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VIA ELECTRONIC FILING

April 07, 2022

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: Skagit River Hydroelectric Project, FERC Project No. 553-235
Filing of Initial Study Report Meeting Summary

Dear Secretary Bose:

In accordance with the Federal Energy Regulatory Commission's (FERC or Commission) regulations at 18 C.F.R. § 5.15(c)(3), the City of Seattle, Washington, through its City Light Department (City Light), hereby files with the Commission its summary of the March 21-23, 2022 Initial Study Report (ISR) meetings for the relicensing of the Skagit River Hydroelectric Project (FERC No. 553) (Project) under FERC's Integrated Licensing Process (ILP). The current license for the Project expires on April 30, 2025.

Pursuant to 18 C.F.R. § 5.15(c), City Light filed its ISR with the Commission on March 08, 2022. On March 21–23, 2022, City Light held a series of virtual public ISR meetings with Commission staff, resource agencies, Indian Tribes, Canadian First Nations, and other licensing participants (LP) to discuss initial study results, variances, modifications, and to provide status updates on outstanding studies to be completed during the second study season in 2022.

Attached to this summary are an ISR Meeting agenda (Attachment A), ISR Meeting attendance roster (Attachment B), and PowerPoint presentations (Attachment C). With today's filing of the ISR Meeting Summary, City Light understands that the next steps of the ILP for the relicensing of the Project will proceed as follows:

- May 07, 2022: Per 18 C.F.R. § 5.15(c)(4), any participant or Commission staff may file a disagreement with the ISR meeting summaries, as well as any recommendations and associated justification for proposed modifications to ongoing studies and/or requests for new studies.
- June 06, 2022: Per 18 C.F.R. § 5.15(c)(5), City Light and stakeholders may file responses to disagreements/requests to amend study plans and/or requests for new studies.

- July 06, 2022: Per 18 C.F.R. § 5.15(c)(6), FERC's Director of Energy Projects issues *Director's Determination on Requests* to resolve any disagreements, requests to amend the study plans and/or requests for new studies.

In addition to filing the ISR Meeting Summary with the Commission, City Light will share the ISR Meeting Summary with LPs by posting it on the Project's relicensing website at [https://www.seattle.gov/light/skagit/Relicensing/default.htm].

City Light appreciates the contribution of LPs and FERC staff through their participation in the ISR meetings. City Light looks forward to continuing to collaborate with LPs and FERC staff throughout the relicensing process. If there are any questions about this filing, please contact me by phone at (206) 304-1210 or by email at Chris.Townsend@seattle.gov.

Sincerely,

Chris Townsend (Apr 6, 2022 13:48 EDT)

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Enclosures

cc: Distribution List (attached)

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Skagit River Hydroelectric Project
Seattle City Light
Initial Study Report Meeting
March 21-23, 2022

Initial Study Report Meeting Summary

Introductions and Purpose of Meeting

On March 21-23, 2022, Seattle City Light (City Light) conducted the Initial Study Report (ISR) meeting for the Federal Energy Regulatory Commission (FERC) relicensing of the Skagit River Hydroelectric Project (FERC No. 553) (Project). This document summarizes items discussed in the meeting, including the ISR findings and results, variances or modifications, and updates on schedule. During the ISR meeting a comment and question period followed each presentation. This meeting summary focuses on questions regarding study status, schedule, and variances and modifications. The meeting summary is not intended to be a transcript of the meeting.

At the beginning of each meeting day, the Meeting Facilitator opened the meeting and introductions were made for City Light staff, outside counsel, consultant team, and FERC staff. Matt Cutlip (FERC Project Coordinator) provided an overview of the purpose of the ISR meeting, next steps related to the relicensing studies, and requests for modification or new studies. Matt explained that City Light will file the ISR meeting summary by April 7, 2022, and stakeholder disagreements, requests to modify the study plan, or requests to develop new studies are due on or by May 7, 2022. Matt stated that on or by June 6, 2022, reply comments to study requests or modifications can be filed by any stakeholder, and thirty days later, on or by July 6, 2022, FERC will issue a study modification determination.

Summary of Relicensing Studies
Session: March 21, 2022 (AM)
9:00 am – 12:00 pm

OM-01 Operations Model Study

Angie Scangas (City Light Consultant Team) presented an overview of the OM-01 Operations Model Study. The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Enhanced consultation by holding additional workshops and small technical work group meetings to address development of the model and discuss potential hydrologic references.
- City Light originally envisioned simulating both a Base Case scenario (defined by current FERC license requirements) and a Current Operations Baseline scenario (defined to

include the current fisheries adaptive management by City Light). However, after a review of operations and operational requirements, it was apparent that the Current Operations Baseline effectively captures current FERC license requirements.

Rick Hartson (Upper Skagit Indian Tribe) inquired about the scenario identification process and if the Operations Model can accommodate changes in Project facilities. Angie Scangas replied that the scenario identification process is being developed collaboratively with licensing participants (LP), a draft scenario request form was attached to the OM-01 Operations Model Study Plan, and that City Light plans to run scenarios requested by LPs. The Operations Model is currently configured with existing facilities; however, it can be modified to accommodate changes in facilities as appropriate.

Ashley Rawhouser (National Park Service [NPS]) inquired about the application of the model and results, and if the Operations Model could be used to predict reservoir refill rates or discharge from Gorge Powerhouse. Angie Scangas replied that the Operations Model is not a short-term model that would be used for dispatching, however, the Operations Model can be used to help predict reservoir refill rates and discharges from Gorge Powerhouse.

There are no immediate action items or topics for follow up for the OM-01 Operations Model Study.

FA-02 Instream Flow Model Development Study

Erin Lowery (City Light) presented an overview of the FA-02 Instream Flow Model Development Study. The study is in progress. The presentation described study goals and objectives, the study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Enhanced consultation by holding additional workshops and small technical work group meetings to address development of Habitat Suitability Criteria and periodicity data.
- The Revised Study Plan (RSP) proposed using observed data from 12 of 17 river transects for hydraulic model calibration, with data from remaining 5 transects reserved for model validation. In consultation with LPs at the December 7, 2021 workshop, it was decided to use all transect data for calibration and forgo model validation. The consensus was that this approach was more likely to produce results that more accurately represent the observed transect data.

Rick Hartson and Dudley Reiser (consultant to Swinomish Indian Tribal Community) asked if the FA-02 Instream Flow Model will be calibrated and validated for floodplain and off-channel habitats. Erin Lowery stated that the FA-02 Instream Flow Model Development Study is sequenced such that the first step includes development of a calibrated and validated hydraulic and habitat model for the mainstem Skagit River and connected side channels, as described in the FA-02 Study Plan. Erin further stated that once the FA-02 Instream Flow Model is calibrated and validated, City Light intends to engage in discussions related to model application in areas in the floodplain and off-channel habitats not currently included in the FA-02 Instream Flow Model study

area. Erin noted that floodplain modeling is complex and computationally intensive, and City Light anticipates that following completion of the FA-02 Instream Flow Model, an approach moving forward could include identification of reference reaches to represent additional information on floodplain areas of interest, in consultation with LPs.

Brian Lanouette (Upper Skagit Indian Tribe) asked about utilization of the model to inform stranding and trapping risk. Erin Lowery stated that there is potential application of the hydraulic model to estimate where the risk of stranding could occur in the river. Stan Walsh (Skagit River System Cooperative) asked about timelines related to application of the model to inform stranding and trapping risk. Erin Lowery stated that City Light intends to have discussions with LPs related to stranding and trapping in 2022 and that the FA-02 Instream Flow hydraulic and habitat models will be used in coordination with the OM-01 Operations Model and other relicensing models to run scenarios and analyze the results in consideration of biological metrics, including stranding and strapping. Andrew Bearlin (City Light) stated that the FA-02 Instream Flow modeling is finalizing the calibration step and City Light anticipates completion of that in April 2022. Andrew further stated that City Light will be coordinating with LPs to identify and run requested scenarios to inform discussions related to development of new license measures.

Jonathan Kohr (Washington Department of Fish and Wildlife [WDFW]) inquired about the information included in the ISR and timelines associated with model development. Erin Lowery replied that the ISR is a progress report and does not include final model results; however, it does include information related to Habitat Suitability Criteria development and substrate and cover information.

Dudley Reiser recalled not being aware of any efforts to further understand groundwater influences and dynamics and that information to inform that process is needed. Erin Lowery replied that groundwater dynamics are difficult to model and that the hydraulic model being developed as part of the FA-02 Instream Flow Model Development Study is a surface water model and not a groundwater model. Erin explained that prior experiences in the Barnaby Reach have informed City Light about the complexities and challenges associated with groundwater modeling, and that results have been inaccurate. Erin further stated that a meeting with LPs is scheduled later in March to further discuss the application of FLIR thermal imagery.

There are no immediate action items or topics for follow up for the FA-02 Instream Flow Model Development Study.

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

Erin Lowery presented an overview of the FA-05 Skagit River Gorge Bypass Reach Hydraulic and Instream Flow Model Development Study (Bypass Instream Flow Model Development Study). The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Refined hydraulic model terrain to a 1-foot resolution in place of originally proposed 3-foot resolution, which provides more realistic representation of actual condition and improves hydraulic model accuracy.
- Acquired water surface profile data using a UAV (drone) in place of originally proposed manual marking and surveying of profiles. Acquisition of data by drone was safer and more efficient.
- The RSP stated that the hydraulic model would be validated without stating which data would be reserved for validation. A proposed validation approach was discussed at Workshop 4 on November 2, 2021, and at a small group technical meeting on January 11, 2022, where the decision was made to forgo model validation. The consensus was that using all data for model calibration instead of reserving some data for model validation was more likely to produce results that more accurately represent the observed transect data.
- Enhanced consultation (with FA-02 Instream Flow Model) by holding additional workshops and small technical work group meetings to address development of habitat suitability criteria and periodicity data.

Rick Hartson asked if there will be an opportunity or plan to model changes to either the channel bed or wood formation in the Gorge bypass reach. Erin Lowery replied that the goal of the FA-05 Bypass Instream Flow Model is to develop a model of the existing conditions that could then be used to evaluate future conditions based on requested scenarios.

There are no immediate action items or topics for follow up for the FA-05 Bypass Instream Flow Model Development Study.

How Relicensing Models Will Work Together

Ty Ziegler (City Light Consultant Team) and Angie Scangas presented an overview of how relicensing models will work together. The presentation provided an overview of the relicensing models under development to inform scenarios related to refined operations, provided an overview of an approach to cross-resource analysis of study results and model applications, and provided an example model output summary table.

Brock Applegate (WDFW) requested clarification of ISR Figure 3.1-2 regarding direct and non-direct Project effects. Ty Ziegler stated that ISR Figure 3.1-2 provides an overview of relicensing models, and the potential outputs of those models, as provided in the example summary output table included in the slides. Additionally, Ty stated that the OM-01 Operations Model is a key linkage regarding flow-related scenarios.

Jenna Friebel (Skagit Drainage and Irrigation District Consortium) inquired about the scenario development process, criteria, and timeline. Angie Scangas replied that the timeline and criteria metrics will be further discussed in work group meetings with LPs. Jenna Friebel asked about the decision-making process following scenario development and analysis. Andrew Bearlin stated that the metrics for evaluation and criteria are related to interests and objectives. Andrew further stated

that there are several approaches for consideration related to prioritization, such as sensitivity analyses and collaboration with LPs on metrics and criteria. Jenna Friebel then asked if alternatives would be compared to baseline requirements or actual operations. Angie Scangas replied that the Current Operations Baseline scenario represents the current operational requirements and additional scenarios could be simulated to represent deviations from the Current Operations Baseline. Jenna Friebel inquired about running multiple scenarios at once or independently. Andrew Bearlin replied that scenarios are run independently but multiple scenario results can be compared simultaneously.

There are no immediate action items or topics for follow up for the Relicensing Models presentation.

Additional Data Updates in ISR (Wood Management Update)

Shelly Adams (City Light) provided an overview of the Woody Debris Management Update memorandum appended to the ISR. The presentation described background information, the memorandum objectives, methods, results and progress, and next steps. Shelly explained that the memorandum provides information in recognition that the LPs and City Light have a shared interest in managing wood on the reservoirs and that City Light anticipates beginning discussions with LPs on reservoir wood management in 2022.

Rick Hartson inquired about the fate of reservoir wood not removed by City Light. Shelly stated that City Light has several storage pens in Ross Lake, and that City Light only collects wood on the northern and southern ends of Ross Lake. Shelly further stated that City Light does not collect wood, or data on the wood, in the middle of Ross Lake.

There are no immediate action items or topics for follow up for the Woody Debris Management Update presentation.

Additional Data Updates in ISR (Littoral Habitat Assessment)

Jeff Fisher (City Light) stated that the purpose of the Littoral Habitat Assessment was to address LP requests and meet the FERC requirement of quantifying the acreages of reservoir shoreline/bed that are subject to frequent fluctuations (i.e., Gorge and Diablo lakes) or extended drawdowns (i.e., Ross Lake) under normal operating condition, as described in the Study Plan Determination (SPD). The presentation described assessment goals, study area, methods, draft results, and status. A technical memorandum is under development that will be filed with FERC and discussed with LPs.

Ashley Rawhouser asked about data inputs for Diablo Lake and Gorge Lake and the methods used in the assessment. Jeff Fisher replied that City Light used LiDAR in Diablo and Gorge lakes for the GIS assessment (where coverage existed) and U.S. Geological Survey (USGS) bathymetry from the 1960s to fill voids in the LiDAR coverage. Jeff stated that the methods are further

described in the technical memorandum and that City Light will be finalizing the memorandum and filing with FERC soon.

Brian Lanouette inquired about the timeline and potential next steps, including field assessments. Jeff Fisher replied that the GIS assessment was the first step and there are several elements in the FA-01a Water Quality Monitoring Study related to metrics in the littoral zone (e.g., benthic grabs for invertebrates). Jeff also stated that City Light will work with the Facilitation Team and LPs to identify the appropriate time for discussions related to the memo and next steps, if necessary.

Curtis Clement (Upper Skagit Indian Tribe) asked if the littoral zone assessment will be updated after the new bathymetry is collected as part of the GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study. Jeff Fisher replied that City Light will likely utilize the new bathymetry data to update the existing GIS assessment, if necessary.

Brian Lanouette then asked if City Light looked at other ways to define the littoral zone besides light, such as coefficient temperature profiles during the summer growth period. Jeff Fisher stated that City Light used the widely accepted definition of the littoral zone based on light extinction (i.e., depth to bottom where there is one percent light penetration) as their working definition. Brian requested additional discussion on how temperature in addition to light extinction might influence littoral habitat areas in follow-up discussions.

David Fluharty (North Cascades Conservation Council) asked if City Light used the euphotic zone as starting at full pool and if that gradually changes with the level of the reservoir. Jeff Fisher stated that it does change, and as part of the assessment City Light identified what was being lost in relation to full pool conditions, and that methods are further described in the memo.

Littoral Habitat Assessment Action Items and Topics for Follow-up

- City Light will provide the littoral habitat memo to LPs for review in April 2022, with sufficient time for LPs to review it before the next Reservoir Work Group meeting.

Additional Data Updates in ISR (Diablo Reach)

Erin Lowery presented an overview on the Diablo Reach Water Level Assessment. The presentation described assessment goals and objectives, methods, and results. Erin stated the assessment was developed to meet a commitment identified in the "Notice of Certain Agreements on Study Plans for the Skagit Relicensing" filed with FERC on June 9, 2021 (June 9, 2021 Notice)[1].

Ashley Rawhouser asked if there was any ground truthing of the modeling or if monitoring equipment was installed to monitor fluctuations. Erin Lowery replied no, as City Light would not intentionally create a zero-flow condition to ground truth the hydraulic model used in the assessment. Erin noted that it would be a significant drawdown of Gorge Lake and that City Light would not want to intentionally do that. Erin further stated that a zero-flow condition is a rare

1 Referred to by FERC in its July 16, 2021 Study Plan Determination as the "updated RSP."

occurrence and it only happened once in 24 years. Ashley asked if there was existing LiDAR data for this specific reach. Erin answered yes, and the data includes survey points.

Brock Applegate asked if there are instream flow requirements below Diablo Dam and the free-flowing conditions of the reach. Erin Lowery replied no, because that area is part of the Gorge Lake reservoir. Erin further stated that section of Gorge Lake only flows freely when City Light is spilling at Diablo Dam, and that such spill would create flow at that reach that would result in zero disconnection.

There are no immediate action items or topics for follow up for the Diablo Reach Water Level Assessment presentation.

Summary of Relicensing Studies
Session: March 21, 2022 (PM)
12:45 pm – 4:00 pm

FA-01a Water Quality Monitoring Study

Jeff Fisher presented an overview of the FA-01a Water Quality Monitoring Study. The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- The addition of opportunistic monitoring of total dissolved gasses (TDG) downstream of Gorge Powerhouse.
- City Light is relying on data collected by the USGS at the Skagit River inflow.
- Starting in September 2021, *E. coli* samples were collected at all fecal coliform sampling sites to conform with a change in Washington State water quality standards.
- Covid-19-related supply-chain impacts delayed deployment of Hydrolab data sondes at two locations in Gorge Lake (delayed until September 9, 2021) and one location in the Gorge bypass reach (delayed until August 2, 2021).
- Benthic macroinvertebrates (BMI) were sampled at all Skagit River sites and in the Sauk River in August 2021; sampling in July and September 2021, as identified in the RSP, was not possible due to high flows.

Ashley Rawhouser asked how City Light determined which existing data (i.e., data collected outside the relicensing studies and reported on in Appendix D of the FA-01a Water Quality Monitoring Study) were useable and requested City Light to coordinate further with NPS regarding data utility. In addition, Ashley stated that some data presented in the FA-01a Water Quality Monitoring Study were not provided as part of NPS official data transmission to City Light but had been provided prior to relicensing for informational purposes. Jeff Fisher agreed that a follow-up conversation would be useful.

Brian Lanouette stated that discussions were ongoing related to the extent of CE-QUAL-W2 modeling, specifically regarding floodplain and off-channel habitats and the downstream extent of

modeling on the Skagit River. Brian further stated that the Upper Skagit Indian Tribe supports expansion of the study to incorporate water quality sampling and monitoring in the floodplain and off-channel habitats and extending the model farther downstream in the Skagit River below Concrete, Washington. Brock Applegate supported the requests of the Upper Skagit Indian Tribe.

Brian Lanouette then asked about the status of nutrient data collection. Jeff Fisher stated that nutrient data will be collected and used to develop and calibrate the FA-01b Water Quality Model.

Ashley Rawhouser acknowledged the magnitude of the FA-01 Water Quality study and data collection effort but stated that it is difficult to understand all the data being collected, both in terms of parameters and frequency. Jeff Fisher stated that the ISR is focused on the sampling parameters identified in the RSP (as modified per FERC's SPD) and that the report includes a table that identifies the constituents, sampling/measurement frequencies, and sampling/measurement locations. Jeff further stated that the additional parameters Ashley was referencing are add-ons to the RSP and that a sampling plan is being finalized per agreements made in work group meetings and would be provided to LPs soon.

FA-01a Action Items and Topics for Follow-up

- Follow up conversation with Ashley Rawhouser, Jeff Fisher, and Rich Wildman (City Light Consultant Team) concerning NPS data.

FA-01b Water Quality Model Development Study

Jeff Fisher presented an overview of the FA-01b Water Quality Model Development Study. The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, and the study schedule. There are no variances or modifications to the FERC approved Study Plan.

Ashley Rawhouser asked about the timelines related to water quality modeling of nutrients. Jeff Fisher stated that it will be finished in conjunction with the rest of the water quality model. Rob Annear (City Light Consultant Team) stated that City Light is targeting May 2022 for calibration of the temperature model, and calibration of the water quality model depends on the timing of additional water quality data collection, which will soon be underway. Rob further stated that City Light is targeting November 2022 as the start date for development of the water quality model.

Dudley Reiser asked about the duration of water quality monitoring. Jeff Fisher stated that monitoring will continue until or beyond May 2023, depending on the constituent, and that a key component of the monitoring associated with the FA-01a Water Quality Monitoring Study is to provide information to support the application for Clean Water Act Section 401 Water Quality Certification, and as part of that, provide enough information to support calibration and application of the CE-QUAL-W2 model.

Brian Lanouette asked if algae, primary producers, and zooplankton were included. Jeff Fisher stated that it is City Light's intention to be able to model those parameters. Brian noted that several

LPs are requesting to have the CE-QUAL-W2 Model extend beyond Concrete to the Highway 9 Bridge.

Monika Kannadaguli (Washington State Department of Ecology [Ecology]) noted that City Light lost monitoring equipment during high flows resulting from storms in the 2021 field season and asked what City Light's plan was to avoid any further losses of data in the future. Jeff Fisher stated that the plan is to manually measure TDG during spill events at select locations instead of permanently deploying TDG monitoring equipment in the Gorge bypass reach and risking additional failure and loss of equipment. A memo describing these changes will be forwarded to Ecology for consideration.

Rick Hartson stated that the Upper Skagit Indian Tribe are seeking data associated with drawdown events at Gorge Lake, and turbidity in particular, and asked if modeling or estimating total suspended solids during drawdown events in Gorge Lake and the Skagit River downstream will occur. Jeff Fisher stated that those events are opportunistic, and City Light is not anticipating that level of drawdown at Gorge Lake during the 2022 field season, but it is possible that such a drawdown event could occur.

FA-01b Action Items and Topics for Follow-up

- City Light to provide LPs with a memo describing changes in data measurement and monitoring in the Gorge bypass reach for their consideration.

FA-08 Fish Entrainment Study

Jeff Fisher presented an overview of the FA-08 Fish Entrainment Study. The study is complete. The presentation described study goals and objectives, study area, methods, results, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- The RSP originally committed to estimating survival using both the U.S. Fish and Wildlife Service (USFWS) Turbine Blade Strike Analysis (TBSA) model and EPRI (1997) survival database. After review of the EPRI (1997) database, facilities listed did not share adequate facility/turbine specifications with the Project and were not considered representative. Therefore, entrainment survival was estimated using the USFWS TBSA model applying site-specific turbine/intake structure specifications.

Brock Applegate asked if the turbine strike and spill analysis model look at delayed mortality due to injury that may occur. Erin Settevendemio (City Light Consultant Team) stated that this was addressed in the report in a qualitative manner because the TBSA does not directly address it. Brock did not identify any analysis in the report addressing that some of the tunnels are over two miles long, dark, and include several turns. Brock then asked if this will be addressed as part of next steps of this study. Jeff Fisher stated that this study was intended to be desktop analysis to gauge the relative risk to species and life stages and the physical features of the facilities are implied in the entrainment analysis. Erin Settevendemio also clarified that concerns related to effects from pressure are qualitatively addressed in the report, but further analysis is a much more

extensive effort that was outside of the scope of the FA-08 Entrainment Study. Jeff stated that the existing intake structure are very deep and if the concern is additional barotrauma affect due to entrainment, then City Light is confident the existing design of intakes eliminate that as a risk factor for any fish entrained.

Brock Applegate then asked about any concerns for hydro hammers or things beyond the gates. Jeff Fisher replied having to default to the design criteria regarding the intakes, but did not think it was an issue, that City Light has not seen evidence of this in the fish captured, and that no evidence supports this is an issue. Brock noted that WDFW supports an additional desktop exercise looking at the risk of mortality or delayed mortality given the Project's unique facilities and long tunnels.

Brian Lanouette stated that in the June 9, 2021 Notice, City Light committed to reaching out to the Upper Skagit Indian Tribe and WDFW for references used in this study or previous City Light documents, and that the Upper Skagit Indian Tribe wanted further discussion related to the development of the studies and references to previous City Light documentation. City Light indicated that the references used are available in the ISR, and that the opportunity is still available for further discussions. Brian stated that the study needs to include additional analysis related to steelhead, Bull Trout, and Brook Trout.

Ashley Rawhouser asked if there were comparisons to other projects in the West looking at projects with similar penstock lengths to the Gorge Development. Jeff Fisher replied that the Fish Entrainment Study looked at other projects, but not expressly at the length of penstocks. Ashley stated that NPS supports incorporating that into the study.

Brian Lanouette then asked if there was a plan to incorporate any potential changes in operational regime into the study. Jeff Fisher stated that the study has not identified a high risk of entrainment for any species evaluated to date and noted, however, that any significant design changes that would be considered would incorporate a similar type of analysis.

There are no immediate action items or topics for follow up for the FA-08 Fish Entrainment Study.

FA-04 Fish Passage Technical Studies Program

Erin Lowery presented an overview of the FA-04 Fish Passage Technical Studies Program (Fish Passage Study). The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Expert Panel: Per Section 2.1 of the RSP, City Light proposed to form a three-member Fish Passage Independent Expert Panel (Expert Panel), which would be available to review reports and provide advisory opinions. The makeup of the Expert Panel was to be determined in collaboration with LPs. As of December 31, 2021, however, City Light and LPs have not convened the Expert Panel and do not intend to do so unless LPs specifically

request it during future study stages. This variance does not affect the ability of the study to meet the objectives of the RSP.

