



VIA ELECTRONIC FILING

June 6, 2022

KIMBERLY D. BOSE
SECRETARY
FEDERAL ENERGY REGULATORY COMMISSION
888 FIRST STREET, NE
WASHINGTON, DC 20426

Re: Skagit River Hydroelectric Project, FERC Project No. 553-235 – Response to Comments on Initial Study Report Meeting Summaries and Requests for Modifications to Ongoing Studies and Requests for New Studies

Dear Secretary Bose:

In accordance with the Federal Energy Regulatory Commission’s (FERC or Commission) regulations at 18 C.F.R. § 5.15(c)(5), the City of Seattle, Washington, through its City Light Department (City Light), hereby files with the Commission its responses to comments from licensing participants (LPs) on the Initial Study Report (ISR) meeting summaries and requests for modifications to ongoing studies and requests for new studies for the relicensing of the Skagit River Hydroelectric Project (FERC Project No. 553) (Project).

Background

The current license for the Project expires on April 30, 2025. In accordance with the Commission’s Integrated Licensing Process regulations, 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. After extensive PSP meetings and careful review of LP comments on the PSP, City Light significantly expanded and modified its PSP in the Revised Study Plan (RSP) filed on April 7, 2021, which included a proposed suite of 33 relicensing studies. Following filing of the RSP, City Light continued to work with LPs to attempt to resolve outstanding areas of disagreement regarding the proposed studies. On June 9, 2021, City Light filed a “Notice of Certain Agreements on Study Plans for the Skagit Relicensing” (June 9, 2021 Notice) detailing additional modifications to the RSP that were agreed to between City Light and supporting LPs. The Commission issued its Study Plan Determination on July 16, 2021, approving with modifications City Light’s RSP. No study disputes were filed with the Commission.

City Light filed the ISR with the Commission on March 8, 2022. The ISR described City Light’s progress in implementing its relicensing studies included in the RSP and the June 9, 2021

Notice, summarized available data, and described any variances from the approved study plans and proposed modifications to the ongoing studies.

In accordance with the Commission’s regulations at 18 C.F.R. § 5.15(c)(2), on March 21, March 22, and March 23, 2022, City Light held a series of virtual public ISR meetings with LPs and Commission staff to discuss the initial study results. City Light appreciates the participation of federal and state resource agencies, Indian Tribes and First Nations, and other LPs in the ISR Meetings. City Light filed the ISR Meeting Summaries on April 7, 2022 consistent with the Commission’s regulations at 18 C.F.R. § 5.15(c)(3).

The Commission’s regulations at 18 C.F.R. § 5.15(c)(4) provide that any participant or Commission staff may file a disagreement concerning the ISR Meeting Summaries within 30 days, setting forth the basis for disagreement. Any such filing must also include any requested modifications to ongoing studies or proposed new studies. Fourteen LPs filed comments on the ISR Meeting Summaries and/or requests for modifications to ongoing studies or requests for new studies, as shown below in Table 1.

Table 1
Licensing Participants Filing Comments on the ISR Meeting Summaries
and/or Requests for New or Modified Studies

Filing LP	Filing Date
Skagit County Dike and Drainage Flood Control Partnership and Skagit County, Washington	March 28, 2022
Craig Cooper (individual)	April 27, 2022
Lydia B. Cooper (individual)	April 29, 2022
Mary F. Black (individual)	May 5, 2022
Skagit County Dike and Drainage Flood Control Partnership and Skagit Drainage and Irrigation Districts Consortium	May 5, 2022
Skagit County, Washington	May 5, 2022
National Marine Fisheries Service	May 6, 2022
U.S. Fish and Wildlife Service	May 9, 2022
Washington State Department of Fish and Wildlife	May 9, 2022
Swinomish Indian Tribal Community	May 9, 2022
American Whitewater	May 9, 2022
Upper Skagit Indian Tribe	May 9, 2022
Whooshh Innovations, Inc.	May 10, 2022
National Park Service	May 10, 2022

Pursuant to 18 C.F.R. § 5.15(c)(5), City Light is filing this response to comments received on the ISR Meeting Summaries and requests for modifications to ongoing approved studies and proposed new studies. As provided in 18 C.F.R. § 5.15(c)(6), the Commission’s Director of the

Office of Energy Projects (Director) will resolve any disagreements and amend the study plan, as appropriate, within 30 days of the date of this filing (i.e., on or before July 6, 2022).

Pursuant to 18 C.F.R. § 5.15(d) of the Commission's regulations, any request to modify an ongoing study must be accompanied by a showing of good cause why the request should be approved, and must include a demonstration that: (1) the approved studies were not conducted as provided for in the approved study plan; or (2) the study was conducted under anomalous environmental conditions, or that environmental conditions have changed in a material way. Pursuant to 18 C.F.R. § 5.15(e) of the Commission's regulations, any request for a new study at this stage in the integrated licensing process (ILP) must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a statement explaining: (1) any material changes in the law or regulations applicable to the information request; (2) why the goals and objectives of any approved study could not be met with the approved study methodology; (3) why the request was not made earlier; (4) significant changes in the project proposal or that significant new information material to the study objectives has become available; and (5) why the new study request satisfied the study criteria in § 5.9(b).

City Light provides responses to actionable requests received from the LPs on the ISR Meeting Summaries and proposed modifications to the ongoing studies and new study requests in the comment/response table attached as Appendix 1. In addition, City Light responds below to certain of the more significant proposed modifications to ongoing studies and new study requests proposed by the LPs.

Third Study Season

Several LPs stated that a third study season will be necessary before City Light's final license application will be ready for environmental review. LPs assert the third study season will allow sufficient time to acquire the necessary data and completely evaluate Project effects.

In light of the challenges presented by the pandemic as well as the timing of the Study Plan Determination (July 16, 2021), for a limited number of studies, field studies and analysis may extend into late 2022 or early 2023. For these studies, while final study results may not be available with lead time desired by some LPs to inform substantive discussions regarding protection, mitigation and enhancement (PME) measures for inclusion in the new license, preliminary data and actionable findings will be available to inform development of the license application. Where it is determined that additional information is necessary to finalize PME measures, final proposals related to these topics may be developed and submitted to the Commission after the license application is submitted. If this occurs, City Light and the LPs may request that the Commission not issue the "Ready for Environmental Analysis" (REA) notice until such studies are completed and submitted to the Commission. This would ensure that City Light and the LPs have enough time to develop a complete record for the mandatory conditioning

agencies, Washington Department of Ecology Section 401 Certification, and the U.S. Fish & Wildlife/National Marine Fisheries Service (NMFS) Endangered Species Act consultation.

Extending the CE-QUAL-W2 Modeling to the Highway 9 Bridge

Several LPs requested that City Light further extend the CE-QUAL-W2 modeling and discrete sampling of critical water quality parameters under the FA-01 Water Quality Monitoring Study to the Highway 9 Bridge.

City Light agreed to modify the FA-01 Water Quality Monitoring Study to include the development of a CE-QUAL-W2 model to evaluate potential temperature impacts from the Project on aquatic resources as part of the June 9, 2021 Notice (FA-01a Water Quality Monitoring Study and FA-01b Water Quality Model Development Study). In January 2022, at the request of LPs, City Light further agreed to extend the downstream boundary of the model from Project River Mile (PRM) 65 near the confluence with the Sauk River, to PRM 54 at Concrete. At the recent Resource Work Group meetings with LPs, study leads have explained that potential Project effects on water temperature downstream of Concrete would be difficult to discern, due to intervening influences, including the operations of Puget Sound Energy's Baker River Project. Detecting possible water quality effects, for example effects on nutrient dynamics, would be even more challenging, given the complex array of factors influencing nutrients between the Project and the lower Skagit River below Concrete, such as agricultural and municipal runoff. Moreover, the extent of modeling, which was already expanded from the Sauk River confluence downstream to Concrete, is more than sufficient to evaluate potential Project impacts on temperature and water quality in the Skagit River.

The LPs have not demonstrated that the FA-01 Water Quality Monitoring Study was conducted in a manner inconsistent with the approved study plan or was conducted under anomalous conditions. 18 C.F.R. § 5.15(d). Nor have they identified significant new information material to the study objectives or an identified Project effect that warrants expansion of the modeling effort. *Id.* § 5.9(b). Accordingly, City Light does not agree that the CE-QUAL-W2 modeling should be extended.

Filling Data Gaps Under SY-01

Several LPs have requested that City Light develop a schedule for filling data gaps and methods for determining Project impacts downstream of the Sauk River confluence.

As described above, for certain studies, there may be a need for data collection efforts to extend beyond the filing of the final license application to fill any identified data gaps. City Light will not know which studies, if any, will require additional data collection until later in 2022. If additional data collection is necessary, City Light and the LPs may request that the Commission not issue the REA notice until such studies are completed and submitted to the Commission.

With regard to determining potential Project impacts downstream of the Sauk River confluence, the SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit

River (Synthesis Study) was proposed as a desktop study to develop a comprehensive data set of existing information on the Skagit River between the Sauk River confluence and the estuary. As noted in the RSP, quantification of Project-related effects on anadromous fish resources in the lower Skagit River represents a significant scientific challenge given the multitude of factors interacting with resources and processes in the lower Skagit River. As part of the June 9, 2021 Notice, City Light committed to perform additional data field studies in year two to fill data gaps in the SY-01 Synthesis Study that are not addressed in the study or in other studies below the Sauk River. City Light is interpreting this commitment to require identification of studies that could be conducted in the second year of study. As noted in the ISR, the determination of additional data collection needs, if any, is on hold awaiting the results of the desktop analysis portion of the SY-01 Synthesis Study and for other studies to be completed. City Light expects to determine if additional data collection is needed by Quarter 4 of 2022. If data gaps are identified that cannot be filled in the second year of study, but are more long term in nature, City Light and the LPs should confer to discuss the content and schedule of additional data collection efforts.

Forward Looking Infrared (FLIR) Survey

Several LPs requested that City Light collect FLIR data and assess groundwater influences under the FA-01 Water Quality Monitoring Study, FA-02 Instream Flow Model Development Study, and GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study. City Light also recently hosted a FLIR workshop, at which LPs requested City Light to conduct a FLIR survey in the Skagit River downstream of the Project and in Project reservoirs during summer 2022.

The collection of FLIR data is not necessary to complete relicensing studies. City Light asserts that in order to develop a meaningful relationship between Project operations and the effects of surface flow on groundwater dynamics, FLIR would need to be applied over a range of flows. Conducting a single FLIR analysis during 2022, as requested by LPs, would not provide sufficient additional value to support an analysis of Project effects and identification of PME to include in the license. City Light recognizes the value of identifying and mapping undetected sources of groundwater influx but has determined that such mapping would be better suited to supporting development of habitat enhancement measures following issuance of the new Project license.

Regarding the application of FLIR to Project reservoirs, this is a new study request under 18 C.F.R. § 5.15(e). The LPs' request does not meet the Commission's criteria for a new study at this point in the ILP. The LPs have not identified any material changes in the law or regulations applicable to the information request. Nor have they established why the goals and objectives of the FA-01 Water Quality Monitoring Study, FA-02 Instream Flow Model Development Study, and GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study could not be met with the approved study methodology. Finally, the LPs have not explained why the request was not made earlier or identified any significant changes in the Project proposal or that significant new information material to the study objectives has become available.

City Light's response to LPs' request to conduct a FLIR survey in the Skagit River and Project reservoirs was circulated to the LPs by email on May 18, 2022. A copy is attached hereto as Appendix 2.

Assessing Stranding and Trapping Risks

LPs noted in their comments that City Light should reconsider the methods used for evaluating stranding and trapping (S&T) risks in the Skagit River below Gorge Dam under the FA-02 Instream Flow Model Development and FA-03 Reservoir Fish Stranding and Trapping Risk Assessment.

City Light implements a S&T monitoring program under the current FERC license, as required by the Fisheries Settlement Agreement and updated in NMFS's Biological Opinion (2012). Current monitoring program methods are based on decades of S&T investigations on this effect in the Skagit River. The culmination of historic investigations is described in R.W. Beck & Associates (Beck 1989) and represents the best available method for accurately estimating and monitoring stranding risk throughout the downstream reach of the Skagit River. The methods used for testing the effects of different flow regimes, ramping rates, and daily amplitude variability, which are described in Beck (1989) and the NMFS monitoring plan, are specifically designed to operate in a dynamic river system. Two main categories of variability are considered in the methodology: natural effects, such as fish size, bar slope, substrate size, time of day, and species; and anthropogenic effects, such as ramping rate, amplitude, and total discharge. The advantage of this approach is that the monitoring and results are robust to changing river morphology and are repeatable across space and time. The current approach results in an index of relative risk defined as "number of stranded fish per 100' of dewatered bar." Periodic monitoring efforts are implemented under the guidance of the current license Flow Coordinating Committee (FCC) comprised of representatives of City Light and the LPs.

Concerns with historic studies, monitoring methods, and the need for reevaluation can all be raised and discussed within the FCC framework. However, current monitoring results indicate a level of stranding risk which is lower than the rate which is described in Beck (1989). This indicates that the fry protection measures are effective and that the monitoring approach can detect changes in relative risk. LPs have not demonstrated that the current S&T methods are ineffective or that the FA-02 Instream Flow Model Development and FA-03 Reservoir Fish Stranding and Trapping Risk Assessment should be modified. As part of the FCC, City Light will continue to work with LPs regarding concerns and outcomes of these discussions, as appropriate, that may inform development of measures in the license application.

Conclusion

For the reasons described above, City Light asserts that any modifications to the approved study plan or new studies are not warranted and respectfully requests that the Director take City Light's responses to these comments into consideration in any decision regarding requests to amend the approved study plan.

City Light looks forward to continued collaboration with LPs and FERC staff in implementing the study program for the Project's relicensing. If there are any questions regarding this filing, please contact me by phone at (206) 304-1210 or by email at Chris.Townsend@seattle.gov.

Sincerely,



Chris Townsend (Jun 6, 2022 12:12 PDT)

Chris Townsend
Director, Natural Resources and Hydro Licensing
Seattle City Light

Enclosures

cc: Skagit Licensing Participants

**SKAGIT RIVER HYDROELECTRIC PROJECT
RESPONSE TO COMMENTS ON INITIAL STUDY REPORT MEETING
SUMMARIES AND REQUESTS FOR MODIFICATIONS TO ONGOING
STUDUES AND REQUESTS FOR NEW STUDIES**

APPENDIX 1

COMMENT/RESPONSE TABLE

Appendix 1: Comment/Response Table

Study Number	Licensing Participant(s)	Summary of Request ¹	Response
n/a	National Marine Fisheries Service (NMFS) National Park Service (NPS) Swinomish Indian Tribal Community U.S. Fish and Wildlife Service (USFWS) Upper Skagit Indian Tribe Washington Department of Fish and Wildlife (WDFW)	Several LPs noted a need to ensure enough time is given for adequate study-cross-walks that fully and completely evaluate Project effects with no data gaps and best available science, and that City Light will not have sufficient time to acquire the necessary data and prepare documentation necessary for the license application. LPs assert that a third study season is necessary before the license application will be ready for environmental review.	<p>In light of the challenges presented by the pandemic as well as the timing of the Study Plan Determination (July 16, 2021), for a limited number of studies, field studies and analysis may extend into late 2022 or early 2023. For these studies, while final study results may not be available with lead time desired by some LPs to inform substantive discussions regarding protection, mitigation and enhancement (PME) measures for inclusion in the new license, preliminary data and actionable findings will be available to inform development of the license application. Where it is determined that additional information is necessary to finalize PME measures, final proposals related to these topics may be developed and submitted to the Federal Energy Regulatory Commission (FERC) after the license application is submitted. If this occurs, Seattle City Light (City Light) and the licensing participants (LP) may request that the Commission not issue the “Ready for Environmental Analysis” (REA) notice until such studies are completed and submitted to the Commission. This would ensure that City Light and the LPs have enough time to develop a complete record for the mandatory conditioning agencies, Washington Department of Ecology (Ecology) Section 401 Certification, and the USFWS/NMFS Endangered Species Act (ESA) consultation.</p> <p>Ultimately, the results of these studies will be comprehensively analyzed together with other available information, including that from the Pre-Application Document (PAD), in order to evaluate the environmental effects of the Skagit River Hydroelectric Project (Skagit River Project or Project) proposal to be described in the license application. The license application will also include a description of any anticipated environmental impacts of continued operation of the Project, the incremental impact of any proposed equipment and/or capacity upgrades or redevelopment of Project works, implementation of PME measures, and any other proposed changes in Project operation. It is City Light’s intent to engage in discussions with LPs with a goal of reaching mutual agreement on a comprehensive Project proposal, inclusive of appropriate PME measures, management plans,</p>

¹ The intent of this matrix is to provide a brief summary of requests received in the fourteen filings identified in Table 1 of the Transmittal Letter. The summary of requests provided in this matrix are not verbatim representations of the LP’s ISR comments.

