, Puget Sound Energy, is contributing 59 times as much to Skagit salmon as Seattle, and it is extraordinarily difficult to see environmental justice in this ratio.</p> <p>In light of the foregoing, it is squarely in our community's interest to ensure that all Skagit River system hydroelectric operators are contributing equitably to our collective fisheries and Treaty rights obligation. We believe that mitigation pursued to that end must demonstrably achieve beneficial results, in order to serve our collective interest in protecting Skagit fish and Skagit farms.</p> <p>In the course of the current FERC relicensing process, Seattle made clear to us its intention to continue purchasing Skagit Valley land as its principal fisheries mitigation strategy under the next license. Accordingly, on October 23, 2020, Skagit County filed a Mitigation Lands Study Request with the Commission, seeking to analyze whether Seattle's mitigation land acquisitions are generating benefit to fisheries that would justify the other costs and burden to our community, with an eye toward informing any potential future acquisitions. We established the proposed study's need and nexus in a manner fully consistent with 18 C.F.R. § 5.9. Seattle summarily rejected our mitigation lands study request, failing to explain the basis for its rejection as required by 18 C.F.R. § 5.11(b)(4).</p>	<p>lands were purchased as part of a City Light program known as the Early Action Program and intended to develop and complete research, conservation land acquisition, and habitat restoration projects in the Skagit and Tolt river basins to support the recovery of listed fish species. The lands purchased by City Light under this Early Action Program in the Skagit basin were selected using the Skagit River Protection Strategy which was developed by the Skagit Watershed Council (SWC)—which counts Skagit County, the Upper Skagit Indian Tribe, Skagit River System Cooperative, and multiple other Skagit County organizations as members. See <a href="https://www.skagitwatershed.org/wp-content/uploads/SWC-2017-Protection-Strategy-Update_Final.12.7.2017.pdf">https://www.skagitwatershed.org/wp-content/uploads/SWC-2017-Protection-Strategy-Update_Final.12.7.2017.pdf</a>.</p> <p>The Protection Strategy is based on a map of all riparian properties in the basin and rates their potential to contribute to salmon production using a formula that accounts for existing salmon habitat conditions, restoration potential, protection status, and adjacent land ownership. Properties are reviewed by the SWC Protection Committee, which includes members of WDFW, Skagit River System Cooperative, and the Skagit Land Trust; parcels that are not highly ranked are not purchased. The SWC Board of Directors, which, until very recently included a Skagit County Council member as Chair, is fully aware and supportive of all purchases made for salmon habitat protection in the basin, including those by City Light.</p> <p>As was pointed out in the response to the PDR from Skagit County, the fisheries mitigation program in the current Skagit license includes: (1) the Flow Program, which is intended to mitigate the impacts of daily and seasonal downstream flow fluctuations on salmon spawning, incubating, and rearing in the Skagit River downstream of the Project; and (2) the Non-flow Plan which establishes City Light's commitment to provide funding for steelhead production, Chinook research, off-channel chum habitat development and improvement, instream or off-channel fish habitat development and sediment reduction, and provisions for a resident trout protection and production program.</p> <p>The Flow Program has clearly benefited fish as 43 percent of all salmon returning to Puget Sound spawn in the 20-mile reach below the Skagit</p>

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							<p>To the extent that Seattle intends to continue opportunistically buying Skagit Valley land as principal mitigation for its fisheries impact under the next license, the Commission must require consideration of whether another 50 years of Seattle's fisheries mitigation strategy, now 25 years old, is a sound idea when all environmental costs and benefits are rationally considered. As we have previously commented, this analysis is also required by the National Environmental Policy Act. See, 42 U.S.C. 4332(8).</p> <p>If Seattle is not intending to continue its mitigation land acquisition program under the next FERC license, then we concede that our mitigation lands study request is unnecessary and agree that concerns as to existing Seattle mitigation lands can be appropriately dealt with through a management plan incorporated in a Settlement Agreement. In other words, a mitigation lands study is only necessary to the extent that Seattle intends to perpetuate the status quo under the next license.</p>	<p>Project, a percentage that has increased since the implementation of the current license. City Light currently owns and manages 290 acres of fish habitat that were acquired or restored solely with funding from the Non-flow Program under the current Skagit River Project license. These parcels are all considered highly rated for salmon production in the Skagit River Protection Strategy and their adjacency with other conservation properties in the basin make them particularly valuable.</p> <p>The total cost of the Fisheries Program, as reported in the Environmental Assessment (EA) for the License Order (FERC 1995), is \$30,068,104 (1990\$) or an equivalent of \$65,001,468 in 2020\$.</p> <p>City Light does not view comparisons to the Baker River license fish mitigation costs as relevant to relicensing the Skagit River Project. Puget Sound Energy has a residential customer base of 1,000,000, more than double that of City Light's.</p> <p>Land acquisition for fish and/or wildlife mitigation under the next license is unknown and will be determined in consultation with LPs. The Early Action Program is funded on an annual basis by Seattle City Council and is not part of the relicensing process.</p>
414.	Stillaguamish Tribe of Indians	03/08/2021	p. 2	STI-C01	N/A	GE-02 Section 2.2	<b>GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Proposed Study Plan</b> <b>Section 2.2 Resource Management Goals.</b> The Stillaguamish Tribe's resource management goals align with those of the Upper Skagit Indian Tribe and request that this be reflected in this section of the proposed study plan.	LP's resource management goals are included in the record, and City Light feels it's appropriate to cross-references those goals, rather than include them in the study plans.
415.	Stillaguamish Tribe of Indians	03/08/2021	p. 2	STI-C02	N/A	GE-02 Section 2.4	<b>Section 2.4 Project Operations and Effects on Resources.</b> Unclear what Best Management Practices are currently used and are they not being followed?	Available City Light road maintenance records will be compiled as part of the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study which will provide information on current practices.
416.	Stillaguamish Tribe of Indians	03/08/2021	p. 2	STI-C03	N/A	TR-01 Section 2.1	<b>TR-01 Vegetation Mapping Proposed Study Plan.</b> <b>Section 2.1 Study Goals and Objectives.</b> The National Vegetation Classification system methodology used does not include estimating forest stand-age, current seral-stage is critical for understanding remaining stand development potential.	The National Vegetation Classification (NVC) system does not include stand age, including mapping completed by the NPS. The TR-01 Vegetation Mapping Study includes LiDAR-derived tree height, which is a good proxy for stand age. These data will be available with map data.
417.	Stillaguamish Tribe of Indians	03/08/2021	p. 2	STI-C04	N/A	TR-01 Section 2.2	<b>Section 2.2 Resource Management Goals.</b> Studies should lead to an understanding of potential riparian condition at some Desired Future Condition.	Riparian data from Gorge Powerhouse to the confluence with the Sauk River will include LiDAR-derived tree height and structural complexity statistics to inform future conditions. The TR-01 Vegetation Mapping Study will not determine Desired Future Conditions which are typically developed as part of a planning process.

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418.	Stillaguamish Tribe of Indians	03/08/2021	p. 2	STI-C05	N/A	TR-01 Section 2.3	<b>Section 2.3 Background and Existing Information.</b> The Stillaguamish Tribe has collected elk collar data along areas of the transmission line corridor and is willing to share GPS points on elk movement to provide information for this study.	City Light greatly appreciates the cooperation and looks forward to collaborating with the Stillaguamish Tribe of Indians to update the transmission line ROW management plan to incorporate wildlife habitat considerations.
419.	Stillaguamish Tribe of Indians	03/08/2021	p. 2	STI-C06	N/A	TR-01 Section 2.5.9	<b>Section 2.5.9 Develop Draft and Final Vegetation Map.</b> It is not clear in the list of specific study products if the GIS-based map of vegetation at group or cultural group level within the study area includes quantifying the area (acreage) for each vegetation group or cultural group. Quantifying the area of each vegetation at the group or cultural group level provides the baseline information needed for assessing the area of current vegetation community conditions and the impacts associated to those vegetation communities with the project boundary. This will inform the development of the vegetation management plan for the transmission line ROW and future protection, mitigation and enhancement measures.	Mapping polygons are completed at the Group level and includes the co-dominant canopy species. Data is being collected at sampled polygons for shrub and ground cover.  Thus, typical understory and ground cover species associated with a Group will be available.  Acreage of each type will be summarized by geographic areas of the study area (e.g., within RLNRA, along Skagit River, etc.). City Light looks forward to working with LPs to present data in a useful manner.
420.	Stillaguamish Tribe of Indians	03/08/2021	p. 3	STI-C07	N/A	TR-02 Section 2.1	<b>TR-02 Wetland Assessment Proposed Study Plan</b> <b>Section 2.1 Study Goals and Objectives.</b> Bullet #7- The Tribe requests that in addition to the basic habitat-related data to be collected during wetland assessments that data is also collected on whether or not the wetland being assessed is connected to fish-bearing water and/ or surface water is connected to a fish-bearing water body.  Collecting this data is critical to understanding Project related impacts to wetlands and informing future protection, mitigation and enhancement measures.	Washington State hydrology data layers have been merged with City Light's wetland data to identify potential fish access to wetlands via streams and other waterbodies. In addition, the 2-D hydraulic model being developed for instream flow studies (FA-02 Instream Flow Model Development Study/FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study) will be used to assess hydraulic connection of off-channel habitat in the Skagit River floodplain as described in GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study.
421.	Stillaguamish Tribe of Indians	03/08/2021	p. 3	STI-C08	N/A	TR-02 Section 2.4	<b>Section 2.4 Study Area.</b> The Tribe assumes the study area, which is defined as the Project Boundary (referencing map 2.4-1) includes the entire transmission line corridor all the way to the terminus at the Bothell substation.  Wetlands located within the transmission line corridor need to be mapped and assessed as wetlands provide significant cultural, fish and wildlife resources for the Tribe. Therefore impacts of the Project on associated wetlands need to be assessed throughout the entirety of the project boundary.	All wetlands along the transmission line are being mapped. Wetlands that are potentially affected by City Light vegetation management or other actions have been rated according to Ecology's Western Washington system. Wetlands not affected by the Project, on private farmland, for instance, were not rated.
422.	Stillaguamish Tribe of Indians	03/08/2021	p. 3	STI-C09	N/A	TR-02 Section 2.5.4	<b>Section 2.5.4 Develop Disturbance Potential Overlay for Study Area.</b> Define the criteria used to identify the areas that are potentially affected by the Project's operation and maintenance and Project related recreational activities will be identified. It is unclear how the wetlands will be identified to determine if they are affected by the Project's operations and maintenance activities.  Having a clear understanding of which wetlands will be identified for their potential to be affected by the Project's operations is critical to understanding the impacts of the Project on wetlands and informing future protection, mitigation and enhancement measures.	Potential Project-related disturbances may include areas of hydraulic modifications and influence, vegetation management, Project-related recreation sites, soil excavation/compaction, and study roads. City Light commits to sharing a draft map of the potentially affected areas overlain on the preliminary wetland map as a study product.
423.	Stillaguamish Tribe of Indians	03/08/2021	pp. 3-4	STI-C10	N/A	TR-02 Section 2.5.5	<b>Section 2.5.5 Conduct Field Data Collection of Wetlands Potentially Affected by the Project in the Study Area.</b> Define the criteria used to determine which wetlands will be assessed in the areas near project activities. It is unclear how it will be	Accessible wetlands within areas of potential Project-related disturbance will be visited for field data collection including functional analysis. These areas are defined in comment response STI-