- Schedule Modification: The Gorge bypass reach assessment results will be presented in a stand-alone report in summer 2022 instead of in the ISR.

Stan Walsh and Brian Lanouette requested additional clarification on the Expert Panel associated with the study. Erin Lowery stated that the support of an independent expert panel was identified in the RSP, however, work completed as part of the Agency Work Sessions were successful and City Light has not received any requests to convene the Expert Panel. Brian stated that the Upper Skagit Indian Tribe would like to have discussions with City Light and other LPs to discuss convening the expert panel.

Rick Hartson noted that other studies may inform the need for temperature conditioning and modification to outlet structures, and asked City Light if the Fish Passage Study would consider such changes. Erin Lowery stated that the goal of the Fish Passage Study is to explore the technical engineering feasibility, and that a lot of additional considerations, such as effects related to temperature, risk assessment due to disease or pathogens, or other considerations such as population sizes, and resource agency/co-manager biological goals and objectives would need to be considered at some point in the future before a final decision related to passage is made. Detailed consideration of these factors is beyond the scope of the Fish Passage Study.

Rick Hartson then asked how hydraulic modeling work as part of FA-05 Bypass Instream Flow Model Development Study will be incorporated into the Fish Passage Study. Erin Lowery stated that topic would be discussed in detail at the March 24, 2022 Fish Passage Work Group meeting.

FA-04 Action Items and Topics for Follow-up

- If requested, City Light will coordinate with LPs on forming an Expert Panel. As of filing of this meeting summary, City Light and LPs have not convened an expert panel and do not intend to do unless LPs specifically request it.

Summary of Relicensing Studies
Session: March 22, 2022 (AM)
8:00 am – 12:00 pm

FA-07 Reservoir Tributary Habitat Assessment

Jeff Fisher presented an overview of the FA-07 Reservoir Tributary Habitat Assessment. The study is in progress. The presentation described the study goals and objectives, study area, methods, results and progress, and the study schedule. There are no variances or modifications to the FERC approved Study Plan.

Dave Price (National Marine Fisheries Service [NMFS]) understood the purpose of the study is to characterize the production potential for salmon and steelhead in the tributaries and reservoirs comprehensively and not to simply measure rearing habitat in tributaries. Dave looked forward to further discussions about parametrizing the IP model for Sockeye Salmon spawning and understanding the potential production capacity for anadromous fish provided by Project reservoirs

and their tributaries. Brian Lanouette, Ashley Rawhouser, and Brock Applegate identified potential reservoir shoreline spawning habitat for Sockeye Salmon as a data gap, and Brian requested that the Food Web Study incorporate output from the CE-QUAL-W2 model into bioenergetics modeling to better understand the effects of varying food availability and fish consumption rates on the production potential of the Project reservoirs.

Jeff Fisher stated that Ross Lake is a flood storage reservoir and experiences drawdowns up to 100 feet, which would influence the availability and suitability of shoreline spawning and rearing habitat. Jeff explained that the ISR is focused on the FA-07 Reservoir Tributary Habitat Assessment, which is an assessment of the spawning and rearing capacities of the reservoirs' tributaries for the target species of salmonids. Jeff further stated that the Food Web Study, which is a separate study being conducted in parallel to relicensing, is the tool that will be used to assess production potential of the reservoirs for both resident and potentially introduced anadromous salmonids.

David Fluharty asked if the Food Web Study is looking at potential competition among resident species. Jeff Fisher replied that the Food Web Study was originally focused on evaluating competition among resident species in the reservoirs but has been expanded to examine the potential consequences of introducing anadromous fish to the system. Jeff said the Food Web study is looking at effects of competition on growth potential for existing and potentially introduced fish species.

Brian Lanouette asked about the Food Web Study in relation to the FERC Integrated Licensing Process (ILP) timeline and integration with other studies. Jeff Fisher stated that the results of the Food Web Study will be integrated with the FA-07 Reservoir Tributary Habitat Assessment as data become available. Jeff noted that City Light anticipates the bioenergetics results by the end of the year and will be available to help answer a range of questions when considering potential future Project operating scenarios.

Dave Price stated that application of forward looking infrared (FLIR) in the Project reservoirs would be useful for understanding groundwater influences, particularly as they may pertain to potential Sockeye Salmon spawning habitat. Brian Lanouette, Ashley Rawhouser, Dudley Reiser, Brock Applegate, and Jeff Garnett (USFWS) supported the request to conduct FLIR in the Project reservoirs. Jeff Fisher stated that a meeting is scheduled with LPs to further discuss the potential application of FLIR.

Brian Lanouette suggested the reservoir bioenergetics models should be used to conduct an analysis of the potential impacts of climate change on food web dynamics and reservoir productivity. Brian also requested that Pacific Lamprey should be incorporated into the tributary habitat assessment (i.e., the FA-07 Reservoir Tributary Habitat Assessment). Brock Applegate, Jeff Garnett, and Ashley Rawhouser supported the request to include Pacific Lamprey.

There are no immediate action items or topics for follow up for the FA-07 Reservoir Tributary Habitat Assessment.

FA-06 Reservoir Native Fish Genetics Baseline

Erin Lowery presented an overview of the FA-06 Reservoir Native Fish Genetics Baseline Study (Reservoir Fish Genetics Study). The study is in progress. The presentation described the study goals and objectives, study area, methods, results and progress, and the study schedule.

Brian Lanouette requested that the study be modified to use the Warheit (2014) study rather than Pflug (2013). Brian stated that some of the conclusions drawn in the Pflug (2013) study were superseded by Warheit (2014), which is the document used by fish co-managers in Washington state. Erin Lowery noted that the Warheit (2014) report is a Puget-Sound wide report, but that City Light is not opposed to adding the Warheit (2014) report as an additional reference to the study.

Dave Price asked if there have been any conversations in examining variation in the GREB1-L gene to see if it varies with anadromous genes. Erin Lowery is not aware of any ongoing conversations regarding this issue, but it is something City Light may consider as part of this or a future study.

Additional questions that were submitted to the Facilitation Team via the Webex chat feature, with responses from City Light following the ISR meetings, are provided below:

- Brian Lanouette:
  (1) Has the Expert Panel evaluated the genetics data in light of the questions summitted by LPs to determine if existing data are sufficient?
  (2) Have we had an update from the Expert Panel regarding the need for additional data collection? What is the plan for additional data collection?
  (3) Given we are still refining study questions with the Expert Panel, does City Light see that there will be sufficient time to collect and analyze any additional genetics samples?

- City Light Response:
  (1) City Light is not aware of any Expert Panel determination on sufficiency of existing data to answer questions submitted by LPs. At the February 15, 2022 Reservoir Work Group meeting, Rick Taylor (Expert Panel Member) provided an update on Expert Panel review of LP questions. General conclusions from an initial assessment of LP questions were that in their current form, the questions lack sufficient detail to develop testable hypotheses. A work session to further develop LP research questions was held on March 31, 2022 between LPs and Expert Panel members (as available). Results or action items from the work session are not yet known to City Light.
  (2) A City Light action item from the February 9, 2022 work session was to develop an updated sampling map to provide clarity for the data presented in the Existing Genetics Data Review technical memo. Figures were provided to the Expert Panel the week of March 28, 2022.

(3) To avoid further delays associated with the refinement of LP research questions, City Light developed a proposed sampling plan for 2022 field activities that addresses research questions to the extent they are defined presently. This sampling plan was provided to the Expert Panel and LPs for feedback on April 1, 2022 with the target of permit application submissions by April 15, 2022. Additional LP research questions, at such time they are finalized, will be considered by City Light for future research opportunities.

There are no immediate action items or topics for follow up for the FA-06 Reservoir Fish Genetics Study.

FA-03 Reservoir Fish Stranding and Trapping Risk Assessment

Jeff Fisher presented an overview of the FA-03 Reservoir Fish Stranding and Trapping Risk Assessment (Stranding and Trapping Assessment). The study is in progress. The presentation described the study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Stratified Random Sampling and Adaptive Cluster Sampling not used when Ross Lake is near maximum water surface elevation, because minimal shoreline is exposed under these conditions. Instead, comprehensive census of dewatered varial zone was undertaken.
- Data types collected from potential stranding and trapping areas were refined to sample a greater proportion of the recently dewatered varial zone while minimizing collection of data from areas that did not feed directly into subsequent stranding and trapping risk analyses.

Brock Applegate stated that WDFW proposes a study modification to include the Skagit River in this study as well. Brock stated that concerns related to trapping were not addressed in the previous licensing and these same study methods in this study were probably not used in the last license[2]. Brock further stated that this information is needed to determine ramping rates for the 401 Water Quality Certification. Brian Lanouette, Ashley Rawhouser, and Stan Walsh supported the

2 In response to Brock Applegate's statement at the ISR Meeting related to trapping not addressed in the previous relicensing, City Light responds with the following additional information: Prior to the expiration of City Light's initial license in 1977, many investigations were conducted evaluating the risk of salmon and steelhead fry trapping and stranding below the Project. As the relicensing process began in the early 1970s, a group of representatives from certain agencies, Tribes, and City Light began developing a method for evaluating stranding and trapping risk in the lower river. This body of work included an evaluation of previous investigations specifically looking into trapping risk. A report from R.W. Beck (1989) detailing all past investigations of trapping risk, and a contemporary master's thesis (also in Beck 1989) specifically investigating trapping risk, are available in the Triangle Associates' SharePoint folder concerning Trapping and Stranding. In addition to the trapping investigations, this report includes a description of the methods used to develop a metric for evaluating relative stranding risk that is statistically robust and allows for evaluating the effects of different flow management scenarios.

modification request. Jeff Fisher replied conversations related to Skagit River Stranding and Trapping (below Gorge Powerhouse) are being addressed in upcoming work group meetings.

Brian Lanouette asked if City Light will be collecting data as part of any incidental drawdowns occurring in Gorge Lake. Jeff Fisher stated that Gorge Lake does not experience annual drawdowns like Ross Lake does, however, per the RSP, City Light is prepared for opportunistic data collection of an incidental drawdown event, should it occur during the study.

There are no immediate action items or topics for follow up for the FA-03 Stranding and Trapping Assessment.

GE-01 Reservoir Shoreline Erosion

Kathy Dubé (City Light Consultant Team) presented an overview of the GE-01 Reservoir Shoreline Erosion Study. The study is in progress. The presentation described the study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Field work, analyses, and reporting will extend into 2022.
- Five sites added in Ross Lake drawdown zone as part of FERC's SPD.
- Gorge Lake fieldwork did not occur in 2021 due to lake level and scheduling constraints and will occur in spring 2022 along with Ross Lake drawdown erosion fieldwork.

Curtis Clement asked if erosion was being studied at locations smaller than the 200 square feet threshold being considered in the GE-01 study. Kathy Dubé stated that the 200 square foot analysis was a reasonable threshold to apply, and City Light is not studying the areas below that threshold. Curtis then asked if City Light were utilizing a GIS approach for analyzing erosion and deposition. Kathy stated that City Light is using 2018 LiDAR and aerial photography and have been using GIS to map areas and following up with field checking. Sharon Sarrantonio (NPS) requested that the preliminary GIS data be made available for review. Kathy Dubé will follow up with City Light on that request.

Ashley Rawhouser stated that the littoral habitat assessment and this study would be good for the Model Integration Small group to work on. Brian Lanouette supported that request.

GE-01 Action Items and Topics for Follow-up

- City Light to follow up on Sharon Sarrantonio's request for preliminary GIS data to be made available for review.

GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern

Kathy Dubé presented an overview of the GE-03 Sediment Deposition in Reservoirs Affecting Resource Areas of Concern Study (Sediment Deposition Study). The study is in progress. The presentation described the study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Field work, analyses, and reporting will extend into 2022.
- Existing LiDAR in Thunder Creek and Skagit River in the Hozomeen area will be used for analysis since there was sufficient detail (do not need field-surveyed topography).

Jon Riedel (individual, no affiliation) asked if the study looked at the left bank spur of large rocks at Stetattle Creek. Kathy Dubé stated that it was part of the hydraulic analysis but could not recall what the results were. Jon noted that NPS has geology maps at a larger scale than the Washington State Department of Natural Resources (DNR) 1:100,000 scale being used in the study.

Curtis Clement asked if City Light was collecting additional bathymetry data in the reservoirs. Andrew Bearlin stated that City Light originally intended to use an in-house Eccomapper tool, however technical issues with the equipment have delayed implementation. Andrew further stated that City Light is investigating alternative approaches to collecting bathymetry data in the 2022 field season.

Curtis Clement asked if City Light was using the Distributed Hydrology Soil Vegetation Model (DHSVM) sediment module as part of this study. Kathy Dubé stated that upon further investigation, the DHSVM module was not the appropriate tool. Kathy further stated that City Light has been working on developing a multiple linear regression to predict specific sediment yield for the tributary basins leveraging available sediment yield data for surrounding river basins.

There are no immediate action items or topics for follow up for the GE-03 Sediment Deposition Study.

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

Andy Haas (City Light) presented an overview of the GE-04 Skagit River Geomorphology Between Gorge Dam and the Sauk River Study (Geomorphology Study). The study is in progress. The presentation described the study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Tributary analysis methods were modified to include multiple metrics (instead of just depth) to assess passage barriers, consistent with methods described in the WDFW Fish Passage Manual (2019).

- In consultation with LPs, the hybrid approach of Rice and Haschenburger (2004) was added to ensure that bulk samples appropriately represent the grainsize distribution of coarse material.
- A sediment transport modeling program to fulfill the RSP and the June 9, 2021 Notice was developed in collaboration with LPs during a series of workshops held on July 20, July 27, September 28, and November 9, 2021.
- Large wood will be inventoried in the Gorge bypass reach using high resolution drone imagery and large wood will be inventoried in the Shovel Spur rapids reach using 2021 aerial images as opposed to field inventories.
- An initial inventory of large wood using filtered LiDAR was not completed because the available LiDAR data was not high enough resolution to delineate large wood features. Large wood was instead inventoried using only aerial images.

Stan Walsh asked how the evaluation of side-channel habitat quality was completed and how much flow each side-channel habitat was seeing. Andy Haas stated that City Light looked at the number of units and diversity, and information related to flow and habitat will be analyzed in 2022 efforts.

Tom O'Keefe (American Whitewater) asked about the variance related to wood at the Shovel Spur rapid reach. Andy Haas stated that due to safety concerns that area was not field verified, however, City Light anticipated they can complete its analysis with digital imagery.

Rick Hartson stated that the off-channel habitats were identified in the Chinook Recovery Plan as critical and asked how City Light is going to assess flow and scour in the floodplain and off-channel habitats. Rick further stated that the Upper Skagit Indian Tribe is seeking model calibration for the floodplain and off-channel habitats. Andy Haas replied that an integrated approach with the FA-02 Instream Flow Model Development Study and the GE-04 Geomorphology Study sediment transport models will inform questions related to channel activation, connectivity, and localized patterns of scour. Andrew Nelson (City Light Consultant Team) stated that both the FA-02 Instream Flow 2-D Hydraulic Model and the GE-04 Sediment Transport 2-D Hydraulic Model spatially cover valley-wall to valley-wall, however, they are calibrated to the mainstem Skagit River. Andrew explained that those models will provide overbank sheer stress and can be used to evaluate questions related to sediment mobilization and scour in side-channel environments.

Brian Lanouette asked when additional discussion related to efforts in the floodplain will occur and how they will be integrated with the FA-01 Water Quality Study. Andy Haas replied that development of the sediment transport models is underway and scenario development will begin in the summer 2022, which will include discussions with LPs on scenarios and integration.

Devin Smith (Skagit River System Cooperative) asked about City Light plans to evaluate how the Project is affecting woody debris and sediment loading upstream of the Project. Andrew Nelson stated that a sensitivity analysis using the UBC Regime Model (UBCRM) and HEC-RAS 1D sediment transport model will include estimates of sediment loading upstream of the Project and further stated that City Light plans to estimate what those are based on sediment studies and ratios of coarse cobble in order to get to an order of magnitude ballpark range for that material and use the modeling tools to understand how that different sediment transport rate would be expressed in

channel and reach scale. For large woody debris, Andy Haas said that there are a number of analyses incorporating wood, however, there is not a specific tie to wood upstream of the Project, and further stated that wood in the Skagit River can be discussed as part of scenario development.

Brock Applegate asked about timing and if City Light was doing any additional analysis related to evaluating fish passage at tributary mouths. Andy Haas replied that work was completed in August 2021 as described in the ISR and that is the extent of the evaluation.

Jon Riedel asked how much of the channel diversity in reach 2B has increased due to natural processes versus human activity. Andy Haas stated that assessment will be included in the Updated Study Report (USR).

Additional questions that were submitted to the Facilitation Team via the Webex chat feature, with responses from City Light following the ISR meetings, are provided below:

- Rick Hartson: Will results from sediment and wood transport modeling be integrated with conclusions from SY-01 to determine whether studies should be extended downstream of the Sauk River confluence?
    - City Light Response: The GE-04 Geomorphology Study ISR describes the study methods related to wood transport and the sediment transport modeling program, which have been extended downstream of the Sauk River confluence. Results of this effort will be considered with data gaps identified as part of the SY-01 Synthesis Study and further described in the USR.

- Rick Hartson: Will wood augmentation analysis involve experimental releases of woody debris?
    - City Light Response: Discussions related to experimental releases of woody debris will occur in 2022 as part of broader discussion related to potential wood and sediment augmentation pilot program, which will be informed by the wood augmentation analysis.

- Rick Hartson: When will results from sediment transport and process flow analyses be available? Will results be available to inform development of the draft license application?
    - City Light Response: Results will be available to inform the license application. A tentative schedule was shared with LPs in the Geomorphology Work Group meeting on January 11, 2022. Those materials are available to LPs on the SharePoint site hosted by Triangle Associates.

There are no immediate action items or topics for follow up for the GE-04 Geomorphology Study.

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

Kathy Dubé presented an overview of the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study (Erosion and Geologic Hazards Study). The study is in progress. The presentation described the study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- The study plan schedule has been modified to fulfill study goals and objectives with fieldwork in 2022.

Rick Hartson stated that the Erosion and Geologic Hazards Study identified a predetermined spatial scope, and the Upper Skagit Indian Tribe are seeking site-specific assessments that look at relevant watershed scale processes. Andy Haas replied that City Light looks forward to the discussion and that there is a field trip scheduled in May to look at channel migration zone (CMZ) sites. Brock Applegate asked to be included in the field trip.

Rick Hartson then asked what the timeline is to complete field-based surveys of the habitat upstream of culverts. Andy Haas responded that the GIS-exercise is a starting point and determination on field-based surveys is a future discussion to determine if warranted after the GIS exercise is completed in 2022. Rick requested maintenance records for how often those areas (specifically for bank armoring) need to be maintained/repaired. Kathy Dubé stated that City Light will look into what is available.

GE-02 Action Items and Topics for Follow-up

- Follow up on Rick Hartson's request for maintenance records for how often those habitat areas (specifically for bank armoring) upstream of culverts need to be maintained/repaired made available for review.

Summary of Relicensing Studies
Session: March 22, 2022 (PM)
12:45 pm – 4:30 pm

TR-01 Vegetation Mapping Study

Rory Denovan (City Light) presented an overview of the TR-01 Vegetation Mapping Study. The study is complete. The presentation described study goals and objectives, study area, methods, results, and the study schedule. There are no variances or modifications to the FERC approved Study Plan.

Stan Walsh asked if the Vegetation Mapping Study area includes the Sauk Confluence. Rory Denovan indicated that the Vegetation Mapping Study covers the entire CMZ down to the Sauk River.

Kyle Taylor Lucas (Cooks Ferry Band, Nlaka'pamux Nation Bands Coalition) asked for clarification regarding which First Nations have been consulted as part of the TR-01 Vegetation Mapping Study. Andrew Bearlin responded that this information can be found in the ISR. City Light will follow up with additional guidance on where to find that information in the TR-01 Vegetation Mapping Study ISR.

TR-01 Action Items and Topics for Follow-up

- City Light will follow up with Cooks Ferry Band, Nlaka'pamux Nation Bands Coalition, regarding which Indian Tribes and First Nations were consulted during the TR-01 Vegetation Mapping Study.

TR-02 Wetland Assessment

Rory Denovan presented an overview of the TR-02 Wetland Assessment. The study is complete. The presentation described study goals and objectives, study area, methods, results, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Some wetlands were assessed and rated remotely instead of in the field at unsafe or inaccessible sites.
- Survey crews recorded the three dominant tree, shrub, and herbaceous species, instead of comprehensive list of all plants. This approach allowed for a rapid assessment in the field to complete the rating form and enabled the study team to minimize collection of data that would not feed into subsequent analyses.

Stan Walsh asked if there are floodplain wetlands that could be hydrologically connected or influenced by the Project that are outside the CMZ. Rory Denovan responded that the CMZ is the boundary for the study area downstream of the Project. Rory stated that he will follow up with additional information in the ISR Meeting Summary (see below). Rory asked Stan Walsh to post any additional questions in the chat.

Curtis Clement asked for clarification regarding the mapping boundary for the Vegetation Mapping Study regarding the CMZ because it looked like vegetation was mapped upslope of the CMZ. Rory Denovan explained that the study area boundary includes the Project Boundary plus a half mile beyond the Project Boundary, and that outside the Project Boundary, the mapping boundary is the CMZ as defined by NPS. Jessica Redman (City Light Consultant Team) added that there is also a half mile buffer around City Light mitigation lands which may extend outside the CMZ and upslope in some locations.

Additional questions that were submitted to the Facilitation Team via the Webex chat feature, with responses from City Light following the ISR meetings, are provided below:

- Stan Walsh: For the Wetland Habitat inventory the study area is the CMZ down to the Sauk River. Are there potentially wetlands in the floodplain that are hydrologically influenced by the project that are outside the CMZ? How is the CMZ defined for this study?
    - City Light Response: Per the Study Plan, the CMZ used in the TR-02 Wetland Assessment was based on a product developed by NPS. In general, the 100-year Skagit River floodplain is encompassed within the NPS CMZ (contains all Skagit meander scars on floodplain). The study team rated all wetlands mapped along the Skagit River, as well as those that appeared to have a hydrologic connection based on aerial imagery and LiDAR analysis.

- Brian Lanouette: Could there be floodplain wetlands that are hydrologically influenced by the Project that are outside of the CMZ?
    - City Light Response: See response above.

There are no immediate action items or topics for follow up for the TR-02 Wetland Assessment.

TR-03 Rare, Threatened, and Endangered Plants

Rory Denovan presented an overview of the TR-03 Rare, Threatened, and Endangered Plants Study (RTE Plants Study). The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- City Light will extend field work into 2022 to fulfill the study goals and objectives. Due to the varying phenology of the target RTE plant species, crews were unable to inspect all potentially suitable habitat at the optimal time for every target RTE plant species. Additional surveys are planned for 2022 to capture areas not visited during the 2021 field season and areas where surveys occurred outside of the peak flowering times.

There were no questions or comments for this study presentation. There are no immediate action items or topics for follow up for the TR-03 RTE Plants Study.

TR-04 Invasive Plants Study

Rory Denovan presented an overview of the TR-04 Invasive Plants Study. The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Population estimates for ubiquitous species were not calculated and percent cover of ubiquitous species was recorded instead.

- City Light will extend fieldwork into 2022 to fulfill the study goals and objectives.

There were no questions or comments for this study presentation. There are no immediate action items or topics for follow up for the TR-04 Invasive Plants Study.

TR-05 Marbled Murrelet Study

Ron Tressler (City Light) presented an overview of the TR-05 Marbled Murrelet Study. The study is complete. The presentation described study goals and objectives, study area, methods, results, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- The study used Washington DNR data instead of LiDAR-derived data to map potentially suitable marbled murrelet nesting habitat. The LiDAR data did not provide full coverage of the study area while the Washington DNR data covered the entire study area. The resolution of the LiDAR data required additional analyses prior to use in the model. The Washington DNR data are derived from field measurements and remotely sensed data and are updated every two years.
- Manual tracking of targets by an experienced radar technician supplemented automated radar tracking software instead of automated tracking alone. Automated tracking was problematic on its own due to issues with wave and ground clutter.

Jeff Garnett asked for clarification on the extent of the mapping layers used to assess murrelet habitat and if data was included beyond the Vegetation Mapping study area and the CMZ. Ron Tressler clarified that the study area for TR-05 Marbled Murrelet Study included a buffer of 0.5 miles from the Project Boundary and the few areas where the mapping may extend beyond the CMZ is around City Light mitigation lands in the floodplain.