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Study Number	Licensing Participant(s)	Summary of Request ¹	Response
			and a Project operations proposal to be presented in the license application. City Light will file a Draft License Application (DLA) with FERC no later than December 1, 2022 and a Final License Application (FLA) no later than April 30, 2023.
CR-02 CR-04	Upper Skagit Indian Tribe	The addition of one more year to more thoroughly gather necessary information during implementation of the CR-02 and CR-04 studies will better align with the Section 106 consultation process, including sufficient time for agency and ACHP reviews.	City Light acknowledges that the schedules related to the Section 106 consultation process and FERC process do not align; current guidelines from FERC also acknowledge this. As stated in the 2002 <i>Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects</i> issued by FERC and the Advisory Council on Historic Preservation (ACHP) (pages 11-12): “It is not good practice to defer all identification and evaluation of historic properties until after the license is issued, especially with large and/or complex Projects. However, it is not necessary to complete identification of each and every historic property within the APE before licensing.” Accordingly, it is not City Light’s intent to complete all historic property identification efforts during study implementation prior to obtaining the new license. City Light anticipates that FERC will develop and implement a programmatic agreement (PA) in compliance with 36 C.F.R. § 800.4(b)(2), which will require development of an Historic Properties Management Plan (HPMP). The PA and HPMP will outline a phased process for completing historic property identification efforts, assessments of adverse effects, and resolution of adverse effects under the new FERC license. However, it is City Light’s intent to complete consultation with Section 106 consulting parties on National Register evaluations as possible during study implementation, and to preliminarily assess Project-related adverse effects on historic properties as feasible during the study period. City Light acknowledges that while study implementation will provide significant information, the Integrated Licensing Process (ILP) does not allow sufficient time to complete all National Register evaluations or assessments of adverse effects for all respective resources identified during the study. Given this, City Light provided an updated schedule for the CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study in the Initial Study Report (ISR), which extended the reporting effort well into 2023 to allow for additional time for consultation with Section 106 consulting parties. City Light expects that historic property identification,

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			assessment of adverse effects, and determining avoidance, minimization, and mitigation measures for adverse effects on historic properties will continue under the HPMP that will be implemented under the new license. City Light anticipates that FERC will enter into a PA with City Light, ACHP, the NPS, and the Department of Archaeology and Historic Preservation (DAHP), with other Section 106 consulting parties as invited signatories. City Light will develop a draft HPMP in consultation with the Section 106 consulting parties, which will be filed with FERC as part of the FLA. In regard to ACHP reviews, City Light reached out to the ACHP on March 12, 2021 to invite its participation in the CRWG meetings; however, the ACHP declined to participate on March 17, 2021. FERC will invite ACHP to participate in the development of the PA and HPMP pursuant to 36 C.F.R. Part 800 and Appendix A to Part 800 (Criteria for Council Involvement in Reviewing Individual Section 106 Cases).
CR-02 CR-04	Upper Skagit Indian Tribe	City Light should develop a clear methodology that provides Tribes (and other LPs) with the steps that City Light will use to clarify the meaning of “focus evaluation efforts on individual resources’ eligibility” in its compliance with Section 106 guidelines.	The intent of City Light’s statement: “focus evaluation efforts on individual resources’ eligibility” is to provide clarification on this aspect of Section 106 compliance (as described in 36 C.F.R. § 800.4). City Light is implementing the cultural relicensing studies as outlined in the Revised Study Plan (RSP), which follows the steps in 36 C.F.R. § 800.4 and § 800.5 to identify historic properties and assess adverse effects. Accordingly, historic property categories include districts, sites, buildings, structures, and objects, as outlined in National Register Bulletin 15 and as defined at 36 C.F.R. § 800.16(l). As described in the CR-04 Inventory of Historic Properties with Traditional Cultural Significance study plan, this includes considering properties that have significance as traditional cultural properties and traditional cultural landscapes. Successful compliance with the Section 106 process does not require resources to go through the nomination process to be listed in the National Register.
FA-01	NMFS NPS Upper Skagit Indian Tribe USFWS WDFW	City Light should extend CE-QUAL-W2 modeling and discrete sampling of critical water quality parameters to the highway 9 bridge.	City Light agreed to modify the FA-01 Water Quality Monitoring Study to include the development of a CE-QUAL-W2 model to evaluate potential temperature impacts from the Project on aquatic resources as part of the June 9, 2021 Notice of Certain Agreements on Study Plans for the Skagit Relicensing (June 9, 2021 Notice) (FA-01a Water Quality Monitoring Study and FA-01b Water Quality Model Development Study). In January 2022, at the request of LPs, City Light

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Study Number	Licensing Participant(s)	Summary of Request ¹	Response
			<p>further agreed to extend the downstream boundary of the model from Project River Mile (PRM) 65 near the confluence with the Sauk River, to PRM 54 at Concrete. At the recent Resource Work Group meetings with LPs, study leads have explained that potential Project effects on water temperature downstream of Concrete would be difficult to discern, due to intervening influences, including the operations of Puget Sound Energy’s Baker River Project. Detecting possible water quality effects, for example effects on nutrient dynamics, would be even more challenging, given the complex array of factors influencing nutrients between the Project and the lower Skagit River below Concrete, such as agricultural and municipal runoff. Moreover, the extent of modeling, which was already expanded from the Sauk River confluence downstream to Concrete, is more than sufficient to evaluate potential Project impacts on temperature and water quality in the Skagit River.</p> <p>The LPs have not demonstrated that the FA-01 Water Quality Monitoring Study was conducted in a manner inconsistent with the approved study plan or was conducted under anomalous conditions. 18 C.F.R. § 5.15(d). Nor have they identified significant new information material to the study objectives or an identified Project effect that warrants expansion of the modeling effort. 18 C.F.R. § 5.9(b). Accordingly, City Light does not agree that the CE-QUAL-W2 modeling should be extended.</p>
FA-01	Upper Skagit Indian Tribe	City Light should evaluate the influence of Project operations on water quality conditions in off-channel and floodplain habitats.	City Light is addressing water quality in off-channel habitats in two ways: (1) level loggers installed at 16-20 (4 pending installation) off-channel locations will provide concurrent water level and temperature data that can be used to link conditions in off-channel areas to mainstem flows; and (2) off-channel locations near the mainstem are being evaluated for inclusion in the CE-QUAL-W2 model. Initial selection will be based on information as part of a study being funded by City Light as part of current license implementation (“Evaluation of Off-Channel Chinook habitats”) and the GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study. City Light will confer with the Upper Skagit Indian Tribe to confirm which off-channel areas can and will be modeled.

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Study Number	Licensing Participant(s)	Summary of Request ¹	Response
FA-01	NMFS Upper Skagit Indian Tribe	Increase vertical profile nutrient sampling in Project reservoirs near the reservoir inlet creeks. Additional sampling in Project reservoirs should consider potential tributary inputs.	As part of its scope revisions to the FA-01 Water Quality Monitoring Study, City Light will conduct nutrient sampling at the mouths of tributaries to Ross Lake (Little Beaver, Lightning, Big Beaver, and Ruby creeks and Skagit River inflow, via the U.S. Geological Survey [USGS]), Diablo Lake (Thunder Creek Arm), and Gorge Lake (Stetattle Creek). Nutrient samples will be collected at three depths along a vertical profile once per month from May-October and one or two times in winter. This sampling approach was identified by City Light’s water quality modeling team and considered sufficient for developing CE-QUAL-W2 models of each reservoir. Once calibrated, these models will be able to simulate nutrient concentrations longitudinally throughout the reservoirs. As a result, City Light does not believe that LPs have demonstrated good cause that additional nutrient sampling in the reservoirs near the reservoir inlet creeks is necessary or warranted. <i>See</i> 18 C.F.R. § 5.15(d) (requiring a showing of good cause why a proposed modification to a study is appropriate, including that the approved study was not conducted as provided for in the approved study plan or that the study was conducted under anomalous environmental conditions or that environmental conditions have changed in a material way).
FA-01	Upper Skagit Indian Tribe	City Light should extend TDG sampling further downstream in the Gorge Bypass Reach, below Diablo Dam, and below Ross Dam.	Total dissolved gas (TDG) has been and will continue to be sampled longitudinally throughout the Gorge bypass reach. TDG sampling has been and will continue to be conducted downstream of Diablo Powerhouse. No TDG sampling is being conducted downstream of Ross Dam because spills are infrequent at Ross Dam due to Ross Lake’s large storage capacity. Spills at Ross Dam are typically associated with gate testing, are of short duration, and average only a few cubic feet per second (cfs). During the period of 2014-2018, Ross Dam spilled 20 times; 11 of these occurred in August 2015 during the Goodell Fire, which disrupted Project operations and transmission, and are not reflective of normal conditions.
FA-01	NMFS Upper Skagit Indian Tribe	City Light needs to convene a workshop with Dr. Scott Wells to understand the development of the CE-QUAL-W2 model and linkages to other water models.	The June 9, 2021 Notice states, “SCL will seek and incorporate the input of Scott Wells...in the development of the CE-QUAL-W2 model.” The modeling team (including Rob Annear [Geosyntec], who was a graduate student of Dr. Scott Wells) is currently consulting Dr. Wells, as promised, on the development and calibration of the CE-

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			QUAL-W2 model. Summaries of these consultations will be included in the Updated Study Report (USR).
FA-02	Swinomish Indian Tribal Community Upper Skagit Indian Tribe	City Light should develop a hydraulic model for off-channel and floodplain habitats.	To date, City Light and its technical consultant team have completed the hydraulic model component of the instream flow model including development of the model surface, field collection of hydraulic information at varying flows over multiple events, hydraulic model calibration, field and desktop activities to develop cover and substrate maps, and the development of Habitat Suitability Criteria in collaboration with LPs. The habitat model component of the instream flow model is currently in development and will be completed in July 2022. City Light has implemented the study in collaboration with LPs through numerous work group meetings that began in early 2021. As discussed at the April 21, 2022 Flows Work Group Meeting, implementation of the FA-02 Instream Flow Model Development Study is consistent with and meets the study goals and objectives identified in the RSP. The study was intentionally focused on developing a hydraulic model necessary to complete an instream flow assessment for relicensing to replace/update the Effective Spawning Habitat (ESH) model used to support the current license flow management program. While the FA-02 instream flow model is primarily calibrated in-channel, the model has utility to assist in evaluation of other Project-related interests identified by LPs, including hydraulics in off-channel and floodplain habitats. The model has been developed to provide for the addition of sub-models as identified as part of those discussions to support implementation of proposed PMEs.
FA-01 FA-02 GE-04	NMFS Swinomish Indian Tribal Community Upper Skagit Indian Tribe USFWS	City Light should collect FLIR data and assess groundwater influences.	The collection of Forward Looking Infrared (FLIR) data is not necessary to complete relicensing studies. City Light asserts that in order to develop a meaningful relationship between Project operations and the effects of surface flow on groundwater dynamics, FLIR would need to be applied over a range of flows. Conducting a single FLIR analysis during 2022, as requested by LPs, would not provide sufficient additional value to support an analysis of Project effects and identification of PMEs to include in the new license. City Light recognizes the value of identifying and mapping undetected sources of groundwater influx but has determined that such mapping would be

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			<p>better suited to supporting development of habitat enhancement measures following issuance of the new Project license.</p> <p>Regarding the application of FLIR to Project reservoirs, this is a new study request under 18 C.F.R. § 5.15(e). The LPs’ request does not meet the Commission’s criteria for a new study at this point in the ILP. The LPs have not identified any material changes in the law or regulations applicable to the information request. Nor have they established why the goals and objectives of the FA-01 Water Quality Monitoring and Water Quality Model Development studies, FA-02 Instream Flow Model Development Study, and GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study could not be met with the approved study methodology. Finally, the LPs have not explained why the request was not made earlier or identified any significant changes in the Project proposal or that significant new information material to the study objectives has become available.</p>
FA-02	Upper Skagit Indian Tribe WDFW	City Light should evaluate instream flows downstream of Diablo Dam.	<p>As part of the June 9, 2021 Notice, City Light agreed to discuss instream flows below Diablo Dam over potential dewatering concerns in the riverine reach between Diablo Dam and Diablo Powerhouse. City Light developed a hydraulic connectivity assessment of the reach between Diablo Dam and Powerhouse using Project operations data and an existing two-dimension (2-D) Hydraulic Model. A technical memorandum was completed and is appended to the ISR (Appendix C).</p> <p>For the reasons stated below, City Light does not believe further exploration of instream flows below Diablo Dam/in Gorge Reservoir is appropriate. The topic has been raised at several Work Group meetings in the past and as recently as the April 5, 2022 Flows Workgroup Habitat Model Workshop. While the Hydraulic Connectivity Assessment of the Reach between Diablo Dam and Diablo Powerhouse Technical Memorandum included a poor choice of terminology, the use of “riverine” in the memorandum was not intended to suggest that this reach within Gorge Lake is “free-flowing” and characteristic of a river. This is not a free-flowing river reach and usage of the term was intended to simply communicate that the reach is two “river” miles in length and/or a segment of the Skagit “River”.</p>

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			<p>Hydraulic conditions in the reach from the toe of Diablo Dam to Stetattle Creek are controlled by the existence of a bar (Stetattle Bar) located at Stetattle Creek and Diablo operations. The reach can be divided into two sections: the Diablo Dam to Diablo Powerhouse section and the Diablo Powerhouse to Stetattle Creek section. During Diablo Powerhouse operations, the dam to powerhouse section exhibits backwatered conditions caused by the hydraulic control at Stetattle Bar and the orientation of Diablo Powerhouse outflows. As indicated in the technical memorandum, hydraulics in this section exhibit lacustrine-like conditions typical of a reservoir and retain hydraulic connectivity; likely at all times. The section between the powerhouse and Stetattle Creek is the Diablo Powerhouse tailrace and water surface elevations within this section are dependent primarily upon the release of water from Diablo Powerhouse into Gorge Lake. Variable outflows from powerhouse generation are introduced into this section, move downstream interacting with the Stetattle Bar hydraulic control which slows and backwaters at this location before transitioning to the lower portion of Gorge Lake beginning near State Route 20 bridge. Instream flows to explore aquatic habitat management are generally not applicable to reservoirs nor would the usual methods of assessing how habitat quantity and quality change with flow since water surface elevation is relatively invariable in this lacustrine reach under different flows. Under current existing conditions/operations, the reservoir remains watered, hydraulically connected, and already supports rearing, foraging, movement, and migration for reservoir fish species (and would continue to do so if anadromous species were introduced). Project biologists have not identified any significant areas of potential spawning habitat in Gorge Reservoir. Furthermore, Diablo Dam operations support other priority Project purposes such as flood control protection, dam safety, operations and maintenance (O&M), and unplanned outages that may not be complimentary and could even impact fisheries resources if instream flows were instituted to promote reservoir spawning (e.g., unplanned high flows over redds, etc.).</p>
FA-02	Upper Skagit Indian Tribe	City Light should develop a hydraulic model downstream of the Sauk River confluence.	As described in the Transmittal Letter and previously discussed with LPs, quantification of Project-related effects on resources in the lower Skagit River represents a significant scientific challenge given the