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							determined which wetlands will undergo a functional analysis using the Wetland Rating System for Western Washington.  Having a clear understanding of which wetlands undergo a functional analysis is critical to understanding the impacts of the Project on wetlands and informing future protection, mitigation and enhancement measures.	C09. Potential Project-related disturbance areas have been clarified in the TR-02 Wetland Assessment Study Plan in Section 2.5.4.
424.	Stillaguamish Tribe of Indians	03/08/2021	p. 4	STI-C11	N/A	TR-04 Section 2.6.2	<b>TR-04 Invasive Species Proposed Study Plan Section 2.6.2 Prioritize Survey Locations.</b> The fourth bullet; surveying areas with active vegetation management in the transmission line ROW and within a 50ft buffer, should also include an emphasis on surveying riparian vegetation condition along fish-bearing streams.  Understanding the composition (invasive and native species) of riparian areas along fish-bearing streams as they intersect with the transmission line ROW is important in assessing the impacts of vegetation management prescriptions on riparian condition and function and will inform future protection, mitigation and enhancement measures.	City Light's intent is to include riparian areas within the ROW and 50 ft buffer. The following clarifying bullet was added to the TR-04 Invasive Plants Study Plan: "Riparian areas within the transmission ROW and 50 ft buffer." In addition, GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study will note vegetation characteristics at stream crossings in the ROW and TR-01 Vegetation Mapping and TR-02 Wetland Assessment will provide descriptive information for vegetation.
425.	Stillaguamish Tribe of Indians	03/08/2021	p. 4	STI-C12	N/A	TR-09 Section 2.1	<b>TR-09 Beaver Habitat Assessment Proposed Study Plan Section 2.1 Study Goals and Objectives.</b> The second objective should be changed to include a physical survey for beaver habitat and active beaver territories along the entire transmission corridor. Relying on known observations provided by other entities or based on past site visits is a good start, but is not sufficient for identifying where beaver occur over the entire study area.  Documenting beaver occurrence throughout the study area is critical to understanding the Project's impacts to beaver habitat and occurrence and informing future protection, mitigation and enhancement measures.	The transmission line ROW is included in the study area. City Light has clarified text in TR-09 Beaver Habitat Assessment Study Plan to indicate that beaver sign and habitat will be documented during relicensing studies, including TR-01 Vegetation Mapping, TR-02 Wetland Assessment, TR-03 RTE Plants Study, TR-04 Invasive Plants Study, and GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study and fish and aquatics studies. The Study Area section was also revised to clarify areas covered.
426.	Stillaguamish Tribe of Indians	03/08/2021	p. 4	STI-C13	N/A	TR-09 Section 2.1	The third objective of habitat suitability mapping should incorporate the entire transmission line corridor and should identify areas for current and future management of beaver territories as well as areas suitable for connectivity for successful dispersal.  Understanding potential available beaver habitat along the entirety of the Project Boundary is critical to understanding the Project's impacts to beaver habitat availability and connectivity and informing future protection, mitigation and enhancement measures.	Please see comment response to STI-C12. City Light believes that results from the TR-09 Beaver Habitat Assessment along with TR-01 Vegetation Mapping, TR-02 Wetland Assessment, TR-03 Rare, Threatened, and Endangered Plants Study, TR-04 Invasive Plants Study, and GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study will inform management priorities and PMEs.
427.	Stillaguamish Tribe of Indians	03/08/2021	pp. 4-5	STI-C14	N/A	TR-09 Section 2.2	<b>Section 2.2 Resource Management Goals.</b> Resource management goals should include the entire transmission line corridor. If the project area was expanded to include the transmission line, will beaver habitat potential be considered within 2 miles of the transmission line corridor?  Beaver dispersal can occur within 2 miles of occupied habitat, so understanding beaver habitat potential in proximity to the Project's transmission line corridor is important in assessing the Project's impacts to beaver habitat and connectivity.	The TR-09 Beaver Habitat Assessment study area includes the transmission line ROW plus a 2-mile buffer for the Beaver Intrinsic Potential mapping (beaver habitat assessment). City Light clarified the study area extent in Section 2.5 of the study plan.
428.	Stillaguamish Tribe of Indians	03/08/2021	p. 5	STI-C15	N/A	TR-09 Section 2.2	Snohomish County should be added to the agencies list and their critical areas regulations around beaver management be included since the Project's transmission line corridor passes through Snohomish County.	Snohomish County was included in the TR-09 Beaver Habitat Assessment Study Plan, Section 2.2.
429.	Stillaguamish Tribe of Indians	03/08/2021	p. 5	STI-C16	N/A	TR-09 Section 2.3	<b>Section 2.3 Background and Existing Information.</b> The study area should include the transmission line into Snohomish County, and therefore this section should cover more than just the Skagit River watershed. In terms of the Stillaguamish watershed	Please see comment response STI-C12 regarding inclusion of transmission line ROW. City Light has modified text in TR-09 Beaver Habitat

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							there are documented beaver territories and historic habitat so the word anecdotal is not appropriate for the entire region.	Assessment Study Plan, Section 2.3 to remove the word "anecdotal" and to indicate that Indian tribes have knowledge of beaver territories and historic areas in the Skagit, Sauk, and Stillaguamish rivers and tributaries.
430.	Stillaguamish Tribe of Indians	03/08/2021	p. 5	STI-C17	N/A	TR-09 Section 2.3	The use of beaver dam analogs (BDAs) should be added as a management tool. BDA's could be useful in assisting beavers with dispersal and recolonization and mitigating the impacts to beaver resources as a result of the Project. The use of BDA's to support beaver dispersal and recolonization is well documented in the literature.	Information on BDAs being a potential management tool in certain situations has been added to Section 2.3 of the TR-09 Beaver Habitat Assessment Study Plan.
431.	Stillaguamish Tribe of Indians	03/08/2021	p. 5	STI-C18	N/A	TR-09 Section 2.4	<b>Section 2.4 Project Operations and Effects on Resources.</b> The assessment of the Project's operations on the effects on resources should include impacts to beaver habitat (occupied or unoccupied) along the entirety of the transmission line corridor.  A lack of documentation of beaver distribution being adversely affected by the project doesn't mean that adverse effects do not exist. Adverse impacts also need to be considered for the entire transmission line corridor.  Understanding the effects of the Project on beaver habitat and occurrence is important in determining future protection, mitigation and enhancement measures.	Please see comment response STI-C12 regarding coverage of the transmission line ROW.  TR-09 Beaver Habitat Assessment Study Plan includes additional discussion of potential O&M effects on beaver habitat.  City Light has revised text in the study plan to indicate use of this study, along with other relicensing studies, to assess beaver habitat issues and PMEs along reservoir/river shorelines and along the transmission line.
432.	Stillaguamish Tribe of Indians	03/08/2021	p. 5	STI-C19	N/A	TR-09 Section 2.5	<b>Section 2.5 Study Area.</b> Figure 2.5-1 seems to indicate the entire transmission line as part of the project area so previous sections of the document should assess the Project's impacts to beaver habitat and occurrence for the entire transmission line corridor.	TR-09 Beaver Habitat Assessment Study Plan has been updated.
433.	Stillaguamish Tribe of Indians	03/08/2021	p. 6	STI-C20	N/A	TR-09 Section 2.6.1	<b>2.6.1 Evaluate Existing Conditions and Management Activities at Off-Channel Habitat Areas.</b> The evaluation of existing conditions and management activities should occur over the entire project area; including the transmission line corridor.	Please see comment response STI-C12.
434.	Stillaguamish Tribe of Indians	03/08/2021	p. 6	STI-C21	N/A	TR-09 Section 2.6.1	Off-channel habitat areas will be wide ranging and it is unclear who will deem and/or what criteria will be used to determine which channels as important and to be maintained. It is not enough to rely on existing information when summarizing site details because beaver occupancy and recolonization of old habitat may have occurred since the last visit.	The off-channel habitats referenced in the TR-09 Beaver Habitat Assessment Study Plan, Section 2.6.1, are limited to the six off-channel habitat areas constructed during the current license and often referred to as "Chum channels": Newhalem and County Line Ponds; Taylor, Powerline, and Illabot spawning channels; and Park Slough. Habitat conditions at these channels will be evaluated by fisheries and aquatic resources specialists, and management will be determined by FCC/NCC as part of their discussions regarding the future viability and management objectives for the constructed Chum channels. If requested by the Fish and Aquatic Resources Work Group, beaver management specialists can assist with assessment of management actions. However, please see comment USIT-C121, where the Upper Skagit Indian Tribe indicates "USIT and other tribes and agencies of the NCC have enough existing information to assess conflicts at the Chum off channel sites...".  Please see response to comment STI-C12 for information on the extent of the study areas for TR-09.

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435.	Swinomish Indian Tribal Community	03/08/2021	pp. 10-12	SITC-C06	Section 6.3.14 (SITC-01)	N/A	<p><b>B. Swinomish Tribe Terrestrial Wildlife Connectivity Study Request- SITC-01.</b> The Swinomish Tribe's Study Request 1 was Reservoir Operation Impacts on Terrestrial Wildlife Connectivity. City Light argued that because the study request "did not provide evidence that the Project has an adverse effect on wildlife movement in the region," then there was no nexus under 18 CFR § 5.9(b)(5) (PSP 6-72). As a result, City Light's PSP rejected the study request. This was an arbitrary determination that relied on an unsupported application of the nexus requirement, essentially asking that the Tribe prove certain, direct adverse effects in its study request before City Light would include the study request to understand the Project effects on terrestrial wildlife connectivity. As described supra, FERC Criteria § 5.9(b) only requires that a proponent demonstrate that "potential effects" are reasonably likely to occur as a result of dam operations.</p> <p>SITC-01 easily meets the correct nexus standard. The Tribe provided ample support for the need to examine terrestrial wildlife connectivity. The Project reservoirs, along with the Environmental Learning Center, visitor facilities, boat launches and other facilities funded by City Light (City Light, PAD, pg. 3-31) provide recreation opportunities that promote a significant level of recreational use, especially during the summer months (City Light, PAD, pg. 4-279). Given well-established avoidance behaviors of wildlife, the reservoirs and associated recreation likely funnel wildlife towards SR 20, where project operations and traffic are concentrated, increasing vulnerability to mortality from vehicle traffic. Cumulatively, the three reservoirs, disturbance from recreation, climate change, Project operations and SR 20 transportation corridor may present an insurmountable barrier for some wildlife species and substantially inhibit others, effectively fragmenting what was formerly contiguous wildlife habitat (City Light, PAD, pg. 4-276 and pg. 4-396). These cumulative impacts likely disrupt population connectivity, contribute to genetic and demographic isolation and limit the recovery of several culturally significant wildlife species of concern. This demonstrates the requisite nexus under § 5.9(b) and the Commission's Guidance between Project operations and effects on wildlife movement in the Project vicinity.</p> <p>Multiple studies (Parks et al 2015 and Shirk et al 2010) identified water bodies as landscape features that diminish population connectivity for mountain goats. While water bodies were not identified as a complete barrier (as noted, mountain goats have been observed to cross water), or the most resistant landscape variable (such as agriculture or major highways), this does not support lack of adverse effect as suggested by the PSP. Additionally, human disturbance related to recreation has been identified as a high management concern for mountain goats by WDFW in the 1998 Game Status and Trend Report, but population monitoring of the East Ross Lake and Jack Mountain herds has not occurred since 2001, when a small number of individuals were recorded (eight adults and four kids) (WDFW 2001).</p> <p>As cited in the PSP, Aubry et al. (2016) documented wolverine movement east and north of Ross Lake and into British Columbia (PSP 6-71), but the area between RLNRA and suitable alpine and subalpine habitat west of the Project was not within the geographic scope of this research project. This research does not sufficiently address whether cumulative impacts of the Project are influencing wolverine population connectivity between RLNRA and conservation lands west of the Project (North Cascades National Park, Mount Baker-Snoqualmie National Forest).</p> <p>Long et al. (2013) did not find evidence of genetic structuring within the Project vicinity, but even in the case of a globally consistent response of a species to a landscape feature, the effect of that feature will only be detectable as genetic structure</p>	<p>As noted by the Swinomish Indian Tribal Community, and by City Light in the PAD, there are many factors that influence wildlife movement, including roads and waterbodies. Development, landscape features, slope and habitat quality also play a role, as does, undoubtedly, Project infrastructure. But influencing connectivity corridors is not the same as blocking the movements animals need to find food, breed or disperse.</p> <p>City Light agrees that resilient and robust wildlife populations are critical to functioning ecosystems and important public resources. However, City Light believes that the existing data, along with it's proposed studies included in the RSP, are sufficient to analyze Project effects on the target wildlife species and inform license conditions. City Light does not manage all recreation in the Project vicinity nor can it influence use of SR 20.</p> <p>City Light understands the LPs' desire for more information on wildlife in the vicinity of the Project to assist with management decisions. City Light will continue to fund relevant research under its Wildlife Grant Program in the current license. Data from those studies will be integrated into the relicensing process, as appropriate.</p> <p>City Light understands the general interest in mountain goat populations and the absence of recent data for the North Cascades. City Light will commit to helping with funding for a helicopter survey of mountain goats in cooperation with the NPS and WDFW. This survey would be conducted in 2021 or 2022. The data would be made available to the Indian tribes and others for management purposes. City Light believes that this can be accomplished outside the relicensing study program.</p>

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							<p>when the pattern of that landscape feature across the landscape is highly variable and strongly limiting gene flow (Cushman et al. 2011; Shortbull et al. 2011). The length of time before the impacts of a landscape feature on genetic connectivity can be detected as genetic structure also depends on the effective population size of the organism. Populations with large population size will take many generations before the negative impacts of a landscape feature can be detected as genetic structure (Landguth et al. 2010; Allendorf and Luikart 2007; Gauffre et al. 2008). Long et al. (2013) did detect a steep genetic gradient for black bears near Highway 2 (PSP 6-71), segmenting the population into a north and south cluster. This suggests that highways can negatively influence black bear population connectivity. Given that traffic volume on SR 20 is expected to continue to increase in step with increased recreation pressure during the spring, fall and summer months when black bears are active, SR 20 is likely to either be negatively influencing black bear population connectivity, or increasing risk of traffic mortality.</p> <p>While habitat within National Park Service’s (“NPS”) North Cascades National Park (“NCNP”) and the Ross Lake National Recreation Area (“RNLRA”) may not be uniformly suitable for mountain goats, historical records indicate that the area previously supported a much more robust population of an estimated 300 mountain goats between East Ross Lake and West Ross Lake in 1961 (Johnson et al. 1983). The Mount Baker area supports an increasing population of mountain goats west of the Project, and could potentially serve as a source for individuals immigrating into NCNP and RNLRA. The Tribe is requesting data to better understand the metapopulation dynamics of mountain goats found within the Project boundary, NCNP and RNLRA so that informed management decisions can be made to protect existing populations from local extirpation and ideally support a population increase. The information the Tribe requested in the SITC-01 is needed to inform the development of the Wildlife Habitat Protection and Management Plan by collecting data on wildlife abundance, movement corridors and seasonal movement patterns. It will also be used to develop Section 10(a), recommendations for license conditions, by the Tribe as well as recommendations and terms and conditions under appropriate sections of the FPA by other tribes, agencies and LPs, including the U.S. Fish and Wildlife Service (“USFWS”), which has conditioning authority relating to protection of wildlife species.</p> <p>Robust and resilient wildlife populations serve the public interest in intact native ecosystems, aesthetic appreciation and the recreation economy. There is also plainly a demonstrated need. There are not existing adequate data, and there are no other study requests addressing Project impacts on terrestrial mammals. In order to make informed management decisions regarding culturally significant and special-status species (mountain goat, American pine marten, Pacific fisher, gray wolf, grizzly bear, Canada lynx and wolverine), LPs, City Light, and the Commission need information about current population status and how animals are navigating the landscape to understand direct Project impacts and cumulative impacts (reservoirs, increasing recreation, climate change, Project operations and SR 20) on landscape-level population connectivity.</p> <p>The Tribe appreciates and acknowledges that City Light submitted an Issue Resolution Form in early February with a proposed path forward to address the rejected study plan. City Light contributes funding as part of the current license to the Wildlife Research Grants (“WRG”) program for wildlife research in the greater North Cascades ecosystem and suggested using that current license funding source to inform scientific understanding for the new license. After evaluating the available information from previously funded studies, we respectfully disagree that the</p>	