Jeff Garnett observed that murrelets do not nest every year depending on climactic conditions and other factors and asked what assessment was made when deciding not to continue the audio-visual surveys for another year. Ron Tressler explained that there was no indication that 2021 was not a typical year for murrelet nesting in the region and that the radar surveys did not pick up any circling behavior by murrelets near the water. City Light determined that an additional year of surveys would not yield any new information beyond what was gathered in 2021. Erin Colclazier (City Light Consultant Team) explained that the original proposal in the study plan was for one year of audio-visual and paired radar surveys. A second year was proposed only in the instance if the first year was declared a poor breeding year; however, all 2021 data thus far indicates that it was a good year for marbled murrelet breeding.

Jeff Garnett asked if there was any additional data that City Light is waiting to review for 2021. Erin Colclazier responded that the team is waiting on data from the WDFW for at-sea marbled murrelet studies on the outer coast. This data will not be available until April or May 2022. Reviewing this data will help City Light confirm that 2021 was a good breeding year for northwestern Washington. Informal conversations with marble murrelet researchers indicate that 2021 was a good breeding year.

Brock Applegate asked why the survey stations were concentrated at the downstream end of the Project. Ron Tressler explained that they wanted to get good coverage where there is the most potential Project-related operations and maintenance (O&M) activity (townsites, Diablo and Ross Dam). The team wanted a few sites further up on Ross Lake, so stations were located near Roland Point where NPS had recorded a marbled murrelet to cover the mouth of the Big Beaver Valley. City Light targeted the northern end of the Project but could not access that area to do the surveys. A station was placed at Little Beaver to cover that area.

Brock Applegate noted that the Project is on the extreme end of marbled murrelet range coming from the ocean to breed and asked about the possibility of murrelets coming into the Skagit area from the Fraser drainage in British Columbia. Erin Colclazier explained that while this is a possibility, there are not any clear pathways from British Columbia to the Skagit without crossing many ridges. The area between British Columbia and the Skagit is the very far inland extent of murrelet habitat.

Leslie Parks (Swinomish Indian Tribal Community) asked what other species could give a murrelet signal on the radar surveys and possibly be confused with murrelets. Ron Tressler explained that some waterfowl can fly relatively fast, as well as band-tailed pigeons. Detections that occur before sunrise help narrow the confidence that it is a marbled murrelet; however, without visual confirmation, it is not absolutely certain.

There are no immediate action items or topics for follow up for the TR-05 Marbled Murrelet Study.

TR-06 Golden Eagle Habitat Analysis

Ron Tressler presented an overview of the TR-06 Golden Eagle Habitat Analysis. The study is complete. The presentation described study goals and objectives, study area, methods, results, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Maps of historic golden eagle observations were not included due to sensitive information and confidentiality concerns. Observational data (individuals and nests) were still incorporated into the model.

There were no questions or comments for this study presentation. There are no immediate action items or topics for follow up for the TR-06 Golden Eagle Habitat Analysis.

TR-07 Northern Goshawk Habitat Analysis

Ron Tressler presented an overview of the TR-07 Northern Goshawk Habitat Analysis. The study is complete. The presentation described study goals and objectives, study area, methods, results,

variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Conservation Biology Institute (CBI) mapping of old-growth and late seral stage forests of the North Cascades was not used in the GIS model because LiDAR data and TR-01 Vegetation Mapping Study products provided higher resolution canopy data.
- LiDAR was high resolution and adequate to identify potentially suitable goshawk nesting components. Field reviews were not needed for this study.

Brock Applegate asked for clarification on the final product for this study. Ron Tressler explained that the goal of the study was to develop a final map product that could be used to inform future management plans, protection, mitigation, and enhancement (PME) measures, and best management practices, as well as identify areas where follow up assessments or surveys may be needed in the future.

There are no immediate action items or topics for follow up for the TR-07 Northern Goshawk Habitat Analysis.

TR-08 Special-Status Amphibian

Ron Tressler presented an overview of the TR-08 Special-Status Amphibian Study. The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- Parts of some wetlands that extended outside Project Boundary were surveyed.
- The study schedule was modified because:
    - Access to the north end of Ross Lake is particularly difficult during the drawdown, so appropriate survey timing for ranid egg mass detection in this area was impractical in April-May 2021, and therefore will occur in 2022.
    - Possible sightings of unidentified ranid frogs by NPS and western toad breeding activity on Ross Lake were too late for follow-up visits in 2021 before rising water levels flooded these sites, and therefore will occur in 2022.
    - Follow-up visits at presumed western toad oviposition sites at County Line Ponds and Newhalem Pond (where western toad tadpoles were subsequently found) also could not occur in 2021 but will occur in 2022.

There were no questions or comments for this study presentation. There are no immediate action items or topics for follow up for the TR-08 Special-Status Amphibian Study.

TR-09 Beaver Habitat Assessment

Ron Tressler presented an overview of the TR-09 Beaver Habitat Assessment. The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- The objective to summarize results of the GE-04 Geomorphology Study and FA-02 Instream Flow Model Development Study was not completed in 2021 because the GE-04 and FA-02 study reports are still in development. The FA-02 Instream Flow Model Development Study is a two-year study—instream flow model and flow-habitat maps are anticipated to be available in 2022. Results will be reviewed and summarized in the TR-09 Beaver Habitat Assessment study report to be included in the USR.

Brock Applegate asked how many incidental beaver observations had been made. Ron Tressler responded that this information is summarized in the study report but will follow up with more information. Brock then asked if there are more refined and specific resources showing where beavers are located and the connectivity other than the maps that are in the TR-09 Beaver Habitat Assessment. Ron explained that all the GIS files are available. Brock asked if City Light created its own map. Ron responded that City Light took the Beaver Intrinsic Potential (BIP) rating as is and field-verified it.

Brian Lanouette asked if there are any plans to look at how Project infrastructure might influence beaver movement and passage up and down the corridor, and if City Light had observed areas between different parts of the Project infrastructure that seemed to not have beavers actively moving through, or if there are isolated beaver populations. Ron Tressler responded that Ross Lake is not good beaver habitat. There was beaver sign in some tributaries such as Big Beaver Creek and downriver near the mouth of Stetattle Creek, however, there are large areas along Ross Lake that are not conducive to beavers. Brian mentioned the Baker Project includes beaver populations upriver from Project facilities. Ron expressed interest in continued conversation about this topic.

Brock Applegate asked for clarification on beaver activity on Diablo Lake and Gorge Lake. Ron Tressler responded that the mouth of Stetattle Creek near Gorge Lake has beaver activity. There are not any major beaver lodges right now, but there have been some historically and there are recent signs of beaver foraging. There have also been some signs of beaver (beaver chew) in the Gorge bypass reach.

TR-09 Action Items and Topics for Follow-up

- The TR09 Beaver Habitat Assessment ISR Appendix A mapbook includes 88 beaver and beaver sign observations recorded through 2021. The database will be updated with sightings recorded during the 2022 field season for inclusion in the USR.
- Follow up with Upper Skagit Indian Tribe to gather any additional information on beaver observations in the vicinity of the Project and obtain information they may have regarding

possible effects of Project infrastructure on beaver distribution and movement. Assessing movement of beaver was outside of the scope of the TR-09 Beaver Habitat Assessment.

TR-10 Northern Spotted Owl Habitat Analysis

Ron Tressler presented an overview of the TR-10 Northern Spotted Owl Habitat Analysis (NSO Habitat Analysis). The study is complete. The presentation described study goals and objectives, study area, methods, results, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- The NSO Habitat Analysis used Washington DNR maximum tree height data layer instead of LiDAR-derived canopy height model (CHM). The LiDAR-derived canopy height model had several gaps within the NSO study area. Extremely high resolution resulted in extremely patchy outputs that under-selected suitable habitat.
- The NSO Habitat Analysis also used Washington DNR stand age layer instead of CBI data layer for mapped old growth and late seral forests. The CBI data did not provide specific stand age info needed to both identify and differentiate between suitable and highly suitable habitat.

There were no questions or comments for this study presentation. There are no immediate action items or topics for follow up for the TR-10 NSO Habitat Analysis.

Summary of Relicensing Studies
Session: March 23, 2022 (AM)
8:45 am – 12:00 pm

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

Jason Hall (City Light Consultant Team) presented an overview of the SY-01 Synthesis and Integration of Available Information on Resources in the Lower Skagit River (Synthesis Study). The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- The study area description has been revised to include the Sauk River, a larger geomorphic delta extent (including Swinomish and portions of the Stillaguamish River delta), and nearshore habitats in Skagit Bay and Padilla Bay, based on preliminary data review and comments from LPs during the preliminary Synthesis Study Work Group meeting.
- The target species for the Synthesis Study has been expanded to include Pacific Lamprey.
- The schedule has been modified as described in the ISR.

Dave Price asked if Jason Hall could elaborate more about the bullet on Slide 8 that labeled 70 future studies. Jason responded that those are studies that may or may not have a source attached with them, but that they are future studies, data sets or online sources that have been identified thus far. Jason further stated that these studies may not all end up having an annotated bibliography associated with them but will be documented and described in the USR so that information will be captured. Dave followed up by asking if these 70 future studies which have already been identified are all in the Skagit watershed. Jason stated yes, these studies would include at least some component of study that will provide information on the Lower Skagit.

Rick Hartson asked if an intent of the study is to differentiate or identify potential or likely Project related effects separate from other cumulative effects that exist. Andrew Bearlin asked if Rick was asking about whether City Light can distinguish between Project effects and other cumulative effects in the lower river. In response, Rick mentioned trying to understand how this study is going to tie into relicensing efforts and asked if a potential outcome of this study would be that City Light would extend certain aspects of some relicensing studies downstream of the Sauk River. Andrew stated that it would probably not, since the relicensing studies are wrapping up after this year, and that the purpose of the study is to help pull together all the information to look at what is necessary and as background to planning and discussing any measures and potential PMEs in the Lower Valley.

Rick Hartson then asked if there will there be different weights placed on different resources, such as those that have been approved by co-managers and federal resource agencies. Andrew Bearlin anticipates stakeholders would be able to weight information however they feel is fit. Jason Hall added that the goal of the Synthesis Study is to develop conceptual life history models, not actual life cycle models or relying only just on existing models.

Jim Myers (NMFS) recollected the purpose of the Synthesis Study was to evaluate available data to see what the lower extent of Project effects were, and based on that, see if additional work needs to be done. Jim worried that since the studies are all in and will be done at the end of this year, the door would seem to be closed on this additional work. Andrew Bearlin responded that the objective was to evaluate whether additional work might be necessary, and that it is City Light's vision that this information comes together and informs next phase of relicensing and to have a good conversation of what is needed.

Dudley Reiser asked for clarification about analysis and modeling in the lower river, particularly related to the sediment issue in that reach, and wanted to confirm that analysis and modeling was proceeding. Andrew Bearlin responded that the sediment modeling discussed in the GE-04 Geomorphology Study was proceeding.

Brian Lanouette recalled that on the first day of ISR meetings there were a few cases where it was suggested the timeline would be tight to get data within the ILP timeframe and asked that if there are areas within studies not ready for environmental analysis would it be possible to use this Synthesis Study be able to further extend data collection in these studies that might require an extended study period. Andrew Bearlin confirmed that may be possible.

Stan Walsh asked for confirmation that the Synthesis Study was meant to address issues downstream of the Sauk River and that this study would inform PMEs and potential management plans. Andrew Bearlin stated that was correct.

There are no immediate action items or topics for follow up for the SY-01 Synthesis Study.

RA-01 Recreation Use and Facility Assessment

Matt Paquette (City Light Consultant Team) presented an overview of the RA-01 Recreation Use and Facility Assessment (Recreation Assessment). The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, and the study schedule. There are no variances or modifications to the FERC approved Study Plan.

Josephine Jefferson (Swinomish Indian Tribal Community) asked what samples are being taken at Ross Lake and Diablo Lake. Matt Paquette confirmed the samples were data collection samples primarily at recreation sites and trails, such as visitor surveys, use counts, trail counters. Andrew Bearlin confirmed these recreation samples were statistical samples only.

Lynn Best (Skagit Environmental Endowment Commission) asked where the 384 Ross Lake survey samples would be on the lake. Mike Aronowitz (City Light) responded that these survey samples would be in a diversity of locations from Ross Lake, Hozomeen, Ross Dam Trailhead, Canyon Creek Trailhead, East Bank Trailhead, and that there would be combinations of areas that City Light will be conducting visitor survey, counts, and installing trail counters in various spots on East Trail, Big Beaver, and Little Beaver campgrounds. Matt Paquette confirmed that there are nine trail counter locations in the Ross Lake area.

Additional questions that were submitted to the Facilitation Team via the Webex chat feature, with responses from City Light following the ISR meetings, are provided below:

- Curtis Clement: My question relates to consulting Tribes for trail counter locations. In the presentation I thought it sounded like this had been done but our cultural resources lead hasn't been asked for this. I'm sure City Light will get to it but I wanted to make sure we weren't missed somehow by missing a deadline or something. We definitely have a number of sites to suggest.
- City Light Response: Following the March 3, 2022 Recreation Work Group Meeting, a draft of the RA-01 trail counter location map was provided to all members of the Recreation Work Group. As recommended in the FERC SPD, since Nlaka'pamux Nation representatives had expressed a particular interest in this study, City Light directly consulted with the Nlaka'pamux Nation Tribal Council and Nlaka'pamux Nation Bands Coalition on the locations of trail counters. Additionally, Andrew Weiser, City Light's cultural resources lead, has encouraged the Cultural Resources Work Group members to track any of the recreation studies or other studies they have a particular interest in and reach out with any topics of interest or questions regarding cultural resources.

There are no action items or topics for follow up for the RA-01 Recreation Assessment.

RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study

John Gangemi (City Light Consultant Team) presented an overview of the RA-02 Gorge Bypass Reach Safety and Whitewater Boating Study (Bypass Safety and Whitewater Boating Study). The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Variances and modifications to the FERC approved Study Plan include the following:

- A pre-reconnaissance site visit for the Level 1 Desktop Analysis was added.
- The Level 1 and Level 2 interim reports were combined into single report.
- Planned spills were scheduled for Level 2 Field Reconnaissance.

Note: The RA-02 study plan includes six criteria for progression between the three successive levels of data collection. Criteria 4 considers if agency regulations and/or Tribal concerns do/do not prohibit further investigation. In February 2022, City Light conducted outreach to the Cultural Resources Work Group and Indian Tribes informing them of the RA-02 ISR recommendations to proceed to Level 3 Multiple Flow Evaluation and explaining the study methods associated with the Level 3 Multiple Flow Evaluation. City Light received a response from the Upper Skagit Indian Tribe in early March 2022, after the RA-02 ISR was finalized for publication, opposing implementation of the Level 3 Multiple Flow Evaluation. As a result, City Light is not moving forward with the Level 3 Multiple Flow Evaluations at this time.

Tom O'Keefe wanted to share a conversation with Scott Schuyler from the Upper Skagit Indian Tribe on the morning of March 23, 2022, and that without going into the details of that conversation, to let the group know that Tom and Scott discussed how to navigate study issues and that there is more conversation to have. Tom then asked for assistance in understanding the implications of delay and information gathering on the Bypass Safety and Whitewater Boating Study and how that fits into the FERC process and ILP timelines.

Stan Walsh asked how many people with whitewater experience participated in the first couple levels of evaluation. John Gangemi stated that was coordinated with America Whitewater and that six individuals with whitewater experience were identified that participated in Level 2 field reconnaissance.

Stating for the record, Kyle Taylor Lucas has been monitoring activity for this study and will be more active in the future. Kyle then asked to what extent the cultural resources group was involved with and consulted for the Bypass Safety and Whitewater Boating Study. John Gangemi confirmed that the study team did send draft study plans out for review by all LPs, and in particular, cultural resources groups and other resource work groups. In February 2022, City Light's cultural resources lead did formal outreach to members of the Cultural Resources Work Group to make them aware of the study findings and the recommendation to proceed with Level 3 Multiple Flow Evaluation and invited a response from the Cultural Resources Work Group if they had concerns.

Kyle Taylor Lucas shared with the group that the First Nations were really beset by natural disasters over this past year, and that in one community, the entire village was burned by fires and there is nothing left in that village. Kyle went on to say that in many of those communities, they were rebuilding because their homes were either burned out or in flood conditions, and that many people were trapped and had to be helicoptered out. Because of this, there have been extenuating circumstances that Kyle wanted to call to the attention of City Light and the LPs which affected the group's participation, and that there will be more input from the group moving forward. Matt Love (City Light Outside Counsel) thanked Kyle for sharing those experiences and that, for clarification, when City Light completed the RA-02 ISR, they acknowledged the continued need to have additional dialogue with respect to Indian Tribes and First Nations moving to the Level 3 evaluation, and that was part of implementation of second year of study. Matt also confirmed there is continued dialogue concerning moving to Level 3, which is informing City Light's decision making in this study.

Tom O'Keefe wanted to state for the record that American Whitewater did also reach out to the Swinomish Indian Tribal Community, the Sauk-Suiattle Indian Tribe, and the Upper Skagit Indian Tribe, and received a response from each of them. Tom also offered being available to have a conversation with any other representatives of other Indian Tribes or First Nations concerning this matter.

There are no action items or topics for follow up for the RA-02 Bypass Safety and Whitewater Boating Study.

RA-03 Project Facility Lighting Inventory

Michael Aronowitz presented an overview of the RA-03 Project Facility Lighting Inventory. The study is complete. The presentation described study goals and objectives, study area, methods, results, and the study schedule. There are no variances or modifications to the FERC approved Study Plan.

Sharon Sarrantonio noted finding it difficult to assess the number of lights as part of the inventory and asked for that information to be included with the location information in the final report. Andrew Bearlin confirmed that the process would be to add information into the USR. Sharon then asked City Light to clarify if the correlated color temperature (CCT) values on the lights were specs that City Light had or if those values were measured in the field. Mike will ask the study report technical lead and follow up with the answer (see follow up, below).

Sharon Sarrantonio then asked if there would be any visits and measurements to areas that were inaccessible to access during the 2021 study season, such as the Environmental Learning Center and some other facilities. Mike Aronowitz stated that with respect to the Environmental Learning Center, while it was closed to the public, City Light did visit the site and interviewed the operations manager to get the information provided in the report, and City Light would have to follow up to answer Sharon's question related to other sites.

Sharon Sarrantonio then stated that, concerning plans to reduce the wall pack lighting in the Project, NPS would like to recommend that lights under 3,000 Kelvin for CCT values are preferred, and that while understanding that Diablo Dam is a historical site, NPS would like to continue conversations on changing CCT values of lights or other modifications to reduce skyglow in ways that do not impact historical value. Mike Aronowitz looked forward to having that conversation.

David Fluharty asked if there is any assessment of the cumulative reduction in skyglow or release to the sky of lumens from the Project that could result from the best practices. Mike Aronowitz stated that was not part of scope of study plan. David stated for the record that North Cascades Conservation Council thinks it would be a good idea to accomplish that but did not know if it required a new study or change in study. David then asked if there was there any nighttime assessment of satellite or viewshed that was done on the visibility of lighting from within the viewshed of the Skagit River, and specifically was speaking about the recreational users above the level of the lighting. Mike stated that was not part of the scope of this study. David noted for the record wanting to discuss this further.

Brock Applegate asked if City Light included the communications towers and other structures that have lighting that are 50 feet or taller in this study. Mike Aronowitz confirmed that the study did include structures like that in its analysis. Brock followed up by asking if the study addressed duration of light. Mike responded that the tables in the "As Found" inventory did address the timing and duration of the lights displayed.

Curtis Clement asked if these data would be tied in assessment to impacts to wildlife and how that would be used. Mike Aronowitz stated that information would be part of next stage of the overall environmental analysis. Curtis asked whether these data will be piped into the environmental analysis done by FERC and if they will determine impacts to wildlife at that point. Mike stated that would be done, if appropriate, but could not speak much on whether that information can be used to determine impacts to other resources and clarified that this study does not do that.

Sharon Sarrantonio said that it would be helpful moving forward if this inventory could identify luminaires over water and be included in the final report.

RA-03 Action Items and Topics for Follow-up

- Follow up with Sharon Sarrantonio about requests for additional data, including the total number of lights assessed as part of the inventory, and luminaires over water.
- Follow up with Sharon Sarrantonio concerning whether the CCT values on the lights included in the inventory were specs City Light had or if those values were measured in the field.
    - City Light Response: The CCT values in the RA-03 ISR are estimates based on source type and visual characteristics and not field measurements.
- Follow up with Sharon Sarrantonio concerning whether visits will be made to areas that were inaccessible (Environmental Learning Center, et al) during the 2021 study season.

- Follow up with Sharon Sarrantonio and the Recreation Work Group concerning continuing discussion with NPS about changing the CCT values of lights or other modifications to reduce skyglow in ways that do not impact historical value.

RA-04 Project Sound Assessment

Michael Aronowitz presented an overview of the RA-04 Project Sound Assessment. The study is in-progress. The presentation described study goals and objectives, study area, methods, results and progress, and the study schedule. There are no variances or modifications to the FERC approved Study Plan.

Sharon Sarrantonio asked about when calculating L_{nat} values if City Light plans on reporting percent time audible for noise sources. Mike Aronowitz responded that City Light may be able to include that in the USR but would have to check with the technical team. From Mike's understanding, the process will identify percent time of audible human-caused noises. Mike then stated that there can be further discussions about the information that may be provided in the USR. Sharon noted that noise-free interval data would be helpful to include in the USR since it will be generated from the measurements and then asked for confirmation that L_{eq} values for daytime versus nighttime samples would be included in the USR. Mike will follow up with the study technical team to see if this can be included in the USR and reach out to Sharon directly to get a better understanding of how to properly respond. Sharon then stated that when it comes to calculating L_{nat} it would be helpful to know how City Light is defining "noise" and to see a list of all the things that went into calculating the percent time audible. Sharon invited City Light to reach out to NPS and LPs when going out for the nine noise models.

Sharon Sarrantonio also noticed, concerning the preliminary results on p. 5-1 of the RA-04 ISR, there was an assumption that the reported helicopter noise was due to wildfire operations. Sharon noted that the Caskey Lake site also identifies helicopter noise and is close to an airfield and thought that statement in the study was a broad assumption that could use clarification in the final report. Mike Aronowitz noted all comments.

Brock Applegate asked if this study plan will give an idea on what kind of noise or how the far average dissipation of noise goes out to L_{nat}. Mike Aronowitz stated that future discussions will come up with the nine different model variants, and that part of the inventory in 2021 was to assess Project noise sources, and that City Light will be working with LPs to consider a combination of different variants that will provide the most useful information and further conversations of how to run the nine models, as well as to develop contour maps that will show how noise propagates and attenuates from those areas.

Sharon Sarrantonio wanted to make sure City Light was collecting information on boat noise source, and information associated with boat use, sound levels and when boats are used, which would be helpful to understand boat traffic. Mike Aronowitz answered yes as it relates to Project boat use (City Light work boats, ferries, tour boats, etc.).

Brock Applegate then asked to be added to the list of LPs engaged in this study. Mike Aronowitz replied yes.

RA-04 Action Items and Topics for Follow-up

- Further discussion with NPS concerning additional measurements or sound parameters to be included in the USR. After speaking with the study technical team, Mike Aronowitz will reach out to Sharon Sarrantonio concerning the specific information requested.
- Add Brock Applegate to the Recreation Work Group.

RA-05 Lower Skagit River Recreation Flow Study

John Gangemi presented an overview of the RA-05 Lower Skagit River Recreation Flow Study (Recreation Flow Study). The study is in progress. The presentation described study goals and objectives, study area, methods, results and progress, and the study schedule. There are no variances or modifications to the FERC approved Study Plan.

Tom O'Keefe asked about how survey participation was going. John Gangemi stated that with the flow survey there has been an uptick in survey responses with start of structured interviews, especially with commercial outfitters, and expects this uptick to continue as commercial guides and additional staff returned to work. John noted there has been 32 responses so far, but that was over the winter period, so there should be an uptick in activity moving into spring.

Additional questions that were submitted to the Facilitation Team via the Webex chat feature, with responses from City Light following the ISR meetings, are provided below:

- Ashley Rawhouser: Hello. I may not be able to make the meeting this afternoon and would like to know if the cultural resources studies will incorporate the results of the recreation studies. Specifically, the NPS needs to understand how visitor use, and the potential for increased visitor use, will affect tribal cultural resources. While we need to understand this for the entire project area we are particularly interested about the effects of increased whitewater recreation in the Skagit Gorge.
    - City Light Response: In response to concerns raised by the Upper Skagit Indian Tribe, City Light is not moving forward with Level 3 Multiple Flow Evaluations for whitewater boating in the Skagit Gorge at this time. Currently, there is not enough information to anticipate whether whitewater recreation is feasible in the Skagit Gorge or how "increased whitewater recreation" could be measured. More broadly, impacts to cultural resources will be assessed once potential PME measures are identified.