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			<p>multitude of factors interacting with resources and processes in the lower Skagit River. As part of the RSP, City Light proposed the SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River as a desktop study to develop a comprehensive data set of existing information on the Skagit River between the Sauk River confluence and the estuary. City Light has conducted the study as provided for in the approved study plan under environmental conditions that have not changed in a material way. 18 C.F.R. § 5.15(d). City Light expects to determine if additional data collection is needed by Quarter 4 of 2022. The FA-02 Instream Flow Model Development Study is being conducted consistent with the goals and objectives as identified in the RSP.</p>
FA-02	Swinomish Indian Tribal Community	<p>Add a background subsection to the introduction of the report that provides a broad overview of the important Skagit River fishery resources. Also add a high-level review of the ESH model.</p>	<p>Per the ISR, the goal of the FA-02 Instream Flow Model Development Study is “to develop an updated flow-habitat evaluation tool for the Skagit River between the Gorge Powerhouse and the confluence with the Sauk River.” Broader context is provided in Section 4.5.1 of the PAD which contains information regarding Skagit River existing fish and aquatic communities including anadromous, resident, and non-native fish species. Information regarding the flow management program being implemented under the current Project license can be found in the Revised Fisheries Settlement Agreement (City Light 2011). Historical information relevant to the development of the ESH model includes Crumley and Stober (1984), Bovee (1978), Stober et al. (1982), and Swanson and Crumley (1984) which are available on the Skagit Relicensing Public Documents Library at the following link: FERC Relicensing Public Documents (seattle.gov). All of this information will be updated (where necessary) and presented in the license application documents.</p>
FA-02	Swinomish Indian Tribal Community	<p>As it stands, this ISR has no context as to its purpose other than it is focused on development of hydraulic and habitat models, but no background is provided as to why this is important. Additionally, the goals and objectives lack specificity and, more clearly identified objectives would be beneficial.</p>	<p>Per the ISR, the goal of the FA-02 Instream Flow Model Development Study is “to develop an updated flow-habitat evaluation tool for the Skagit River between the Gorge Powerhouse and the confluence with the Sauk River.” Also, the ISR states that “Once the study is complete (i.e., the model has been developed), the flow-habitat model will be used to investigate and inform the evaluation of flows and habitat in the Gorge Powerhouse to Sauk River reach to continue supporting mainstem Skagit River fish habitat during the new FERC license term and to support additional discussions regarding hydraulic conditions</p>

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		<p>FA-02 Study Plan Objectives should evaluate:</p> <ul style="list-style-type: none"> • The balance between spawning and incubation flows and flows for juvenile salmonid rearing habitat to understand how Project operations influence the spatial and temporal distributions and amounts of fish habitat in the Skagit River; • Flows for connectivity of flood plain and off-channel habitats including seasonal connectivity in fall when juvenile salmonids are seeking those habitats and spring when juveniles are migrating to salt water; • How project operations influence tributary connectivity; • How project operations potentially influence stranding and trapping of fish; • Potential benefits and risk on Steelhead of mimicking a more natural spring hydrograph as opposed to the flow shaping in the current flow model including several levels of bedload augmentation; • The range of flows conducive for fine sediment delivery to Skagit Bay (in conjunction with GE-04); • The range of flows conducive to LWD transport (in conjunction with GE-04); and • The range of flows conducive to sediment transport (in conjunction with GE-04). 	<p>and aquatic habitat, including migration habitat.” As such, the report provides the necessary information to document the development of the instream flow model. The model is anticipated to be completed in July 2022 and as a subsequent step after study completion, will be used along with other relicensing study models (e.g., Operations Model, etc.) and study results (GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study) to support an integrated environmental analysis of Project operations on flows, aquatic habitat, stranding and trapping, geomorphic processes, connectivity, and species/life stage protection and associated trade-offs. The proposed objectives listed in the comment would be addressed after study completion as questions to be considered via use of the modeling tool and as part of this integrated environmental analysis. The results of this information will be updated (where necessary) and presented in license application documents. As such, it is not appropriate to include these as objectives in the current study documentation (RSP, ISR, or USR).</p>
FA-02	Swinomish Indian Tribal Community	In order to determine City Light’s progress, the comments associated with the June 9,	Following filing of the RSP, City Light continued to work with LPs to attempt to resolve outstanding areas of disagreement regarding the

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		2021 Commitments need to be shown or at least summarized in order to determine if they are adequately addressed. ISR FA-02 only shows the commitments and status and not the original comments from LPs. The entire June 2021 Notice of Agreement list should be shown for FA-02 to include Comment/Response/Status.	proposed studies. The ongoing discussions resulted in the filing of the “Notice of Certain Agreements on Study Plans for the Skagit Relicensing” with FERC on June 9, 2021. Updates on the commitments described in the June 9, 2021 Notice are provided within Appendix B and within the applicable study reports included in this ISR (Appendix F). City Light respectfully disagrees that a summary of RSP comments is necessary to understand whether the June 9, 2021 commitments have been addressed.
FA-02	Swinomish Indian Tribal Community	The two-dimensional version of HEC-RAS proposed for this study does not allow for varying hydraulic roughness (Manning’s n) with flow. This limitation could be overcome by developing a low flow model (with high hydraulic roughness valued), a mid-flow model (with intermediate hydraulic roughness values), and a high flow model (with low hydraulic roughness values). This relatively modest addition to the modeling effort would provide substantial benefit and should be prioritized.	City Light appreciates that this is a limitation of HEC-RAS. To address this concern, City Light created separate models with unique roughness values for each of the 4 calibration discharges (Low, Moderate, High and November 2020/bankfull). From these, models with unique roughness values (interpolated from the 4 calibration discharge models) for the 12 flows run through the habitat model (ranging from >99.9 percent to 5 percent AEP) were created. This effort is detailed in the model calibration report that will be filed with the USR.
FA-02	Swinomish Indian Tribal Community	The Study Area should be more clearly described to clarify the FERC Project Boundary, which is shown on the Figure but is confusing as presented. It is unclear why the Study Area does not lie entirely within the FERC Project Boundary. Additionally, the Study Area is purportedly coincident with the limits of the Upper Skagit Habitat Model but the figure doesn’t clearly show the boundary of the Upper Skagit Habitat Model	The primary purpose of the FA-02 Instream Flow Model Development Study was to update/replace the existing ESH model which provides <u>instream</u> flows below Gorge Powerhouse for aquatic habitat protection under the current license. As noted in the FA-02 Instream Flow Model Development Study ISR, the spatial scope of instream flows for this study is coincident with the Upper Skagit Habitat Model. Inclusion of the FERC Project Boundary under the current license is provided only as reference and the study area is not necessarily required to fall entirely within the current Project Boundary. The Upper Skagit Habitat Model boundary will be added to a figure in the USR to provide greater clarity to the reader as to the study area extent as compared to the current Project Boundary.
FA-02	Swinomish Indian Tribal Community	City Light should provide a rationale for why USHyM and USHabM have different reach lengths, and why the FERC boundary	The Upper Skagit Hydraulic Model extends above and below the habitat model to minimize potential negative influences from the imposed boundary conditions on hydraulics within the habitat model. The FERC Project Boundary represented in Figure 3.0-1 of the FA-02

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		would not include all the parcels in the USHyM.	Instream Flow Model Development Study ISR represents the Project Boundary as established under the current license. City Light may propose updates to the FERC Project Boundary in the license application and would expect to include parcels within the Upper Skagit Hydraulic Model domain that are needed for Project purposes under the new license.
FA-02 FA-03	NMFS NPS Swinomish Indian Tribal Community Upper Skagit Indian Tribe USFWS WDFW	City Light should reconsider the current methods used for evaluating stranding and trapping risks in the Skagit River below Gorge Dam.	<p>City Light implements a stranding and trapping (S&T) monitoring program under the current FERC license, as required by the Fisheries Settlement Agreement and updated in the NMFS Biological Opinion (2012). Current monitoring program methods are based on decades of S&T investigations on this effect in the Skagit River. The culmination of historic investigations is described in R.W. Beck & Associates R.W. Beck & Associates (Beck 1989) and represents the best available method for accurately estimating and monitoring stranding risk throughout the downstream reach of the Skagit River. The methods used for testing the effects of different flow regimes, ramping rates, and daily amplitude variability, which are described in Beck (1989) and the NMFS monitoring plan, are specifically designed to operate in a dynamic river system. Two main categories of variability are considered in the methodology: natural effects, such as fish size, bar slope, substrate size, time of day, and species; and anthropogenic effects, such as ramping rate, amplitude, and total discharge. The advantage of this approach is that the monitoring and results are robust to changing river morphology and are repeatable across space and time. The current approach results in an index of relative risk defined as “number of stranded fish per 100’ of dewatered bar.” Periodic monitoring efforts are implemented under the guidance of the current license Flow Coordinating Committee (FCC) comprised of representatives of City Light and the LPs.</p> <p>Concerns with historic studies, monitoring methods, and the need for reevaluation all can be raised and discussed within the FCC framework. However, current monitoring results indicate a level of stranding risk which is lower than the rate which is described in Beck (1989). This indicates that the fry protection measures are effective and that the monitoring approach can detect changes in relative risk. LPs have not demonstrated that the current S&T methods are</p>

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			ineffective or that the FA-02 Instream Flow Model Development and FA-03 Reservoir Fish Stranding and Trapping Risk Assessment should be modified. As part of the FCC, City Light will continue to work with LPs regarding concerns and outcomes of these discussions, as appropriate, that may inform development of measures in the license application.
FA-03	Upper Skagit Indian Tribe	City Light should conduct representative field sampling in Canadian portions of the drawdown zone.	As detailed in the RSP and in discussions with LPs at previous Reservoir Work Group meetings, the Canadian portion of Ross Lake is outside of the FERC Project Boundary and is not included in the study area. The study team has stated that the physical features that may promote a risk of stranding and trapping (e.g., gradual slope, potholes/depressions, tree wells, etc.) in the Canadian portion of Ross Lake are also features that are present in the U.S. portion of the reservoir. Using a risk assessment approach, an analysis of existing information and field data collected in the U.S. portion of Ross Lake to assess stranding and trapping risk for the Canadian portion should suffice to meet the objectives of the study. However, if the analysis were to conclude that data from the U.S. is not sufficient to adequately address study objectives, City Light will explore the feasibility of field data collection in Canada at that time.
FA-04	Whooshh Innovations, Inc.	Design for Targeted Species – Study would have benefited from further exploration of the implications of target population as an important input to the design criteria.	<p>As discussed in the FA-04 Fish Passage Technical Studies Program (Fish Passage Study) RSP, June 9, 2021 Notice, and the FA-04 Design Criteria Document (DCD), the target species selected for passage were identified by LPs, including resource agencies and Skagit River fisheries co-managers. Section 3.0 of the DCD explores baseline conditions for all target species, and Section 6.0 presents information on specific technologies with respect to passage performance for facilities in the Pacific Northwest that have been designed to pass specific target species.</p> <p>Biological objectives and population targets for target species and implications on existing populations are typically examined and identified as part of a process that occurs prior to or in conjunction with an engineering feasibility study so that the type, size, complexity, and operational requirements for potential fish passage facilities, adequately reflect known or agreed-upon future goals. However, at this phase of study completion, biological goals in consideration of</p>

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			<p>future recovery targets have not yet been established. To address the need for this data, City Light offered to initiate discussions regarding biological goals and objectives of the Fish Passage Study during Agency Working Session (AWS) meeting No. 6, held on October 18, 2021. However, the consensus among AWS participants was that establishing biological, ecological, and fisheries resource management goals for fish passage is a co-manager, policy-level discussion that should not occur as part of the Fish Passage Study, but rather will be informed by concurrent studies and agency/tribal discussions in the future with consideration of recovery planning targets and current and future harvest objectives. Therefore, the Fish Passage Study does not establish biological goals and objectives for fisheries resource management but rather considers biological requirements of target species within the anticipated operating environments of the Gorge, Diablo, and Ross developments. As such, the current approach to addressing such biological goals will be to bracket a broad range of potential strategies and fish passage facility concepts that can be considered when biological objectives are known.</p>
FA-04	Whooshh Innovations, Inc.	Rapid Deployment and Lower Costs – Time and cost to implement are not discussed.	<p>The overall purpose of the Fish Passage Facility Alternatives Assessment is to evaluate the technical feasibility of potential fish passage facility alternatives. Capital, operation, and maintenance costs will be developed as part of Stage 2 of the assessment and will be presented in the Final Fish Passage Concept Development Report (CDR). However, economic feasibility was not identified by LPs as a basis of technology selection. As such, economic feasibility (i.e., answering the question - is the economic investment to implement a fish passage program feasible?) may be evaluated by others, after biological objectives and fish management practices have been established, and the fish passage facilities that meet those goals have been selected at some future date. Although pneumatic fish transport tube technologies could be considered as one element of a full-scale comprehensive fish passage facility, the evaluation of stand-alone pneumatic tubes to provide upstream transport at each dam was not carried forward to the next stage of the Fish Passage Facilities Alternatives Assessment. The pneumatic transport tube and scanning technologies will be named in the Final CDR as optional technologies that could be considered as part of a full-scale comprehensive fish</p>

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			<p>passage facility (i.e., one transport component of a full-scale trap and transport facility). Concepts presented in the Final CDR will be advanced and evaluated for potential technical feasibility considering the four evaluation factors identified previously in Section 5.8 of the Final DCD completed as part of Stage 1 of this assessment.</p>
FA-04	Whooshh Innovations, Inc.	<p>Data – Availability of producing comprehensive data for each technology considered for upstream was only given a cursory valuation.</p>	<p>The FA-04 Fish Passage Technical Studies Program is a technical feasibility assessment to identify possible passage solutions at the Project. The study commenced in June 2021, and, per the RSP, included a three-stage evaluation of potential fish passage facilities at the Project. Per Section 2.6.1.1 of the RSP, “As part of the assessment process, City Light will gather and present information related to the biological performance of fish passage facilities that have been completed at high-head dams in the Pacific Northwest, along with other relevant site-specific information.” Commensurate with the commitments in the RSP, and dialogue during workshops and bi-weekly meetings with agency and tribal LPs, the DCD (completed during Stage 1 of 3) presented performance information of existing fish passage facilities, having a long-term history of record while in use at high head dams. A comprehensive evaluation of all potential technologies that are not currently in such use (e.g., those without a long-term history of performance), was not included as part of the original study requirements. Per comments received from LPs during multiple bi-weekly meetings, successful and proven measures should be exhausted first at this stage of the feasibility assessment.</p>
FA-04	Whooshh Innovations, Inc.	<p>Adaptive Management – Perceived uncertainty of performance was used subjectively to question only the pneumatic tube technology in the consideration of the four options.</p>	<p>As stated in Section 8.5.2 of the DCD, the pneumatic transport tube technology does not have example installations with a long-term history of performance at high-head dams, demonstrating its ability to meet passage and survival performance standards. As stated however, any phased approach to fish passage program implementation may still consider such technologies in short-term prototype trap and haul operations, and permanent trap and haul facilities should be forward-compatible with such equipment, should the technology make advances in permanent, long-term installation over time. City Light will emphasize in the CDR and USR that the pneumatic transport tube technology may be considered as one element of a full-scale fish passage facility should a fish passage program be implemented at any of the Project developments and the technology has demonstrated its</p>