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							<p>available research sufficiently addresses our concerns regarding Project impacts on terrestrial wildlife. Specifically, there is no current research available evaluating the cumulative impacts of Project-induced effects from recreation, degraded riparian zone around the reservoirs, Project infrastructure, State Route 20 and climate change on wildlife connectivity between RLNRA and conservation lands west of the Project. We believe this information is necessary to inform the license application and license conditions, as well as the NEPA analysis.</p> <p>The scale of funding available, as well as certain restrictions on use of funds, within the WRG framework make this funding source a poor fit to gain the necessary data and information within the ILP timeline to address data needs. Thus, the study request should be included in the RSP.</p>	
436.	Swinomish Indian Tribal Community	03/08/2021	pp. 12-13	SITC-C07	Section 6.3.13 (SITC-02)	N/A	<p><b>C. Swinomish Tribe Mitigation Lands Access and Habitat Assessment- SITC-02.</b> The information the Tribe requested in the Tribe-02-Fish and Wildlife Mitigation Land Access, Stewardship and Habitat Assessment is needed to evaluate whether and the extent to which mitigation lands serve as replacement for the loss of access to high-quality, contiguous riparian habitat on federal lands. Management of the active drawdown zone commits contiguous, riparian habitat within federal lands, vital to tribes from time immemorial, to hydropower. This ongoing management of the drawdown zone prevents the establishment of natural riparian habitat and results in Project induced loss of access. Mitigation lands are intended to offset this loss, but tribes face increasing access challenges, and the suitability of mitigation lands to support culturally significant and special-status species, today and in the future, has not been evaluated. This demonstrates a clear, direct nexus between Project operations and effects on mitigation land habitat under § 5.9(b)(5). There is also a clear link to potential license conditions, which could include increased lands to offset loss of access, revised access conditions, and land management to improve resource availability on mitigation lands.</p> <p>The Tribe is pleased that, even though City Light rejected SITC-02, it submitted an Issue Resolution Form in early February as a path forward to develop a management plan during the ILP timeline. City Light agrees that the Tribe's management objectives should be considered on a parcel-by-parcel basis during the development of the management plan to maximize the benefit of wildlife mitigation lands to wildlife. TR-01 Vegetation Mapping Study, TR-02 Wetland Assessment and TR-04 Invasive Plants Study will identify dominant/co-dominant vegetation and regional environmental conditions, but all lack information about critical wildlife habitat features, such as brush piles, snags, forest age-structure, understory vegetation or forage species.</p> <p>We are pleased that City Light recognizes that additional habitat enhancement actions can be implemented in some areas. The Tribe expects that City Light will commit to active management and habitat enhancement during the development of the management plan, as well as provide a funding mechanism to facilitate active management, enabling wildlife mitigation lands to better support culturally significant and special-status species into the future. This alternative path forward will only work if City Light commits to perform the additional data collection about critical wildlife habitat features during the ILP timeline so that the license application can be informed with this data. If the LPs lack information about the current status of critical wildlife habitat and the potential of sites to support species of concern, it will be difficult to draft management objectives for each parcel. The Tribe maintains that the information outlined in the SITC-02 must be collected within the ILP timeline in order to inform a management plan that is actionable when the new license is issued as this is the</p>	<p>Over the current license City Light's land acquisition program has been directed by the Wildlife Lands Acquisition Committee (which includes representatives from the Upper Skagit Indian Tribe, Sauk-Suiattle Indian Tribe, and Swinomish Indian Tribal Community) with the intent of protecting high quality wildlife habitat. Some of the best properties for this purpose are often remote and without direct vehicle access. All parcels are open to tribal and public access although adjacent landowner permission may be needed. The management plan will provide summary of each mitigation parcel and will include a description of access and adjacent ownership.</p> <p>City Light looks forward to collaborating with the Indian tribes in the development of a management plan for the mitigation lands. However, City Light is unable to commit to the schedule outlined by the Tribe as part of the study plan. While a draft management plan will be submitted to FERC with the license application in 2023, City Light will work with LPs to finalize the plan for implementation following FERC approval of the plan, anticipated in June 2025 at the soonest. This provides additional time to finish collecting the data on the mitigation lands needed to identify desired conditions and associated habitat management and improvement measures. The maps of vegetation, rare plants, wetlands, and invasive species generated from the relicensing studies will be used to target sites within the mitigation parcels for additional data collection on critical habitat features.</p>

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							<p>standard the Commission will apply. We suggest the following timeline established in binding requirements.</p> <ul style="list-style-type: none"> <li>▪ Complete GIS analysis of access to mitigation lands: Q2 of 2021.</li> <li>▪ Evaluate land use change over 30-yr period to mitigation lands and adjacent properties: Q2 of 2021.</li> <li>▪ Collect information about illegal activities and map where possible: Q2 of 2021.</li> <li>▪ Assemble information on species of concern on and in the vicinity of mitigation lands: Q2 of 2021.</li> <li>▪ Map proximity of other conservation lands using existing information: Q2 of 2021.</li> <li>▪ Assess data needs based on existing information (Identify pilot sites for additional data collection, develop plans, methods and schedule for additional field data collection): Q2 of 2021.</li> <li>▪ Implement additional data collection at pilot sites: 2021-2022.</li> <li>▪ Identify desired conditions for habitat and target species for each parcel (i.e., elk forage, mature forests) based on existing information: Q4 of 2022.</li> <li>▪ Planning group draft management objectives for each parcel, develop conceptual measure to meet objectives for each parcel, identify additional data needs: Q4 of 2022.</li> </ul> <p>The Tribe expects that City Light will incorporate active management strategies that will enhance wildlife habitat throughout the development of the management plan, enabling wildlife mitigation lands to better support culturally significant and special-status species into the future. We welcome a written, binding proposal from City Light that includes the criteria and timeline above, and look forward to this opportunity to collaborate with City Light.</p>	
437.	USFWS	03/08/2021	pp. 16-17	USFWS-C11	Sections 6.2.9, 6.3.4  (USFWS-03, USFWS-04)	GE-01	<p><b>GE-01 Reservoir Shoreline Erosion Study.</b> This study is conducted to locate and describe shoreline erosion occurring at and near normal maximum water surface elevation. We generally agree with this study, however it discounts erosion at other reservoir elevations that can cause sedimentation during wind and storm events. Please refer to our Study Request #3, Skagit Project Water Quality Assessment and Modeling Study, which shows the need to extend the geographic and temporal scope in order to capture areas of erosion, levels of erosion, and the distribution of erosion, especially near bull trout spawning tributaries, where juveniles, sub-adults and adults could congregate. Erosion and sedimentation are associated with changes in reservoir elevations. Dry Creek (Figure 10) is indicative of other locations in Ross Lake where NPS spot surveys have documented NTU as high as 121 in streams, and 11-16 in the reservoir. Big Beaver Valley (Figure 11) is near the head of Skagit Gorge and contains significant glacial cover. Deposits near the mouth bury the pre-reservoir landscape in as much as 26 feet of sand. Information from the range of locations, duration, and magnitude of all events is necessary to understand the effect of the Project operations to species and aquatic habitat at multiple reservoir elevations.</p> <p>In order to capture erosion and turbidity, SCL should also plan to collect information over a full year of operations, preferably two seasons, to be able to capture effects across a range of elevation levels during flow and storm events. We generally agree with most of the study methods; however, we suggest SCL merge this study with our study request USFWS-04 Reservoir Secondary Productivity Studies to assist in collection of data to understand the range of effects.</p>	<p>City Light does not feel that an assessment of erosion within the entire drawdown zone is needed to assess the potential for Project effects associated with erosion, but instead plans to assess potential effects to specific resources from erosion and sedimentation as follows:</p> <p>Sampling of turbidity during drawdown of Ross Lake has been added to the FA-01 Water Quality Monitoring Study to evaluate water quality impacts.</p> <p>Potential impacts of erosion and sedimentation to archaeological and cultural resources will be addressed as part of the ARMMP.</p> <p>Potential blockages to fish passage within the drawdown zone are being addressed as part of the on-going Transitory Barrier Removal Program.</p>
438.	USFWS	03/08/2021	p. 18	USFWS-C12	Sections 6.2.13, 6.2.14, 6.2.15, 6.2.16, 6.3.4, 6.3.13	GE-02	<p><b>GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study (Erosion and Geologic Hazards Study).</b> The USFWS generally supports SCL's GE-02 Erosion and Geologic Hazards Study plan. We recommend this study plan be incorporated as a task into GE-04 Geomorphology</p>	<p>The GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way (Erosion and Geologic Hazards) Study Plan will remain a stand-alone study plan and not be</p>

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					(USFWS-15, USFWS-16, USFWS-18)		<p>Study and reported on separately. We suggest SCL gather land-type data as a basic layer and overlay soils and geologic hazard areas. The drainage areas should be mapped for soil and hazard types, geomorphology, geologic hazards, vegetation, and aquatic habitat conditions at stream crossings. Data should be collected in a manner that is comparable to data collected across the Project both above and below the dams.</p> <p>During development of draft documents, LPs recommended that SCL identify streams, road crossings, and drainage features (i.e. culverts, fords, drainage systems) and survey them according to best forest management practices based on methods used by adjacent landowners. Streams should be inventoried and documented as intermittent, seasonal, or year-round fish-bearing streams. A barrier analysis following the WDFW protocol should be conducted to understand conditions and potential long-term effects of ongoing maintenance and use of roads. Powerline structures should be assessed for effects to stream and floodplain processes. Maintenance records for maintenance projects at facilities, roads, and powerline corridors and structures should be compiled to help understand how much maintenance occurs, as well as the conditions of roads, facilities, and access along T-Line right-of-way areas. We also recommend SCL assess unlawful, dispersed use of roads/and facilities throughout the Project; these can contribute to erosion, sedimentation, trash/human waste issues, and other effects to habitat that generally arise on forested roads left open to the public. Finally, we suggest SCL merge information to further develop a study with a larger scope, which accounts for erosion and geologic hazards across the area affected by the Project. USFWS-15, Geomorphology and Aquatic Habitat Complexity Study Request, USFWS-16, The Impacts of Project Operations on Aquatic and Riparian Biological Productivity Downstream of Gorge Dam, and USFWS-18, Assessment of Fish and Wildlife Conservation Lands: Access, Stewardship, and Habitat Use covers aspects of this work.</p> <p>On February 23, 2021, SCL provided an Issue Resolution Form stating that it would address concerns of the LPs brought up during a February 11, 2021 public meeting. In summary, SCL will adapt the GE-02 study plan to: (1) inventory all Project-related stream crossings; (2) field verify all streams for fish-use potential using WDFW protocols; (3) identify roads requiring RMAPs; (4) compile Project road and road crossing maintenance records; (5) re-inventory stream crossing data that is older than five years in a fish bearing stream; (6) conduct a culvert fish passage assessment per WDFW protocols, and; (7) assess non-culvert stream crossings with fish-use potential. The USFWS welcomes these changes to the study plans and looks forward to seeing them in the RSP.</p>	<p>incorporated into GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study since each study plan covers a different topic.</p> <p>City Light will collect land type data, soils, geologic hazard areas as part of the Erosion and Geologic Hazards Study. The study will assess each study road-stream crossing using Washington DNR and WDFW protocols for road and crossing condition, fish passage barriers, potential for road runoff hydrologic connectivity, erosion, and maintenance activities. CMZs around roads and along the transmission line ROW will be assessed. Maintenance records will be compiled.</p> <p>City Light will continue to coordinate with local law enforcement on illegal activities on City Light property, however, City Light does not propose to assess unlawful, dispersed use of roads as part of a relicensing study.</p> <p>The Erosion and Geologic Hazards Study will develop information on erosion and geologic hazards along Project-related study roads, the transmission line ROW, and at Project facilities. This information will be used to assess potential effects to other resources as part of the license application.</p> <p>The Erosion and Geologic Hazards Study Plan has been updated to make it clear that it will inventory all study road-stream crossings, evaluate potential for fish use in streams, compile road maintenance information, and assess fish passage based on WDFW protocols at all streams that are potentially fish bearing if a barrier assessment has not been done in the past 5 years.</p> <p>Washington DNR has clarified that RMAPS do not apply to Project-related roads.</p>
439.	USFWS	03/08/2021	pp. 23-24	USFWS-C16	N/A	TR-01	<p><b>TR-01 Vegetation Mapping Study.</b> The goal of the Vegetation Mapping Study is to develop a complete and systematic vegetation mapping geographic information system (GIS) database to describe existing conditions, assess potential Project-related habitat effects, and inform development of terrestrial resource management plans and protection, mitigation, and enhancement measures. We agree this study is needed to understand vegetation types, habitat patches, seral stages, riparian habitat conditions, and connectivity of habitat. Because SCL's Project affects the flow of the river and reservoir levels, there is a clear nexus. When SCL also works with the ACOE and the Baker River (FERC No. 2150) Hydroelectric Project for flood flow operations it demonstrates a Project affect downstream of the Sauk River.</p> <p>The USFWS does not agree with SCL on the scope of the study. Currently, information will be collected only as far downstream as the Sauk River. We find it</p>	<p>The TR-01 Vegetation Mapping Study area includes buffers around all Project reservoirs, around all fish and wildlife mitigation lands, the entire transmission line ROW, and along the Skagit River from the Project downstream to the Sauk River confluence to provide baseline vegetation information in the area surrounding the Project.</p> <p>Extensive field verification effort and iterative remote sensing model runs are included in the study plan.</p>