There are no action items or topics for follow up for the RA-05 Recreation Flow Study.

Summary of Relicensing Studies
Session: March 23, 2022 (PM)
12:45 pm – 4:00 pm

Cultural Resources Studies Introduction

Andrea Weiser (City Light), Cultural Resources lead for Skagit Relicensing at City Light, made an introduction, and thanked everyone for their participation and engagement in the Cultural Resources Work Group (CRWG) meetings. Andrea introduced Jen Ferris (City Light Consultant Team) and Danielle Risse (City Light Consultant Team). Andrea reminded attendees that no confidential information will be shared during the meeting.

Andrea briefly described the four cultural resources studies being implemented for relicensing and the intersection between the FERC licensing process and the National Historic Preservation Act (NHPA) Section 106 process. Andrea also described what historic properties typically include, the focus of studies on identifying historic properties, and how the Section 106 process is completed for FERC relicensing efforts and the ILP process. Andrea illustrated that, through implementation of the cultural resources relicensing studies currently underway, we are in step two of a four step Section 106 process (i.e., identification of historic properties). Andrea emphasized that the relicensing studies are intended to identify and evaluate properties with traditional cultural significance rather than engaging in the process to seek formal listing of historic properties in the National Register. Andrea stated that City Light anticipates developing a Historic Properties Management Plan (HPMP) that would be implemented through a programmatic agreement and use a phased approach to complete Section 106.

Matt Love gave a brief overview of the National Environmental Policy Act (NEPA) process as it relates to the timeline of Skagit relicensing. City Light will develop its Draft License Application in December of 2022 and the Final License Application in April of 2023. Matt stated that it may take some time for FERC to issue a Ready for Environmental Analysis (REA) and that issuance will set the schedule for the NEPA process. Matt went on to say that FERC will issue a draft environmental document and seek public comment with the objective of issuing a final environmental document prior to the expiration of the current license in 2025. If that does not occur, City Light will rely on annual licenses until relicensing is complete. City Light anticipates filing a draft HPMP with the Final License Application for FERC to process and integrate into the final environmental review process.

Bob Mierendorf (Upper Skagit Indian Tribe) asked if FERC has any written guidance on how it mixes and synthesizes the NHPA and NEPA processes. Matt Cutlip was not aware of any and indicated looking into whether any exists. Matt Love referred Bob Mierendorf to FERC's Historic Properties Management Plans Guidance and its ILP tutorial materials[3].

3 These links to FERC's Historic Properties Management Plans Guidance and the FERC ILP tutorial materials were provided in the Cultural Resources Studies Introduction session chat:
https://www.ferc.gov/sites/default/files/2020-04/DevelopmentofHistoricPropertiesManagementPlans.pdf.
https://www.ferc.gov/industries-data/hydropower/licensing/licensing-processes/integrated-licensing-process-ilp-tutorial.

CR-01 Cultural Resources Data Synthesis

Andrea Weiser presented an overview of the CR-01 Cultural Resources Data Synthesis. The study is in-progress. The presentation described study goals and objectives, study area, methods, results and progress, variances to the FERC approved Study Plan, and the study schedule. Andrea also summarized the NHPA Section 106 review progress for the associated study reports. There were no modifications to this study from the FERC approved Study Plan. A variance included the following:

- Inaccessible Data: Several repositories and facilities were not accessible due to closures associated with the Covid-19 pandemic. These include local libraries, historical societies, and museums. Such document reviews will be completed as needed if repositories become accessible and particular research topics are identified as relevant under implementation of CR-02 Cultural Resources Survey, CR-03 Gorge Bypass Reach Cultural Resources Survey and CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study.

Kyle Taylor Lucas asked a question about the ISR comment process. Matt Cutlip explained that the ISR is a progress report and there is no provision to amend or modify that document. Matt stated that FERC is interested in whether there is a need to modify a study plan moving forward and that participants are welcome to file modification requests formally with FERC. City Light has the option to respond to these requests, and FERC will issue a determination. Anyone may provide comments on the ISR for City Light to consider.

There are no immediate action items or topics for follow up for the CR-01 Cultural Resources Data Synthesis.

CR-02 Cultural Resources Survey

Andrea Weiser presented an overview of the CR-02 Cultural Resources Survey. The study is in-progress. The presentation described study goals and objectives, study area, methods, results and progress, and the study schedule. There are no variances or modifications to the FERC approved Study Plan.

Bob Mierendorf expressed concern that the High Ross Inundation Zone[4] is not included in the survey tracts and stated the position of the Upper Skagit Indian Tribe is that there needs to be surveys done above the Project Boundary within the High Ross Inundation Zone within the Area of Potential Effects (APE). Andrea Weiser responded that some of the study survey does go into the High Ross Inundation Zone, particularly around known sites and shoreline areas, including a

4 The High Ross Inundation Zone is an area in which Project operations/inundation were proposed in the 1970s but not implemented. Instead, City of Seattle agreed not to build the High Ross Dam, which would have raised the height of Ross Dam by 125 feet and would have raised the pool elevation of Ross Lake and inundated the additional acreage known as the High Ross Inundation Zone.

known site that is bisected by wave action, which Bob was referring to. Andrea expressed interest in further discussion and assured the group that this comment has been noted.

CR-02 Action Items and Topics for Follow-up

- City Light to follow up with Upper Skagit Indian Tribe to facilitate further discussion about particular areas of survey in the High Ross Inundation Zone.

CR-03 Gorge Bypass Reach Cultural Resources Survey

Andrea Weiser presented an overview of the CR-03 Gorge Bypass Reach Cultural Resources Survey (Bypass Cultural Resources Survey). The study is complete. The presentation described study goals and objectives, study area, methods, results, variances to the FERC approved Study Plan, and the study schedule. There were no modifications to the FERC approved Study Plan. Variances included the following:

- Historic Built Environment Recordation: The study noted the presence of one historic built environment resource, the Gorge Creek Bridge (DAHP Property No. 710275/45WH607). This is a State Route (SR) 20 bridge that is owned and maintained by Washington State Department of Transportation (WSDOT). Although it is located within the study area, it was not recorded for the Bypass Cultural Resources Survey given that it does not have potential to be affected by the Project, nor is it owned or maintained by City Light.
- Reporting: The Research Design originally identified the development of two study reports—one for archaeological resources and one for historic built environment resources. However, a separate historic built environment study report was not necessary given no historic built environment resources were documented under the study.

David Fluharty asked if the artifacts mentioned in a recent newspaper article that were returned to the Upper Skagit Indian Tribe were included in the study report. Andrea Weiser clarified that the effort involving those artifacts is separate from the relicensing and was not part of this study.

Ashley Rawhouser asked for clarification on the interaction between increased recreation use and cultural resources in the Gorge bypass reach. Andrea Weiser stated that this is a topic for future discussion. The Bypass Cultural Resources Survey helps define areas where City Light has noted and recorded archaeological and tribal resources that have been the topic of consultation (these are confidential) and that this is an ongoing conversation. Andrea noted that City Light has no control over certain recreation activities. Ashley responded that NPS will follow up with City Light.

Tom O'Keefe expressed interest in the topic of recreation and its impacts on cultural resources. Scott Schuyler (Upper Skagit Indian Tribe) stated that the Upper Skagit Indian Tribe has concerns regarding recreation as well as with related impacts on salmon. Bob Mierendorf reflected that while City Light does not control recreation directly, the reservoirs and associated facilities are how access is provided for recreation and those opportunities would not be available if not for City Light's projects. David Fluharty observed there is a new general management plan for the Ross Lake National Recreation Area (RLRNA) that includes a strong mandate from Congress for NPS

to leave the resources unimpaired for future generations. Andrea Weiser explained that the geographic area for this study was the Gorge bypass reach (i.e., not in a reservoir) and that the reason this particular geographic area was identified for an early study, during the time the broader APE was still being developed, was to address the concern about potential Project effects occurring currently in the study area. City Light wanted to prioritize this area before the APE was fully defined to identify risks to cultural resources as soon as possible.

CR-03 Action Items and Topics for Follow-up

- NPS to follow up with City Light regarding potential recreation activities and impacts in the Gorge Bypass area.

CR-04 Inventory of Historic Properties with Traditional Cultural Significance

Andrea Weiser presented an overview of the CR-04 Inventory of Historic Properties with Traditional Cultural Significance (Properties with Traditional Cultural Significance Study). The study is in-progress. The presentation described study goals and objectives, study area, methods, status and progress, modifications to the FERC approved Study Plan, and the study schedule. There are no variances to the FERC approved Study Plan. Modifications include the following:

- The APE study area was updated based on comments received from the Section 106 consulting parties and Department of Archaeological and Historic Preservation (DAHP). The updated APE was filed with FERC on May 10, 2021. The DAHP concurred with the APE update on June 23, 2021.
- An updated schedule for study implementation is included in the study report.

There were no questions or comments for this study presentation. There are no immediate action items or topics for follow up for the CR-04 Properties with Traditional Cultural Significance Study.

INITIAL STUDY REPORT MEETING SUMMARY

ATTACHMENT A

ISR MEETING SCHEDULE AND AGENDA

Skagit River Hydroelectric Project
Initial Study Report (ISR) Meeting Schedule

Time (PST)	**Monday, March 21 | *9:00 am – 4:00 pm*** **Meeting join link:** LINKED HERE **Call-in #:** +1-510-338-9438 USA Toll **Meeting #/Access Code:** 2556 885 8986 **Password:** PwphXJeA256 (79749532 from phones and video systems)	**Tuesday, March 22 | *8:45 am – 4:30 pm*** **Meeting join link:** LINKED HERE **Call-in #:** +1-510-338-9438 USA Toll **Meeting #/Access Code:** 2555 557 6348 **Password:** XTwnhh4T4R5 (98964448 from phones and video systems)	**Wednesday, March 23 | *8:45 am – 4:00 pm*** **Meeting join link:** LINKED HERE **Call-in #:** +1-510-338-9438 USA Toll **Meeting #/Access Code:** 2557 236 5576 **Password:** JiYpKdpm399 (54975376 from phones and video systems)
Morning Session	**Welcome and Introductions** ***Studies/Topics:*** • Operations Model (OM-01) • Instream Flow Model Development (FA-02) • Gorge Bypass Reach Hydraulic & Instream Flow Model Development (FA-05) • How the models work together • Additional Data Updates in ISR (Wood Management Update and Littoral Habitat Assessment)	**Welcome and Introductions** ***Studies/Topics:*** • Reservoir Tributary Habitat Assessment (FA-07) • Reservoir Native Fish Genetics Baseline (FA-06) • Reservoir Fish Stranding and Trapping Risk Assessment (FA-03) • Reservoir Shoreline Erosion (GE-01) • Sediment Deposition in Reservoirs Affecting Resource Areas of Concern (GE-03) • Geomorphology Between Gorge Dam & Sauk River (GE-04) • Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way (GE-02)	**Welcome and Introductions** ***Studies/Topics:*** • Synthesis and Integration of Available Information on Resources in the Lower Skagit River Study (SY-01) • Recreation Use and Facility Assessment (RA-01) • Gorge Bypass Safety and Whitewater Boating (RA-02) • Project Facility Lighting Inventory (RA-03) • Project Sound Assessment (RA-04) • Lower Skagit River Recreation Flow (RA-05)
Break	**12:00 – 12:45**: Lunch Break	**12:00 – 12:45**: Lunch Break	**12:00 – 12:45**: Lunch Break
Afternoon Session	**Welcome and Introductions** ***Studies/Topics:*** • Water Quality Monitoring Study (FA-01a) • Temperature Model Development Study (FA-01b) • Fish Entrainment Study (FA-08) • Fish Passage Study (FA-04)	**Welcome and Introductions** ***Studies/Topics:*** • Vegetation Mapping (TR-01) • Wetland Assessment (TR-02) • Rare, Threatened, and Endangered Plants (TR-03) • Invasive Plants (TR-04) • Marbled Murrelet (TR-05) • Golden Eagle Habitat Analysis (TR-06) • Northern Goshawk Habitat Analysis (TR-07) • Special-Status Amphibian (TR-08) • Beaver Habitat Assessment (TR-09) • Northern Spotted Owl Habitat Analysis (TR-10)	**Welcome and Introductions** ***Studies/Topics:*** • Cultural Resources Data Synthesis (CR-01) • Cultural Resources Survey (CR-02) • Gorge Bypass Reach Cultural Resources Survey (CR-03) • Inventory of Historic Properties with Traditional Cultural Significance (CR-04)

The intent of Skagit Relicensing ISR meetings is for City Light to provide updates on study implementation through the first study season. Presentations will outline study goals, objectives, methods, preliminary data (if available), variances, as well as the study schedule moving forward. The ISR reports will be available to the public via FERC's eLibrary under docket number P-553 on March 8, 2022.

Seattle City Light

INITIAL STUDY REPORT MEETING SUMMARY

ATTACHMENT B

ATTENDANCE ROSTER

Skagit River Hydroelectric Project
Seattle City Light
Initial Study Report Meeting
March 21–23, 2022

Attachment B - Attendance Roster

Attendance Roster
Session: March 21, 2022 (AM)
9:00 am – 12:00 pm

Elizabeth Ablow (Seattle City Light)
Shelly Adams (Seattle City Light)
Brock Applegate (Washington Department of Fish and Wildlife)
Michael Aronowitz (Seattle City Light)
Andrew Bearlin (Seattle City Light)
Stuart Beck (Consultant to Swinomish Indian Tribal Community)
Hans Berge (Seattle City Light Consultant Team)
Jenna Borovansky (Seattle City Light Consultant Team)
Anna Brady (Counsel for Swinomish Indian Tribal Community)
Kenneth Brettmann (U.S. Army Corps of Engineers)
Lucius Caldwell (Seattle City Light Consultant Team)
Curtis Clement (Upper Skagit Indian Tribe)
Steve Copps (National Marine Fisheries Services)
John Covert (Washington State Department of Ecology)
Matt Cutlip (Federal Energy Regulatory Commission)
Rory Denovan (Seattle City Light)
Bec Detrich (North Cascades Institute)
Lisa Dosch (Seattle City Light Consultant Team)
Pauline Douglas (Nlaka'pamux Nation Tribal Council)
Edward Eleazer (Washington Department of Fish and Wildlife)
Jackie Ferry (Samish Indian Nation)
Jay Fields (Department of the Interior, Office of the Solicitor)
Randall Filbert (Seattle City Light Consultant Team)
Jeff Fisher (Seattle City Light)
Kelly Flint (Seattle City Light Consultant Team)
David Fluharty (North Cascades Conservation Council)
Leska Fore (Seattle City Light)
Jenna Friebel (Skagit Drainage and Irrigation District Consortium)
Jennifer Gagnon (Seattle City Light Consultant Team)
Michael Garello (Seattle City Light Consultant Team)
Jeff Garnett (U.S. Fish and Wildlife Service)
Kiza Gates (Washington Department of Fish and Wildlife)
Andrew Haas (Seattle City Light)
Daryl Hamburg (Skagit County Dike District)
Danielle Hanson (Seattle City Light Consultant Team)
Rick Hartson (Upper Skagit Indian Tribe)
Shauna Hee (U.S. Forest Service)
Becky Holloway (Seattle City Light Consultant Team)
Susan Imholt (Seattle City Light Consultant Team)
Joy Juelson (Triangle Associates Facilitation Team)
Grace Kane (Skagit County Public Works)

Monika Kannadaguli (Washington State Department of Ecology)
Grant Kirby (Sauk-Suiattle Indian Tribe)
Jonathan Kohr (Washington Department of Fish and Wildlife)
Brian Lanouette (Upper Skagit Indian Tribe)
Mike Larrabee (National Park Service)
Kevin Lautz (Washington Department of Fish and Wildlife)
Bao Le (Seattle City Light Consultant Team)
Malcolm Leytham (Seattle City Light Consultant Team)
Matt Love (Seattle City Light Outside Counsel)
Erin Lowery (Seattle City Light)
Vanessa Lund (Seattle City Light Consultant Team)
Kerry Lyste (Stillaguamish Tribe of Indians)
Theo Malone (Seattle City Light Consultant Team)
Jared McKee (U.S. Fish and Wildlife Service)
Bridget Moran (American Rivers)
Jim Myers (National Marine Fisheries Services)
Thomas O'Keefe (American Whitewater)
Adam Osbekoff (Snoqualmie Indian Tribe)
Rebecca Ossa (Seattle City Light)
Ellen Pepin-Cato (Seattle City Light Consultant Team)
Duncan Pfeifer (Washington Department of Fish and Wildlife)
David Price (National Marine Fisheries Services)
Ashley Rawhouser (National Park Service)
Dudley Reiser (Consultant to Swinomish Indian Tribal Community)
Susan Rosebrough (National Park Service)
Angie Scangas (Seattle City Light Consultant Team)
Lauren Schultz (Triangle Associates Facilitation Team)
Michael See (Skagit County Public Works)
Devin Smith (Skagit River System Cooperative)
Ronda Strauch (Seattle City Light)
Alison Studley (Skagit Fisheries Enhancement Group)
Brian Taubeneck (Seattle City Light)
Kyle Taylor Lucas (Cooks Ferry Band, Nlaka'pamux Nation Bands Coalition)
Chris Townsend (Seattle City Light)
Lauren Townson (Federal Energy Regulatory Commission)
Amy Trainer (Swinomish Indian Tribal Community)
Ron Tressler (Seattle City Light)
Stan Walsh (Skagit River System Cooperative)
Andrea Weiser (Seattle City Light)
A.J. (Anthony) Whiley (Washington State Department of Ecology)
Sharon White (Seattle City Light Outside Counsel)
Rob Whitlam (Department of Archaeology and Historic Preservation)
Matthew Wiggs (Seattle City Light Consultant Team)
Michael Witter (Seattle City Light Consultant Team)
Sonia Wolfman (State of Washington Attorney General's Office / Ecology)
John Wooster (National Park Service)
Erik Young (Skagit Fisheries Enhancement Group)
Ty Ziegler (Seattle City Light Consultant Team)
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Call_in_User_8
Call_in_User_9
Call_in_User_10
Call_in_User_11
Call_in_User_12

Attendance Roster
Session: March 21, 2022 (PM)
12:45 pm – 4:00 pm

Elizabeth Ablow
Rob Annear (Seattle City Light Consultant Team)
Brock Applegate
Michael Aronowitz
Laurie Beale (National Marine Fisheries Services)
Andrew Bearlin
Stuart Beck
Dave Beetle (Seattle City Light)
Mike Bonoff (Seattle City Light Consultant Team)
Jenna Borovansky
Anna Brady
Richard Brocksmith (Skagit Watershed Council)
Peter Browning (Skagit County)
Curtis Clement
Steve Copps
John Covert
Matt Cutlip
Rory Denovan
Pauline Douglas
Edward Eleazer
Jay Fields
Randall Filbert
Jeff Fisher
David Fluharty
Leska Fore
Michael Garello
Jeff Garnett
Kiza Gates
Daryl Hamburg
Danielle Hanson
Rick Hartson
Shauna Hee
Becky Holloway
Will Honea (Skagit County)
Misty Huddleston (Seattle City Light Consultant Team)
Joy Juelson
Grace Kane
Monika Kannadaguli
Grant Kirby
Lauren Kirigin (Washington State Attorney General's Office/WDFW)
Keith Kirkendall (National Marine Fisheries Services)
Jonathan Kohr
Brian Lanouette
Kevin Lautz
Bao Le
Matt Love
Erin Lowery
Vanessa Lund
Kerry Lyste
Theo Malone
Jared McKee
Crystal Miller (Confederated Tribes of the Colville Reservation)
Bridget Moran
Pradeep Mugunthan (Seattle City Light Consultant Team)
Jim Myers
Thomas O'Keefe
Adam Osbekoff
Rebecca Ossa
Ellen Pepin-Cato
Dawn Presler (Snohomish County)
David Price
Ashley Rawhouser
Dudley Reiser
Susan Rosebrough
Angie Scangas
Lauren Schultz

Michael See
Erin Settevendemio (Seattle City Light Consultant Team)
William Stelle (Washington Water Trust)
Alison Studley
Olga Symeonoglou (Cultural Heritage Partners)
Susan Tanco (Nlaka'pamux Nation Tribal Council)
Kyle Taylor Lucas
Chris Townsend
Lauren Townson
Amy Trainer
Ron Tressler
Stan Walsh
Andrea Weiser
Anthony A.J. Whiley
Rob Whitlam
Matt Wiggs
Tj Wiggs (Seattle City Light Consultant Team)
Sonia Wolfman
John Wooster
Erik Young
Call in User_15
Call in User_17
Call in User_18

Attendance Roster
Session: March 22, 2022 (AM)
8:00 am – 12:00 pm

Shelly Adams
Brock Applegate
Michael Aronowitz
Elizabeth Barnett (Seattle City Light Consultant Team)
Laurie Beale
Andrew Bearlin
Stuart Beck
Hans Berge
Dan Bingham (Seattle City Light Consultant Team)
Mike Bonoff
Jenna Borovansky
Richard Brocksmith
Peter Browning
Lucius Caldwell
Blaine Chesterfield (City of Mount Vernon, Washington)
Curtis Clement
Steve Copps
John Covert
Matt Cutlip
Rory Denovan
Bec Detrich
Pauline Douglas
Kathy Dubé (Seattle City Light Consultant Team)
Jeff Duda (U.S. Geological Survey)
Edward Eleazer
Susannah Erwin (National Park Service)
Annika Fain (Seattle City Light Consultant Team)
Jay Fields
Randall Filbert
Maryalice Fischer (Low Impact Hydropower Institute)
Jeff Fisher
David Fluharty
Leska Fore
Jeff Garnett
Andy Haas
Danielle Hanson
Rick Hartson
Shauna Hee
Shawn Higgins (Seattle City Light Consultant Team)
Susan Imholt
Grace Kane

Lauren Kirigin
Keith Kurko (Skagit Environmental Endowment Commission)
Brian Lanouette
Mike Larrabee
Kevin Lautz
Bao Le
Matt Love
Erin Lowery
Vanessa Lund
Kerry Lyste
Greer Maier (Triangle Associates Facilitation Team)
Theo Malone
Jared McKee
Bridget Moran
Kristin Murray (Skagit Fisheries Enhancement Group)
Jim Myers
Andrew Nelson (Seattle City Light Consultant Team)
Thomas O'Keefe
Adam Osbekoff
Duncan Pfeifer
David Price
Ashley Rawhouser
Dudley Reiser
Jon Riedel (Individual)
Phil Roni (Seattle City Light Consultant Team)
Traci Sanderson (Seattle City Light Consultant Team)
Sharon Sarrantonio (National Park Service)
Lauren Schultz
Michael See
Erin Settevendemio
Devin Smith
William Stelle
Rhonda Strauch
Alison Studley
Olga Symeonoglou
Kyle Taylor Lucas
Dan Thomas (Seattle City Light Consultant Team)
Ryan Thompson (Consultant for Upper Skagit Indian Tribe)
Chris Townsend
Amy Trainer
Ron Tressler
Jacob Venard
Tino Villaluz (Swinomish Indian Tribal Community)
Stan Walsh
Andrea Weiser
Matt Wiggs
John Wooster
Call_in_User_6
Call_in_User_7
Call_in_User_8
Call_in_User_11
Call_in_User_12

Attendance Roster
Session: March 22, 2022 (PM)
12:45 pm – 4:30 pm

Brock Applegate
Michael Aronowitz
Simone Barley-Greenfield (Seattle City Light Consultant Team)
Andrew Bearlin
Dave Beedle
Jenna Borovansky
Richard Brocksmith
Blaine Chesterfield
Thomas Christian (Triangle Associates Facilitation Team)

Margaret Clancy (Seattle City Light Consultant Team)
Curtis Clement
Erin Colclazier (Seattle City Light Consultant Team)
John Covert
Matt Cutlip
Rory Denovan
Pauline Douglas
Edward Eleazer
David Fluharty
Jeff Fisher
Jeff Garnett
Andrew Haas
Rick Hartson
Shauna Hee
Susan Imholt
Nathan Jones (Seattle City Light Consultant Team)
Grace Kane
Brian Lanouette
Matt Love
Erin Lowery
Kerry Lyste
Bridget Moran
Stephen Nyman (Seattle City Light Consultant Team)
Thomas O'Keefe
Rebecca Ossa
Leslie Parks
Ellen Pepin-Cato
Duncan Pfeifer
Kurt Pullman (Seattle City Light)
Jason Ransom (National Park Service)
Ashley Rawhouser
Jessica Redman (Seattle City Light Consultant Team)
Matt Reed (Seattle City Light Consultant Team)
Scott Rockwell (Stillaguamish Tribe of Indians)
Sharon Sarrantonio
Lauren Schultz
Michael See
Rob Smith (National Parks Conservation Association)
William Stelle
Colin Struthers (Seattle City Light Consultant Team)
Alison Studley
Kyle Taylor Lucas
Chris Townsend
Lauren Townson
Amy Trainer
Ron Tressler
Tino Villaluz
Stan Walsh
Andrea Weiser
Matthew Wiggs
Michael Witter
Julian Yates (S'ólh Téméxw Stewardship Alliance)
Erik Young
Call_in_User_17