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			<p>ability to meet each of the feasibility factors defined in Section 5.8 of the DCD. The feasibility factors to assess whether passage alternatives are technically feasible for implementation were developed in coordination with LPs. From a feasibility perspective, there is general agreement among licensing participants who have attended bi-weekly AWS meetings that developing concept facilities requiring additional research and development (above and beyond the inherent requirements of any fish passage facility at high dams) should not be undertaken at the feasibility stage because such technologies lack the long-term performance data to establish confidence in meeting performance standards and goals.</p>
FA-04	Whooshh Innovations, Inc.	<p>Incorrect Technology Assumptions – The recommendation process failed to adequately research the operation and capability of Whooshh technology.</p>	<p>We appreciate the time and energy expended to review the FA-04 Fish Passage Technical Studies Program (Fish Passage Study) ISR. The DCD represents Stage 1 of a three-stage process outlined in the Fish Passage Study RSP to develop fish passage facility concepts and assess their technical feasibility for the Project. The DCD provides the foundation upon which a range of fish passage facility concepts are being developed as part of Stage 2 of the Fish Passage Study. Since the study commenced in June 2021, the Fish Passage Study team convened three workshops and held bi-weekly meetings with fish passage specialists and interested LPs. The selection of upstream and downstream passage alternatives was vetted with LPs during these coordination meetings, and consensus was reached regarding a potential range of fish passage facility options that would be advanced to Stage 2 of the study. During Stage 1, and during discussions subsequent to the preparation and release of the FA-04 Fish Passage Study ISR, LPs expressed a desire to explore passage options that have a proven record of performance at high dam facilities. In general, such technologies adhere to NMFS passage guidelines and have been monitored over decades to determine if they are capable of meeting biological goals and objectives set for other like projects. In evaluating technical feasibility as part of this study, the study team therefore focused on technologies that will not require further research and development. As expressed by feedback obtained directly from the LPs, successful and proven measures should be exhausted first because unproven technologies add to the uncertainty of success at this stage of the feasibility assessment. This does not preclude the introduction</p>

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			of additional technologies at a later date should fish passage move forward at the Project.
FA-04	Whooshh Innovations, Inc.	Components – There is no acknowledgement that modular components such as scanning, sorting and data collection are worth consideration in other parts of the facility design.	Fish passage strategies and associated biological goals and objectives for each target species at the Project have not yet been established by co-managers and resource agencies for the upper Skagit River populations. However, should a passage program be implemented at the Project, each of the trap and transport type facilities that are advanced to Stage 2 of the Fish Passage Facilities Alternatives Assessment will require scanning, holding, and sorting facilities. The use of pneumatic transport tubes and a range of scanning systems could be considered as one of the methods by which these activities can be accomplished. The CDR will include references to possible uses of such technologies as one element to support the successful operation of upstream passage facilities like trap and transport. At this stage of the feasibility assessment and given the concept nature of the CDR, City Light is not prescribing specific technologies for all supporting ancillary elements of each fish passage facility.
FA-04	Whooshh Innovations, Inc.	<p>Regulatory Acceptance – City Light apparently failed to confirm agency attitude and acceptance of the technology particularly for certain uses as related to reintroduction programs, and the involvement on NMFS engineers in the process.</p> <p>Whooshh requests that the next phase of the assessment revisit the requirements for upstream passage, and compare them to capabilities and existing data that is available for existing Whooshh products and modular technologies along with Trap and Transport, while fully exploring the timing, cost and risks in its technical feasibility assessment.</p>	As stated above, during discussions prior to and after the preparation and release of the FA-04 Fish Passage Technical Studies Program ISR, LPs, including representatives from NMFS, WDFW, and USFWS came to a consensus that the Stage 2 CDR should explore passage options that exhibit a proven long-term record of performance at high dam facilities. In general, technologies considered must adhere to NMFS passage guidelines and example facilities must have been monitored over long periods of time to confirm their ability to meet biological goals and objectives of target species. However, if fish passage is provided at any of the developments for the Project, a system incorporating pneumatic transport tube technology could be explored in conjunction with program execution or as one component of a full-scale trap and haul facility if future studies advance specific upstream passage designs. At this stage of the evaluation, City Light must remain objective and cannot promote the advancement of any specific technology.
FA-04	Upper Skagit Indian Tribe	City Light should work with LPs to describe the timeline and approach for synthesizing	Comment noted. A potential fish passage execution plan and timeline will be developed and presented in the Draft Fish Passage Facilities

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		information to determine fish passage feasibility.	Alternatives Assessment Report prepared in Stage 3 of the fish passage assessment process.
FA-04	Upper Skagit Indian Tribe	City Light should revise FA-04 to fill any additional data gaps left by related studies.	The FA-04 Fish Passage Technical Studies Program (Fish Passage Study) is a technical feasibility assessment to identify possible passage solutions at the Project. Study methods are designed to be robust to varying degrees of existing information availability. City Light and its technical consultant team do not anticipate any data gaps that may impact its ability to address the study's goals and objectives as defined in Section 2.1 of the FA-04 Fish Passage Study RSP. City Light anticipates working with state and federal agencies and tribes to identify next steps and information needs to inform a fish passage decision after the completion of the FA-04 Fish Passage Study.
FA-04 FA-07	Upper Skagit Indian Tribe	City Light should use information gleaned from Elwha dam removal to guide and cross-validate evaluations of fish passage through existing barriers.	<p>Thank you for the comment. Each river's reach is unique and has variable flows, hydraulics, velocities, and depths, all of which factor into passage success. Cross-comparison to the Elwha River for data validation is not proposed at this time. The assessment is implementing an approach that has been vetted with the LPs and found to be accurate in empirical settings. As stated in the RSP, Hydrologic Engineering Center River Analysis System (HEC-RAS) is currently being used to assess whether existing features are barriers to upstream passage of target species. HEC-RAS is widely recognized and accepted throughout the engineering and scientific community for riverine hydraulic modeling. The proposed application of HEC-RAS 2-D for characterizing the hydraulics of channel features that may be barriers to upstream migration is consistent with approaches undertaken in similar situations.</p> <p>The Assessment of Fish Passage at Existing Features in the Gorge Bypass Reach focuses on known swimming and leaping abilities for target species or surrogates of similar size and condition and considers site-specific hydraulic data for passage assessment under an extensive suite of potential flows that would be passable to adult life stages of the largest and most athletic target species.</p>
FA-04	Upper Skagit Indian Tribe	City Light should design studies to identify potential changes to Project operations that could improve passage feasibility and	Changes in Project operations to optimize fish passage feasibility will be considered concurrently with the identification of the preferred alternative. The desire to discuss potential operational changes was discussed during earlier AWS meetings for the Fish Passage Study

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		consider positive influences of fish passage on ecosystem services.	which resulted in the addition of Feasibility Factor No. 4 – Adaptability. This feasibility factor was added with the intention of discussing how potential changes in operations or the various operating environments may or may not influence technical feasibility. This assessment will be performed as part of Stage 3 of the Fish Passage Study and will be documented in the Draft Fish Passage Facilities Alternatives Assessment Report.
FA-04	Swinomish Indian Tribal Community	There are 256 total potential passage combinations in this system, ranging from no passage in any location to full upstream and downstream passage at all of the dams and in the bypass reach. The FA-04 ISR has outlined a general framework for evaluating potential fish passage options but specifics have not been provided yet. The collective wisdom of the technical study group could be used to scale down the number of combinations by considering potential costs and benefits.	<p>Thank you for the comment. As described in the FA-04 Fish Passage Technical Studies Program (Fish Passage Study) ISR and DCD, the establishment of biological goals and objectives for a potential fish passage program at the Project was deemed outside the scope of the FA-04 Fish Passage Study. Until such objectives are established by co-managers and resource agencies, the consensus among LPs was to keep a robust suite of options open for consideration so that any potential passage strategy could be accommodated using technologies that have been evaluated for feasibility under this study.</p> <p>The FA-04 Fish Passage Study ISR represented a summary of study activities that had taken place to date and provided a road map to study completion in compliance with commitments made in the RSP and June 9, 2021 Notice commitments. The FA-04 Fish Passage Study ISR was not intended to provide a comprehensive evaluation as the two-year study is on-going. City Light appended to the FA-04 Fish Passage Study ISR robust documentation and workshop materials. Along with the bi-weekly AWS meetings, these materials and workshops have been submitted for LP review to ensure collaboration along each step of the study, and to engage the LPs on study progress and content.</p> <p>We concur that passage combinations under current consideration are robust in the Stage 2 CDR. This suite of options can be ranked when evaluated for feasibility in Stage 3 of the Fish Passage Facilities Alternatives Assessment. At that time, the suite of options may be scaled back for future design considerations. City Light continues to engage fish passage experts in bi-weekly meetings to discuss the progress of the study, and looks forward to preparation of the Stage 3 assessment to evaluate all passage options for which conceptual layouts have been considered under the Stage 2 CDR.</p>

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FA-04	Swinomish Indian Tribal Community	Recommendation to move the entire study element one – fish passage analysis in the Gorge Bypass – from FA-04 to FA-05.	Thank you for the comment. The fish passage assessment for the bypass reach remains in the FA-04 Fish Passage Technical Studies Program (Fish Passage Study), per the RSP. The FA-04 Fish Passage Study and FA-05 Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study teams work closely to share data to inform this analysis under FA-04 Fish Passage Study.
FA-04	Swinomish Indian Tribal Community	The ISR needs to provide more detail as to how and why the Existing Feature 1 and 2 have been identified as potential impediments to passage. What criteria were used that resulted in the selection of just these two features, beyond the priori selection in the EnviroSphere report? The ISR references “any partial impediments”, which will be partially identified through modeling in FA-05. This suggests a wider view than just the two EnviroSphere areas previously identified and should be clarified.	The initial selection and inclusion of Existing Feature 1 and 2 in the RSP was based upon their reference in EnviroSphere, 1989. As part of the current study, the remainder of the Gorge bypass reach will undergo a qualitative evaluation to identify the presence or absence of other such features. The criteria used for this assessment will be based upon the swimming capabilities and resulting biometric values already established for the study and presented to the AWS participants.
FA-04	Individuals: Craig Cooper Lydia Cooper Mary Black	The study should include passage of out-migrating juvenile salmonids.	Thank you for the comment. All potential downstream passage options that are currently being evaluated in Stage 2 of the Fish Passage Facilities Alternatives Assessment will include provisions for downstream passage of out-migrating juvenile salmonids.
FA-05	Upper Skagit Indian Tribe	City Light should modify the bypass reach model to account for the influence of sediment and wood augmentation and process flow scenarios.	Per the ISR, the goal of the FA-05 Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study is “to develop a flow/habitat evaluation tool for the Gorge bypass reach and to develop hydraulic data necessary to support an evaluation of fish passage at two locations in the Gorge bypass reach.” The ISR also states that once the study is complete (i.e., the model has been developed), it will be used to support additional discussions regarding hydraulic conditions and aquatic habitat within the Gorge bypass reach. While the primary purpose of the model is not to evaluate sediment and wood augmentation and process flow scenarios (these are potential PME measures), the model, as developed, has utility to assist in evaluation of other Project-related interests identified by LPs in future discussions.

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FA-05	Swinomish Indian Tribal Community	FA-05 lacks any details regarding the fish passage analysis, which is currently housed in FA-04. Moving this analysis into FA-05 would greatly facilitate analysis and consolidate both the hydraulic, habitat and passage components central to the Gorge Bypass into FA-05.	The purpose of the FA-05 Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study (Bypass Instream Flow Model Development Study) is to develop the modeling tool. Once the study is complete (i.e., the modeling tool is developed), the hydraulic outputs will be provided to the FA-04 study to conduct a comprehensive analysis of two existing features in the bypass reach. It is appropriate to keep the fish passage analysis in the FA-04 Fish Passage Technical Studies Program because the hydraulic output for the fish passage analysis being provided by the FA-05 model is just one of multiple components of information necessary to support this analysis. Other components of this analysis critical to but not relevant to the FA-05 Bypass Instream Flow Model Development Study include field work to document the physical characteristics of the existing features, fish species of interest and associated periodicities, biometric and lab data available of fish swimming and leaping capabilities, and fish condition and potential size-class distribution. Evaluation of potential Project effects in the bypass reach with regard to hydraulics, habitat and passage will be evaluated as part of an integrated analysis subsequent to completion of relevant relicensing studies. Other resource areas such as recreation, geomorphology, and cultural may also require consideration as a part of this integrated analysis.
FA-05	Swinomish Indian Tribal Community	It would be helpful if preliminary hydraulic model calibration results were presented in tabular format for comparisons between observed and preliminary modeled water surface elevations from July 26, 2021 through July 30, 2021. It would be helpful to provide a similar comparison of observed versus simulated water surface elevations in tabular format during the spill that occurred from June 28, 2021 through July 2, 2021.	Model calibration was noted to be approximately 50 percent complete as presented in the FA-05 Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study ISR, therefore very limited information was provided comparing observed to simulated values. The model calibration report is much more thorough and explicit in charting and tabulating comparisons between the observed and simulated values. The model calibration report will be attached to the USR.
FA-06	Upper Skagit Indian Tribe	City Light should replace the Pflug 2013 reference with Warheit 2014.	As discussed at a Resource Work Group meeting with LPs, City Light will add Warheit 2014 as a reference to the FA-06 Reservoir Native Fish Genetics Baseline Study (Reservoir Fish Genetics Study) but respectfully disagrees that it should replace Pflug 2013. Pflug 2013

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			contains site specific information relevant to the FA-06 Reservoir Fish Genetics Study.
FA-06	Upper Skagit Indian Tribe	City Light should incorporate data needed to fulfill LP study questions and associated expert panel suggestions into year-2 sampling collection.	Since the development of the FA-06 Reservoir Native Fish Genetics Baseline Study (Reservoir Fish Genetics Study) ISR, City Light has supported Expert Panel engagement to assist LPs with further refinement of LP study questions that were developed as potential additions to the FA-06 Reservoir Fish Genetics Study objectives. Initial input from the Expert Panel was that the questions developed by LPs were not of a sufficient level of detail for which to develop specific, testable hypotheses that could be incorporated into the FA-06 Reservoir Fish Genetics Study Year 2 sampling program. It is City Light’s understanding that the Expert Panel is continuing to work with LPs on this task. However, given the relicensing study timeline, field sampling in support of this study must be conducted in the summer and fall of 2022. In addition to logistical planning for field activities, sampling permit applications must be provided to required agencies for approval months in advance of anticipated field activities with ESA related permit approvals for sampling listed Bull Trout potentially taking longer. As such, City Light and its FA-06 Reservoir Fish Genetics Study team developed and provided a sampling plan consistent with the study’s RSP objectives to LPs and the Expert Panel for review. City Light incorporated/addressed comments received from the Expert Panel and LPs that responded. City Light then submitted this sampling plan to the appropriate permitting agencies including the USFWS. It is also expected that the proposed sampling plan will also provide information useful to addressing several of the LP questions which show congruence with City Light’s existing study objectives in establishing a genetic baseline. City Light has remained receptive to evaluating whether the field program could be modified if and when more refined questions are available as a result of LP and Expert Panel discussions. However, the ability to incorporate any potential modifications will be directly influenced by the permitting process and necessary approvals in a timely manner for which to conduct field work.
FA-06	Swinomish Indian Tribal Community	We would like to see a specific intent to evaluate the Project effects on genetic diversity of O. mykiss and Bull trout within	1. The FA-06 Reservoir Native Fish Genetics Baseline Study (Reservoir Fish Genetics Study) ISR includes a detailed account of what genetic diversity apparently exists as estimated from

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		<p>the anadromous zone. Namely, genetic diversity is an important consideration in species recovery. FA-06 should be refined to address the following questions:</p> <ol style="list-style-type: none"> 1. What is the genetic diversity for <i>O. mykiss</i> and Bull trout currently in the upper Skagit? Is it optimal or are there conservation concerns? 2. Given the population size of the target species, how many individuals would need to disperse downstream to provide meaningful genetic diversity contribution? Could this amount of dispersal have occurred pre-dam construction? 3. Is it known how much asymmetric gene flow could occur to the receiving population? Or is the receiving population too large to be affected? 	<p>previously collected microsatellite data. Heterozygosity (gene diversity) in the Bull Trout collections ranged from 0.337 to 0.467 within collections from upstream of Gorge Dam in the United States and was 0.473 in the Ross Lake collection (Table 5.3-2 of the FA-06 Reservoir Fish Genetics Study ISR). The collections from within the Project Boundary (above Gorge Dam) had lower heterozygosity than the collections from below Gorge Dam (Chi-square p-value = 0.0027). Whereas for Rainbow Trout, average gene diversity in collections from upstream of the Project Boundary at Gorge Lake was similar ($H_S=0.73$) to the estimated diversity in all other collections ($H_S=0.74$). Importantly, it is unknown how hybridization with <i>O. clarkii</i> could have affected these estimates because the diagnostic properties of the analyzed microsatellites were undocumented. Regarding whether conservation concerns exist, new collections planned in Year 2 of the FA-06 Reservoir Fish Genetics Study are intended to provide updated genetic baseline information, including estimates of genetic diversity upstream of the Project dams to understand what conservation concerns might exist. The Year 2 tissue collections will be genotyped at newly developed single nucleotide polymorphisms (SNP) markers, including markers that are quantitative (e.g., associated with phenotypes like migration) and presumably neutral. Thus, new collections in Year 2 should provide a more refined understanding of the genetic diversity upstream of the Project dams and a better understanding of whether the amount of diversity is of conservation concern.</p> <ol style="list-style-type: none"> 2. As a general rule of thumb, one genetically effective migrant per generation into a subpopulation is sufficient to minimize the loss of polymorphism and heterozygosity while allowing for divergence in allele frequencies among subpopulations (e.g., local adaptation) regardless of population size. The one-migrant-per-generation rule is based on numerous simplifying assumptions that may not hold in natural populations, such as in the Skagit River. City Light did not complete an analysis of whether this amount of dispersal (or any other amount) occurred pre-dam construction. However, new data to be collected in Year 2 could