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							<p>extremely important to include an expanded area, in both the desktop exercises and field visits to validate the remote sensing desk exercise data. This would be similar to how SCL is validating wetlands for an overlay of Project-related disturbances to prioritize field survey. We also suggest that SCL include the field verification to be able to validate vegetation conditions and potential Project related disturbances and sources of impairment. The USFWS would need to have the information from the mouth to the estuary and for areas upstream of the reservoirs in affected areas to understand the extent of the conditions of vegetation within the area affected by the Project. We also believe that SCL will need an additional year to collect the field data to validate remote sensing desk exercise data, just as SCL is planning in doing in the Wetland Assessment (TR-02).</p> <p>Vegetation is as important to collect across the Project area as geology and geomorphology. They are the basics that makeup aquatic habitat and allow one to determine the range natural variation and effects. Water flow affects vegetation through many different pathways. We utilized key indicators as described in the USFWS's "Bull Trout Matrix of Effects Pathways", such as riparian vegetation, to determine conditions and effects to bull trout, previously described in our PAD and draft study plan comments (USFWS 1999).</p> <p>Additionally, the collection of vegetation data is important for assessing effects on bald and golden eagles, wildlife connectivity, riparian conditions, wood recruitment, invasive weeds, nesting, roosting and foraging habitats for raptors, marbled murrelet, and northern spotted owls. Please include data categories that WDFW (Brock Applegate) has provided for priority habitat and species within his comments on the study plan. This data will also be utilized in many other SCL studies and LP studies because it is foundational information. The USFWS studies that are relying on this information, include: USFWS-04, USFWS-07, USFWS-13, USFWS-14, USFWS-15, USFWS-16, and USFWS-19. This data is necessary and will be a starting point for assessing potential impact on wildlife connectivity across the vast area affected by the Project.</p>	<p>For clarification, the TR-02 Wetland Assessment will be completed after one year of field effort; any supplemental data collection will occur as needed in 2021 in conjunction with other terrestrial studies.</p> <p>For areas downstream of the Sauk River, City Light will rely upon existing information. As identified in the Wetlands Assessment Study Plan, there is existing mapping of riparian habitat for the Skagit and Sauk rivers in the Skagit Watershed Council Riparian Assessment. Existing riparian area vegetation will be considered in the SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River Study Plan.</p> <p>Field surveys, including model verification surveys, were prioritized in areas of transitional habitat, such as riparian areas, to improve model accuracy and gauge cover type diversity. The primary goal of the study is to describe and map vegetation to the Group level for future management needs. An effects analysis will not be performed at this time.</p> <p>Data provided by the vegetation and wetlands studies will be used to develop a cross-walk table for WDFW priority habitats. As stated in the study plan, a product of the study includes "Cross-walk table that translates mapped vegetation groups (alliances in area covered by NPS mapping) to PHS habitats and State Wildlife Action Plan (SWAP) habitats and separate GIS layer of obvious snag-rich areas in the study area."</p>
440.	USFWS	03/08/2021	p. 24	USFWS-C17	N/A	TR-02	<p><b>TR-02 Wetland Assessment.</b> The Wetland Assessment study aims to document and assess condition of wetlands in the Project area. We also agree that this study is necessary to understand impact of the Project on wetlands, seeps, springs, associated vegetation, and aquatic habitat features. We agree that this is necessary information, however, we disagree on the scope of the study. We strongly recommend that SCL expand the scope of the study to include areas below the Sauk River and above the Project dams in areas affected by Project operations. If SCL has existing information on these other areas, it should be included in the report. SCL will need to add field sites in these areas below and above the Project dams to validate the conditions and identify potential Project-related disturbances, especially related to reservoir drawdown. We also recommend assessment of Fish and Wildlife Conservation/Mitigation Lands conditions. These data are needed to monitor conditions as part of any long-term management plan for periodic monitoring across the term of a new license. The nexus is the same as above, and due to ongoing operations and including flood management in coordination with the ACOE and the Baker River Hydroelectric Project. We support the rest of the protocol and methods.</p>	<p>Please see the comment responses STI-C08 and USFWS-C16 regarding the scope of the TR-02 Wetland Assessment study area and areas downstream of the Sauk River confluence.</p> <p>Existing data could be mapped but no field verification will be conducted for these areas outside of the study area for wetlands.</p> <p>The Vegetation Mapping and Wetland Assessment studies include mapping of the fish and wildlife mitigation lands.</p>
441.	USFWS	03/08/2021	pp. 24-25	USFWS-C18	N/A	TR-05	<p><b>TR-05 Marbled Murrelet Study.</b> SCL proposes a study to map potentially suitable marbled murrelet nesting habitat with the study area and assess the likelihood of</p>	<p>City Light believes the approach in the TR-05 Marbled Murrelet Study Plan aligns with generally</p>



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							<p>marbled murrelet nesting. Mapping of potentially suitable nesting habitat would occur as part of TR-01 Vegetation Mapping Study and TR-02 Wetland Assessment with additional ground surveys to field verify the accuracy of the habitat mapping and collect information on potential nest platform abundance. Radar and audio-visual surveys are also proposed per the protocol established by the Pacific Seabird Group (Evans Mack et al. 2003).</p> <p>The USFWS supports this study but recommends a minor modification. SCL has proposed that radar and audio-visual surveys only occur during the 2021 field season, with the caveat that an additional field season be added if 2021 is deemed a poor nesting season for marbled murrelets in Washington State. The Pacific Seabird Group protocol states that “intensive surveys should be conducted for at least two consecutive years,” to ensure that occupied sites are not misclassified. SCL’s proposed methodology does not fully align with the generally accepted practice in the scientific community [criterion 18 CFR § 5.9(b)(6)] by not committing to two years of radar and audio-visual surveys. A singular field season, as SCL proposes, risks underestimating marbled murrelet occupancy within the study area; as such, the USFWS may require additional field surveys at a later date to inform Endangered Species Act consultation post license issuance. Two consecutive survey seasons are necessary to understand the extent of murrelet occupancy within suitable habitat; this knowledge will assist FERC, SCL, and the USFWS in developing future Project construction and operations alternatives that do not jeopardize marbled murrelets and support recovery efforts as outlined in the USFWS Marbled Murrelet Recovery Plan (USFWS 1997). Therefore, the USFWS strongly recommends that SCL make a second year of simultaneous radar and audio-visual surveys mandatory to be consistent with the Pacific Seabird Group protocol and similar studies conducted at hydropower facilities (e.g. Jackson Hydroelectric Project – FERC No. 2157).</p>	<p>accepted practice and the Pacific Seabird Group protocol. The protocol describes two types of surveys: Radar Survey and Intensive Survey. These two methods have different objectives:</p> <ul style="list-style-type: none"> <li>• “Radar surveys cannot determine occupancy, but can often be used to identify presence of birds at stands (i.e., identify where occupancy is a possibility)” (Evans Mack et al. 2003). If the radar detects marbled murrelets in an area, the data is also used to gauge the relative activity level (# detections/hour or # detections/survey morning).</li> <li>• “Intensive surveys are designed to determine probable absence or presence of murrelets at a specific site, document occupancy, monitor murrelet activity levels at specific sites (e.g., for a pre-harvest inspection), locate nests, and establish murrelet use patterns” (Evans Mack et al. 2003).</li> </ul> <p>The protocol also states: “For the purposes of this protocol, radar surveys can be applied to document probable presence and help identify where follow-up efforts of intensive surveys for determining occupancy would be most effective” (Evans Mack et al. 2003).</p> <p>City Light’s Marbled Murrelet Study was designed by one of the authors of the Pacific Seabird Group Marbled Murrelet Inland Survey Protocol (Evans Mack et al. 2003). It is meant to determine where murrelet activity and potential occupancy are located in the study area and where potential nesting habitat exists within 0.5 miles of locations where most Project noise generation occurs; not to determine occupancy in specific stands. City Light is not proposing intensive surveys at this phase, because it believes they would be ineffective to do before knowing if and where potentially-occupied stands might occur.</p> <p>City Light may still conduct intensive surveys if radar surveys detect consistent murrelet activity in specific areas. The intensive surveys would determine probable absence or presence and occupancy of murrelets at a specific stand may be conducted for one or two years to find occupied sites (likely nesting areas) depending on the potential for Project effects.</p>
442.	USFWS	03/08/2021	p. 25	USFWS-C19	N/A	TR-06	<b>TR-06 Golden Eagle Habitat Analysis.</b> SCL proposes to assess the potential effects of Project operation and maintenance on golden eagle. Objectives include mapping	City Light understands the need to avoid unpermitted take of golden eagles and bald eagles

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							<p>observations and potential nesting and foraging habitat, as well as developing a golden eagle geospatial risk assessment to evaluate collision risk with transmission lines. Results of the TR-01 Vegetation Mapping Study and TR-02 Wetland Assessment will be used to identify potential nesting and foraging habitat, including movement corridors near the Project.</p> <p>The USFWS supports this effort but requests the study plan be amended to include bald eagles. The USFWS has a mandate to implement the Bald and Golden Eagle Protection Act, which prohibits unpermitted take of bald eagles as well as golden eagles. As bald eagles are well known to occur within the study area, the USFWS requests that SCL extend the study objectives to include bald eagle.</p>	<p>as both species are protected by the Bald and Golden Eagle Protection Act. There are no known incidences of bald eagle mortality from the lines since 1973. As indicated in the TR-06 Golden Eagle Habitat Analysis Study Plan, Section 2.3, City Light completed intensive monitoring of wintering bald eagles near several sections of the transmission line where wintering bald eagles concentrate at foraging and roosting areas in 1996-2000. Based on observations of eagles modifying their flight paths near powerlines, City Light installed bird flight diverters at six sites. City Light will include bald eagle in the Avian Protection Plan for the Project but believe existing data are adequate to assess ongoing Project effects and identify PMEs.</p>
443.	USFWS	03/08/2021	p. 25	USFWS-C20	N/A	TR-10	<p><b>TR-10 Northern Spotted Owl Habitat Analysis.</b> SCL proposes a study to identify and map suitable nesting, roosting, and foraging habitat with the study area for northern spotted owl. The study would produce GIS layers using a combination of the refined Northwest Forest Plan vegetative model and LiDAR data. Additional targeted ground surveys would field verify the accuracy of the habitat mapping and provide further refinement.</p> <p>In addition to habitat mapping, the USFWS recommends northern spotted owl surveys occur within mapped suitable habitat to ascertain occupancy. These surveys should be conducted per the USFWS's 2011 Northern Spotted Owl Survey Protocol (USFWS 2011). Similar surveys were conducted at the Jackson Hydroelectric Project (FERC No. 2157) during its recent relicensing. Understanding the spatial distribution of northern spotted owls within the study area may influence future license conditions, especially as it pertains to Project-related sound. If field surveys are not undertaken, the USFWS would make the conservative assumption that all suitable habitat within the survey area is occupied, which has the potential to impact Project operations.</p>	<p>City Light is committed to conserving northern spotted owls and their habitat and believes that the mapping of suitable habitat throughout the Project Boundary and buffer proposed in the TR-10 Northern Spotted Owl Habitat Analysis will provide a sound basis to inform where Project construction or major O&amp;M activities during the new license may necessitate surveys. Many of the major projects and activities included in the new license will take place 10 or 20 years from now. Occupancy data from surveys done during relicensing would be out of date by then, requiring additional surveys.</p> <p>Due to the extensive acreage included in the study request USFWS-19, protocol surveys cannot be accomplished during the relicensing study timeframe. City Light understands that unsurveyed suitable habitat will be assumed to be occupied until protocol surveys are completed for the Action Area for a specific undertaking. City Light looks forward to working with the USFWS to develop a protection plan for northern spotted owls that includes survey protocols and BMPs.</p>
444.	USFWS	03/08/2021	p. 36	USFWS-C28	Sections 6.3.14, 6.3.16 (USFWS-17)	TR-01, OM-01	<p><b>USFWS-17: Impact of Operations of Terrestrial Wildlife Connectivity.</b> Four LPs submitted study request related to wildlife connectivity. There is an overall concern about the location of the Project and its infrastructure, SR20, impacting the ability of wildlife to move as needed maintain healthy populations and support recovery. Species and habitats of concern include: mountain goat, pine marten, Pacific fisher, gray wolf, grizzly bear, Canada lynx, and wolverine. Additionally, the request includes generating a population estimate for mountain goats in North Cascades National Park, RLNRA, and the surrounding area.</p> <p>SCL asserts that the study need was not addressed by the FERC Study Criteria (18 CFR § 5.9(b)(5)). SCL presumes the need is for mitigating or assessing and adverse effect. The term of the permit is for likely 30 years or more and it is reasonable to assume that conditions across the area affected by the Project could change due to</p>	<p>Please see comment response SITC-C06.</p> <p>City Light understands that the USFWS will need to evaluate Project effects on listed species by today's standards. City Light believes that existing data and the information that will be forthcoming from the proposed studies will be sufficient to analyze Project impacts on wildlife and complete ESA consultation.</p>