Attendance Roster
Session: March 23, 2022 (AM)
8:45 am – 12:00 pm

Brock Applegate
Michael Aronowitz
Laurie Beale
Andrew Bearlin
David Beauchamp (U.S. Geological Survey)
Stuart Beck
Lynn Best
Jenna Borovansky
Richard Brocksmith
Blaine Chesterfield

Thomas Christian
Curtis Clement
Steve Copps
Matt Cutlip
Rory Denovan
Bec Detrich
Pauline Douglas
Amber Earley (Seattle City Light)
Edward Eleazer
Jay Fields
David Fluharty
Leska Fore
John Gangemi (Seattle City Light Consultant Team)
Jeff Garnett
Kiza Gates
Andrew Haas
Jason Hall (Seattle City Light Consultant Team)
Rick Hartson
Shauna Hee
Will Honea
Josephine Jefferson (Swinomish Indian Tribal Community)
Monika Kannadaguli
Lauren Kirigin
Keith Kirkendall
Brian Lanouette
Matt Love
Erin Lowery
Vanessa Lund
Jared McKee
Bridget Moran
Jim Myers
Thomas O'Keefe
Adam Osbekoff
Rebecca Ossa
Matt Paquette (Seattle City Light Consultant Team)
Leslie Parks
David Price
Ashley Rawhouser
Dudley Reiser
Susan Rosebrough
Sharon Sarrantonio
Denise Shultz (National Park Service)
Lauren Schultz
Michael See
Devin Smith
William Stelle
Alison Studley
Susan Tanco
Kyle Taylor Lucas
Ryan Thompson
Chris Townsend
Lauren Townson
Amy Trainer
Ron Tressler
Tino Villaluz
Stan Walsh
Andrew Weiser
Rob Whitlam
Matt Wiggs
Tj Wiggs
Erik Young
Call_in_User_3
Call_in_User_5
Call_in_User_6
Call_in_User_7

Attendance Roster
Session: March 23, 2022 (PM)
12:45 pm – 4:00 pm

Michael Aronowitz
Simone Barley-Greenfield
Andrew Bearlin

Maia Bellon (Seattle City Light Outside Counsel)
Shannon Bentley (Skagit Environmental Endowment Commission)
Diana Bob (Seattle City Light Outside Counsel)
Jenna Borovansky
Anna Brady
Ellen Chapman (Cultural Heritage Partners)
Thomas Christian
Matt Cutlip
Rory Denovan
Bec Detrich
Pauline Douglas
Amber Earley
Edward Eleazer
Jennifer Ferris (Seattle City Light Consultant Team)
Jackie Ferry
Jay Fields
David Fluharty
Leska Fore
Shauna Hee
Josephine Jefferson
Joyce LeCompte (Seattle City Light Consultant Team)
Matt Love
Kerry Lyste
Bob Mierendorf (Upper Skagit Indian Tribe)
Crystal Miller
Bridget Moran
Guy Moura (Confederated Tribes of the Colville Reservation)
Thomas O'Keefe
Adam Osbekoff
Rebecca Ossa
Dawn Presler
Ashley Rawhouser
Danielle Risse (Seattle City Light Consultant Team)
Lauren Schultz
Denise Shultz
Scott Schuyler (Upper Skagit Indian Tribe)
Michael See
Susan Tanco
Kyle Taylor Lucas
Ryan Thompson
Chris Townsend
Lauren Townson
Amy Trainer
Ron Tressler
Tino Villaluz
Andrea Weiser
Sharon White
Rob Whitlam
Matthew Wiggs
Julian Yates
Call_in_User_13
Call_in_User_14
Call_in_User_16
Call_in_User_17

INITIAL STUDY REPORT MEETING SUMMARY

ATTACHMENT C

POWERPOINT PRESENTATION SLIDES

Initial Study Report

- Initial Study Report (ISR) review process is initiated with City Light's filing of the report [March 8, 2022].
- ISR intent – progress report summarizing overall progress in implementing the study plan. Should also include:
  - Variances from approved study plan
  - Any applicant proposals to modify or implement new studies

ISR Meetings

- Goals:
  - Discuss the study results.
  - Discuss City Light's and any other participant's proposals to modify the study plan or develop new studies based on the data collected during the first study season.
  - If any agreements are reached, they would be documented in City Light's ISR meeting summary.

Comments on ISR

- Stakeholder comment period on ISR is intended to specifically focus on disagreements about the need to modify the study plan moving forward.
- No requirement for City Light to formally respond to or edit and refile the ISR.
- FERC will only focus on “actionable” requests to modify the study plan or new studies.

ISR Comment Period and Schedule

- Within 15 days of the meetings, City Light must file a meeting summary [April 7, 2022].
- Stakeholder disagreements or other requests to modify the study plan or develop new studies are due within 30 days of the ISR meeting summary [by May 7, 2022].
- Reply comments from any stakeholder due 30 days later [June 6, 2022].
- FERC study modification determination to follow 30 days after, if necessary [July 6, 2022].

Study Plan Modification

- Study Modification Requests – 18 CFR 5.15(d)(1)-(2)
- Must be accompanied by showing of good cause why the modification should be approved, and demonstrate:
  - Study was not conducted as approved; or
  - Study was conducted under anomalous environmental conditions.

New Study Requests

- New Study Requests – 18 CFR 5.15(e)
- Must Explain:
- **(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 satisfies the study criteria in § 5.9(b) (e.g., project nexus, study need, accepted scientific practices)

Questions?

Matt Cutlip, FERC, Office of Energy Projects, Division of Hydropower Licensing

Skagit Project Relicensing Coordinator

503.552.2762

matt.cutlip@ferc.gov

OM-01 OPERATIONS MODEL STUDY

Initial Study Report Meeting

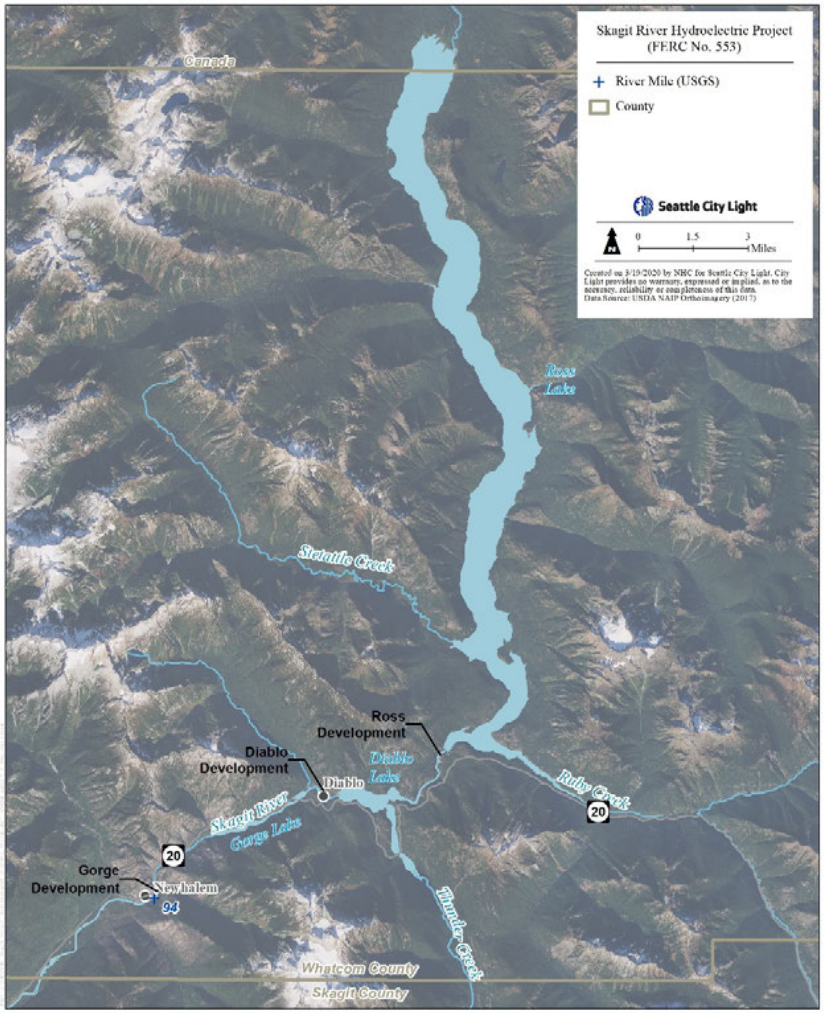
Angie Scangas | March 21, 2022

STUDY GOALS AND OBJECTIVES

- Goal: develop a tool to simulate Project operations for the evaluation of the effects of alternative future operating scenarios
- Objectives:
  - The objective of this study is to develop an Operations Model that describes and simulates existing Project operations for purposes of relicensing, and which can be used to simulate potential future operations under a variety of operating scenarios
  - Aid in decision-making regarding the effects of those various operating scenarios on water allocation, flood control, fish and wildlife habitat, instream flows, reservoir levels, wetland and floodplain connectivity, recreation, hydropower generation, and other matters affected by flow releases from the Project

STUDY AREA

- Upper end of Ross Lake to the Gorge Powerhouse tailrace
  - Ross Lake, Ross Dam, and Powerhouse
  - Diablo Lake, Diablo Dam and Powerhouse
  - Gorge Lake, Gorge Dam, Gorge bypass reach, Gorge Powerhouse, and tailrace



STUDY METHODS

- Operations model development
  - Physical descriptors of each reservoir/dam
  - Operational procedures such as minimum flows
- Development or identification of inflow dataset
  - Historical USGS/Operations based

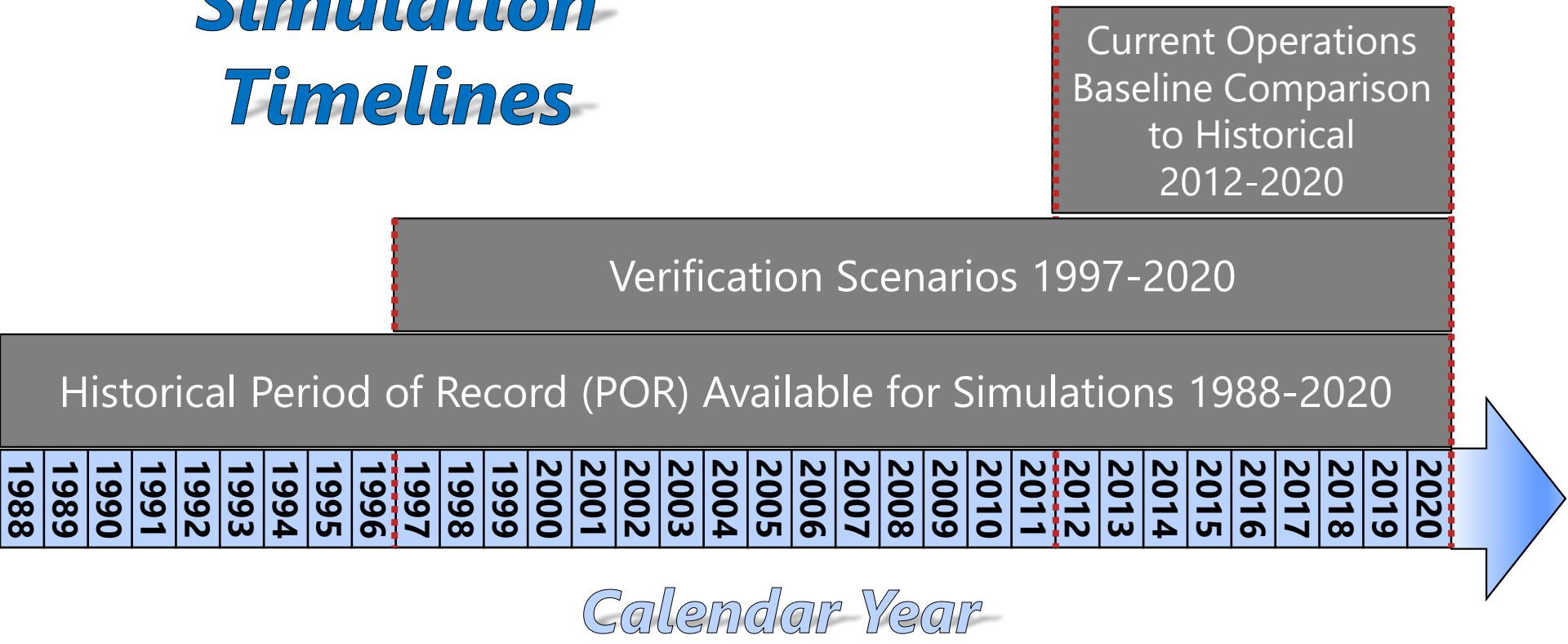
$$Q_{target} = \left(\frac{A_{target}}{A_{reference}} \right) Q_{reference}$$

$$Q_i = Q_o - \Delta S - losses$$

  - DHSVM resource for potential future hydrology

STUDY METHODS

Simulation Timelines



STUDY METHODS

- Verification/Validation
  - Evaluate the Skagit Operations Model by comparing model output to the historical operations records and outflow from Gorge Development calculated from USGS flow records
  - Verify that the Skagit Operations Model describes and simulates the Project's operating rules by comparing the Current Operations Baseline scenario to historical operations records
- Current Operations Baseline
  - All subsequent Operations Model runs will be compared to the Current Operations Baseline

STUDY METHODS

- Consultation Process with LPs
  - June 28, 2021
    - Introduction of Model and Skagit Hydrologic Data
    - Scenario Discussion
  - August 10, 2021- small working group DHSVM discussion
  - December 16, 2021- Skagit Operations Model validation and establishment of Baseline scenario
  - January 20, 2022 - Continued discussion of Skagit Operations Model validation and establishment of Baseline scenario
  - February 17, 2022 – Operations Model Training
  - March 17, 2022 – Continued Operations Model training and LPs provided access to a web hosted model

STUDY METHODS (CONTINUED)

Tasks for 2022:

- Additional consultation workshops
- Alternative Analysis
  - Identify and evaluate performance metrics/measures/objectives
  - Identify and simulate alternative operations scenarios
  - Evaluate and document alternative Project operation scenarios

RESULTS

- Skagit Operations Model Logic and Validation Report
  - Demonstrates we have a tool Operations Model that describes and simulates existing Project operations for purposes of relicensing, and which can be used to simulate potential future operations under a variety of operating scenarios
  - Detailed summary of historical hydrology per NOA
    - Inflow dataset summary to be included in ISR:

      (1) a specific description of the reservoir tributaries included in the inflow analysis

      (2) the period of record used for each, and

      (3) the source of the flow data for each (e.g., USGS gage flow record or synthetic flow record)
- USR will include Scenario Documentation Report

STUDY VARIANCES

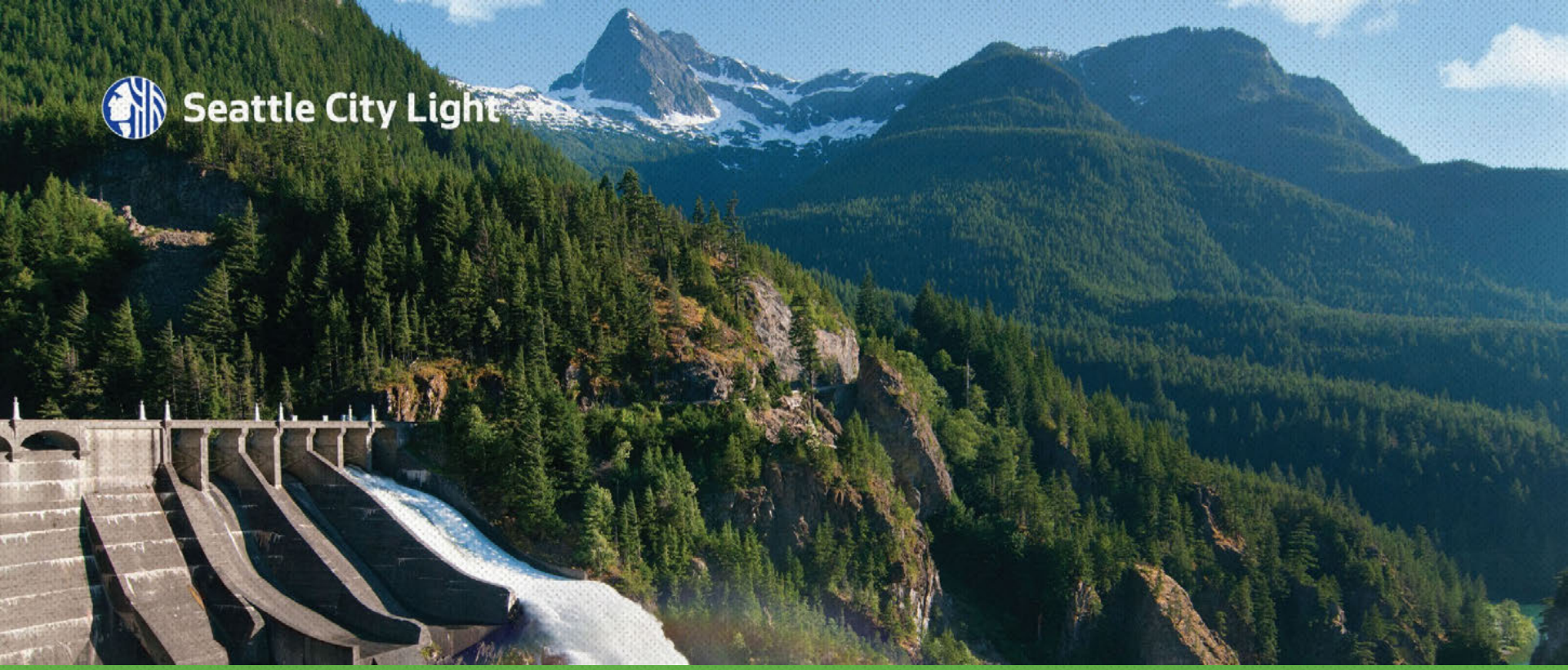
- **Consultation process:** Enhanced consultation by holding additional workshops and small technical work group meetings to address development of the model and discuss potential hydrologic references.
- **Model validation:** City Light originally envisioned simulating both a Base Case scenario (defined by current FERC license requirements) and a Current Operations Baseline scenario (defined to include the current fisheries adaptive management by City Light). However, after a review of operations and operational requirements, it was apparent that the Current Operations Baseline effectively captures current FERC license requirements.

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Scenario Identification and Evaluation Process - Discussed at Standing Workgroup Meetings	Starting April 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?



FA-02 INSTREAM FLOW MODEL DEVELOPMENT STUDY

Initial Study Report Meeting

Erin Lowery | March 21, 2022

STUDY GOALS

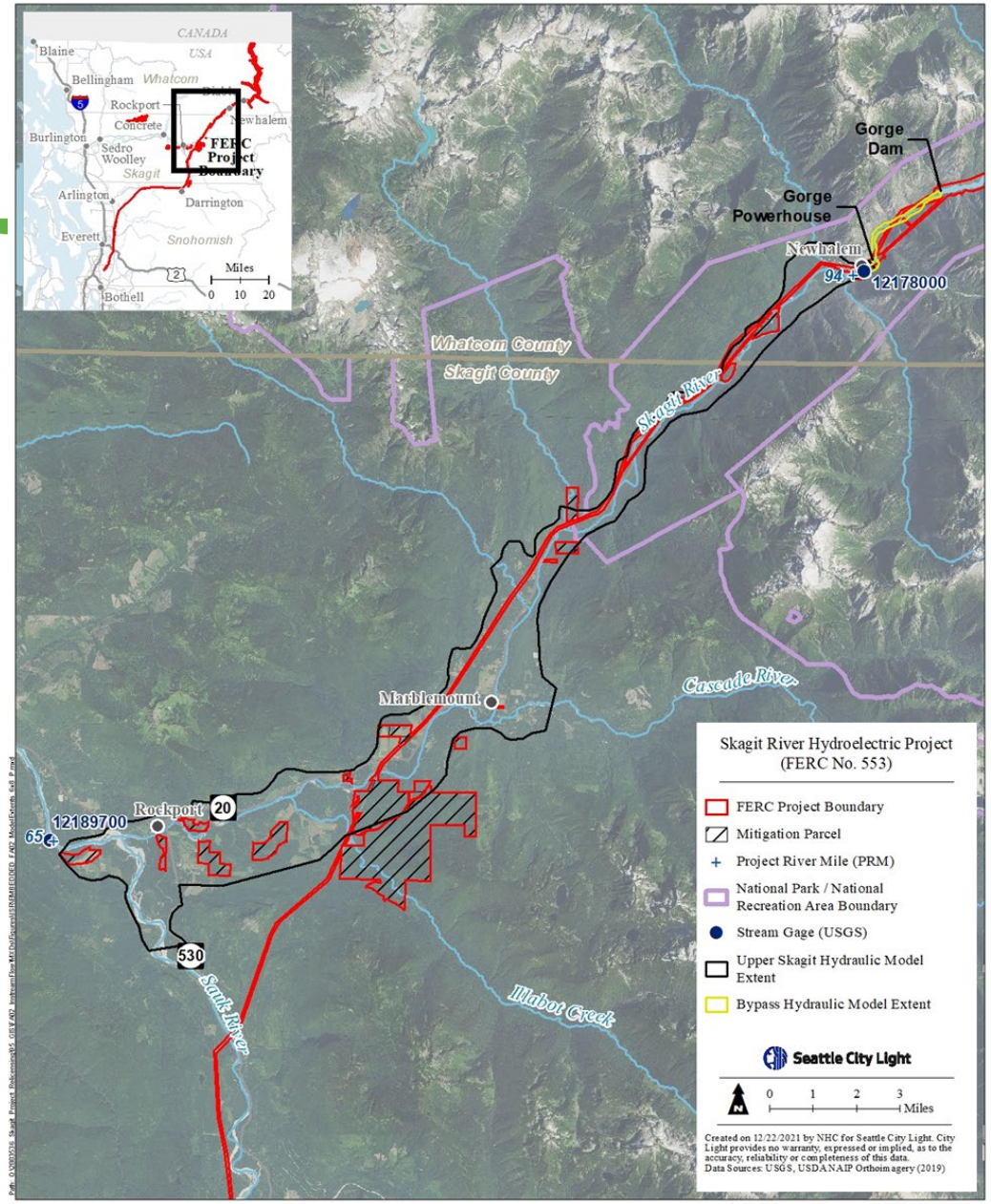
- Develop an updated instream flow/habitat evaluation tool for the Skagit River between Gorge Powerhouse and the confluence with Sauk River

STUDY OBJECTIVES

- Develop, calibrate, and validate a numerical hydraulic model of the Skagit River for the reach between Gorge Powerhouse and the confluence with the Sauk River
- Integrate hydraulic model outputs and observed characteristics of substrate and cover with biological (species, life stages, and periodicities) and physical (depth and velocity) criteria used in the current flow-habitat evaluation tool, including modifications from additional data sources as appropriate, to develop updated flow-habitat relationships for the reach of the Skagit River between Gorge Powerhouse and the confluence with the Sauk River

STUDY AREA

- 28-mile reach of the Skagit River between USGS Skagit River at Newhalem stream gage (USGS gage 12178000) and confluence with the Sauk River



STUDY METHODS

- Data collection
  - Acquire topographic and bathymetric data from 2016, 2017 and 2018 LiDAR, and previous hydraulic model study of Barnaby Reach
  - Conduct bathymetric surveys to fill voids in the LiDAR surfaces
  - Collect hydrologic and hydraulic data for hydraulic model calibration:
    - Obtain stage and discharge records from long-term USGS gauges
    - Install and collect water level data from 6 new water level recorders installed and operated by the USGS under agreement with City Light
    - Collect velocity and depth data at 17 transects during low, moderate and high discharge field data collection efforts (daily average flow at Newhalem 2350, 4200 and 6700 cfs)

STUDY METHODS (CONTINUED)

- Data collection (continued)
  - Collect hydrologic and hydraulic data (continued):
    - Collect water surface profile and depth data for study reach during low, moderate and high discharges
    - Identify and survey high water marks for November 2020 high flow event (peak flow at Newhalem 12,200 cfs)
    - Measure discharges on ungauged tributaries
  - Conduct desktop analysis of channel migration between Marblemount and the Sauk River to understand differences between 2020 bathymetric survey data and 2017 LiDAR data
  - Map substrate and cover

STUDY METHODS (CONTINUED)