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			<p>potentially be used to better understand how dam construction and operation affects(ed) native trout and char in the Skagit River.</p> <p>3. There are a variety of analyses that could be implemented to estimate the amount of gene flow that has occurred or is occurring in the Skagit River. The types of analysis range from classical and theoretical (e.g., estimating migration rates based on the equation $F_{ST} \approx 1/(4Nem + 1)$) to more complex (e.g., based on coalescent theory). Each type has its own set of limiting assumptions that may or may not reflect the true biology of Skagit River trout and char. City Light shares the perspective that understanding how gene flow affects(ed) or could affect viability, including how population size affects diversity in the face of gene flow. One of the key goals of the FA-06 Reservoir Fish Genetics Study is to estimate the effective population size of trout and char in the Project vicinity, which will provide a better understanding of how gene flow affects (or might affect) recipient populations. To begin developing inferences about gene flow, a key initial step is to obtain representative samples from the subpopulations of interest. The FA-06 Reservoir Fish Genetics Study Year 2 data collections are intended to provide baseline information that can be used to begin answering questions about historical, contemporary, or future gene flow.</p>
FA-06	Swinomish Indian Tribal Community	Section 4.2.1 specifically identifies rainbow trout which confuses the topic of this species that includes a variety of migratory types. It is unclear whether FA-06 is solely evaluating resident forms? If so, how are samples treated in the anadromous zones of the Skagit to ensure only resident forms are acquired? Care should be taken to appropriately describe if migratory forms are taken into account during sampling and why.	City Light agrees that using the common name “Rainbow Trout” confuses the topic of conservation for this highly diverse taxon. For this reason, City Light has decided to genotype all sampled <i>Oncorhynchus</i> spp. at a newly developed GT-Seq SNP panel that includes genetic markers associated with a variety of adaptive (and potentially maladaptive) genetic diversity, including markers for inland versus coastal ancestry, anadromy, migration timing, and hybridization with <i>O. clarkii</i> . This information should provide a baseline that can be used to answer more specific questions about the genetic diversity of native trout and char in the Project vicinity.
FA-06	Swinomish Indian Tribal Community	In Figures 5.2-3 and -4, the PCA suggests that very little of the data variance is accounted for in the first 2 principal	City Light agrees that the first two principal components in Figure 5.2 explain a relatively low proportion of the genetic variation present in the preexisting microsatellite data that was available for <i>O. mykiss</i> . The

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		<p>components, (<5%), and with it seems small steps in the first 3 Eigenvalues suggesting the data are not clustering well. FA-06 should be improved to describe the uncertainty of the PCA’s within the results section.</p>	<p>intention of the Year 2 efforts of the FA-06 Reservoir Native Fish Genetics Baseline Study is to increase statistical power and precision of such multivariate analyses by increasing the sample sizes (i.e., a target of 50) and by using improved genetic markers (i.e., GT-seq SNPs). Larger sample sizes and numbers of markers should improve the resolution of analyses such as principal component analysis (PCA).</p>
FA-06	Swinomish Indian Tribal Community	<p>In the Year 2 Sampling Plan, it states that, “The timing for completion of this task has not yet been defined.” ... “Nevertheless, initial review of the LP questions (as described above) suggests this sampling plan will provide information useful (in part or entirely) for addressing several LP questions, once finalized.” This seems overly vague and needs refinement. The extent to which LPs’ questions will be answered should be listed with each question. Also, asymmetrical gene flow is known to occur downstream across artificial barriers. Is there evidence that this is not important for the Skagit?</p>	<p>Please note that this is a comment on the FA-06 Reservoir Native Fish Genetics Baseline Study (Reservoir Fish Genetics Study) sampling plan that was developed subsequent to the FA-06 Reservoir Fish Genetics Study. As indicated above, initial input from the Expert Panel was that the LP questions were not of a sufficient level of detail for which to develop specific, testable hypotheses that could be incorporated into the FA-06 Reservoir Fish Genetics Study Year 2 sampling program at this time. City Light has since developed and submitted to permitting agencies for approval a sampling plan based on objectives listed in the RSP and June 9, 2021 Notice. This sampling plan will also provide information that is useful to addressing several of the LP questions but given the current lack of detail in LP questions, a specific accounting is not appropriate at this time. Data collected in summer 2022 will be analyzed to support meeting FA-06 Reservoir Fish Genetics Study objectives and as appropriate, questions developed by LPs. City Light did not complete any analysis looking at the effects of any forms of dispersal. Year 2 data collections and genotyping are designed to provide a baseline of contemporary genetic information that can be used to start answering questions about dispersal and as appropriate, to develop new hypotheses to be tested about the conservation value of dispersal.</p>
FA-06	Swinomish Indian Tribal Community	<p>The FA-06 Year 2 Sampling Plan’s study design needs to better refine and include testable hypotheses.</p>	<p>Please note that this is a comment on the FA-06 Reservoir Native Fish Genetics Baseline Study (Reservoir Fish Genetics Study) sampling plan that was developed subsequent to the FA-06 Reservoir Fish Genetics Study ISR. The FA-06 Reservoir Fish Genetics Study design is intended to provide baseline data needed to address City Light and LP concerns about the genetic diversity of native trout and char in the Project vicinity. Broadly speaking, the FA-06 Reservoir Fish Genetics Study will further collect baseline information to begin addressing concerns about genetic diversity, genetic structure, effective size, and adaptability/viability of native trout and char in the Project vicinity.</p>

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FA-06	Swinomish Indian Tribal Community	It is difficult to envision 50 individuals of the 3 target species being collected within 90 minutes using backpack e-fishing. Thus, it should be expected that the stated 50-fish sample target will be rarely achieved. The Sampling Plan should address this and be revised accordingly to ensure it has a sufficient number of samples.	Please note that this is a comment on the FA-06 Reservoir Native Fish Genetics Baseline Study (Reservoir Fish Genetics Study) sampling plan that was developed subsequent to the FA-06 Reservoir Fish Genetics Study ISR. The sampling plan states, “[A]necdotal evidence suggests the collection of 50 individuals may be impractical in many tributaries, therefore sample sizes may be scaled by a predetermined survey effort (e.g., initial presence/absence survey, collection of 50 individuals, or up to 90 minutes of electrofishing).” The sampling effort will work to balance the statistical needs (i.e., obtaining the target sample size of 50) with the inherent challenges associated with broad geographic scope of sampling (i.e., 25 reaches listed in Table 1 of the sampling plan) and the short amount of time available to sample this summer (i.e., samples must be collected in between Spring runoff and the peak Bull Trout spawning season). This summer’s field work is the first step in a larger effort to conserve the genetic diversity of native fish in the Project vicinity.
FA-07	NPS Upper Skagit Indian Tribe USFWS WDFW	City Light should provide for tributary production potential, via IP modeling or other means, for all species considered for passage under the FA-04 study, including pacific lamprey.	As requested by NMFS in its study request, reservoir tributary habitat is being evaluated with Intrinsic Potential (IP) modeling, as a screening tool, with subsequent fieldwork to assess rearing capacity (Unit Characteristic Method) and spawning habitat and to locate and document physical barriers to upstream fish migration. NMFS’s study request states, “This study request is intended to obtain information to quantify potentially available habitat and productivity of the SCL Project reservoir tributaries and Skagit River headwaters to develop fish passage suitability to advance the recovery of ESA-listed Chinook Salmon and steelhead as well as currently unlisted Coho...” As a result, City Light developed the study plan to address these three anadromous salmonid species and subsequently added Sockeye Salmon at the request of LPs. It is unlikely that a collaborative agreement to move forward with fish passage will not rest on Pacific Lamprey or the other species of fish being evaluated as part of the FA-04 Fish Passage Technical Studies Program, and as such there is no reason to assess habitat for these species. Also, the ranges of Pink and Chum salmon and Pacific Lamprey are such that these species mainly occupy reaches downstream of the Project and are unlikely to be passed upstream in appreciable numbers if Fish Passage were to be implemented at one or more of the Project dams.

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FA-07	NMFS Upper Skagit Indian Tribe	City Light should collect LiDAR to enhance anadromous fish IP modeling.	As noted above, City Light is applying IP modeling to identify stream reaches that are to be surveyed by field crews. These field surveys will provide results that characterize habitat and identify and document upstream passage barriers at a level of resolution and accuracy unachievable with remote techniques. Because field surveys are being conducted to complement and supersede the results of the IP modeling, City Light sees no reason to commit funds to improving the resolution of the remote, screening technique. Hence, there is no compelling reason at this time to dedicate resources to collecting Light Detection and Ranging (LiDAR) data in the reservoir tributaries, i.e., the existing digital elevation models (DEM) are adequate for conducting the IP modeling needed to set the stage for the field investigations.
FA-07	NMFS Upper Skagit Indian Tribe	City Light should collect FLIR data to evaluate areas of groundwater upwelling that could be significant areas for Sockeye shore IP modeling.	City Light recognizes the value of identifying and mapping undetected sources of groundwater influx but has determined that such mapping would be better suited to supporting development of habitat enhancement measures in the context of a Reservoir Fisheries Management Plan. Should a decision be made to pass anadromous fish upstream of the Project dams, FLIR could be used to assess shoreline groundwater influx to refine the understanding of potential Sockeye spawning habitat and whether and how it might be managed.
FA-07	Upper Skagit Indian Tribe	City Light should incorporate climate change predictors to bioenergetics consumption and growth modeling.	Use of the bioenergetics model for assessing potential impacts associated with climate-related temperature shifts is a next step in the process. The scope of the Food Web Study, which was developed and is being conducted in parallel to the relicensing proceedings, is to characterize existing bioenergetic conditions for resident fish (and four species of anadromous fish using resident species as surrogates). City Light plans to use temperature simulations from the CE-QUAL-W2 model to drive qualitative bioenergetics analyses under a range of thermal conditions. However, City Light expects to frame this analysis in a management plan, to be agreed to during settlement negotiations and implemented in the new license term. Management of Project reservoirs will be an adaptive process, and the approach and timeline for this process will be outlined in a Reservoir Fisheries Management Plan.
FA-07	Upper Skagit Indian Tribe	City Light should model productivity potential of the riverine reach of Gorge reservoir below Diablo Dam.	Nutrient dynamics/productivity modeling (i.e., CE-QUAL-W2) will be conducted for the entirety of Gorge Lake. Likewise, bioenergetics

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			modeling conducted as part of the Food Web Study applies to Gorge Lake as a whole.
FA-07	Upper Skagit Indian Tribe	City Light should use quantitative estimates of reservoir rearing capacity through the integration of water quality and productivity modeling into the food web and capacity model. City Light should expand the food web and bioenergetics modeling approach to evaluate the influence of Project operations on consumption and growth as well as quantitative estimates of rearing capacity through incorporating FA-01 productivity estimates to consumption rates in bioenergetics modeling.	City Light plans to use temperature simulations from the CE-QUAL-W2 model to drive qualitative bioenergetics analyses under a range of thermal conditions. However, as indicated above, City Light expects to frame this analysis in a management plan, to be agreed to during settlement negotiations and implemented in the new license term. Management of Project reservoirs will be an adaptive process, and the approach and timeline for this process will be outlined in a Reservoir Fisheries Management Plan.
FA-07	NPS Upper Skagit Indian Tribe	City Light should model food web relationships based on variable temperature induced shifts, caused by seasonal changes or changes in Project Operations that affect temperature.	See prior response above.
FA-07	Upper Skagit Indian Tribe	City Light should model varying prey consumption to evaluate how growth is influenced by consumption of macroinvertebrates versus plankton.	The Food Web Study takes into consideration both benthic and planktonic food sources when characterizing bioenergetics within the reservoirs.
FA-07	NPS Upper Skagit Indian Tribe USFWS	City Light should incorporate climate predictions into tributary and reservoir capacity bioenergetics modeling.	City Light plans to use temperature simulations from the CE-QUAL-W2 model to drive qualitative bioenergetics analyses under a range of thermal conditions. However, City Light expects to frame this analysis in a management plan, to be agreed to during settlement negotiations and implemented in the new license term. Management of Project reservoirs will be an adaptive process, and the approach and timeline for this process will be outlined in a Reservoir Fisheries Management Plan.
FA-08	NPS Upper Skagit Indian Tribe	City Light should: - reevaluate qualitative entrainment risk as low and early life stages (juvenile and fry) analysis as	City Light disagrees. The entrainment risk analyses were conducted consistent with the approved study methodology and are consistent with methods used for desktop entrainment studies conducted at other hydroelectric projects. 18 C.F.R. § 5.9(b)(6). Moreover, commenters

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		<p>tables 5.4-4 through 5.4-6 do not match with life histories.</p> <ul style="list-style-type: none"> - provide literature estimates for areas where data are not available - Adjust entrainment rates based on improper assessment of life stage. 	<p>have not demonstrated that the study was not conducted according to the approved study plan or was conducted under anomalous conditions. <i>Id.</i> § 5.15(d).</p> <p>The life history assessments are based on published data. Section 5.4.1 and Table 5.4-1 and Attachment C of the FA-08 Fish Entrainment Study ISR provide additional details regarding seasonal habitat associations by life stage and references for resident trout species in the Project reservoirs and anadromous salmonids found below Gorge. The early life stages (eggs, alevins and/or fry, juveniles) of the trout species found within the reservoirs typically remain in the spawning streams prior to entering the reservoirs as young adults, thus minimizing the risk of entrainment and impingement. Migratory Bull Trout (adfluvial and fluvial) spawn and remain in headwater streams until around age 4-5, when they migrate downstream to larger rivers and lakes or reservoirs. Although still potentially susceptible to impingement, swim burst speeds at this age are sufficient to overcome approach velocities at the intake structures.</p> <p>Similarly, Dolly Varden spend 2-4 years in their natal stream before entering the reservoirs, however, juveniles may be present in the Project reservoirs. While juveniles may be subject to entrainment, the risk is minimized due to juvenile preference for the epilimnion and shallow water habitats and shoreline areas.</p> <p>Eastern Brook Trout have life histories similar to the native char, however, this species matures earlier.</p> <p>Juvenile Rainbow Trout may enter the Project reservoirs during their first summer, and at lengths around 70 millimeters (mm) or less, would be susceptible to entrainment should they occur near the Project intakes; however, the preferred habitat for juvenile Rainbow Trout minimizes the risk that this life stage would be near the Project intake structures.</p> <p>Non-native Redside Shiner is the only species for which all life stages are found in the reservoirs; however, Redside Shiner eggs and fry are associated with shallow, shoreline habitats. Juveniles and adults forage</p>