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							climate impacts and other factors. Understanding where these corridors are today and where they could be 20 years from now is important in addressing effects of the Project. We disagree with SCLs statement that there is no evidence for effects, at least adverse. The nexus is not built only around the level of an adverse effect, but any effect, so it could be a “not likely to adversely affect”. Moreover, that effect may look different 30 years from today. It is important to assess the effects for the term of the permit, at multiple population scales, and not just under current conditions. However, without compiling the connectivity data today to use in effects analysis, future wildlife movement patterns may be within the affected area. Relying on a 1994 wildlife concurrence letter that does not address today’s species is not a means for developing an assumption about effects. SCL did describe that they thought this would need to be a multi-year study with severe limitations to isolate the effects of the Project. However, the USFWS typically errs on the side of the species when there is limited data. Even a desktop analysis might be enough to start to show patterns of connectivity. We disagree that this study will take a large amount of time. Data collected for the TR-01 Vegetation Mapping Study, the OM-01 Operations Model Study, and other terrestrial data sets information can be used to develop connectivity layers. The USFWS continues to request the adoption of our USFWS-17 study and effective coordination about how to develop a wildlife connectivity map through the areas affected by the Project.	
445.	USFWS	03/08/2021	pp. 36-37	USFWS-C29	Section 6.3.13 (USFWS-18)	TR-01, TR-02, TR-04, TR-05, TR-09, GE-02	<p><b>USFWS-18: Assessment of Fish and Wildlife Conservation Lands.</b> The primary goal is to examine the condition of the Fish and Wildlife Conservation lands and determine whether they are providing expected conservation benefits. Study objectives are to identify condition, connectivity to wildlife habitat corridors between mitigation other conservation lands, evaluate the potential habitat quality, and assess any illegal trespass action. SCL rejected the study, and therefore, this data will not be collected. However, SCL’s other studies TR-01, TR-02, TR-04, TR-05, TR-09, and GE-02 may collect some data, and data from these plans could be used to update management plans for these lands. There is a possibility that this could be done once the data is collected and compiled from other studies. SCL has stated that this study should be retained and developed following data collection.</p> <p>We disagreed with SCL’s assertion this study did not meet FERC Study Criteria under (18 CFR §§ 5.9(b)(5)) and that there was no nexus between Project operations and effects. The nexus is that the mitigation or conservation lands were purchased with monies associated with the FERC Project, and the lands are described as part of the FERC license. The PAD previously described that this is the case for some of these lands. SCL describes that the primary purpose of the mitigation land is to protect and enhance habitat for wildlife. The actions on these lands will be covered in NEPA analysis and our biological opinion. It is important to assess the condition of these lands, as well as if they are protected, maintained, or can be enhanced to provide for the functions for which they were purchased into the future. Also understanding how these lands link to any wildlife connectivity or movement corridors will be important to understand their function and assess effects. These lands may be within ESA listed critical habitat or other habitats necessary for ESA species survival. The USFWS continues to request the adoption of our USFWS-18 study request and effective collaboration to determine management of these lands as key wildlife mitigation lands.</p>	<p>Please see comment response SITC-C07.</p> <p>City Light believes that existing data and the information that will be forthcoming from the proposed studies will be sufficient to analyze the potential effects of management actions on the wildlife mitigation lands for the purposes of complying with NEPA or ESA—and these documents can be supplemented or amended if conditions or actions change substantially.</p> <p>City Light has agreed to develop a management plan for wildlife habitat lands in collaboration with the agencies and Indian tribes. The development of a solid management plan, however, takes time and effort and will be built on data that will be collected over the next two years. The results of these studies will inform the need for additional site-specific data. In addition, the mapping will help identify possible wildlife corridors and habitats that could be protected or improved to support sensitive and culturally important species.</p>
446.	Upper Skagit Indian Tribe	03/08/2021	p. A70	USIT-C69	Section 5.10	GE-01	<p>Although no directly applicable formal study requests were submitted, there are study requests that are impacted by the results of this study because of the effect of erosion on water quality and Rare, Threatened and Endangered species that exist along the shoreline. Also, of concern is the impact of erosion on cultural sites, which is addressed here and in previous comments. The rockfall and mass wasting features</p>	<p>The effects of reservoir shoreline erosion on resources of concern will be evaluated as part of the license application.</p>

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							<p>identified in this study will be further analyzed in GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way study. It is important that mass wasting features are not removed from the shoreline erosion estimates if they were caused by shoreline erosion.</p> <p>The study will inform more than CR-02, it will also potentially assist in CR-01 and CR-04, and Sec. 106 assessments of effect to historic properties. The study will also assist in evaluating water quality and reservoir habitat conditions impacted by turbidity and sediment caused by shoreline erosion (please refer to USIT comments on FA-01 and FA-04 in this filing)</p>	Mass wasting features along reservoir shorelines will be mapped and assessed as part of the GE-01 Reservoir Shoreline Erosion Study.
447.	Upper Skagit Indian Tribe	03/08/2021	pp. A70-A71	USIT-C70	N/A	GE-01 Section 1.3	<p><b>Study Plan Development.</b> On p. 1-2 City Light states: "Information from this study will inform the Cultural Resources Survey. Note that reservoir sedimentation at resource areas of concern will be addressed in the Sediment Deposition in Reservoirs Affecting Resources Areas of Concern Study."</p> <p>As City Light's response to comment #6 (Appendix D, GE-01, Attachment B Page 2) implies that erosion of archaeological sites will be dealt with in the current license ARMMP (Archaeological Resources Mitigation and Management Plan). If that is the case, the text should clearly state that this plan will inform not just other cultural resources studies but in addition, the updating of the ARMMP.</p>	City Light revised the GE-01 Reservoir Shoreline Erosion Study Plan accordingly in Section 1.3.
448.	Upper Skagit Indian Tribe	03/08/2021	p. A71	USIT-C71	N/A	GE-01 Section 2.1	<p><b>Study Goals and Objectives.</b> City Light refers to monitoring sites and representative unmonitored sites as locations where erosion will be analyzed. It is unclear whether the entire shoreline will be included in the analysis of existing information or during field work.</p> <p>City Light differentiates between Project and non-Project erosion. USIT is unable to make this distinction because the reservoirs are the Project, so regardless of how the erosion occurs along the shoreline it is Project related.</p>	The entire reservoir shoreline will be assessed. City Light has revised Section 2.1 of the GE-01 Reservoir Shoreline Erosion Study Plan for clarity.
449.	Upper Skagit Indian Tribe	03/08/2021	p. A71	USIT-C72	N/A	GE-01 Section 2.5	<p><b>Study Area.</b> The study area needs to be updated to include all the bare and exposed surface of the shoreline during low pool and intermediate reservoir elevations. While erosion at full pool has specific implications and focus, the erosion that occurs at lower water levels needs to be quantified in order to truly understand the impact of erosion from the Project on the aquatic resources (as is highlighted in USIT's comments to FA-01 and FA-04 in this filing).</p>	Please see comment response USFWS-C11.
450.	Upper Skagit Indian Tribe	03/08/2021	p. A71	USIT-C73	N/A	GE-01 Section 2.6	<p><b>Methodology.</b> The methods need to be updated in order to allow time and resources to examine erosion at lower than full pool elevations. Additional LiDAR, Terrestrial Laser Scanner, or photogrammetry should be employed in this study to compare to previous high-resolution digital elevation models for volume estimations and to build a digital database of erosion features for future analyses. Use of these methods to quantify erosion and deposition is well established. Additionally, the utility of a hydrodynamic model such as CE-QUAL-W2 and reservoir bathymetry (as highlighted in USIT's comments to both FA-01 and FA-04) should be explored as means of tracking and quantifying Project operations related to shoreline erosion.</p>	Please see comment response USFWS-C11.  Potential monitoring methods will be developed as part of PMEs.
451.	Upper Skagit Indian Tribe	03/08/2021	p. A71	USIT-C74	N/A	GE-01 Section 3.0	<p><b>References.</b> City Light's response to comment #10 does not address comment #87, which suggested that the ARMMP citation be referenced (Appendix D, GE-01, Attachment Page 17). It's relevance to this study is demonstrated by City Light's reference to the ARMMP in responding to comment #6, regarding erosion of archaeological sites. The ARMMP citation belongs in Section 3.0.</p>	City Light has added a reference to the ARMMP citation in Section 3.0 of the study plan.
452.	Upper Skagit Indian Tribe	03/08/2021	p. A113	USIT-C110	N/A	TR-01 Section 6.2	<p>USIT provided comments related to vegetation mapping in its study request Geomorphology and Anadromous Salmonid Habitat and in comments to City Light's PAD (see section Proposed Study Plan Comments, TR-01: A1-44). City Light did not acknowledge USIT's requests and did not address them in its Proposed Study Plan.</p>	City Light focused its PSP on responding to specific study requests.

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								TR-01 will provide a baseline map and vegetation data, in combination with results of related studies such as the Geomorphology Study and additional information being collected in GE-02 outlined in response to USIT-C75 below, City Light believes many of the information needs noted in the referenced PAD comments will be addressed. City Light will continue to coordinate with LPs as studies proposed in the RSP are implemented to review whether specific information needs identified in these PAD comments are being addressed to ultimately inform analyses in the DLA.
453.	Upper Skagit Indian Tribe	03/08/2021	p. A73	USIT-C75	N/A	GE-02	<p><b>Agreements Reached During PSP Meetings.</b> USIT submitted comments on City Light's PAD (October 26, 2020 filing, pg. A1-36 – A1-37) and during the PSP meetings (Appendix B229), including the following requests related to fish barrier assessments:</p> <ul style="list-style-type: none"> <li>▪ Inventory all road crossings, including an update of GPS locations (WDFW, 2019)</li> <li>▪ Field verify fish-use potential following State of Washington Forest Practices Rules (Washington Administrative Code, Chapter 222; WDNR, 2000, Section 13, Guidelines for Determining Fish Use for the Purpose of Typing Waters, pg. M13-1)</li> <li>▪ Compile maintenance records for all stream crossings within the Project Boundary (WDNR, 2000, Section 5, Part 6 Water Crossing Structure Maintenance and Repair, pg. B5-42)</li> <li>▪ Update all existing data older than 5 years, including fish barrier assessments</li> <li>▪ Conduct fish barrier assessments on streams with fish-use potential according to WDFW (2019) guidelines                             <ul style="list-style-type: none"> <li>• Include Level B analysis, when necessary</li> <li>• Include non-culvert crossings (WDFW, 2019, Chapter 4) and miscellaneous obstructions (WDFW, 2019, Chapter 6)</li> </ul> </li> </ul> <p>During the PSP meetings, City Light agreed to include the study elements listed above (Appendix C467). USIT requests these elements be included in the RSP.</p>	<p>The GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study Plan has been updated to add:</p> <ul style="list-style-type: none"> <li>▪ Inventory all road crossings, including an update of GPS locations;</li> <li>▪ Field verify potential for fish-use based on stream gradient less than 20 percent and scour width greater than 2 feet;</li> <li>▪ Compile available maintenance records for study roads (roads and crossings);</li> <li>▪ Update fish barrier assessments if existing data is over 5 years old; and</li> <li>▪ Conduct fish barrier assessments on streams with fish-use potential according to WDFW (2019) guidelines                             <ul style="list-style-type: none"> <li>• Include Level B analysis, when necessary; and</li> <li>• Include non-culvert crossings (WDFW, 2019, Chapter 4) and miscellaneous obstructions (WDFW, 2019, Chapter 6).</li> </ul> </li> </ul>
454.	Upper Skagit Indian Tribe	03/08/2021	p. A74	USIT-C76	Section 6.2.23	GE-02	<p><b>Transmission Line Right of Way Aquatic Habitat.</b> USIT submitted comments on City Light's PAD (Oct. 26, 2020 filing, p. A1-36 – A1-37) and during the PSP meetings (Appendix B229) related to study components in GE-02, including fish barrier assessments at stream crossings, stream habitat assessments where barriers exist, geomorphic assessments along the Project transmission line, townsites, and facilities, and risk assessments for Project transmission line towers, townsites, and facilities within CMZs. City Light did not address USIT's comments in its PSP.</p>	<p>The GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study Plan has been updated to address fish barrier assessments at study road-stream crossings on potential fish-bearing streams and includes geomorphic and riparian/fish habitat assessments at transmission line stream crossings.</p> <p>City Light is not planning to conduct stream habitat assessments at study road crossing barriers as part of the study plan, but this will be part of a longer-term road management plan to be developed in consultation with interested LPs.</p> <p>City Light is not proposing to conduct a risk assessment for Project-related transmission line towers, townsites, or facilities within CMZs at this time, but City Light will address these as part of future management planning. Furthermore, City</p>