- Hydraulic model development
  - Develop terrain model of study reach from bathymetric surveys and LiDAR data
  - Develop initial hydraulic roughness zones from Barnaby Reach hydraulic model, aerial imagery, NPS landform mapping study, delineation of large wood from GE-04 study, and flow depth
  - Define model boundaries from discharge and stage data
  - Generate initial model computational mesh (current model consists of approximately 1.7 million cells)
- Sensitivity testing
  - Test model sensitivity to and select initial cell size, simulation time step, turbulence parameters and roughness coefficients

STUDY METHODS (CONTINUED)

- Hydraulic model calibration (on-going)
  - Select model performance evaluation metrics
  - Adjust model parameters and cell size to match:
    - depths and velocities at transects
    - longitudinal water surface elevation and depth profiles
- Habitat model development (on-going)
  - Consultation with LPs to:
    - select species and life stages to be considered for modeling
    - determine periodicity by species and life stage
    - determine habitat suitability criteria (HSC curves)
  - Field validation studies

STUDY METHODS (CONTINUED)

- Consultation
  - Hydraulic model:
    - Four (4) Workshops through December 2021 covering all aspects of data collection, hydraulic model development, and hydraulic model calibration
    - Two (2) small technical workgroup meetings focusing on approach to and calibration of hydraulic model
  - Habitat model:
    - Five (5) Workshops through February 2022 covering selection of species/life stages, periodicity and habitat suitability criteria
    - Ten (10) HSC-focused technical workgroup meetings through January 2022
    - Two (2) periodicity-focused technical workgroup meetings through January 2022

STUDY METHODS (CONTINUED)

Tasks for 2022

- Additional consultation workshops
- Complete hydraulic model calibration
- Complete habitat model development
- Develop flow/habitat relationships for species/life stages of interest
- Assess potential impact of November 2021 flood on hydraulic and habitat modeling

RESULTS

- Summary of hydraulic model and habitat model development
- Preliminary hydraulic model calibration results
- Substrate and cover mapbooks
- Species/life stages to be considered for habitat modeling
- Preliminary periodicity data
- Habitat suitability criteria

STUDY VARIANCES

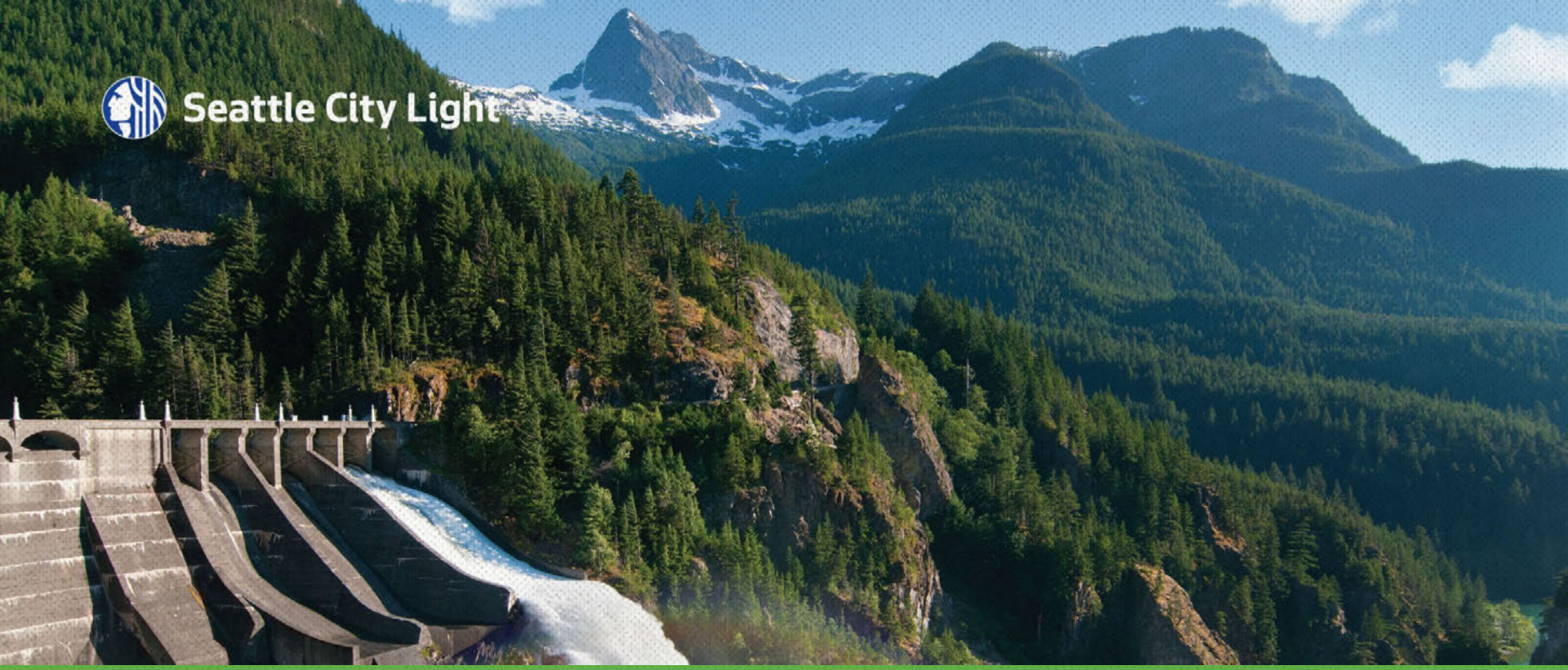
- **Consultation process:** Enhanced consultation by holding additional workshops and small technical work group meetings to address development of habitat suitability criteria and periodicity data.
- **Hydraulic model validation:** The RSP proposed using observed data from 12 of 17 river transects for hydraulic model calibration, with data from remaining 5 transects reserved for model validation. In consultation with LPs at the December 7, 2021, workshop, it was decided to use all transect data for calibration and forgo model validation. The consensus was that this approach was more likely to produce results that more accurately represent the observed transect data.

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 8, 2022
Habitat modeling workshop (with FA-05)	April 5, 2022
Hydraulic modeling Workshop #5	April 2022
Hydraulic model calibration complete	April 2022
Develop flow/habitat relationships	April – June 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?



FA-05 SKAGIT RIVER GORGE BYPASS REACH HYDRAULIC AND INSTREAM FLOW MODEL DEVELOPMENT STUDY

Initial Study Report Meeting

Erin Lowery | March 21, 2022

STUDY GOALS

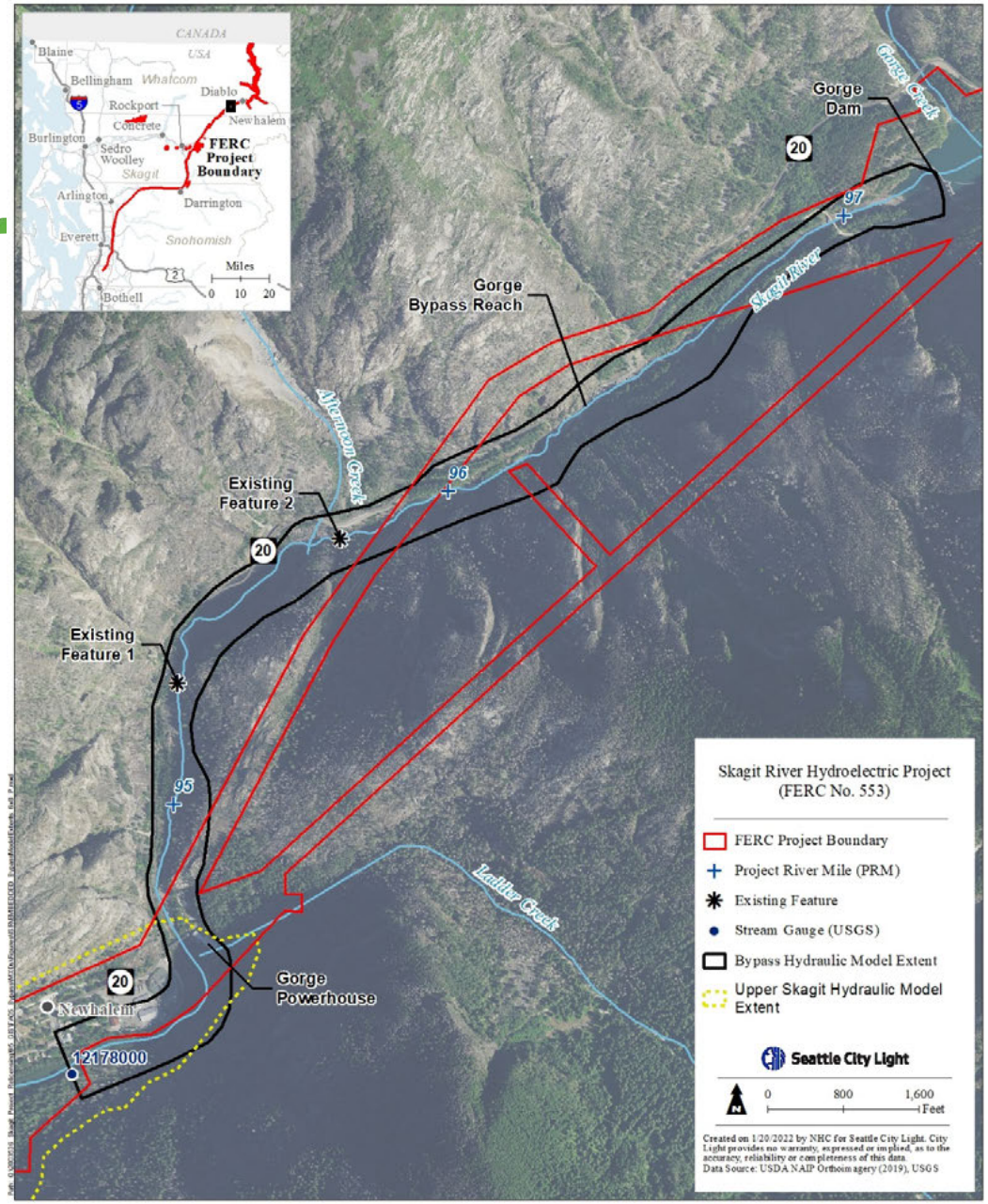
- Develop an instream flow/habitat evaluation tool for the Gorge bypass reach
- Develop hydraulic data necessary to support an evaluation of fish passage at two locations in the Gorge bypass reach

STUDY OBJECTIVES

- Develop and calibrate a numerical hydraulic model (or models) of the Gorge bypass reach
- Integrate hydraulic model outputs and observed characteristics of substrate and cover with biological (fish species, life stages, periodicities) and physical (depth, velocity) criteria to develop flow-habitat relationships for the Gorge bypass reach
- Apply the model to provide hydraulic data to support the evaluation of fish passage, particularly at two previously identified potential upstream passage barriers (now referred to as "existing features") within the Gorge bypass reach located approximately 0.6 and 1.3 miles upstream from Gorge Powerhouse

STUDY AREA

- 2.9-mile reach of the Skagit River between Gorge Dam and the USGS Skagit River at Newhalem stream gage (USGS gage 12178000)



STUDY METHODS

- Data collection
  - Acquire topographic and bathymetric data (from 2018 LiDAR)
  - Collect hydrologic and hydraulic data for hydraulic model calibration:
    - Obtain spill and discharge records from City Light and USGS
    - Collect velocity and depth data at 5 transects for 4 controlled releases from Gorge Dam ranging from 50 cfs to 1200 cfs
    - Install and collect water level data from 12 water level loggers – 6 at each "existing feature"
    - Take UAV photos and videos during 4 controlled releases and baseflow
  - Map substrate and cover

STUDY METHODS (CONTINUED)

- Hydraulic model development
  - Develop high resolution terrain model (1-ft cell resolution) of bypass reach by refining the 2018 LiDAR ground point classification data
  - Develop initial hydraulic roughness zones from vegetation cover imagery
  - Define model boundaries from discharge and stage data
  - Generate initial model computational mesh (final model consists of approximately 1.75 million cells)
- Sensitivity testing
  - Test model sensitivity to cell size, simulation time step, turbulence parameters and roughness coefficients
  - Select cell size, time step, turbulence parameters and roughness coefficients for “base” model”

STUDY METHODS (CONTINUED)

- Hydraulic model calibration (on-going)
  - Adjust model parameters to match:
    - depths and velocities at transects for controlled releases
    - water surface elevations at level logger locations for controlled releases and two higher flows (4,800 and 6,200 cfs) observed in late June 2021
    - water surface profiles (from UAV imagery) for controlled releases
- Habitat model development (on-going)
  - Consultation with LPs as part of FA-02 to:
    - select species and life stages to be considered
    - determine periodicity by species and life stage
    - determine habitat suitability criteria (HSC curves)

STUDY METHODS (CONTINUED)

- Consultation
  - Workshop 1 (May 17, 2021)
    - Objectives and methodology for fish passage evaluation
    - Role of hydraulic modeling/use of HEC-RAS 2D in fish passage evaluation
    - Data collection program for hydraulic model development
  - Workshop 3 (August 26, 2021)
    - Update on field data collection program
    - Hydraulic model terrain data
    - Approach to hydraulic model development

STUDY METHODS (CONTINUED)

- Consultation (continued)
  - Workshop 4 (November 2, 2021)
    - Uncertainty in discharge data
    - Update on model development
    - Approach to/status of hydraulic model calibration
    - Update on development of biological and habitat data
    - Preview integration of hydraulic model output and biological/habitat data
  - Small group technical meetings (January 11 and January 21, 2022)
    - Discuss status of hydraulic model calibration
  - Held HSC and periodicity workgroup meetings separate from model workshops. FA-02 HSC/periodicity activities also address FA-05 needs

STUDY METHODS (CONTINUED)

Tasks for 2022

- Additional consultation workshops
- Complete hydraulic model calibration
- Complete habitat model development (under FA-02)
- Develop flow/habitat relationships for species/life stages of interest
- Produce hydraulic data for evaluation (under FA-04) of fish passage
- Assess potential impact of November 2021 flood on hydraulic and habitat modeling

RESULTS

- Summary of hydraulic model and habitat model development
- Preliminary hydraulic model calibration results
- Substrate and cover mapbooks
- Species/life stages to be considered for habitat modeling
- Habitat suitability criteria
- Preliminary periodicity data

STUDY VARIANCES

- **Terrain refinement:** Refined hydraulic model terrain to a 1-foot resolution in place of originally proposed 3-foot resolution. Provides more realistic representation of actual condition and improves hydraulic model accuracy.
- **Water surface profile data:** Acquired water surface profile data using a UAV (drone) in place of originally proposed manual marking and surveying of profiles. Acquisition of data by drone was safer and more efficient.

STUDY VARIANCES

- **Hydraulic model validation:** The RSP stated that the hydraulic model would be validated without stating which data would be reserved for validation. A proposed validation approach was discussed at Workshop 4 on November 2, 2021, and at a small group technical meeting on January 11, 2022, where the decision was made to forgo model validation. The consensus was that using all data for model calibration instead of reserving some data for model validation was more likely to produce results that more accurately represent the observed transect data.
- **Consultation process:** Enhanced consultation (with FA-02) by holding additional workshops and small technical work group meetings to address development of habitat suitability criteria and periodicity data.

STUDY SCHEDULE

Milestone	Date
Consultation Workshop #5	February 1, 2022
Hydraulic model calibration complete	March 2022
Produce data for fish passage evaluation	March 2022
City Light files Initial Study Report	March 8, 2022
Habitat modeling workshop (with FA-02)	April 5, 2022
Develop flow/habitat relationships	March – June 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

HOW RELICENSING MODELS WILL WORK TOGETHER

Initial Study Report Meeting

Ty Ziegler and Angie Scangas | March 21, 2022

STUDY MODEL INTEGRATION

- Multiple models are being developed to support relicensing studies:
  - Bypass and downstream flows
  - Fish habitat
  - Reservoir operations
  - Water quality
  - Sediment transport
- These modeling tools be utilized in conjunction to evaluate potential alternative operations scenarios
- Small Study Integration/Roadmap Work Group discussing model integration and study linkages

MODELS UNDER DEVELOPMENT

SOURCE: ISR TABLE 3.1-1

Study	Model	Brief Description
FA-02	Hydraulic 2-D Model from Gorge Powerhouse to Confluence with Sauk River	Will provide information on the hydraulic characteristics of flows in the Skagit River (discharge, depth, and velocity, and their spatial and temporal variations).
FA-02	Integrated Habitat Model from Gorge Powerhouse to Confluence with Sauk	Will integrate hydraulic model outputs and observed characteristics of substrate and cover with biological (species, life stages, periodicities) and physical (depth and velocity) to develop updated flow-habitat relationships.
FA-05	Hydraulic 2-D Model from Gorge Dam to Gorge Powerhouse	Will provide information on the hydraulic characteristics of flows in the Skagit River Bypass Reach (discharge, depth, and velocity, and their spatial and temporal variations).
FA-05	Integrated Habitat Model from Gorge Dam to Gorge Powerhouse	Will integrate hydraulic model outputs and observed characteristics of substrate and cover with biological (species, life stages, periodicities) and physical (depth and velocity) to develop updated flow-habitat relationships.
OM-01	Operations Model	The Operations Model will provide simulations of existing and potential Project operations scenarios and provide information on reservoir elevations, instream flows and generation.

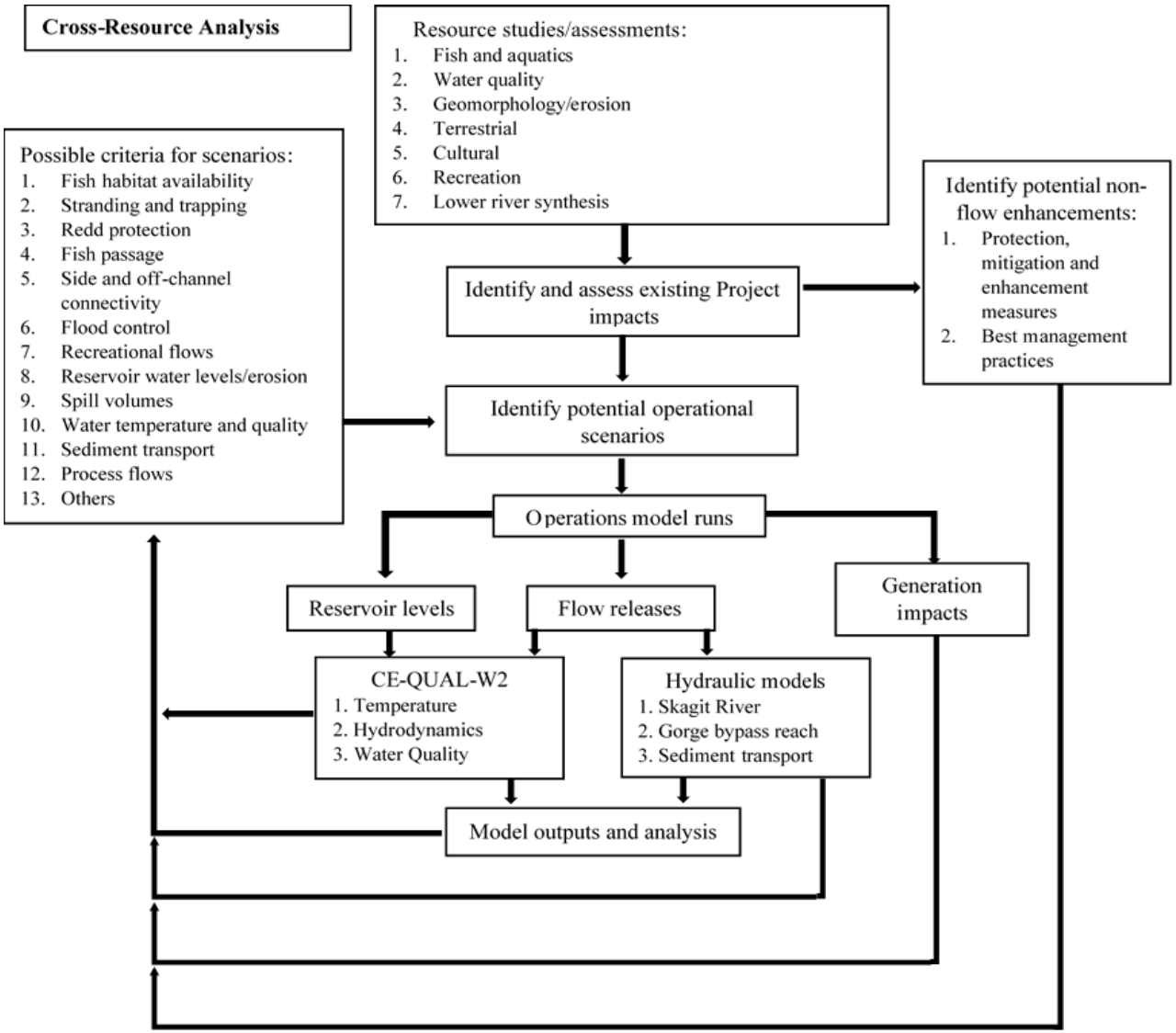
MODELS UNDER DEVELOPMENT

SOURCE: ISR TABLE 3.1-1

Study	Model	Brief Description
FA-01b	CE-QUAL-W2 Temperature, Hydrodynamics, and Water Quality Model	These models will act as a tool in scenario analyses to evaluate impacts from the Project on aquatic resources related to water temperature, hydrodynamics, and water quality.
GE-04	UBCRM Model	This model assesses river hydraulic geometry and propensity for side channel or multi-channel morphologic adjustments based on prescribed hydrology and sediment loading scenarios.
GE-04	MAST one-dimensional (1-D) Model	This model will quantify width adjustments of the Skagit River to existing and potential future flow release scenarios and evaluate patterns of bed material mobility downstream of Sauk River.
GE-04	HEC RAS 1-D Model	This model will quantify long-term channel bed and hydraulic profiles of the Skagit River.
GE-04	HEC RAS 2-D Model	This model will quantify erosion and deposition processes related to key morphologic and habitat features identified at six subreaches identified in collaboration with LPs.
GE-04	Indicators of Hydraulic Alteration (IHA)	The IHA software package will be used to investigate the timing and duration of different types of high flow events under unmanaged conditions to inform the development of potential process flow scenarios.

CROSS-RESOURCE ANALYSIS

SOURCE: ISR FIGURE 3.1-2



EXAMPLE OF OPERATIONS MODEL OUTPUT SUMMARY TABLE

Criterion	Start Date	End Date	MISC	Baseline	Alt 1
				(POR)	(POR)
Incidents of absolute lake level drops >= X ft over X day-period	1-Mar	31-May	85	2,939	3,040
Percent of time of lake levels >= X ft	1-Mar	31-Jul	10%	24%	35%
Percent of time of lake levels >= X ft during the recreation season	1-Apr	30-Sep	10%	21%	21%
Incidents/yr of lake levels <= X ft for at least 2 consecutive days	1-Jan	31-Dec	10	97	97
Percent of days lake level within +/- X ft of target	1-Jan	31-Dec	5%	54%	54%
Percent of days lake level < Normal Minimum Elevation	1-Jan	31-Dec	10%	8%	20%
Days lake level above X ft	1-Jan	31-Dec	1	116	116
Avg. days/yr lake level below critical level for highest public boat ramp (< X ft) during higher use months	1-Mar	31-Oct	25	23	23
Days below critical level for hydro unit operation	1-Jan	31-Dec	1	0	0
Lowest 7-day average flowrate (cfs) released from the hydro development for the evaluation period	1-Jan	31-Dec	15	75	75
Percent of hours at or below X cfs released from the hydro development	1-Jan	31-Dec	10%	64%	64%
Percent of hydropower generation lost due to unplanned spills	1-Jan	31-Dec	1%	3%	5%
Percent of hydropower generation lost due to other non-power generation uses	1-Jan	31-Dec	1%	8%	10%
Avg. MWH/yr of hydropower produced	1-Jan	31-Dec	31,000	1,400,000	1,200,000

Seattle City Light

QUESTIONS?