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			<p>in open water and overwinter in deep water, the water depth at which they reside during this period is unknown. Overwintering in deep water may expose Redside Shiner to increased risk of entrainment due to smaller size and burst swimming speeds.</p> <p>Rearing habitats for eggs and alevins are not available for salmonids within the reservoirs, and as such, eggs and alevins are not expected to occur within the reservoirs where they would be susceptible to entrainment and impingement. Occasionally, fry and juveniles may be washed downstream from natal spawning locations during unusually high rain events. Juvenile fish generally occupy stream habitats and may also enter reservoirs early for increased food availability, or if washed down by a high flow event.</p> <p>Juvenile (and on occasion, fry) trout and char that may be present in Project reservoirs generally remain nearshore and around shallow, structurally complex habitats to avoid predation; although they may venture into the upper water column in search of forage resources. Given their habitat and feeding preferences, the risk of entrainment to juvenile trout and char at the Project’s deep-water intakes is low. Section 5.4.2 provides a detailed discussion with literature references for the depth distributions of juvenile and adult trout in the Project lakes as well as other water bodies.</p>
FA-08	NPS Upper Skagit Indian Tribe USFWS	<p>City Light should:</p> <ul style="list-style-type: none"> - Standardize future uses the acoustic data set such that has been screened for quality control following established guidelines. The data used from the bull trout acoustic telemetry study is unpublished and it is unknown how many of the fish that were tagged died after being released or dropped their tags. - Explain how these studies will inform the ILP and development of license conditions. 	<p>Historic and ongoing acoustic monitoring studies are described in Section 2.1.2.1 of the FA-08 Fish Entrainment Study ISR. The acoustic data sets are standardized and based upon procedures originally used by the USFWS (2013) to establish a biological opinion and an incidental take statement (ITS) for Bull Trout. The internal acoustic tags transmit an ultrasonic signal at approximately two-minute intervals for a period of about two years. A total of 42 Bull Trout were tagged in Ross Lake in 2009 as part of a study to better define seasonal habitat use and evaluate the potential entrainment through the turbines and over the spillway. All 42 Bull Trout were detected continuously at different locations during fall 2009 through the winter of 2012 indicating good tag retention and survival of the tagged fish. One individual was determined to have died since the transmitter remained in the vicinity of the same receiver until the transmitter battery lost</p>

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		<ul style="list-style-type: none"> - Consider a collaborative approach by SCL and the LPs to identify how the above mentioned telemetry studies may be incorporated into the FA-08 analysis and/or develop a field based study to further assess entrainment risk that can be accomplished within a reasonable amount of time to inform license conditions. 	<p>power. The acoustic tracking program has been standardized and expanded with installation of additional receivers including locations below each dam and is being further expanded to include other fish species (e.g., Rainbow and Cutthroat Trout). Table 2.2-2 provides the number of active tags in each reservoir from 2015 to 2020.</p> <p>Results of the ongoing acoustic study provides an annual assessment of potential turbine and spillway entrainment and survival to inform incidental take estimates and development of license conditions. This information is available in annual reports to USFWS.</p> <p>A field-based entrainment study using industry accepted methodology would involve the use of tailwater entrainment sampling. This type of study is not practicable at the Skagit River Project due to the high-head design of the dams, challenging sampling conditions, and personnel safety concerns. As such, the ongoing acoustic tracking study has been expanded to include additional fish species to further inform potential turbine and spillway entrainment risk at the Project facilities.</p>
FA-08	NPS Upper Skagit Indian Tribe USFWS	<p>City Light should:</p> <ul style="list-style-type: none"> - The entrainment risk evaluation for anadromous salmonids listed on Table 5.4-7 was only conducted on smolts. The early life stages of anadromous including fry should be listed on Table 5.4-7. - Reevaluate inclusion of out-migrating <i>O. mykiss</i> kelts 	<p>Table 5.4-7 of the FA-08 Fish Entrainment Study ISR includes the early life stages (fry) for Chum and Pink salmon. Currently there are no anadromous salmonids present in the Project reservoirs. The remaining salmon species other than Chum and Pink Salmon generally out-migrate at the smolt stage. If fish passage were successfully established, the primary life stages of anadromous salmonids at risk of entrainment are out-migrating smolts (Chinook Salmon, Coho Salmon, Sockeye Salmon) steelhead trout kelts, and fry (Chum Salmon and Pink Salmon). Out-migrating salmon smolts or fry are likely to experience higher susceptibility to approach velocities near intake structures due to their limited swim burst speed at these life stages. However, the association with the upper water column minimizes risk of entrainment at the deep-water intakes except during periods of maximum reservoir drawdown which happens infrequently. <i>O. mykiss</i> kelts outmigrate at depths according to specific thermal range, and therefore the position of kelts and proximity to intakes and/or fish passage facilities is influenced by ambient conditions.</p>

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			<p>The presence of these species in the Project reservoirs are assumed to only occur with the installation of fish passage technologies at Project facilities approved by agencies/co-managers, to provide safe passage to out-migrating organisms and minimize entrainment risk. Since fish passage facilities (including juvenile bypass systems) are not currently available at the Project, there is no entrainment risk for anadromous salmonids at the Project at the current time, regardless of life stage.</p>
FA-08	NPS Upper Skagit Indian Tribe USFWS	<p>City Light should:</p> <ul style="list-style-type: none"> - Address all relevant sources of information such as Envirosphere (1989). Rainbow Trout have been documented in the Gorge plunge pool and Gorge bypass reach originating from Ross Lake. Similarly, Gorge Lake has an established population of Eastern Brook Trout, however, there is no evidence of spawning grounds in the lake or its tributaries. - Adjust entrainment rates based on presence of trout in the plunge pool and Gorge bypass reach. 	<p>City Light addresses all sources of information to the extent possible and relies on the most recently published results. City Light also recognizes that entrainment may occur. Entrainment (turbine and spillway) of Bull Trout is discussed in Section 2.1.2.1 of the FA-08 Fish Entrainment Study ISR. The presence of Rainbow Trout in the Gorge bypass reach and Eastern Brook Trout in Gorge Reservoir as related to entrainment are discussed in the Gorge Second Tunnel Document (City Light 2012) and the PAD (City Light 2020). Although entrainment can occur, the overall relative risk of entrainment remains low. This is primarily due to trout species’ spawning and rearing habitat requirements (i.e., tributary streams) combined with the depth of intake structures (versus depth preference of each fish species considered), infrequent drawdown of the Project reservoirs, and swimming ability of the size classes of fish that may be in the vicinity of the Project intakes. Spillway entrainment is minimized since spills are infrequent and of short duration. The relatively large numbers of trout documented out-migrating from Ross during 1972 occurred due to an extreme spill event that lasted for 60 days and does not represent typical conditions or operations at the Project. Trout may be susceptible to increased turbine entrainment during drawdowns that reduce surface water elevations. However, drawdowns of this magnitude are infrequent and have only happened three times over the current license period (City Light 2020).</p>
FA-08	WDFW	<p>City Light should:</p> <ul style="list-style-type: none"> - Continue its entrainment study in Year 2 and include a more detailed explanation based on scientific literature on delayed mortality rates based on injury through spill and intake entrainment. 	<p>Results of the FA-08 Fish Entrainment Study indicate that entrainment of fish through the Project is likely to be low; especially for native trout and char. Of the low numbers of fish that may be entrained, delayed mortality could occur on an even smaller proportion of these low numbers of fish. Existing information also indicates delayed mortality is not expected to significantly affect fish populations or the fish community of the Project reservoirs. For example, data from acoustic</p>

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		<ul style="list-style-type: none"> - City Light should also reconsider the impacts from infrastructure between intake and turbine, because the Gorge intake tunnel and penstock represents an exceptionally long, 2-mile journey for a fry or juvenile fish. 	<p>telemetry monitoring activities of bull trout under the current license have not identified any delayed mortality of tagged fish that passed Project dams. The FA-08 Fish Entrainment Study is complete and the entrainment risk analyses were conducted consistent with the approved study methodology and are consistent with methods used for desktop entrainment studies conducted at other hydroelectric projects. 18 C.F.R. § 5.9(b)(6).</p>
FA-08	NPS	<p>City Light should:</p> <ul style="list-style-type: none"> - Incorporate results from USGS Food Web Study providing gill net sampling results for native char ranging from 146 to 480 mm in length at depths of 21 to 34 meters. 	<p>Results are consistent with gill net sampling results from 2005-2012 presented on Table 5.3-1 of the FA-08 Fish Entrainment Study ISR. Results of the USGS Food Web Study will be available in Quarter 4 of 2022. If at that time a link can be made between the bioenergetics results and the entrainment study, City Light will collaborate with LPs to identify potential next steps.</p>
FA-08	Upper Skagit Indian Tribe	<p>City Light should:</p> <ul style="list-style-type: none"> - Reevaluate inclusion of summer Steelhead and spring Chinook into Table 5.4.1 and analysis 	<p>The viability of the summer steelhead population is unknown. Because there is no summer steelhead hatchery program and no allowable harvest of wild summer steelhead, harvest management of Skagit River steelhead targets winter-run fish. Despite extensive surveys, the only location where summer-timed fish are currently known to spawn is from RMs 8.0 to 11.6 of Finney Creek. Summer steelhead enter Finney Creek in October and November, with spawning occurring primarily from February through March (Sauk-Suiattle Indian Tribe et al. 2018). Fry emergence peaks in early August (WDFW 2004). Summer steelhead may be included on Table 5.4.1 of the FA-08 Entrainment Study ISR, however, outmigration timing is likely similar to the mainstem Skagit winter population, which occurs primarily from early April through early June (Kinsel et al. 2008) and thus is accounted for in the existing report.</p> <p>Neither summer steelhead nor spring Chinook Salmon are present in the Project reservoirs. The Puget Sound Technical Recovery Team identified 22 independent Chinook Salmon populations within five biogeographic regions in the Puget Sound Evolutionarily Significant Unit (Ruckelshaus et al. 2006). The Skagit River watershed includes six of these populations. Distinct independent populations of spring Chinook Salmon were identified only in the upper Sauk and upper Cascade rivers.</p>

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			Detailed discussions of both summer steelhead and spring Chinook Salmon can be found in the PAD (City Light 2020). The final list of target species evaluated in this study was formed with input from the LPs and includes species with federal protection, recreational or commercially important species and associated forage fish species, and migratory (i.e., anadromous) species including Chinook Salmon and steelhead.
GE-01	Upper Skagit Indian Tribe	City Light should record positions of erosion sites that are under the size threshold.	As stated in the RSP, sites smaller than 200 square feet exist but were not considered to be as critical to overall resource concerns due to their small size. City Light believes that this minimum size is sufficient, especially compared to the size of the reservoirs and the length of shoreline.
GE-01	Upper Skagit Indian Tribe	City Light should determine the extent that shoreline erosion is assisting the spread of invasive species.	City Light is conducting the TR-04 Invasive Plants Study to determine where Project operations may affect invasive species; the purpose of the Invasive Plants Study is to identify those sites. Invasive plant occurrences in relation to shoreline erosion and Project effects will be assessed in the DLA.
GE-02	Upper Skagit Indian Tribe	City Light should determine the need for field-based habitat surveys upstream of fish blocking culverts, and, if necessary, conduct the surveys as part of the ILP study.	Quantifying fish habitat upstream of all crossings is beyond the scope of this study. The purpose of the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way study is to identify where fish passage issues exist at road crossings with culverts. The next step (and beyond the scope of the study) is to assess watershed factors that will help prioritize mitigation efforts at culverts.
GE-03	Upper Skagit Indian Tribe	City Light should conduct field work in Canada to complete understanding of flows and sediment supply.	As described in Section 3.0 of the GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study ISR, the study area within Canada was evaluated using remote sensing data (LiDAR, aerial photographs). As such, field work in Canada is not necessary.
GE-03	Upper Skagit Indian Tribe	City Light should examine the potential to synchronize flows from Diablo and Stetattle to help move sediment and increase hydraulic potential.	To the extent this is a request to modify the GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern study plan, this request has not met FERC's criteria at 18 C.F.R. § 5.15(d). City Light notes that high flow releases from Diablo Dam have been attempted in the past and resulted in minimal affect at altering the hydraulic control at the Stetattle Delta area.
GE-03	Upper Skagit Indian Tribe	City Light states in Table 6.1-1 of the GE-03 ISR that detailed topographic information necessary to complete a 1-D	This discrepancy will be corrected in the USR. As noted in Section 7 of the GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern ISR, existing detailed topographic LiDAR data for

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		backwater model of the Skagit River upstream of Ross Lake doesn't exist and no model will be developed, however, Section 7 states that LiDAR does exist. If the LiDAR mentioned is sufficient, it should be used to develop a 1-D backwater model. However, if they are not able to do the 1-d model, they should describe what approach they will take to gain the desired knowledge.	the Skagit River upstream from Ross Lake will be used for the analysis of sediment transport/deposition; these data extend approximately two miles upstream from the head of Ross Lake and are of sufficient detail for the analysis.
GE-03 GE-04	NMFS NPS USFWS	City Light should collect bathymetry information and not rely upon linear regression analyses to quantify reservoir sediment deposition.	As discussed in work group meetings, while City Light is currently in the beginning stages of collecting bathymetry information, bathymetry is not necessary to complete the study analyses. City Light is developing a multiple linear regression to estimate sediment yield for the subbasins of the Skagit River above the Project. These results will be integrated with results of the GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study. City Light believes this will provide information to inform a sediment yield analysis detailed in the ISR and inform analyses related to any potential project effects consistent with FERC's Study Plan Determination.
GE-04	Upper Skagit Indian Tribe	City Light should develop a schedule for filling data gaps and methods for determining Project impacts on geomorphology and anadromous salmonid habitat downstream of the Sauk River confluence.	See Transmittal Letter for responses related to requests to determine potential Project impacts downstream of the Sauk River.
GE-04	Upper Skagit Indian Tribe	City Light should collect information on the amount of wood delivered to the reservoirs that collects along the shorelines.	Wood collection along the reservoir shorelines was not part of the scope of the GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study). Reservoir wood data collection is ongoing and data from 2017 to present was provided to LPs in late June 2021 and raw data sheets were provided in December 2021. A memorandum report summarizing this task was appended to the GE-04 Geomorphology Study ISR.

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GE-04	Swinomish Indian Tribal Community Upper Skagit Indian Tribe	City Light needs to provide an update on the sediment and wood augmentation pilot study, including a schedule and whether the results will be available to inform license development and settlement negotiations.	As stated in Table 6.2-1 of the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study ISR, City Light will model to determine locations and methods for wood and sediment augmentation no later than 6 months following completion of the instream flow model. Based on the results of the modeling, City Light will implement a wood and sediment augmentation pilot program to be developed jointly by City Light and the LPs no later than 2023 (unless City Light and the LPs mutually determine that such a pilot program is unnecessary). City Light anticipates that discussions related to this effort will begin starting in the summer of 2022.
GE-04	NPS Upper Skagit Indian Tribe	City Light needs to provide more information on sediment transport modeling, including the spatial extent, the ability to assess floodplain flow and scour, if the model will be calibrated and validated in floodplain areas, and if not, impacts on model accuracy.	Detailed description of the sediment transport modeling methods will be included in the USR. Those methods were still being determined in collaboration with LPs at the time the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study ISR was drafted.
GE-04	Upper Skagit Indian Tribe	City Light should provide an update on IHA modeling.	As described in the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study (Geomorphology Study) ISR, Indicators of Hydraulic Alteration (IHA) modeling is underway. A time series representing unmanaged flow conditions based on inflows to Ross Lake and incremental flow from tributary basins between Ross Lake and Marblemount was developed from Study OM-01 Operations Model Study in March 2022. IHA software is being used to investigate timing and duration of high flow events under unmanaged conditions. City Light will provide LPs with an update on IHA modeling process during 2022 Geomorphology Work Group Meetings.
GE-04	Swinomish Indian Tribal Community	City Light needs to reevaluate Section 5.3 as some of the areas outlined as side channels appear to be more like sloughs or alcove areas and there suggest a further assessment of the specific habitat designations be made to ensure typing was consistently applied.	The classification of channel types based on level of connectivity with the main channel is in process using results of the Instream Flow Model that were produced after release of the GE-04 Geomorphology Study ISR. Results will be incorporated into discussion in the USR. The channel types evaluated in Section 5.3 of the GE-04 Geomorphology Study ISR can be reviewed with LPs as part of the Geomorphology Work Group Meetings and updated, as needed, in the USR.