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								Light will overlay Project facilities on a hazard zonation map such that a basic picture of the proximity and severity of hazards to facilities can be drawn, and some of the related elements of risk can be inferred.
455.	Upper Skagit Indian Tribe	03/08/2021	p. A74	USIT-C77	N/A	GE-02 Section 2.3	<b>Background and Existing Information.</b> USIT has partnered with NPS, WSDOT, and City Light on restoration planning for the Goodell Creek alluvial fan. These efforts have identified risk to three Project transmission line towers. The towers are located within relatively low points in the floodplain and aggradation at the alluvial fan apex is expected to increase risk of channel avulsion toward the towers over the coming years. Two towers received a score of “high” risk and the third tower received a score of “very high” risk. City Light does not discuss the implications of the feasibility report in the proposed study plan and the report is not included in the list of existing reports, data and resources (HEC, 2017). USIT requests this information to be incorporated in the RSP.	Reference to the Goodell Creek fan feasibility study has been added to the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study Plan.
456.	Upper Skagit Indian Tribe	03/08/2021	p. A74	USIT-C78	N/A	GE-02 Section 2.3.3	<b>Transmission Line Right-of-Way and Tower Maintenance.</b> City Light describes an effort to move or redesign a transmission tower at Diobsud Creek. According to USIT’s understanding, City Light has made no such effort. City Light removed a wood jam that was causing bank erosion and threatening a channel avulsion toward a transmission tower on the bank of Diobsud Creek. The channel bank already contains extensive riprap armoring, placed previously by City Light to protect the tower. This is an example of a type of geomorphic and habitat impact that should be avoided during the new license term.	The GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study Plan has been revised to reflect this information.
457.	Upper Skagit Indian Tribe	03/08/2021	p. A74-A75	USIT-C79	N/A	GE-02 Section 2.6.2	<b>Project-related Roads and Townsite Erosion Runoff.</b> See comments above for “Agreements Reached During PSP Meetings” for a discussion of expected changes to City Light’s proposed fish-bearing stream crossing barrier assessment. USIT requests stream habitat assessments where Project barriers exist on streams with fish-use potential. USIT requests the habitat assessments be conducted according to the WDFW Fish Passage Inventory, Assessment, and Prioritization Manual (WDFW, 2019, Chapter 10). USIT requests City Light identify Project roads that require Road Maintenance and Abandonment Plans (RMAP) (WDNR, 2000, Section 3, Guidelines for Forest Roads, pg. B3-1).  USIT requests that City Light conduct assessments for non-fish stream crossings. Crossings over non-fish streams can cause downstream impacts to fish-bearing streams, including issues related to altered drainage patterns, mass wasting events, interruption of sediment and wood transport, and water quality degradation associated with vegetation clearing (WDNR, 2000). Crossing structures over streams determined to be Type N (Washington Administrative Code, Chapter 222-16-031) should be assessed in terms of their adequacy for meeting the Washington Forest Practices Rules for Hydraulic Projects (WDNR, 2000, Section 5, Part 5 Water Crossing Structures in Type N Waters, pg. B5-32).	Please see comment responses USIT-C75, USIT-C76 and USFWS-C12.  The GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study will assess the potential for hydrologic connectivity, erosion, and mass wasting at all study road stream crossings in the study area.  City Light does not plan to evaluate the hydraulic adequacy of Type N crossing structures as part of GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study, but to assess this information as part of a longer-term road management plan to be developed in consultation with interested LPs.
458.	Upper Skagit Indian Tribe	03/08/2021	p. A75	USIT-C80	N/A	GE-02 Section 2.6.3	<b>Channel Migration and Stream Crossings.</b> USIT requests geomorphic and habitat assessments for all crossings over anadromous fish-bearing streams along Project roads and the transmission line right-of-way and for all Project facilities, including townsites and maintenance areas. Geomorphic impacts occur due to bank armoring, roads in the CMZ, and vegetation removal. Bank armoring and roads and fill in floodplain roads result in straightened and simplified channels, reduced aquatic habitat quality, reduced channel forming process, and reduced floodplain connectivity. Vegetation removal results in destabilized banks, widened and simplified channels, reduced wood recruitment, and reduced terrestrial inputs to the aquatic food web.	As stated in the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study (Erosion and Geologic Hazards Study), geomorphic and habitat assessments will be made at all transmission line stream crossings where the channel migration assessment indicates that channel migration could affect study roads, facilities, or transmission towers or where Project maintenance procedures could affect aquatic or riparian resources. This assessment will be conducted for a distance of 10

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							<p>Field-based geomorphic assessments should be conducted by a trained professional and extend upstream and downstream until direct and indirect Project impacts are no longer noticeable. Extent of assessments should be considered prior to the field with a desktop investigation of historic aerial photographs, LiDAR maps, maintenance records, and other available sources. Field-based habitat assessments should follow established methods and include main channel aquatic habitat and floodplain habitat connectivity and condition (e.g. DOI, 2015). Field validation for City Light's TR-01 Vegetation Mapping should be conducted within CMZs covering the upstream and downstream extent of the geomorphic assessments and vegetation should be mapped at the Alliance level to provide information on understory vegetation.</p> <p>Wetlands should be included for field data collection for City Light's TR-02 Wetland Assessment, covering the same area as for validation of vegetation mapping. USIT requests an assessment of risk to transmission line towers, townsites, maintenance areas, and other Project facilities from flooding, bank erosion, and channel avulsion. The risk assessment should determine the likelihood and type of maintenance actions and extent of associated resource damage expected to occur over the course of the new license term. Assuming a 30 to 50-year license term, the risk to Project facilities within the CMZ may change considerably from current levels.</p>	<p>bankfull channel widths upstream and downstream from the crossing/ROW.</p> <p>A distance of 10 bankfull widths allows for a representative condition of habitat conditions to be collected.</p> <p>Please see comment responses USFWS-C16, USIT-C112, and USIT-C113 regarding the study area, field validation locations, and NVC level for TR-01 Vegetation Mapping.</p> <p>The TR-02 Wetland Assessment study area includes the area within the Project Boundary and the CMZ from Gorge Powerhouse to the confluence of the Sauk and Skagit rivers. Please see comment response STI-C09 and STI-C10 for criteria for wetland field data collection. An assessment of the potential for channel migration (bank erosion and avulsion) will be made as part of the Erosion and Geologic Hazards Study; a risk assessment for towers, townsites, maintenance areas, and other Project-related facilities will be part of the license application or relevant management plans.</p>
459.	Upper Skagit Indian Tribe	03/08/2021	p. A113	USIT-C111	N/A	TR-01 Section 2.1	<b>Study Goals and Objectives.</b> The Study goals should also include an acknowledgement that this information has broader applications than to just assess ongoing Project impacts to just terrestrial resources. This information is also needed to assess Project impacts to process flows and Essential and Critical habitats for salmonids.	City Light added text to the TR-01 Vegetation Mapping Study goals and objectives acknowledging the importance of vegetation on habitat for salmonids and other aquatic organisms.
460.	Upper Skagit Indian Tribe	03/08/2021	p. A113	USIT-C112	N/A	TR-01 Section 2.4	<b>Study Area.</b> The study area should be expanded to encompass the channel migration zone (CMZ), as this represents the potential area over which process flows may interact with vegetation. As discussed in comments for GE-04, the study should be expanded downstream of the Sauk River confluence and include areas currently isolated by hydromodifications (USIT 2015) that have potential to be engaged with improved process flows.	<p>In response to LP requests for City Light to expand the geographic scope of certain studies to include the reach of river from the Sauk River confluence to its mouth, the delta and the estuary, City Light proposes SY-01 as described in comment response NCCC-C06.</p> <p>The CMZ used in this analysis (provided by NPS) from Gorge Powerhouse to the confluence of the Sauk River is part of the TR-01 Vegetation Mapping study area and includes areas behind hydromodifications.</p>
461.	Upper Skagit Indian Tribe	03/08/2021	pp. A113-A115	USIT-C113	N/A	TR-01 Section 2.5	<b>Methodology.</b> The vegetation maps should be adjusted to include the identification of trees to species, or at least differentiate between deciduous and coniferous trees. Vegetation mapping is needed to assess large wood recruitment from bank erosion and channel migration in the Skagit River downstream of Gorge Dam (see USIT's study request Geomorphology and Anadromous Salmonid Habitat and comments in this filing on GE-04). Coniferous trees recruited to the channel and floodplain generally have greater geomorphic value compared to deciduous trees because they are more durable and resistant to decay. Species of conifer vary in these attributes, making some more desirable than others when considering geomorphic potential (WSDOT, 2019, sec. 10-6.1).	<p>Mapping to the Group level will provide identification of dominant and co-dominant tree species. In addition, LiDAR-derived 95<sup>th</sup> percentile for height, mean height, and rumple will allow classification by seral stage within the CMZ. This information can be used to assess potential for large wood recruitment.</p> <p>Lines denoting channel edges are being developed.</p>

Table No.	Organization	Date	Comment Letter Page	Comment ID No.	PSP Introduction (if §6, relevant ID No. used in PSP of entity's own study request)	Study Plan(s)	Comment	Response
							<p>Lines denoting channel edges should be developed, either from field mapping or aerial photo interpretation. The distance of trees from the channel edge should be determined, as this would inform the potential for recruitment to channels.</p> <p>Stratification for collecting model training and verification data (Section 2.5.8) should include:</p> <ul style="list-style-type: none"> <li>Channel margins, which will help assess whether vegetation is encroaching into the channel due to lack of channel maintenance flows (Wald, 2009).</li> <li>Areas where process flows are likely to erode banks or scour floodplains. The landform mapping study currently being conducted by NPS (Riedel et al., in prep) can be used to help identify these areas, as can the morpho-dynamic model requested in this filing for</li> <li>GE-04 and the approach for determining areas potentially accessible to salmonids requested for FA-02.</li> <li>Existing side channels and off-channel habitats, including those that do not typically become connected under current license conditions but that could exhibit increased connectivity under improved process flows.</li> </ul> <p>Field verification of the areas described above should include measurements of tree size (diameter-at-breast height), which would help predict the geomorphic potential following wood recruitment to the channel.</p> <p>The study should map the age of vegetation along channel banks and within channels, including islands and vegetated gravel bars. This information, when combined with information from other studies, including GE-04, would help identify the downstream extent of Project impacts on channel maintenance and channel forming process flows. For instance, a relatively homogenous age diversity of trees could suggest a lack of sediment transporting flows where channels have been incised and simplified due to the loss of peak flow, sediment, and wood. Additionally, the data would inform assessment of Project impacts on terrestrial energy and prey inputs to anadromous salmonid habitats (see USIT's study request Littoral and Riparian Productivity A3-128).</p> <p>A proxy measure for terrestrial inputs could be developed by using outputs from FA-02 to model the area of vegetated gravel bars, islands, and channel banks inundated under potential flow scenarios. This would help understand Project impacts to aquatic productivity from broken aquatic-terrestrial linkages (see USIT's study request Littoral and Riparian Productivity A3-128). Areas where process flows are likely to inundate floodplains should be mapped to the Alliance level to include understory mapping, which would help assess Project impacts on terrestrial energy and prey inputs to anadromous salmonid habitats. The ongoing NPS landform mapping study (Riedel et al., in prep) could be used to inform selection of areas for mapping to Alliance level. As described above, outputs from the FA-02 model could be used to develop a proxy measure for terrestrial inputs.</p>	<p>The vegetation model will map vegetation to the Group level; stratifications using geomorphic factors are not part of this study plan. DBH was collected at verification sites.</p> <p>Project effects analyses will occur following evaluation of data collected as part of the studies.</p> <p>Within the CMZ from Gorge Powerhouse to the Sauk River confluence, City Light will collect LiDAR-derived statistics of mean height, 95<sup>th</sup> percentile height and rumple index to assess seral stage.</p> <p>Understory species information are being collected at model training and verification sites.</p>
462.	Upper Skagit Indian Tribe	03/08/2021	pp. A116-A117	USIT-C114	Section 6.2.16 (USIT-08)	TR-02	<p><b>Potential Floodplain Connectivity of Off-Channel Aquatic Habitat.</b> In its study request Geomorphology and Anadromous Salmonid Habitat, USIT requested an expanded scope of work for the collection of topo-bathymetric data and installation of piezometers to help understand how the Project impacts off-channel habitats used by anadromous salmonids.</p> <p>On p. 6-43 City Light states:                      "City Light does not believe that deploying a large network of piezometers in off-channel floodplain habitats or an analysis of groundwater inundation across the entire</p>	<p>Please see comment response NPS-C08.</p> <p>Modifications to GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study have been made that address assessing connecting of off-channel habitats with mainstem flows using the 2-D hydraulic model developed for the FA-02 Instream Flow Model Development Study and existing detailed green</p>