WOODY DEBRIS MANAGEMENT

Initial Study Report Meeting

Shelly Adams | March 21, 2022

BACKGROUND

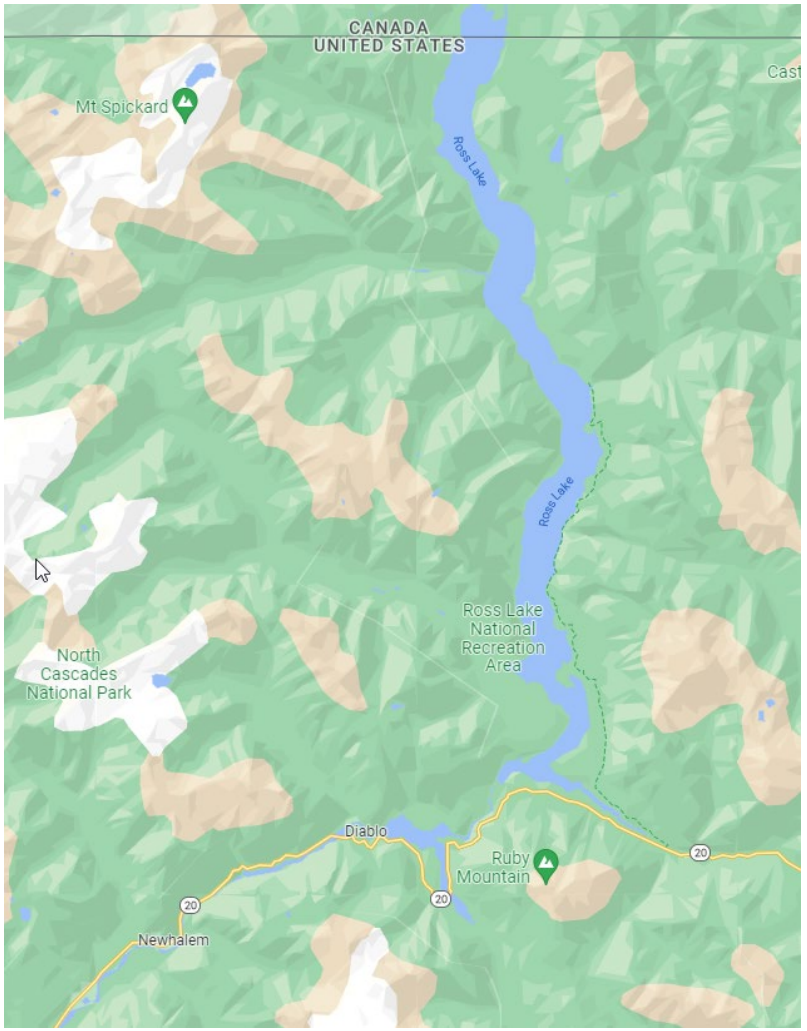
- Woody debris can pose dam safety and recreation hazards
- Collected volume is approximately 1,000 – 2,700 cubic yards (CY); actual volume as high as 6,500 CY
- In the past, City Light contractors burned collected reservoir wood; burning was voluntarily discontinued in 2009
- Reservoir "pens" used to temporarily store woody debris are at/nearing capacity
- City Light and LPs have a shared interest in exploring reservoir wood management alternatives as part of new license

MEMO OBJECTIVES

- Review and summarize the current Project woody debris management process
- Present a summary of woody debris collection, transport and placement activities from 2017 – 2021
- Support identification of future Project wood debris management alternatives
- May inform ongoing relicensing studies

STUDY AREA

- Project reservoirs
  - Woody debris storage locations
  - Collection locations
- Woody debris placement locations
  - Aggregate Storage Facility along the mainstem Skagit River



METHODS

- In consultation with geomorphology team, implement more detailed data collection in Ross Lake in 2021
- Acquire and review all available wood collection, extraction and placement data sheets
- Tally and summarize total quantities of specific wood categories, as well as transportation and placement activities

RESULTS

- Wood collection and extraction data from 2017 to 2021 was tabulated and summarized
- Ross Lake 2021 recommendations for new data collection were implemented
- Summary of woody Debris management process

SUMMARY OF 2017-2021 WOOD COLLECTION AND EXTRACTION – ROSS LAKE WOOD

Event	2017	2018	2019	2020	2021
Ross Lake Collection					
Collection dates	July and August 2017	July and August 2018	No wood collected due to low summer water level	July 1 – August 31, 2020	July 21 – August 10, 2021
Bags collected	4	6	N/A	10	8
CY per bag	250	250	N/A	250	250
Total quantity collected (CY)	1,000 CY	1,200-1,500 CY	N/A	2,500 CY	2,000 CY
Location and volume stored in Ross Lake (not later extracted from lake)	Roland Bay – 2 bags (500 CY)	Hozomeen – 3 bags (750 CY) Roland Bay – 1 bag (250-300 CY)	N/A	Hozomeen – 7 bags (1,750 CY)	Hozomeen – 3 bags (1,000 CY) Dry Creek – 1 bag (500 CY)
Temporary storage location and volume	Green Point – 2 bags (500 CY)	Green Point – 2 bags (500 CY)	N/A	Green Point – 3 bags (750 CY)	Green Point – 2 bags (500 CY)
LWD used for log booms or bags	Yes	Yes	N/A	Yes	Yes
Quantity	2 or 3	8 or 9		5	5
Ross Lake Extraction					
Dates extracted	November – December 2017	November – December 2018	N/A	November 2020	November 2021
Dates transported to Aggregate Ponds	June 2019[2]	June 2019[1,2]	N/A	November 10 – December 14, 2020	December 2021
Total quantity for extraction	500 CY	500 CY	N/A	750 CY	500 CY
% high-quality large wood[3, 4]	0%	0%		30%	10%
% low-quality large wood[4]	5%	5%		10%	30%
% medium woody debris[4]	10%	10%		10%	30%
% small woody debris[4]	85%	85%		50%	30%
Total # intact rootwads[4]	5	1		50	1
Total loads to Aggregate Ponds	40 loads (~350 CY)[2] (approximately 150 CY deteriorated over 2 years)	40 loads (~350 CY)[2] (approximately 150 CY deteriorated over 2 years)	N/A	56 loads (~600 CY[5])	40 loads (~500 CY)

SUMMARY OF 2017-2021 WOOD COLLECTION AND EXTRACTION – DIABLO LAKE WOOD

Diablo Lake Collection					
Collection dates	N/A. No wood collected in 2017	September 2018	N/A. No wood collected in 2019	June 2020	N/A. No wood collected in 2021
Bags collected	N/A	N/A	N/A	1 bag	N/A
Total quantity collected (CY)	N/A	70 CY	N/A	200 CY (20 loads)	N/A
Location and volume stored in Diablo Lake (not later extracted from lake)	N/A	0 CY	N/A	0 CY	N/A
Temporary storage location and volume	N/A	Mouth of Sourdough Creek; 70 CY	N/A	Mouth of Sourdough Creek; 200 CY	N/A
LWD for log booms or bags	N/A	No	N/A	No	N/A
Diablo Lake Extraction					
Dates extracted	N/A	September 2018	N/A	June 2020	N/A. No wood extracted from Diablo Lake
Dates transported to Aggregate Ponds	N/A	September 2018	N/A	June 1-4, 2020	N/A
Total quantity for extraction	N/A	70 CY	N/A	200 CY	N/A
% high-quality large wood	0%	2%		60%	0%
% low-quality large wood	0%	12%		10%	0%
% medium woody debris	0%	12%		20%	0%
% small woody debris	0%	75%		10%	0%
Total # intact rootwads	0	0		10	0
Total quantity to Aggregate Ponds	N/A	70 CY	N/A	200 CY	N/A
Total quantity wood placed in river at Aggregate Ponds (from Ross and Diablo)					
	350 CY	420 CY	N/A	800 CY	500CY

NEXT STEPS

- Begin discussions with interested LPs on potential future reservoir woody debris management options in spring/summer 2022
  - Avoid long-term storage of wood
  - Cost-effective methods to eliminate wood, and if possible, in an environmentally sustainable manner

Seattle City Light

QUESTIONS?

GIS-BASED RESERVOIR LITTORAL ZONE EVALUATION

Initial Study Report Meeting

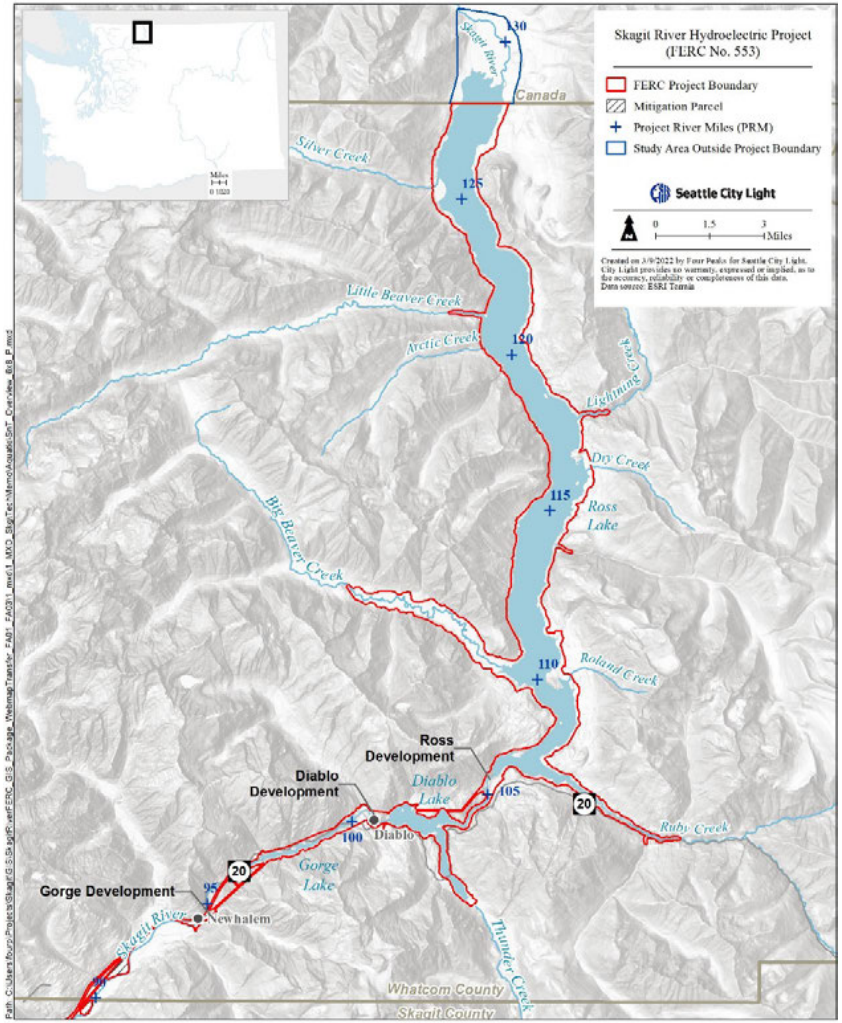
Jeff Fisher | March 21, 2022

ASSESSMENT GOALS

- Quantify littoral zone habitat present within varial zone of Project reservoirs
- Evaluate how Project operations affect quantity of littoral zone habitat around Project reservoirs

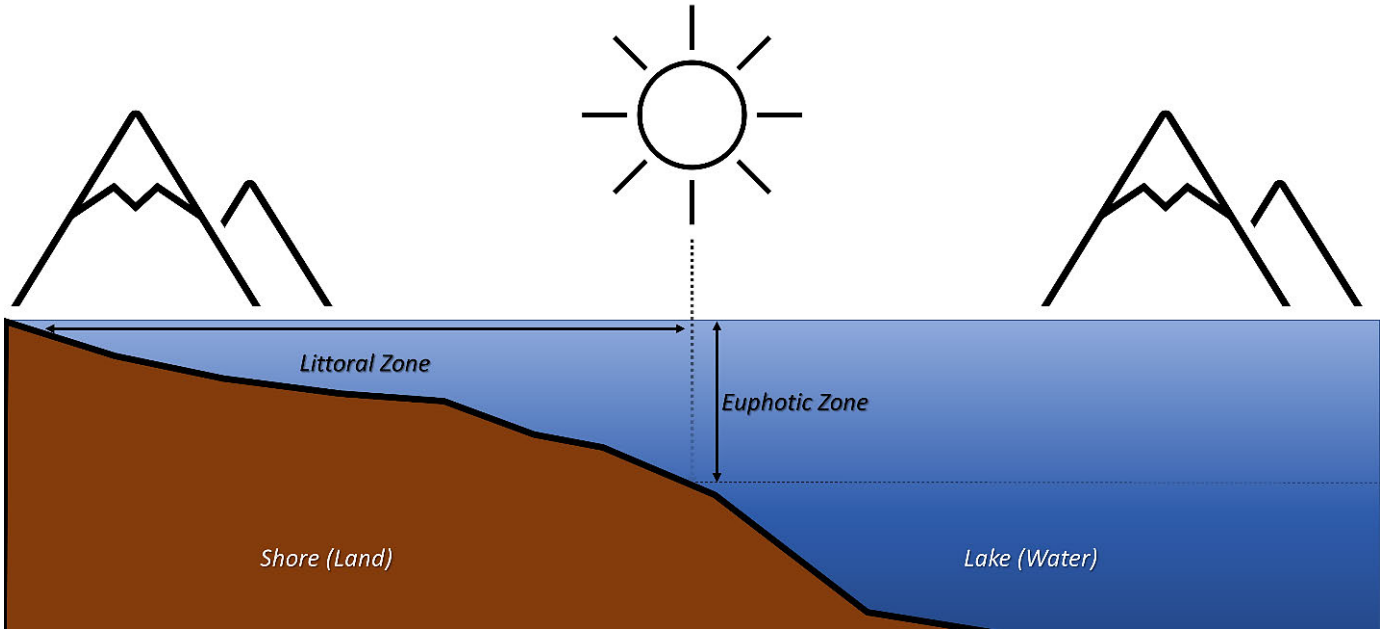
STUDY AREA

- Littoral and varial zones of Project reservoirs



METHODS

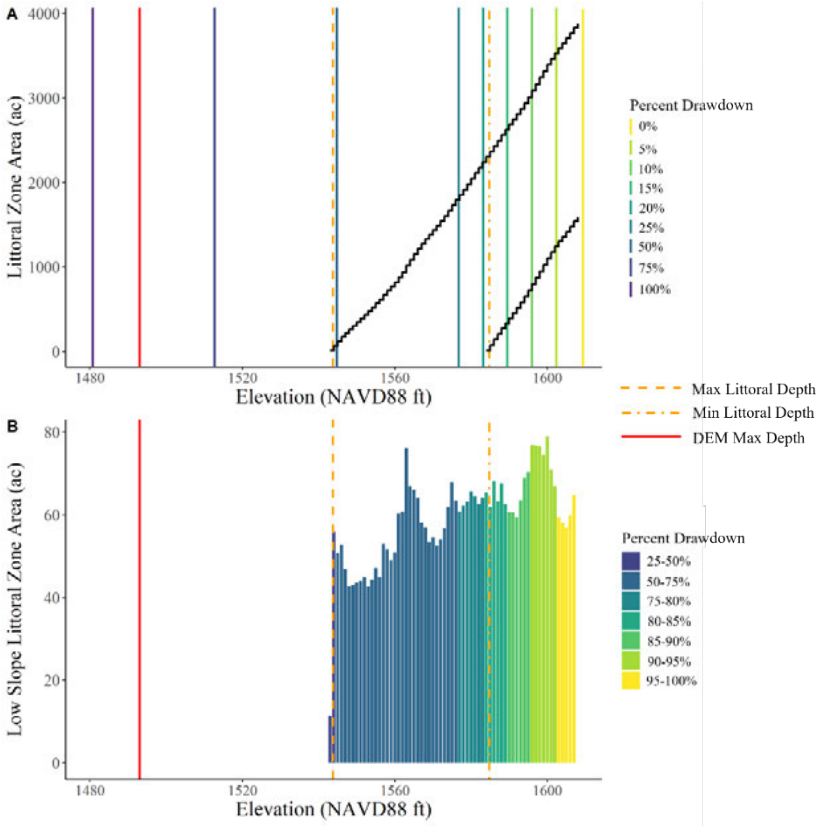
- Estimate depth of the littoral zone in each reservoir
  - Minimum littoral depth: secchi disk measurements
  - Maximum littoral depth: the depth at which 1% of incident radiation penetrates the water column

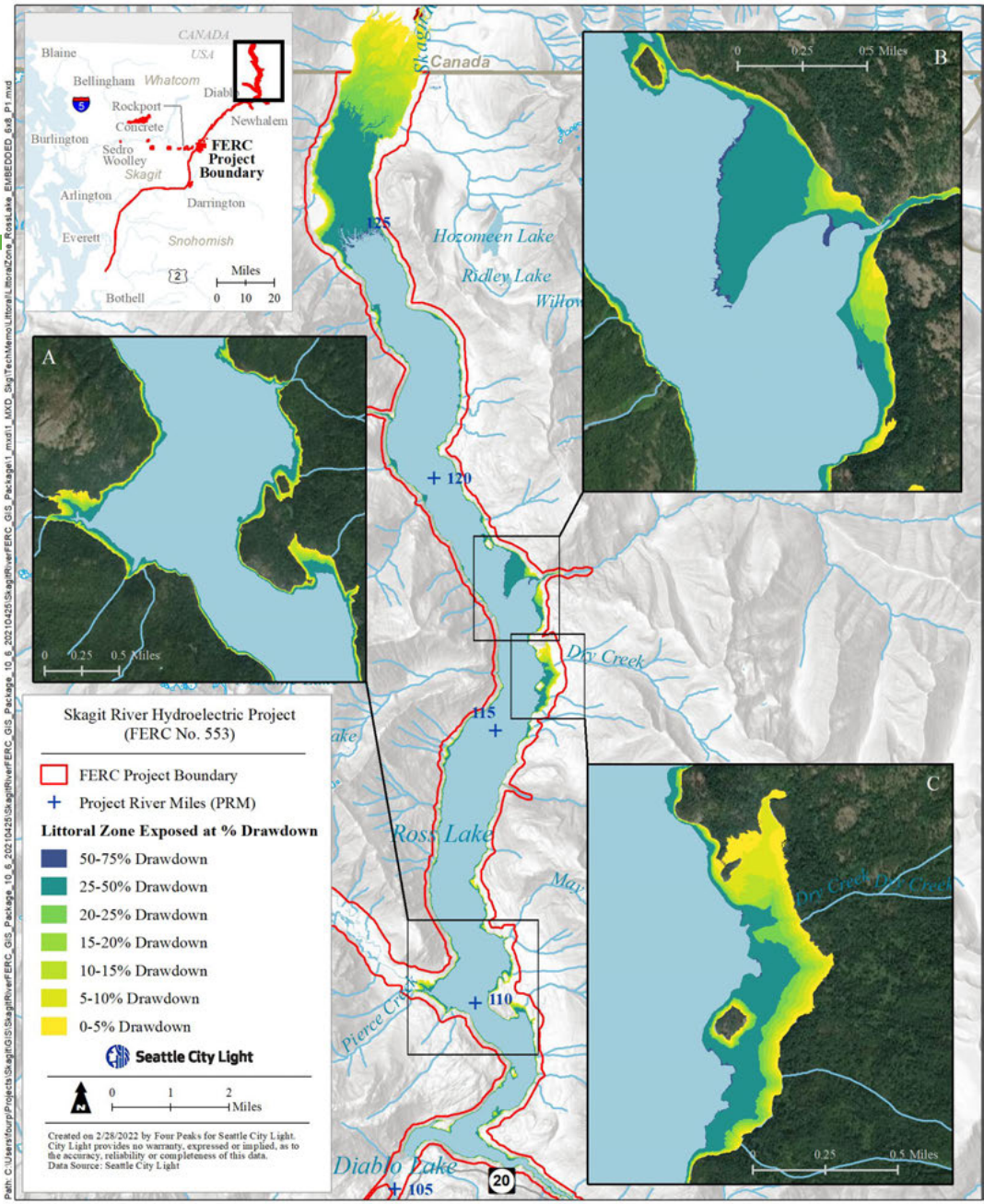


METHODS

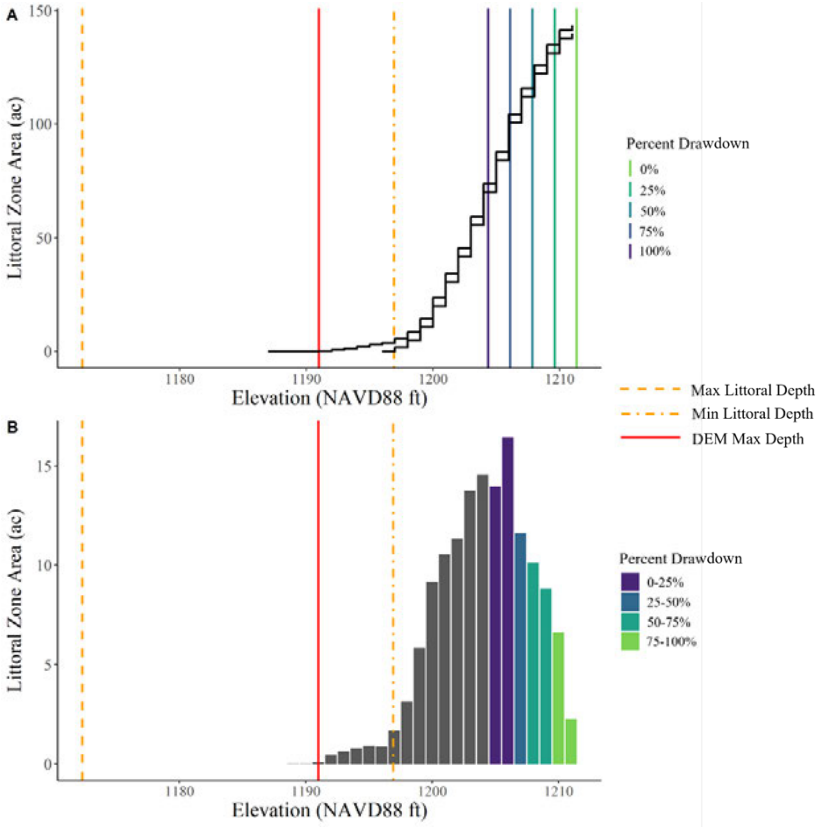
- Define spatial extent of the littoral zone in terms of depth at full pool for each reservoir
- Evaluate spatial extent across range of WSE present during normal Project operations for each reservoir