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GE-04	Swinomish Indian Tribal Community	There are NOA commitments by City Light to address the simulation of added sediment, flow, and log jams in the model mesh via scenarios developed in coordination with the LPs, but more specificity is needed about this in the ISR.	At the time the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study ISR was drafted and submitted, the sediment transport modeling program was still in the early stages of development. Full specificity in the model schema to characterize existing conditions will be reported in the USR. City Light anticipates that discussions related to this effort will continue in work group meetings starting in the summer of 2022.
GE-04	Swinomish Indian Tribal Community	There is also a NOA commitment by City Light to implement a pilot bedload augmentation program. An estimate of the annual disruption of bedload should be routed through the sediment model as a starting point, from which lesser amounts of bedload can be modeled to inform the pilot augmentation project. Analyses should also be completed to evaluate how much project operations reduce large woody debris transport.	This comment has been noted and reflects the modeling team's understanding of one approach we expect to use to characterize potential effects of a bedload augmentation program. Regarding wood inputs, as noted above, wood collection along the reservoir shorelines was not part of the scope of the GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study). Reservoir wood data collection is ongoing and data from 2017 to present was provided to LPs in late June 2021 and raw data sheets were provided in December 2021. A memorandum report summarizing this task was appended to the GE-04 Geomorphology Study ISR.
GE-04	Swinomish Indian Tribal Community	The geomorphology study should evaluate how reductions in large woody debris and incision caused by bedload disruption might reduce connectivity with side channel and off-channel habitats in downstream areas.	The GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study (Geomorphology Study) has a two-year schedule and results that synthesize the interaction among flow, sediment loading, large wood input, channel migration/side channel formation, floodplain connectivity and aquatic habitat will be included in the USR. The synthesis will include discussion of historic changes in large woody debris with comparison to reference conditions described in Collins et al. (2002) and other studies included in Attachment A of the GE-04 Geomorphology Study ISR. Investigation of the relations between channel incision, bedload disruption, and side channel connectivity are in process as part of the sediment transport analysis and will be included in discussion as part of the USR.
GE-04	Swinomish Indian Tribal Community	In section 4.1.4, Vertical Channel Changes, the ISR proposes to evaluate incision in the Skagit River using rating curve changes at USGS gages over the term of the current license. It is very possible that project impacts from bedload disruption occurred	Analysis of the USGS gage rating curve changes was part of the methodology included in the RSP. The limitations of the approach associated with the time period of available data and locations of existing gaging stations will be discussed in the USR. Additional data from LIDAR and historic maps and imagery are being incorporated into the analysis of vertical channel changes.

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		<p>well before the current license and project operations in the current license maintained an already degraded state. Also USGS gage locations are chosen for their stability and are unlikely to be widely representative of a river reach.</p>	
OM-01	NPS	<p>City Light should develop logic within the Operations Model or appropriate model input for LPs so that they can develop alternative operational scenarios that still optimize Project operations.</p>	<p>The operations model utilizes historical operations to inform the Current Operations Baseline scenario as these operations reflect actual Project operations. Section 4.1.2 of the OM-01 Operations Model Study ISR outlines the intent of the Current Operations Baseline scenario, which is to provide a representation of current Project operations.</p> <p>As for the target elevations specifically, for the Current Operations Baseline scenario, in addition to the target elevation entered into the Operations Model user interface, there is additional logic in the fishflow file that dictates the Ross target elevations for the period of March 15 to June 15 of each year of a simulation based on the Ross Lake Spawning Control Curve (SCC) logic as described in the Revised FSA, this is outlined in Appendix 2 of Attachment A to the OM-01 Operations Model Study ISR.</p> <p>To date we have provided two Operations Model training workshops for LPs to help introduce the model to those that desire to run their own simulations outside the collaborative process. As discussed in these Operations Model working group workshops, including the recent meeting on May 19, 2022, the model does allow the user to simulate modifications to current operations such that the impacts of those modifications can be evaluated against current and other proposed alternative operations. However, it is understood that the analysis of all of the operational objectives is complicated and why we see the evaluation of potential operations as a collaborative process going forward. It is important that each alternative scenario be evaluated in detail as the Project is operated for many, often conflicting, resource goals, including but not limited to flood control, instream flows, recreation, power generation.</p>

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OM-01	NPS	City Light should provide daily flow series for all flow inputs, including specific calculations used for developing all synthetic hydrology.	The flow series utilized in the model, including actual historical and the Distributed Hydrology Soil Vegetation Model (DHSVM) flow series, have been provided to LPs via the web-based model. Additionally, the DHSVM files and summaries are available via the Project SharePoint. We will also provide the actual historical flow series via the Project SharePoint. The historical hydrological daily flow series was developed from publicly available USGS data. The development of this historical daily flow is explicitly detailed in Appendix 1 of Attachment A to the OM-01 Operations Model Study ISR. Appendix 1 was written such that the methodologies could be replicated by others if desired.
OM-01	NPS	City Light needs to provide more information in the observed vs model predicted high flow regimes is necessary if the operations model will be used to develop potential alternative operations scenarios that include prescribed high flows for environmental goals such as channel maintenance and bed mobilization.	Additional summaries and information will be provided in the USR.
OM-01	NPS	City Light should develop metrics to quantitatively assess how well the model tracks the water balance in the system (e.g., inflows and outflows, reservoir storage and evaporation) on a seasonal, annual basis, as well as by reservoir (i.e., inflows to Ross, Diablo, and Gorge reservoirs). The assessment should identify strengths and shortcomings in tracking the water balance for the Skagit system.	Additional information will be provided in the USR. The 2019/2020 deviations mentioned were specifically discussed with the LPs in the December 16, 2021 Operations Model Workshop. This discussion detail will be added in the USR. Detail will be provided describing examples of simulated and actual operation deviations and the source of those deviations, such as drawdown for maintenance operations. Given the limited available hydrologic data within the Project basin, water balance of the Project is and will be compared based on reservoir operations (lake levels) and total Project outflows (captured by the USGS gage Skagit River at Newhalem 12178000).
OM-01	Upper Skagit Indian Tribe	City Light should revise the Operations Model and validate to a hourly time step.	The Operations Model does simulate on an hour timestep. However, it simulates a typical demand schedule and is not intended to capture the short-term operations decisions based on pricing, demand, etc. This is outlined in detail in Section 5.2.4.6 of Attachment A to Operations Model Study ISR. An hourly time step is not appropriate for the validation of the Operations Model.

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			Concern with the deviation in simulated and historical generation based on the traditional Operational Model dispatching of the Project units is noted. As outlined in the Operations Model Interim Report, the traditional dispatching was selected by default to simulate generation potential. As a sensitivity analysis, if desired, alternative operations scenarios could also be simulated with the even dispatching to show the difference in generation between the two dispatching regimes.
OM-01	NMFS Skagit County Skagit County Dike and Drainage Flood Control Partnership and Skagit Drainage and Irrigation Districts Consortium Upper Skagit Indian Tribe	City Light needs to include climate change scenarios in model scenarios.	Alternative operational scenarios can be simulated with historical or potential future climate change flow series. Both the actual historical hydrology and the DHSVM flow series have been provided to LPs via the web-based model. Additionally, the DHSVM files and summaries are available via the Project SharePoint.
OM-01	Swinomish Indian Tribal Community	City Light should incorporate the entire Attachment A into the Main ISR.	The main body of the Operations Model Study ISR was developed as a summary that is consistent with the more detailed Model Validation Report Attachment A.
OM-01	Skagit County Dike and Drainage Flood Control Partnership and Skagit Drainage and Irrigation Districts Consortium	Operations Model inflows should be validated at a time interval that is meaningful for the successful operation of the Skagit Project prior to and during a flood event.	Following the typical demand schedule outlined in the OM-01 Operations Model Study ISR, the Operations Model simulates Project operations on an hourly timestep. Typically, during a large flood event Project Operations are driven by water allocation and not short-term decisions based on pricing, demand, etc. As outlined in Section 5.2.4.6 of Attachment A to OM-01 Operations Model Study ISR, utilizing a daily average inflow dataset as primary input, Operations Model simulates operations to allocate water between reservoir storage and required outflow constraints (physical, environmental, and operational) while permitting generation. The Operations Model was developed and validated for the allocation and balance of water within the Project vicinity and is meaningful for simulation of Project operations prior to and during large flood events.
OM-01	Skagit County Dike and Drainage Flood Control Partnership and Skagit Drainage and Irrigation Districts Consortium	The ISR incorrectly identifies an alternative inflow hydrograph as an Operational Scenario. As shown on Figure 5.1-2 of the Skagit Operations Model Logic and Validation Report; project inflows are	Section 6.1 Next Steps of the Operations Model Study ISR states that model sensitivities relative to changes in inflow hydrology due to potential climatic conditions can be employed in the modeling process as needed. To apply this, alternative operational scenarios would be simulated with potential future climate change flow series versus the

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		<p>independent variables and should be used as input to the Operations Model; not as an operational scenario. In addition, the ISR suggests that alternative inflow hydrographs will be developed or proposed by LPs. This is unacceptable, SCL should lead work with LPs to develop a synthetic inflow hydrograph that characterizes likely future inflow scenarios.</p>	<p>historical. Both the actual historical hydrology and the DHSVM flow series have been provided to LPs via the web-based model. Additionally, the DHSVM files and summaries are available via the Project SharePoint.</p> <p>The intent was not for LPs to develop proposed potential climate change hydrologic flow series; as previously noted these flow series have already been provided by City Light. However, if desired, in addition to the historical and DHSVM hydrology, LPs could also simulate other synthetic hydrologic flow series.</p>
OM-01	<p>Skagit County Dike and Drainage Flood Control Partnership and Skagit Drainage and Irrigation Districts Consortium</p>	<p>The ISR does not clarify the process or methods to be for scenario evaluation, scenario synthesis, or what role, if any, SCL will play in this process. SCL needs to make it clear to LPs how many operational scenarios will be run, how those scenarios will be selected, and specifically how the operational scenarios will be evaluated. In addition, the ISR should have reported on the timeline for this work and milestones as it pertains to the decisions in settlement discussions and pertaining to filing deadlines.</p>	<p>At the May 19, 2022 Operations Model Workshop, City Light discussed with LPs that the Operations Modeling Workgroup will continue as a forum to discuss, develop, and evaluate alternative operations scenarios. City Light has presented examples of metrics that could be used to evaluate scenarios in ongoing Operations Model and Technical Steering Committee meetings; Figure 3.1-2 of the ISR introduction shows possible criteria for evaluation of scenarios informed by these discussions with LPs. How many scenarios will be run and the metrics for the evaluation of scenario results will be determined in collaboration with the LPs, with the next meeting to be held in June 2022; the ISR identifies that there will be a scenario documentation report filed by City Light with the USR.</p>
SY-01	<p>NMFS Swinomish Indian Tribal Community Upper Skagit Indian Tribe USFWS WDFW</p>	<p>City Light needs to fill data gaps identified in the SY-01 literature review as part of other relicensing studies during a third study season.</p>	<p>As described in the Transmittal Letter, for certain studies, there may be a need for data collection efforts to extend beyond the filing of the FLA to fill any identified data gaps. City Light will not know which studies, if any, will require additional data collection until later in 2022. If additional data collection is necessary, City Light and the LPs may request that the Commission not issue the REA notice until such studies are completed and submitted to the Commission.</p>
SY-01	<p>Skagit County, Washington</p>	<p>As such, Skagit County respectfully requests that SCL amend SY-01 to clarify that the study is concerned solely with quantification and analysis of Project impacts, that being unclear at present.</p>	<p>With regard to determining potential Project impacts downstream of the Sauk River confluence, the SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River (Synthesis Study) was proposed as a desktop study to develop a comprehensive data set of existing information on the Skagit River between the Sauk River confluence and the estuary. As noted in the</p>

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SY-01	Skagit County, Washington	To the extent SCL nevertheless intends to pursue far-reaching analysis of species-limiting factors outside the scope of impacts reasonably arising from the Project, SCL must amend SY-01 to include compilation and analysis of comprehensive harvest data, which the NMFS and WDFW can readily furnish.	RSP, quantification of Project-related effects on anadromous fish resources in the lower Skagit River represents a significant scientific challenge given the multitude of factors interacting with resources and processes in the lower Skagit River. As part of the June 9, 2021 Notice, City Light committed to perform additional data field studies in year two to fill data gaps in SY-01 Synthesis Study that are not addressed in the study or in other studies below the Sauk River. City Light is interpreting this commitment to require identification of studies that could be conducted in the second year of study. As noted in the SY-01 Synthesis Study ISR, the determination of additional data collection needs, if any, is on hold awaiting the results of the desktop analysis portion of SY-01 Synthesis Study and for other studies to be completed. City Light expects to determine if additional data collection is needed by Quarter 4 2022. If data gaps are identified that cannot be filled in the second year of study, but are more long term in nature, City Light and the LPs should confer to discuss the content and schedule of additional data collection efforts.
SY-01	Skagit County, Washington	To the extent SCL intends to pursue comprehensive analysis of all Skagit anadromous species and the main factors limiting their recovery, SY-01 must necessarily incorporate comprehensive marine and in-river harvest data.	
SY-01	Skagit County Dike and Drainage Flood Control Partnership and Skagit Drainage and Irrigation Districts Consortium	<p>City Light needs to:</p> <ul style="list-style-type: none"> • Clarify the study’s purpose and objectives • Clearly link study elements to study requests made by LPs • Clarify the connection SY-01 has to the Skagit Habitat Enhancement Program; • Include unregulated hydrographs in the lower river and discuss the role the Skagit Project has on re-timing hydrographs; and • Modify the scope of SY-01 to remove all work related to the evaluation, quantification, or characterization of “other contributing factors” • SY-01 should incorporate only relevant studies that clearly link the Skagit Project to the lower river, estuary, and other watersheds • Any conclusions of SY-01 should be specifically limited to the potential effects of the Skagit Project, and not 	

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		hypothesize about “other contributing factors”.	
RA-02	NPS	City Light should suspend the third phase of the study in respect of the cultural sensitivity of the Skagit Gorge.	Per feedback from the Upper Skagit Indian Tribe, City Light will not be moving forward with phase 3 of the RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study.
RA-02	American Whitewater	American Whitewater expresses interests in better understanding the concerns of the Upper Skagit Indian Tribe with respect to this study.	Per feedback from the Upper Skagit Indian Tribe, City Light will not be moving forward with phase 3 of the RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study.
RA-02	American Whitewater	The “national online river index” should be described as “American Whitewater National Whitewater Inventory.”	Thank you for the comment. This update will be reflected in the USR.
RA-03	NPS	City Light needs to describe if CCT values are estimated or measured in the field.	CCT values were estimated, as identified in the RA-03 Project Facility Lighting Inventory ISR in the “as found” lighting inventory tables in Attachment B.
RA-03	NPS	City Light needs to redeploy to visit sites that were not visited during the first study season to meet the goals of the inventory.	<p>City Light did not visit the North Cascades Institute ELC during the 2021 field inventory as the facility was closed due to the COVID-19 pandemic. However, City Light coordinated with the ELC Director of Operations to inventory the lighting at the ELC which was described in the ISR in Section 5.9 and tables and photographs detailing the lighting in Attachment B (Figures 5.9-1 and 5.9-2, Table 5.9-1). Section 5.9 in the ISR states that all the lighting (i.e., trail lighting, porch lighting, and limited architectural lighting) is LED, full cut-off, and on a timeclock control system that automatically turns the lights off at 11:00 p.m. when the ELC facility is in use.</p> <p>In addition, the ELC has received a Leadership in Energy and Environmental Design (LEED) silver rating for its level of sustainability, which includes features to minimize the use/need for lighting. These lighting-related features include LED lighting in the dining hall; prioritizing natural light in the building design to eliminate the need for lights during most times of the year; and most of the ELC lights are timed to turn off automatically.</p>