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							<p>Skagit River floodplain are necessary because groundwater levels are dependent upon a variety of non-Project factors that are beyond control of the Project and the level of effort required to try to determine Project vs. non-Project factors would be very high compared to the likely usefulness of the data (18 CFR § 5.9(b)(7)).”</p> <p>And:                      “City Light believes that alternatively, if particular side channel or off-channel areas are proposed for specific mitigation measures that require groundwater information, more detail on groundwater at those locations could be collected as part of detailed planning efforts.”</p> <p>City Light did not address USIT’s request to collect topo-bathymetric data, which would improve assessment of off-channel connectivity. City Light misinterprets the scope and scale of USIT’s request related to groundwater monitoring. USIT is requesting a network of piezometers to understand how individual off-channel habitats track main channel flows (please refer to FA-01 comments in this filing for location examples). There is a Project nexus due to the influence of main channel flows on off-channel surface water elevations. This has important consequences for anadromous salmonids, including accessibility to off-channel areas and the influence of hyporheic flow on water quality in seasonally disconnected habitats (please refer to FA-01 comments in this filing). Anadromous salmonids including Steelhead, Chinook, and Coho utilize off-channel areas for rearing because they provide refuge from mainstem flows and predators and because they provide energetically favorable conditions that support high growth. Chum Salmon preferentially spawn in off-channel areas where upwelling and protection from scouring flows provide favorable conditions for incubating eggs. The suggestion that studies should be limited to specific mitigation measures illustrates an important disconnect that has persisted between USIT and City Light since relicensing efforts began over three years ago. USIT seeks information to assess the Project’s ongoing impacts to flow, sediment, and wood downstream of Gorge Dam, which encompass large areas of main channel, off-channel, and floodplain habitats. The information would help develop PMEs to improve the quantity and quality of salmonid spawning and rearing habitats. Specific or localized mitigation measures do not seem likely to provide an adequate remedy, rather PMEs will ideally address Project operations that impact habitats at the reach or river scale</p>	<p>LiDAR data. City Light proposes to assess side channel and off-channel connectivity using the 2-D hydraulic model as part of GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study and then if additional information on specific areas of side channels or off-channel habitat is needed to install appropriate monitoring equipment and collect appropriate topographic information to inform PME evaluations.</p>
463.	Upper Skagit Indian Tribe	03/08/2021	p. A117	USIT-C115	N/A	TR-02 Section 2.1	<b>Study Goals and Objectives.</b> Study goals should be expanded to include providing information to assess ongoing Project impacts to process flows and anadromous salmonid habitat.	Study goals currently include habitat-related data for geomorphology and fish and aquatic studies.
464.	Upper Skagit Indian Tribe	03/08/2021	p. A117	USIT-C116	N/A	TR-02 Section 2.4	<b>Study Area.</b> The study area should be expanded to encompass the channel migration zone (CMZ), as this represents the potential area over which process flows may interact with wetlands. As discussed in comments for GE-04 and FA-01, the study should extend downstream of the Sauk River confluence and include areas currently isolated by hydromodifications that have potential to be engaged with improved process flows	The TR-02 Wetland Assessment Study includes the CMZ from Gorge Powerhouse to the Sauk River confluence. Existing wetland and riparian area vegetation will be considered in the SY-01 Data Synthesis Study.
465.	Upper Skagit Indian Tribe	03/08/2021	pp. A117-A118	USIT-C117	N/A	TR-02 Section 2.5	<b>Methodology.</b> The area considered for collection of model training data (Section 2.5.2) should encompass all areas potentially accessible to anadromous salmonids, including habitats not currently accessible but that might become accessible under alternative process flow scenarios. An approach to determine areas potentially accessible to salmonids using the 2-D hydraulic model is described in comments in this filing on City Light’s proposed study plan FA-02. In addition to USFWS National Wetlands Inventory data and aerial photos, the relative elevation model being developed as part of the ongoing NPS landform mapping study (Riedel et al., in prep) and outputs from the approach referenced above for the 2-D hydraulic model should	<p>Model training data for vegetation mapping was randomly assigned by the model to best sample vegetation polygons in order to improve the efficiency, accuracy, and precision of the results. Sample points were modified for areas that were too remote or difficult to access.</p> <p>Iterative model run results included sampling in a stepwise manner using a similar construct.</p>

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							<p>be used to identify potential wetlands. These areas should be included in model training data collection, and sampling should include protocols for degraded landscapes to help identify wetlands impacted by the Project.</p> <p>The disturbance potential overlay, used to determine the focus of the field and analytical portion of the study (Section 2.5.4), should encompass all areas potentially accessible to anadromous salmonids, including habitats not currently accessible but that might become accessible under alternative process flow scenarios.</p> <p>City Light has not described a method for selecting sites that will be sampled as part of field data collection for wetlands potentially affected by the project (Section 2.5.5). If City Light proposes to sample the entire disturbance potential overlay area, this should be made clearer. Site selection should prioritize habitats accessible, or potentially accessible, to anadromous salmonids, as described above. These habitats have been identified as a limiting factor on the abundance and productivity of Skagit Chinook (SRSC and WDFW, 2005), and are also used by Coho and Steelhead. Sampling should include a detailed assessment of potential connectivity to the main channel (e.g. swales, signs of overland flow, topographic depressions).</p> <p>For wetlands determined to have existing or potential access for anadromous salmonids, topo-bathymetry should be collected and used to refine the model mesh for the 2-D instream flow hydraulic model to improve accuracy of the model for assessing connectivity to off-channel habitats (see study request Geomorphology and Anadromous Salmonid Habitat and comments in this filing related to FA-02). Turbid, non-gravel bottomed channels tend to be inaccurately captured by green lidar. Piezometers should be installed in a subset of wetlands to compare differences in surface elevation between main channel and individual off-channel habitats (see comments in this filing related to FA-01). This will improve the accuracy of the 2-D hydraulic model (see comments in this filing related to FA-02), as well as help identify off-channel areas where groundwater or hyporheic flow is impacted by the Project. These areas should be considered for water quality monitoring, including temperature, dissolved oxygen, and nutrients (see USIT's study request Littoral and Riparian Productivity A3-128 and comments in this filing on FA-01). Informing off-channel water quality will also aid understanding of Project impacts to river and riparian productivity (see USIT's study request Littoral and Riparian Productivity A3-128).</p>	<p>Available floodplain data were used between the Project and the Sauk River confluence to help determine the influence of the Project.</p> <p>Wetlands in areas of potential Project-related disturbance were visited in accordance with the guidelines in the Ecology Western Washington Rating System. Some wetlands in areas of potential Project-related disturbance could not be accessed safely or only with extreme difficulty. These wetlands were still rated but by using available aerial photographs and data collected from nearby similar wetlands.</p> <p>All wetlands in areas of potential Project-related disturbance were rated and visited except as described above, not just those potentially accessible by anadromous fish. While the TR-02 Wetland Assessment may inform some fish issues it was not designed as a fish accessibility study.</p> <p>With respect to comments related to the accuracy of the 2-D instream flow hydraulic model and its application for assessing connectivity to off-channel habitats, please see comment responses NPS-C08, USIT-C22, and USIT-C25.</p>
466.	Upper Skagit Indian Tribe	03/08/2021	p. A118	USIT-C118	N/A	TR-02 Section 2.6	<p><b>Schedule.</b> During the PSP meeting presentations City Light reported the draft study report would be share in March 2022, while the schedule in the City Light PSP packet state draft study report will be completed in 2021. As this study we prioritized to begin early to inform other studies USIT recommends a clarification on schedule in the RSP. As one of the earliest field studies, leveraged studies such as TR-09 Beaver habitat assessment protocols might have not been available for field surveys. It would be helpful for City Light to identify where sampling was not completed in the field as not to bias other dependent field studies.</p>	<p>Data from the TR-01 Vegetation Mapping and TR-02 Wetland Assessment studies is now anticipated to be available mid-summer 2021.</p> <p>The incidental observation and beaver habitat form were developed early and used during 2020 field visits. Sampling sites for this and other studies will be documented in the study reports.</p>
467.	Upper Skagit Indian Tribe	03/08/2021	p. A120	USIT-C119	Section 5.27	TR-09	<p>[provides City Light quote] USIT recommends the study goal should be applied in a broader geographical scope than the engineered chum channels and existing beaver conflict. USIT's study goal includes an evaluation of beaver conflict at the existing engineered channels, but also requests an assessment of project impacts to the species habitat within the project area. A desk top Beaver Intrinsic Potential (BIP) assessment and a planning level feasibility report would provide valuable data for a future beaver relocation and restoration program including; infrastructure and equipment needs, operational costs, assessment processes, regulatory permits, and a monitoring program that could be used during the next license. The information collected in this study plan will guide the development of a future Beaver Management Plan.</p>	<p>The proposed TR-09 Beaver Habitat Assessment includes an analysis of the BIP information for entire the Project Boundary and 2-mile buffer, as well as summarization of existing information provided by agencies and Indian tribes and field data collected during the TR-01 Vegetation Mapping Study, TR-02 Wetland Assessment, TR-03 Rare, Threatened, and Endangered Plants Study, TR-04 Invasive Plants Study, TR-08 Special-status Amphibian Study, GE-02, Erosion</p>

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							<p>On p. 5-26 City Light states:</p> <p>“Tasks associated with the study include:                      (1) Evaluating existing conditions and management activities at off channel habitat areas;                      (2) Mapping beaver occurrence in Project Boundary (incidental observations gathered during fieldwork for all studies; and                      (3) Assessing beaver habitat.”</p> <p>USIT recommends an amendment to the third task and the inclusion of one additional task:                      (3) Conduct the Beaver Intrinsic Potential and other qualitative vegetation mapping in the Project area plus the two-mile buffer.                      (4) Prepare a supplemental planning document to assess the feasibility of a future relocation program feasibility including the assessment of infrastructure and equipment needs, operation cost estimates, assessment processes and permitting, and recommendations for future monitoring programs. The feasibility report could be based off beaver relocation programs in the area, i.e. Tulalip Beaver Project <a href="https://nr.tulaliptribes.com/Programs/Wildlife/Beaver">https://nr.tulaliptribes.com/Programs/Wildlife/Beaver</a>, Beavers Northwest <a href="http://www.beaversnw.org/">http://www.beaversnw.org/</a>, and the Methow Beaver Project, <a href="https://methowbeaverproject.org/">https://methowbeaverproject.org/</a>.</p>	<p>and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study, and GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study that will address geomorphology, wetlands, riparian areas and stream crossings. City Light believes this information will provide the appropriate level of detail for this relicensing.</p> <p>City Light does not propose to include a planning level feasibility report at this time because it is City Light’s opinion that it would be more appropriate for LPs and City Light to first evaluate study results and Project effects and then to discuss with beaver experts (Beavers Northwest, Tulalip Tribe, Methow Beaver Project) whether beaver relocation is warranted and feasible and what options should be considered. City Light also notes that WDFW currently has a pilot project for relocating nuisance beavers (<a href="https://wdfw.wa.gov/species-habitats/living/nuisance-wildlife/beaver-relocation#FAQ">https://wdfw.wa.gov/species-habitats/living/nuisance-wildlife/beaver-relocation#FAQ</a>).</p>
468.	Upper Skagit Indian Tribe	03/08/2021	p. A122	USIT-C120	N/A	TR-09 Section 1.3	<p><b>Study Plan Development.</b> On p. 1-2 – 1-3 City Light states:                      “A study of the City Light Chum channels and beaver habitat suitability in the Project vicinity is proposed to inform future management of the spawning channels. Measures to be considered include physical modifications to the ponds or active removal of beavers (Pollock et al. 2018). Another option that has been brought up by LPs is to relocate beavers from the spawning channels to other suitable locations to benefit ecological processes, salmon habitat, and climate change resiliency.”</p> <p>UST has repeatedly asked for a broader assessment than the existing 6 engineered spawning channels as reservoir management continues to degrade beaver habitats, and lack of downstream (Below Gorge powerhouse) process flows have altered floodplain hydrology, and riparian condition which has direct impacts to beaver habitat. City Light has agreed to assess Beaver Intrinsic Potential (BIP) (Dittbrenner et al 2018) throughout the project area, but artificially constrains the implementation of future actions to just the engineered spawning channels. Although information gained will explicitly inform future management of beaver at the chum channels, the broader intention is to create a management plan that can mitigate ongoing project operations to this keystone species, not how to manage beaver at the 6 spawning channels.</p>	<p>City Light is not limiting consideration of future actions to the constructed Chum channels. While an important study objective is to identify beaver conflicts and inform future management of the constructed channels, the proposed TR-09 Beaver Habitat Assessment will characterize beaver habitat suitability in the study area (the Project Boundary and 2-mile buffer, which includes the entire CMZ between Gorge Dam and the Sauk River) to inform PMEs that could include beaver relocations, if deemed feasible and appropriate. City Light believes that the study, along with results of TR-01 Vegetation Mapping Study, TR-02 Wetland Assessment, FA-02 instream Flow Model Development, GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study, and evaluation of flow management alternatives, will provide useful information for assessing where Project O&amp;M activities (management of flows, vegetation, and roads) could be affecting beaver habitat and where PMEs may be appropriate.</p>
469.	Upper Skagit Indian Tribe	03/08/2021	pp. A122-A123	USIT-C121	N/A	TR-09 Section 2.1	<p><b>Study Goals and Objectives.</b> On p. 1-4 City Light states:                      “The goals of this study are to characterize the ongoing beaver conflicts at the Project’s Chum Salmon off-channel sites and characterize beaver habitat suitability in the study area.”</p> <p>USIT recommends the study goal should be applied in a broader geographical scope than the engineered chum channels and existing beaver conflict. USIT’s study goal includes an evaluation of beaver conflict at the existing engineered channels, an</p>	<p>City Light has revised the Goals statement to: “The goals of this study are to provide information that can be used to address the ongoing beaver conflicts at the Project’s Chum salmon off-channel sites and to characterize beaver habitat conditions in the study area to inform a project effects assessment and development of PME measures.”</p>