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			Given the information in the ISR and the ELC’s LEED silver rating, City Light does not believe that redeploying to visit the ELC facility is warranted.
RA-03	NPS	City Light needs to better describe how many fixtures are associated with each lighting unit and ensure consistency in reporting.	City Light believes the information provided meets the study goals and objectives of the RSP and is sufficient to inform development of PME’s. Providing quantities of existing luminaire types was not a part of the RA-03 Project Facility Lighting Inventory methods. The RA-03 Project Facility Lighting Inventory ISR identifies and describes typical luminaire type characteristics. City Light has identified all luminaire types, source quantities per typical luminaire type, and luminaires with multiple sources that are typical for the Project.
RA-03	NPS	City Light needs to identify which lights impact water bodies in the Project Boundary.	Identification of lights impacting bodies of water was not part of the RA-03 Project Facility Lighting Inventory goals and objectives. City Light has implemented the study consistent with the approved study plan and under normal environmental conditions. 18 C.F.R. § 5.15(d).
RA-04	NPS	Noise free interval for each site should be reported as well as identifying the noise sources, particularly when associated with the Daily Lmax column in Table 5.1-1. The ambient noise measurements in this table should be split into day and night categories.	This information will be provided in the USR.
RA-04	NPS	The statement on page 5-1 “City Light assumes that daily Lmax helicopter noise sources identified in the 7-day ambient noise measurement period are associated with the helicopter use authorized by NPS,” should be removed or modified in the report.	This information will be updated in the USR.
TR Studies	Swinomish Indian Tribal Community	For TR-05, TR-06, TR-07, TR-08, TR-09, many special-status species and culturally significant species (listed below) were excluded and should be added for consideration: Swinomish terrestrial animal species of cultural significance and of concern:	City Light does not believe a relicensing study is warranted for these individual species as there is no evidence that the Project has an adverse effect on wildlife movement or connectivity in the region. 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 concern:

Study Number	Licensing Participant(s)	Summary of Request ¹	Response
		<ul style="list-style-type: none"> • Mountain goat: Swinomish culturally significant species, USFS sensitive species and Mt. Baker-Snoqualmie District of the USFS Management Indicator Species for cliff and alpine habitat. • Elk: Swinomish culturally significant species for subsistence hunting. • Black-tailed deer: Swinomish culturally significant species for subsistence hunting • American pine marten: WDFW priority species, USFS sensitive species and Mt. Baker-Snoqualmie District of the USFS Management Indicator Species for mature and old-growth forests where downed logs are available; silver fir zone. • Pacific fisher: WDFW endangered and priority species, USFWS proposed threatened. • Gray wolf: WDFW endangered and priority species, Mt. Baker-Snoqualmie District of the USFS Management Indicator Species for forests, meadows, sub-alpine and alpine where ungulate prey is available, USFWS endangered. • Grizzly bear: WDFW endangered and priority species, Mt. Baker-Snoqualmie District of the USFS Management Indicator Species for forests, meadows, sub-alpine and alpine, USFWS threatened. • Canada lynx: WDFW endangered and priority species, USFWS threatened. 	<p>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 has expressed interest in helping NPS with funding for a helicopter survey of mountain goats in cooperation with the NPS and WDFW; NPS has not requested funding support from City Light. This survey is currently scheduled for July 2022 to visually count the number of adult and young goats and collect spatial information about their habitat use. City Light will integrate available data from surveys into the relicensing process, as appropriate.</p> <p><u>Transmission Line Right-of-Way (ROW) Management</u> 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. 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.</p> <p><u>Mitigation Lands Management</u> 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 City Light has proposed to develop a new management plan for mitigation lands in consultation with LPs.</p> <p>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</p>

Appendix 1: Comment/Response Table

Study Number	Licensing Participant(s)	Summary of Request ¹	Response
		<ul style="list-style-type: none"> Wolverine: WDFW candidate and priority species, USFS sensitive species and USFWS proposed threatened. 	<p>Habitat Assessment, and TR-10 Northern Spotted Owl 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.).</p>
TR-01	Swinomish Indian Tribal Community	For TR-01, fine-scale habitat assessment of mitigation lands is needed.	<p>While not required for mapping at the Group level, additional vegetation data was collected as part of the TR-01 Vegetation Mapping study during field verification efforts to supplement the mapping effort at certain locations. These metrics include the following:</p> <ul style="list-style-type: none"> Cover estimates of co-dominant species of each stratum – tree, shrub, and groundcover. Plant species were documented using plant nomenclature from the University of Washington (UW) Burke Herbarium Image Collection (UW 2021). Sample measurements of diameter-at-breast-height (dbh) for co-dominant trees. Lists of common species in each stratum. Incidental observations of special features, such as areas of high snag density, beaver activity, wildlife sightings, and similar items. Observations of plant species that Indian Tribes and Canadian First Nations consider as culturally important. A list of these species was created based on feedback from the Stillaguamish Tribe of Indians, the Sauk-Suiattle Indian Tribe, the Swinomish Indian Tribal Community, the Upper Skagit Indian Tribe, and the Nlaka’pamux Nation Tribal Council. <p>In addition, the TR-02 Wetland Assessment, TR-03 Rare, Threatened, and Endangered Plants Study, and TR-04 Invasive Plants Study also gathered data on vegetation and habitats in the mitigation lands.</p>
TR-05	NPS Upper Skagit Indian Tribe USFWS	City Light should conduct an additional season of radar and audio-visual surveys.	The purpose and intent of the TR-05 Marbled Murrelet Study is to determine where murrelet activity and potential occupancy is located in the study area (i.e., likelihood of presence) and where potential

Appendix 1: Comment/Response Table

Study Number	Licensing Participant(s)	Summary of Request ¹	Response
	WDFW		<p>nesting habitat exists within 0.5 miles of locations where most Project noise generation occurs; not to determine occupancy in specific stands, nor to assess presence of murrelet activity throughout the FERC Project Boundary.</p> <p>The Pacific Seabird Group Survey Protocol does not determine murrelet nest locations, it only determines if birds are present in the canopy or not (occupied behaviors). If present, then there is a likelihood that birds are nesting in that forest patch or nearby.</p> <p>The phased approach for this study included the following: 1) Conduct study to determine if and where murrelet activity is located in the study area using Radar Surveys, as described in Pacific Seabird Group Marbled Murrelet Protocol Surveys (Evans Mack et al. 2003) to identify where occupancy is a possibility. If activity is detected, then next steps will be determined based on those results: A) If likelihood of murrelet presence is extremely low, then ground surveys are unlikely to be needed to locate specific occupied sites. B) If consistent murrelet activity is detected by radar surveys in some areas, then follow up Pacific Seabird Group Protocol Intensive Surveys (Evans Mack et al. 2003) to 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 potential for Project effects. (City Light could also assume occupancy for these sites and determine if best management practices (BMP) can be applied to avoid effects.)</p> <p>No murrelet-type targets detected by radar exhibited circling flight paths, usually documented during the breeding season near marbled murrelet nesting locations as an indicator of nesting activity. Most targets, 92 percent, exhibited straight flight paths, and were also documented over water (not land), further indicating these targets were using the waterways for transiting the area. The findings of this study indicate with high confidence that a very small number of marbled murrelets are likely using the upper Skagit River, Diablo Lake, and Ross Lake waterways as travel corridors to transit through the Project Boundary.</p>

Appendix 1: Comment/Response Table

Study Number	Licensing Participant(s)	Summary of Request ¹	Response
			<p>Based on these results, City Light does not believe that follow-up surveys beyond this study are warranted to identify likely nesting stands.</p> <p>For locations near the Project outside of the radar survey study areas, City Light could assume occupancy and determine if BMPs can be applied to avoid Project effects. For most City Light activities, the general location of potential nesting habitats will be sufficient to implement BMPs. For future new construction or vegetation clearing activities within a certain distance of suitable habitat, City Light would have a working assumption that the habitat is occupied until a protocol survey is conducted to verify absence.</p>
TR-08	NPS	City Light should include a second year of surveys from a spatially distributed randomly selected set of habitats within the Park.	City Light <u>is</u> conducting a second year of surveys targeted to areas where additional information would be beneficial to understanding habitat use and life history phenology of amphibians in the Project vicinity. The study is not intended to document amphibian occurrences within the National Park outside of areas that may be affected by Project O&M nor does the study require surveys of habitats that are not suitable for the target species. Most habitat within the Project vicinity in Ross Lake National Recreation Area (RLNRA) is not suitable breeding habitat for the target species or other amphibians. In particular, potential breeding habitat for spotted frogs is scarce or absent in most of the study area and is largely limited to the extreme north end of Ross Lake, mostly north of the international border (see Response to Comment below). Despite this, City Light is conducting further investigation in 2022, including day and night surveys, in the drawdown zone at the north end of Ross Lake near the border to assess use of borrow pits, pools, or other habitats that could be available to Columbia spotted frogs or other amphibians during the oviposition period. The north end of Ross Lake is within the expected range of Columbia spotted frog and is situated near extensive suitable habitat north of the international border and upstream of the Project. Although NPS contends that a random survey is necessary to determine “detection efficiency” and “site occupancy,” surveys of unsuitable habitats are not justified. The comment also implies that the target species are difficult to document or unpredictable in occurrence,

Appendix 1: Comment/Response Table

Study Number	Licensing Participant(s)	Summary of Request ¹	Response
			<p>neither of which is accurate if surveys are conducted at the appropriate time.</p> <p>City Light must also note that it has made multiple and specific requests for information regarding the results of amphibian surveys conducted by NPS at Ross Lake in 2021. No information, except for general statements to City Light on June 24, 2021 that certain species were found, has been shared with City Light. Nevertheless, City Light is conducting additional field work to address remaining questions raised by these findings, including NPS’ reported findings of western toad “breeding activity” at several sites on Ross Lake, which were too late for follow-up visits in 2021 before rising water levels flooded these sites, and therefore will occur in 2022. Concern for survey efficiency could have been addressed by sharing information on locations, species, life stages and numbers, habitat types, and the dates and times of observations, as well as sharing digital images to verify species identification.</p> <p>City Light is also conducting additional field work at the County Line Ponds and the large Newhalem Pond, where the Special-Status Amphibian study surveys found western toad tadpoles. This work is not strictly required as per the study plan but will be beneficial to understanding western toad habitat use at these sites, and will therefore be included in the TR-08 Special-status Amphibian Study field schedule in 2022.</p>
TR-08	NPS	Additionally, we also request that the study include the Canadian portion of the Ross Reservoir.	While areas north of the international border are outside of FERC or other U.S. agencies’ jurisdiction, City Light has already gathered existing reports on amphibians for the Skagit Valley Provincial Park to provide additional context. City Light cannot conduct field data collection in Canada but is exploring options to obtain select information on wetlands and amphibians north of the international border through coordination with the Skagit Environmental Endowment Commission (SEEC) and BC Parks. City Light believes that this can be accomplished outside the relicensing study program.
TR-08	NPS	Finally, we request that the USR include a data file that includes the location (UTM), species, life stage, number of each species	City Light will provide these data upon request.

Appendix 1: Comment/Response Table

Study Number	Licensing Participant(s)	Summary of Request ¹	Response
		and life stage including egg masses, habitat type, and the date and time of the observations to meet Goal 4 of the study.	

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**SKAGIT RIVER HYDROELECTRIC PROJECT
RESPONSE TO COMMENTS ON INITIAL STUDY REPORT MEETING
SUMMARIES AND REQUESTS FOR MODIFICATIONS TO ONGOING
STUDUES AND REQUESTS FOR NEW STUDIES**

APPENDIX 2

**CITY LIGHT RESPONSE TO LP REQUEST TO CONDUCT A FLIR
SURVEY IN THE SKAGIT RIVER AND PROJECT RESERVOIRS**

MAY 18, 2022

Skagit River Hydroelectric Project
City Light Response to LP Request to Conduct a FLIR Survey in the Skagit River and
Project Reservoirs
May 18, 2022

On March 29, 2022, City Light hosted a Forward Looking Infrared (FLIR) Workshop, during which Licensing Participants (LPs), led by Dudley Reiser (Kleinschmidt Group for Swinomish Tribe), provided a presentation on LPs' rationale for why City Light should conduct a FLIR survey in the Skagit River downstream of the Project and in Project reservoirs during summer 2022. City Light's response, crafted around excerpts taken from the FLIR presentation,¹ is provided below.

The presentation contains the following LP request:

...conduct a FLIR survey this summer [2022] (August/September) of the Skagit River Project study areas to include 1) the entire river below Ross Dam and floodplain during periods of active temperature monitoring; and 2) the shoreline areas and varial zones of Ross, Diablo and Gorge reservoirs.

The presentation includes the following statements to justify the need for a single FLIR survey in summer 2022:

...changes in surface flows will influence subsurface flows and hyporheic exchange...

...since Skagit operations influence surface flows, those operations also influence subsurface flows and hyporheic exchange.

Changes in surface flows influence subsurface flow dynamics and hyporheic exchange and Project operations influence surface flows in the Skagit River. However, although a one-time application of FLIR would be helpful in identifying near-surface groundwater inputs (inputs at depth would often be undetected), these groundwater sources would be mapped under a fixed set of conditions, including only a single Project flow release at any given location, when the FLIR survey is conducted.

The presentation states the following:

...under the prevailing flow and weather conditions, inferences can be drawn relative to how patterns might be influenced under different flows/operational scenarios.

City Light believes that in order to develop a meaningful relationship between Project operations and the effects of surface flow on groundwater dynamics, FLIR would need to be applied over a range of flows and that one data FLIR data point would not be sufficient to develop relevant protection, mitigation and enhancement (PME) measures.

¹ "Importance of Understanding Groundwater-Hyporheic Flow in the Skagit River System and the Use of FLIR/TIR."

The presentation states the following:

Useful for calibration of CE-QUAL-W2: FLIR imaging may also reveal areas of thermal refugiae within the mainstem river, the data of which would be useful for calibrating W2 modeling.

If a significant water balance or temperature discrepancy were to arise during calibration of the CE-QUAL-W2 model, it is possible that FLIR imaging could shed light on the location(s) of potential ungauged flow inputs. However, there is no indication there are significant sources of flow that are unaccounted for by the existing gaging system on the Skagit River. If a calibration issue were to arise, it might then be useful to consider the use of FLIR or temporary flow gauges at critical locations along the Skagit River or its tributaries.

The presentation includes the following statement regarding the utility of FLIR:

FLIR will be valuable in detecting and mapping heretofore undetected sources of groundwater influx that will provide a more comprehensive picture of existing fish habitats (spawning and rearing), in both Skagit River main channel and important off-channel/floodplain areas used by fish and aquatic biota, as well as shoreline areas in Ross, Diablo and Gorge reservoirs that could be used for spawning.

City Light recognizes the value of “detecting and mapping...undetected sources of groundwater influx” but has determined that the mapping referred to would be better suited to supporting development of habitat enhancement measures following issuance of the new Project license. As such, there may come a time when applying FLIR will be justified as an initial objective of a management plan aimed at identifying potential habitat restoration locations in the Skagit River basin.

City Light believes the suite of tools it is developing in collaboration with LPs for use in the relicensing, including the instream flow, water quality, and sediment transport models, can be used to assess Project effects in a manner sufficient for the NEPA analysis (i.e., Exhibit E of the FERC License Application) and the application for Section 401 Water Quality Certification, and also to identify potential PME for implementation under a new Project license.

Regarding the application of FLIR to Project reservoirs, City Light notes that this is a new request. References to FLIR in the June 9, 2021 Notice were aimed at understanding conditions in the Skagit River downstream of the Project. Ross Lake, which has by far the most shoreline of the reservoirs, is operated as a flood control facility, and as such, experiences a great deal of variability in water surface elevation. City Light notes the high level of water surface elevation variability in the Ross Lake varial zone is driven primarily by the US Army Corps of Engineers to support its flood management actions in the Skagit River basin. Under such conditions, City Light believes that a one-time application of FLIR would be of little value in identifying PMEs that would influence Corps drawdown requirements for flood risk mitigation.

Should a decision be made to pass anadromous fish upstream of the Project dams, the use of FLIR for assessing shoreline groundwater influx could be explored.

City Light has determined that conducting a single FLIR analysis during 2022 would not provide sufficient additional value to support analysis of project effects and identification of PME to include in the license. City Light acknowledges that FLIR might have utility as an exploratory first step included in a lower Skagit River habitat management plan during license implementation.