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							<p>assessment of project impacts to the species habitat within the project area, a desk top BIP assessment, and a planning level feasibility report for a future beaver relocation and restoration program including; infrastructure and equipment needs, operational costs, assessment processes, regulatory permits, and a monitoring program that could be used to support the development of Beaver Management Plan.</p> <p>On p. 2-1 City Light states:                      “The objectives are as follows:                      ▪ Evaluate beaver conflicts and assess hydrologic and geomorphic issues adversely affecting chum..., at each of City Light Chum off-channel sites                      ▪ Identify where beaver occur in study area based on existing information and field observation during relicensing studies                      ▪ Map beaver habitat suitability of aquatic habitat in the study area, and provide information useful for potential future relocations aimed at reducing Chum channel conflicts and enhance ecological functions...in the watershed.”</p> <p>USIT and other tribes and agencies of the NCC have enough existing information to assess conflicts at the Chum off channel sites and has already been sharing the data with City Light. USIT is encouraged by City Light’s willingness to assess hydrologic and geomorphic issues at the Chum off channel site, but requests additional specifics on the methodology proposed, during the PSP process as USIT currently understands that City Light is rejecting studies that could address the hydrology and geomorphic conditions at these sites. USIT appreciates the early coordination amongst field studies to begin mapping beaver occupancy within the project area and buffer. USIT requests that City Light follow BIP methodologies from Dittbrenner et al. 2018 and not attempt to replicate City Light’s previous efforts of mapping Habitat Suitability Indexes within the project area and associated buffers. Lastly USIT is requesting a specific objective includes a feasibility assessment for a Beaver Relocation Program.</p>	<p>City Light agrees that objectives should include:                      1) summarization of beaver conflicts at the engineered channels using existing information from Indian Tribes and NCC/FCC;                      2) identifying locations where Project O&amp;M affects wetland and riparian habitats important for beaver; and                      3) use of BIP mapping and data from Indian Tribes, agencies, and relicensing studies to inform PME development.</p> <p>Please see response to USIT-C119 for the feasibility report. City Light thinks the feasibility report for a future beaver relocation and restoration program is more appropriate to discuss after study results are compiled. City Light stands ready to work with Upper Skagit Indian Tribe and other LPs on the topic.</p> <p>City Light acknowledges the receipt of data referencing the existing conditions at the Chum channels and has referenced this data in Section 2.1.</p> <p>City Light has revised the study’s objectives to eliminate the on-site field evaluation of conflicts at the Chum channels; and to indicate that Chum channel conflicts will be summarized from existing Indian Tribe and FCC/NCC information.</p> <p>City Light is not rejecting studies that could address hydrology and geomorphic conditions. City Light clarified that the current geomorphic and habitat conditions of the Chum channels as well as hydrologic connectivity, water depth, velocity and shear stress using the FA-02 Instream Flow Model Development Study results for various flows will be assessed as part of the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study.</p> <p>City Light is not replicating previous efforts of mapping Habitat Suitability Indices and has revised the study plan to focus primarily on the BIP data and current and historic beaver observations and activity.</p>
470.	Upper Skagit Indian Tribe	03/08/2021	p. A123	USIT-C122	N/A	TR-09 Section 2.2	<p><b>Resource Management Goals.</b> On p. 2-1 City Light states:                      “City Light’s goal is to gain an understanding of the current conditions at the Chum off-channel sites and the issues caused by beaver activity and to assess overall beaver habitat potential...”</p> <p>USIT and other tribes and agencies have enough information relating to the existing beaver habitat conditions at the Chum off-channel sites. However, USIT’s goal is not to understand what problems beaver have caused, but the goal is to understand how</p>	<p>City Light has made revisions to the Resource Management Goals section.</p>

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							project operations cause an impact to this keystone species for wetland and riverine habitat resiliency and complexity important to tribal culture and salmonid recovery.	
471.	Upper Skagit Indian Tribe	03/08/2021	pp. A123-A124	USIT-C123	N/A	TR-09 Section 2.3	<p><b>Background and Existing Information.</b> During the last license study period City Light conducted a habitat suitability assessment of beaver habitat (Envirosphere 1988) around Ross Reservoir highlighting significant loss of habitat. This assessment was isolated to Ross Reservoir and was not conducted for the other reservoirs nor was it conducted downstream of the project in the study area. USIT requests this information should be referenced in the background and existing information section, as USIT believes that much of the habitat quantified in the original study is still undergoing operational impacts as fluctuating reservoir levels impact both riparian and tributary habitats in the drawdown zone and to some effect above the drawdown zones.</p>	<p>Envirosphere (1988) conducted the quantitative analysis of pre- and post-Project habitat using Habitat Evaluation Procedures (HEP) Study for Ross Lake but not the other reservoirs because, "The steep, rocky terrain surrounding Gorge and Diablo during both the pre- and post-impoundment periods is not beaver habitat." (pg 3-20). Although, under current conditions, beaver activity does occur in upper Gorge Lake near Reflector Bar. City Light has added reference to the information in Section 2.3 of the study plan.</p> <p>City Light believes that the TR-09 Beaver Habitat Assessment, along with the TR-01 Vegetation Mapping Study, TR-02 Wetlands Assessment, GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study, FA-02 Instream Flow Model Development Study, and GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study, will provide adequate information for assessing habitat conditions and Project effects and will inform PMEs in the Project Boundary as well as in the CMZ to the Sauk River. This will include the fish and wildlife mitigation lands that were acquired to protect riparian, wetland, and upland wildlife habitats, including a number of areas supporting beavers.</p>
472.	Upper Skagit Indian Tribe	03/08/2021	p. A124	USIT-C124	N/A	TR-09 Section 2.4	<p>Project Operations and Effects on Resources. USIT is committed to sharing data collected during the ongoing efforts to manage the off channel engineered spawning channels for both chum salmon and beavers. USIT and other agencies in collaboration with the NCC have been collecting adult chum spawning data, and more recently USIT has been evaluating both beaver use and alternative management strategies designed to accommodate beaver occupation. Strategies to date have included; restoring riparian vegetation communities, relocation of instream habitat features (e.g. LWD), beaver exclusionary fences at culverts, beaver deceivers and fish passage boxes, and seasonal beaver dam removal. The NCC has also approved lethal beaver trapping in several of the channels when all other methods to managing the beaver have failed.</p> <p>City Light continues to propagate an opinion that Project operations due not impact the species outside of the engineered spawning channels. The conflict with this approach is highlighted from the text. On p. 1-4 City Light states:                      "As reservoirs with large annual water level fluctuations preclude beaver use (Allen 1983), Ross Lake is not suitable habitat."                       The next paragraph states:                      "There is no documentation that beaver distribution or abundance in the Skagit River and tributaries up and downstream of the dams are adversely affected by the Project."                       City Light agreed to the Study Area and is proposing to conduct the BIP through in all three reservoirs and a two-mile buffer as stated during the PSP meeting #4 1/14/21</p>	<p>The TR-09 Beaver Habitat Assessment Study Plan has been revised to more clearly describe how the study will document conditions throughout the study area, how results will be used to describe ongoing Project effects from management of flows, vegetation, and roads, and how results can be used for PME development.</p>

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							meeting slide 129 (Appendix C424), and passively collect beaver occupation when conducting other vegetation, wetland, or other surveys during the study period. Therefore, USIT explicitly requests that City Light acknowledges ongoing reservoir operations are an impact to beaver habitats, distribution and occupancy throughout the project area. As that conceptual agreement would facilitate an approved alignment of USIT study goals and City Light's in efforts to collect the necessary data to inform future managements plans and to off-set project ongoing impacts.	
473.	Upper Skagit Indian Tribe	03/08/2021	p. A124	USIT-C125		TR-09 Section 2.6	<b>Methodology.</b> A new section should be added to support the development of the planning level feasibility report for future beaver restoration and relocation programs.	Please see comment response USIT-C121.
474.	Upper Skagit Indian Tribe	03/08/2021	p. A125	USIT-C126		TR-09	<b>Requested Study Methods.</b> USIT is requesting that a feasibility assessment be completed to inform the assessment and feasibility of a future Skagit Beaver Relocation Program. It should be noted that methods developed to address reservoir habitat for beavers has direct ties with habitat quality methods recommend in USIT's comments to FA-04 in this filing for evaluating littoral and riparian habitat quality.	Please see comment response USIT-C121.
475.	WDFW	03/08/2021	pp. 10-12	WDFW-C03	N/A	TR-08 Section 5.26	<p>TR-08 Special-status Amphibian Study. Numerous times during the last two years, WDFW has asked SCL to include the Big Beaver Creek, Valley, and wetlands in their study area. SCL has refused to add this area into their survey, which has a population of federally-listed species, Oregon spotted frog (<i>Rana pretiosa</i>) and possibly Washington State Candidate and Priority Species, the Columbia spotted frog (<i>Rana luteiventris</i>) (Holmes and Glesne 1997). The Big Beaver Valley and Wetlands resides within the FERC Project Boundary and withing the project effects area. Ross Reservoir has acted as a source population for the non-native, invasive reed canarygrass (<i>Phalaris Arundinacea</i>) that has migrated, probably gradually over land or via beaver, and has invaded and degraded the wetlands of the spotted frog populations.</p> <p>The operation of the reservoir also affects the interaction of the frogs with reservoir bull and rainbow trout that have now become larger in size due to the explosion of the Ross Reservoir redbreast shiner population. The increase in water elevation, during the summer allows access over a fish passage barrier to Beaver Creek and any hydraulically connected wetlands. WDFW has a picture (Riedel 2021) of the natural resident fish passage barrier, a water falls below, not during full pool. Access by larger reservoir fish increase the chances for predation, not only frog juveniles, but possibly adults due to the larger size of the reservoir fish, something that has only happened in the last 20 years. WDFW recommends that SCL include this Big Beaver Creek Valley to the Wetlands and the Big Beaver Wetland to the Special-Status Amphibian Survey Study Plan, so that they can understand the extent of the population, which would affect management of the wetland. SCL and National Park Service currently conducts reed canarygrass management in the wetland. The survey and mapping of the location of the special-status frog population could help inform management of reed canarygrass, operation of the reservoir between the levels that affect fish passage, and possible future disturbances by Project related recreation.</p>	<p>City Light respectfully disagrees that adding Big Beaver Valley to the study area is justified.</p> <p>The TR-08 Special-status Amphibian Study Plan discusses evidence regarding the range of Oregon spotted frog, which does not appear to include Big Beaver Valley. (See Holmes and Glesne 1999, 2000, discussing Michael Blouin genetic analyses.) City Light also disagrees with WDFW's conclusions about the effects of fish on frogs in the Big Beaver Valley, and in particular that (1) fish are more widely distributed or larger than they were previously (when Holmes and Glesne performed surveys); or (2) that fish are having a greater effect on frog populations than previously. Holmes and Glesne found Columbia spotted frog at beaver-dammed wetlands in Beaver Valley, including sites with fish, after the creation of Ross Lake.</p> <p>City Light also is not aware of evidence that the distribution of fish in Big Beaver Valley has changed to the detriment of frog populations. Population declines of spotted frog species are generally associated with introduction of non-native fishes, whereas populations coexist with native fishes where dense vegetation and shallow edges provide hiding cover and habitat separation from fish.</p> <p>City Light has expressed its support for efforts to control, manage, or eliminate reed canarygrass infestations. City Light believes these efforts are best addressed in a separate management plan, to be developed in consultation with interested LPs. With respect to this study plan, City Light has not seen evidence that Project operations will foreseeably spread reed canarygrass to wetlands</p>

Table No.	Organization	Date	Comment Letter Page	Comment ID No.	PSP Introduction (if §6, relevant ID No. used in PSP of entity's own study request)	Study Plan(s)	Comment	Response
								<p>upstream of the Project in Big Beaver Valley or that Columbia spotted frog or other amphibians are being adversely affected at specific locations. City Light does not agree that Project reservoir fluctuation has a documented effect on spread of reed canarygrass. The widespread nature of reed canarygrass in the Pacific Northwest, including isolated wetlands, demonstrates that infestations may arise from distant source populations and by multiple vectors.</p>

**REVISED STUDY PLAN**

**APPENDIX F**

**CITY LIGHT'S STUDY PLANS**