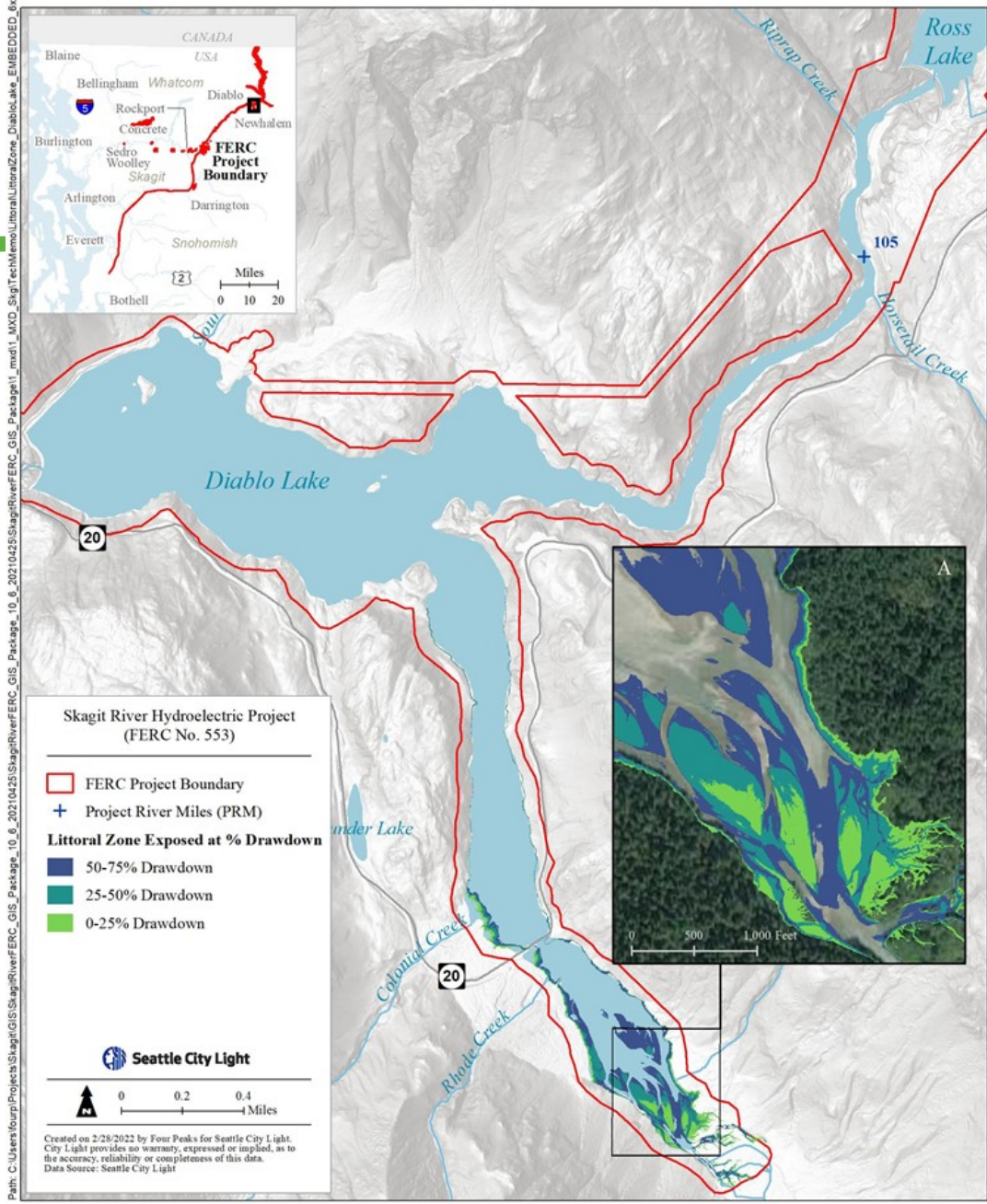
PRELIMINARY RESULTS ROSS



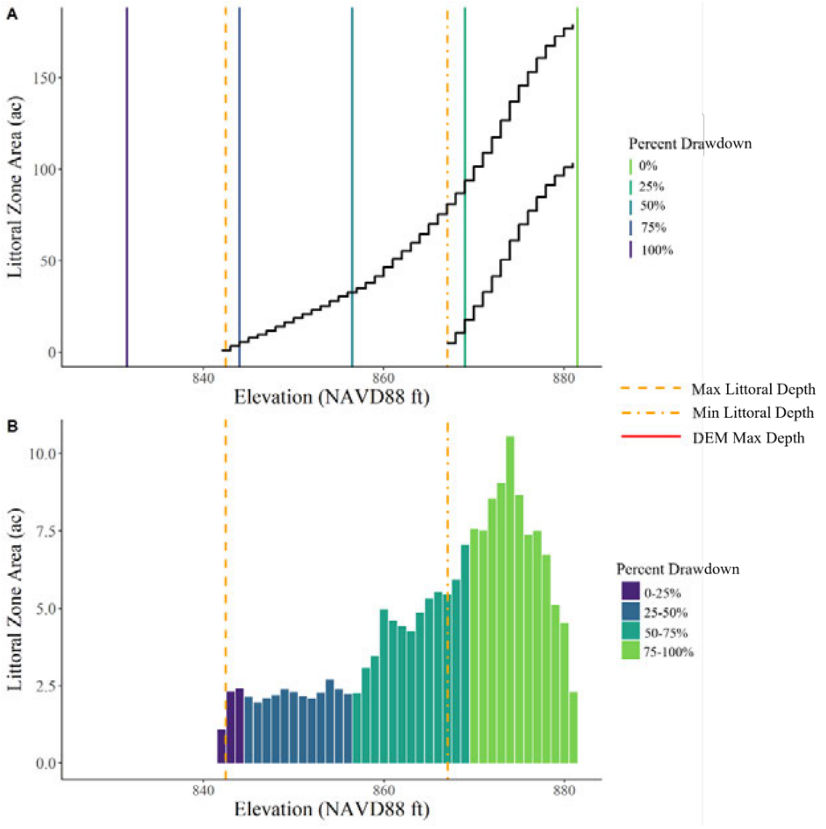


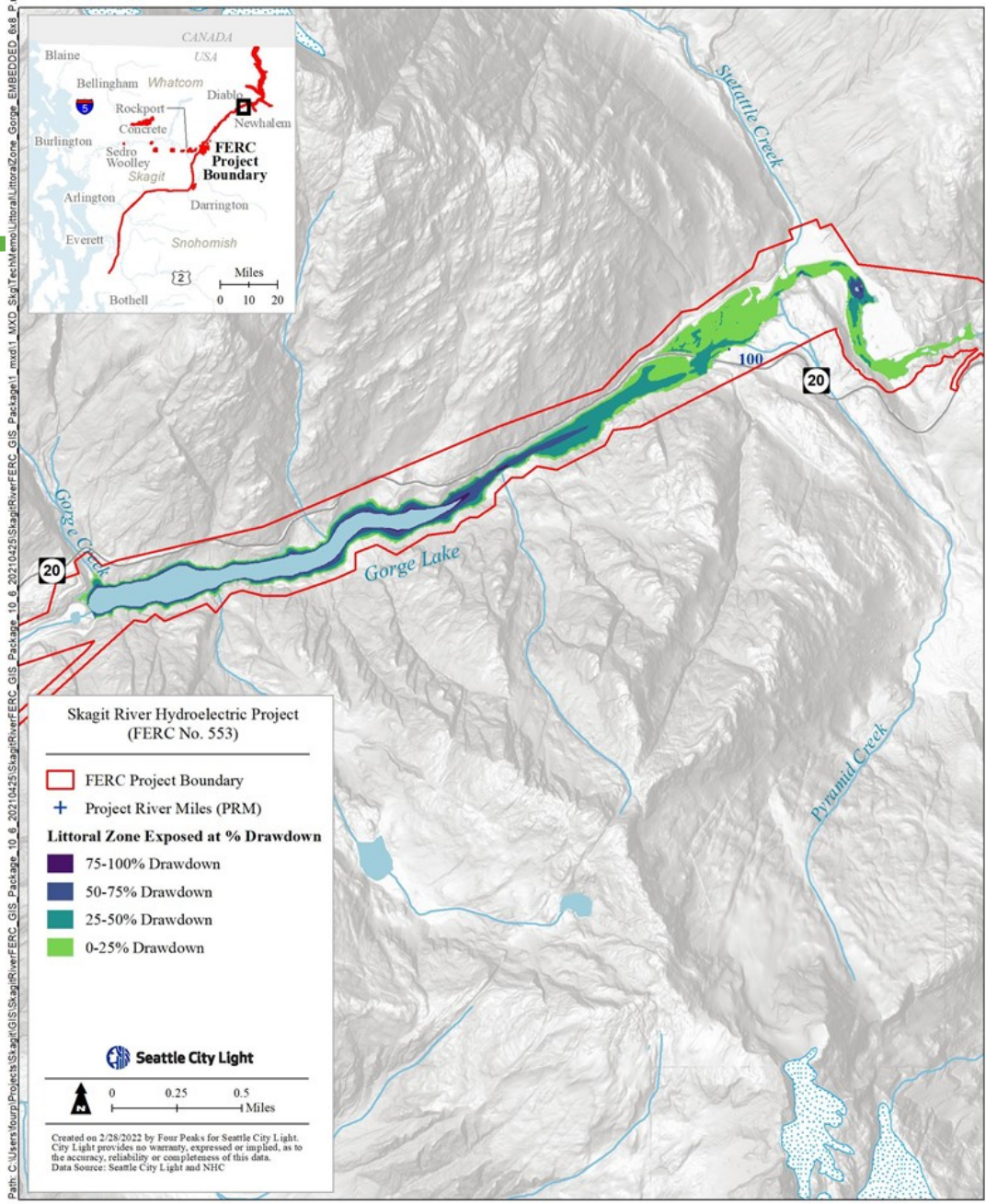
PRELIMINARY RESULTS DIABLO





PRELIMINARY RESULTS GORGE





STATUS

- Preliminary analysis complete and a technical memo under development
- Once technical memo is complete, it will be filed with FERC and discussed with LPs

Seattle City Light

QUESTIONS?

DIABLO REACH WATER LEVEL ASSESSMENT

Initial Study Report Meeting

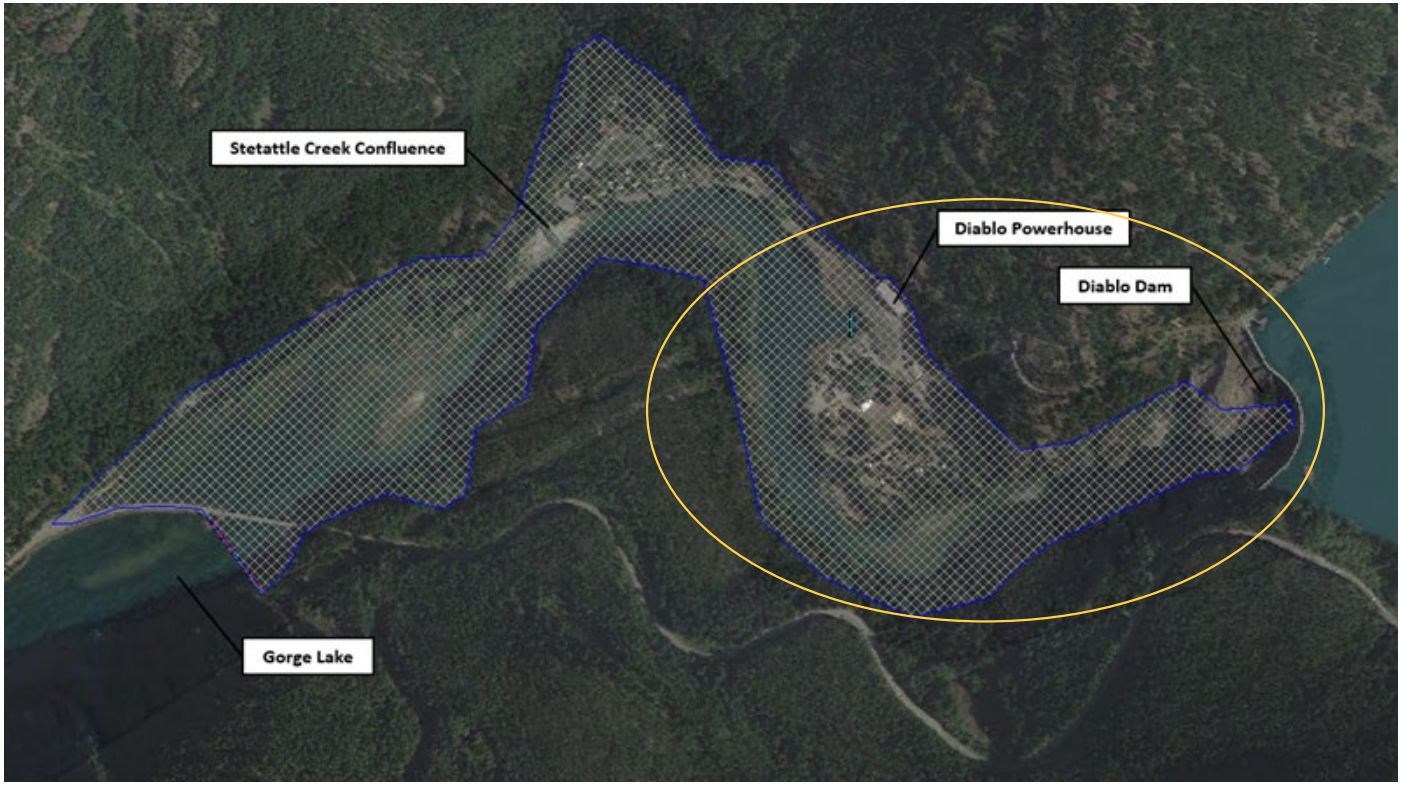
Erin Lowery | March 21, 2022

ASSESSMENT GOALS AND OBJECTIVES

- Hydraulic Connectivity Assessment of the Reach between Diablo Dam and Diablo Powerhouse
  - Determine the potential and frequency for the reach to potentially become disconnected due to water level (loss of hydraulic connectivity) which could cause temporary stranding and trapping

STUDY AREA

- Diablo Reach extends from toe of Diablo Dam to Diablo Powerhouse
- Hydraulic Model area included below Diablo Dam to just north of SR-20 causeway



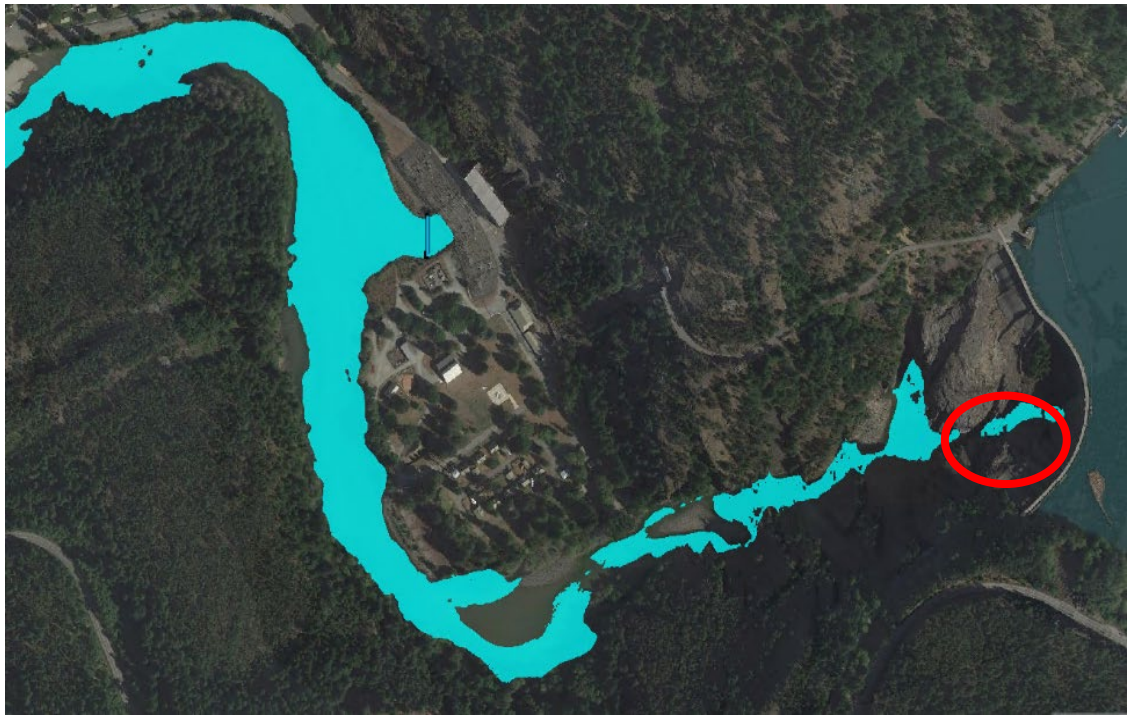
METHODS

- Hydraulic Connectivity Assessment consisted of 4 steps
  1. Determine a minimum threshold water surface elevation at which the Diablo reach loses hydraulic connectivity
  2. Identify hydraulic simulations which represent a range of generation conditions from the Diablo Powerhouse
  3. Conduct HEC-RAS modeling using threshold water surface elevation from Step 1 and Powerhouse operations from Step 2
  4. Conduct a reoccurrence frequency analysis of Diablo Powerhouse operations data

RESULTS

- **Step 1: Determine minimum threshold water surface elevation at which loss of hydraulic connectivity within Diablo reach occurs**

- Through an iterative process using HEC-RAS, an initial water surface elevation of 878.5 feet NAVD88 was determined to be the water surface elevation at which the reach experienced a loss in hydraulic connectivity



RESULTS

- **Step 2: Determine simulations which represent a range of generation conditions from the Diablo Powerhouse**
  - Average, minimum and maximum discharge of Diablo Powerhouse units was determined from August 2011 to 2021

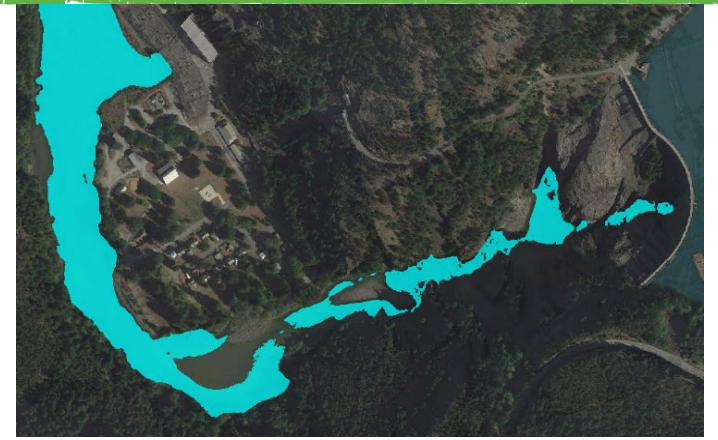
Unit	Minimum Discharge (cfs)	Average Discharge (cfs)	Maximum Discharge (cfs)
Unit 31	0	1,851	3,777
Unit 32	0	1,848	4,059
Unit 35	0	7	47
Unit 36	0	9	42
Plant	0	3,716	7,824

  - Discharge values for each HEC-RAS model simulation

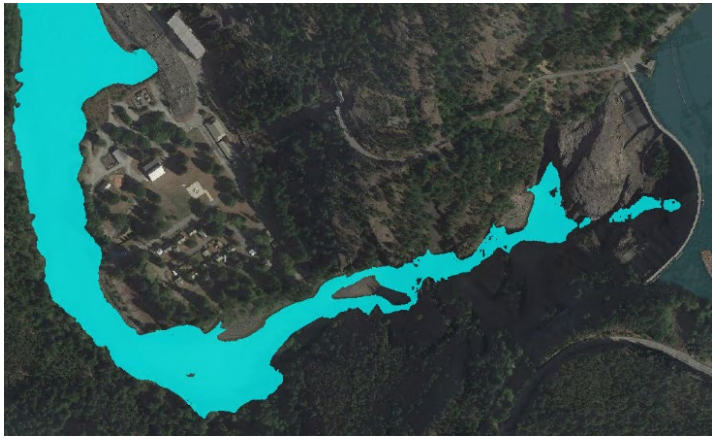
Unit	Total Discharge (cfs)
Zero Powerhouse Discharge	0
Two Small Units (Unit 35 + Unit 36)	16
Two Small Units and One Generation Unit (Unit 35 + Unit 36 + Unit 31)	1,867
Full Powerhouse (All four Generation Units)	3,716

RESULTS • Step 3: Conduct HEC-RAS model simulations

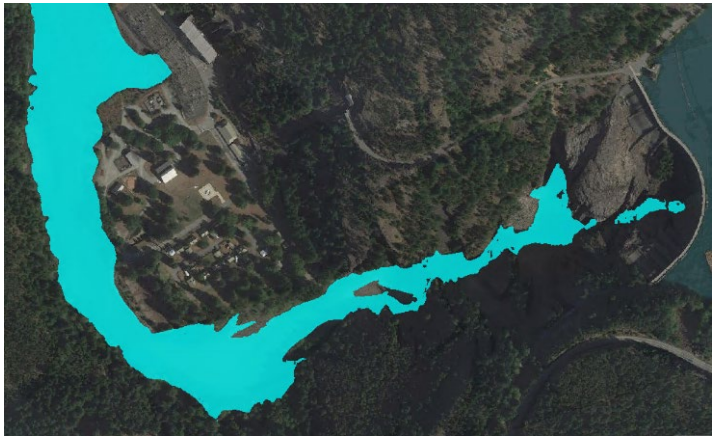
Zero flow released from Diablo Powerhouse



Operation of two small units at Diablo Powerhouse (approximately 16 cfs)



Operation of two small units and one generation unit at Diablo Powerhouse (approximately 1,867 cfs)



Operation of full Powerhouse (approximately 3,715 cfs)

RESULTS

- **Step 4: Conduct a reoccurrence frequency analysis**
  - Within the previous 24-years and most recent 10-years, the Diablo Powerhouse tailrace water surface elevation fell below the minimum threshold elevation of 878.5 feet NAVD88 a total of 271 days and 34 days, respectively
  - During these days, the Diablo Powerhouse generation discharges of less than 1,867 cfs occurred a total of 1 day and zero days

Frequency	Full POR (1997 to 2021)	10-Year POR (2011-2021)
Number of Days tailrace water surface below Elevation 878.5 feet	271	34
Number of Days tailrace water surface below Elevation 878.5 and Diablo Powerhouse discharge below 1,867 cfs.	1	0

CONCLUSION

- Hydraulic modeling results indicates that threshold water surface elevation in combination with Diablo generation that promote loss of hydraulic connectivity are extremely rare
- Modeling does not account for SOPs that would be implemented by Project staff to maintain downstream minimum instream flow requirements (i.e., spill from Diablo Dam within 2 hours)
- Results indicate the reach continues to maintain significant wetted area and that areas of lost connectivity would be in the upper half of the Diablo Reach (from the bend to Diablo Dam)

CONCLUSION

- Upper half of Diablo reach contains areas with slopes greater than the typical range of 4 to 6 percent where stranding is identified as a risk
- Impacts due to trapping risk would also be low due to the availability of numerous deep pools (4-15+ ft in depth) which serve as refugia and likely maintain good water quality until conditions are restored

Seattle City Light

QUESTIONS?

FA-01a WATER QUALITY MONITORING

Initial Study Report Meeting

Jeff Fisher | March 21, 2022

STUDY GOALS AND OBJECTIVES

- Summarize and analyze existing (pre-relicensing) water quality data
- Data collection for relicensing included in the ISR
  - Project reservoirs:
    - Measure temperature, DO, pH, turbidity, and TSS at various locations in Project reservoirs
    - Measure turbidity/TSS at tributary mouths in Ross and Diablo lakes during drawdown (the list of tributary mouths was expanded per a requirement in FERC's SPD)
    - Measure turbidity and TSS at transects adjacent to erosional areas in Ross and Diablo

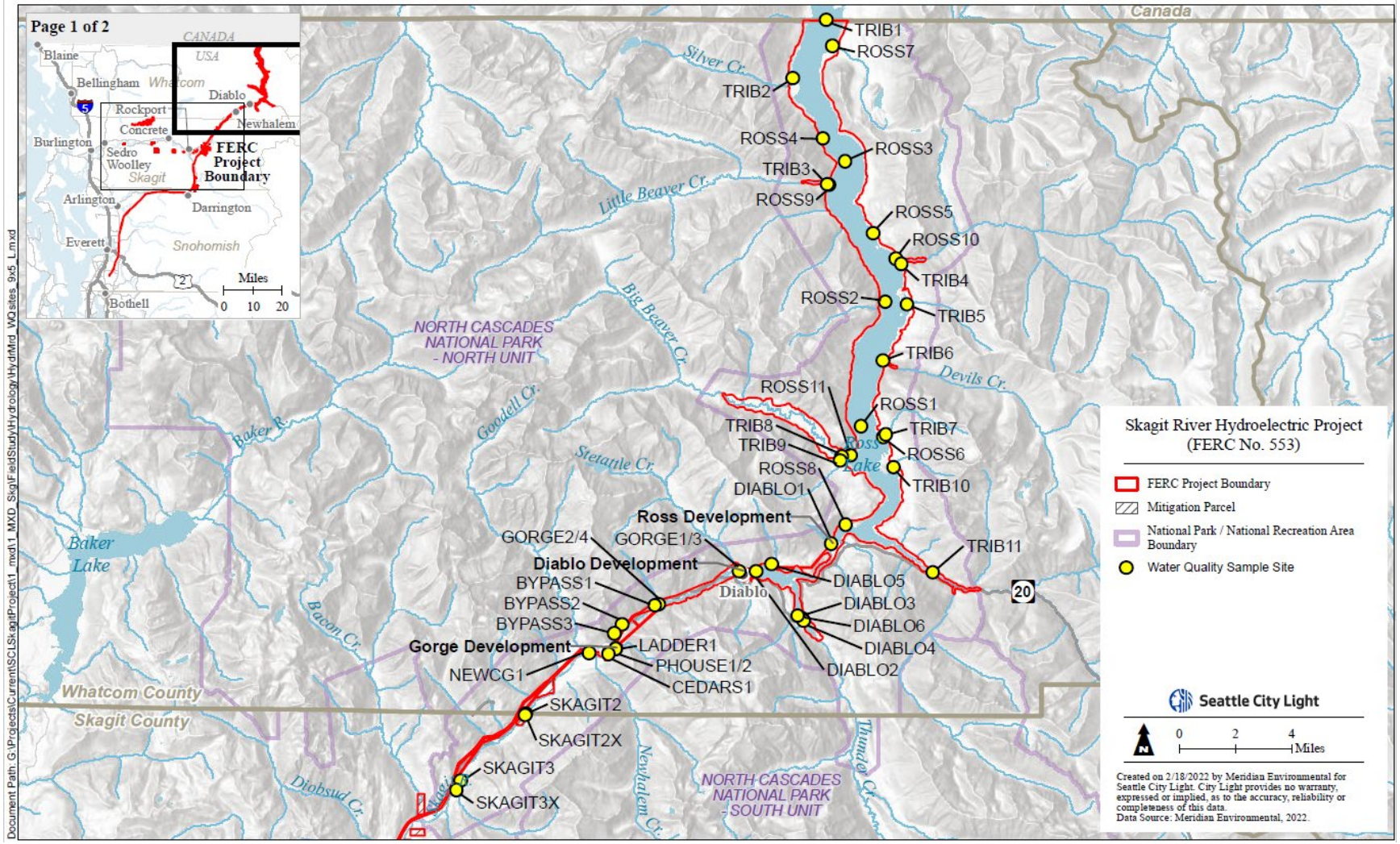
STUDY GOALS AND OBJECTIVES (CONTINUED)

- Project reservoirs (continued)
  - Measure fecal coliform at targeted locations in Ross and Diablo lakes
  - Continuously measure TDG in the Diablo Dam tailrace and Gorge Lake forebay
- Riverine reaches
  - Measure temperature, DO, pH, turbidity, and TSS in the upper Skagit River inflow
  - Continuously monitor temperature, DO, TDG, and turbidity at three locations in Gorge bypass

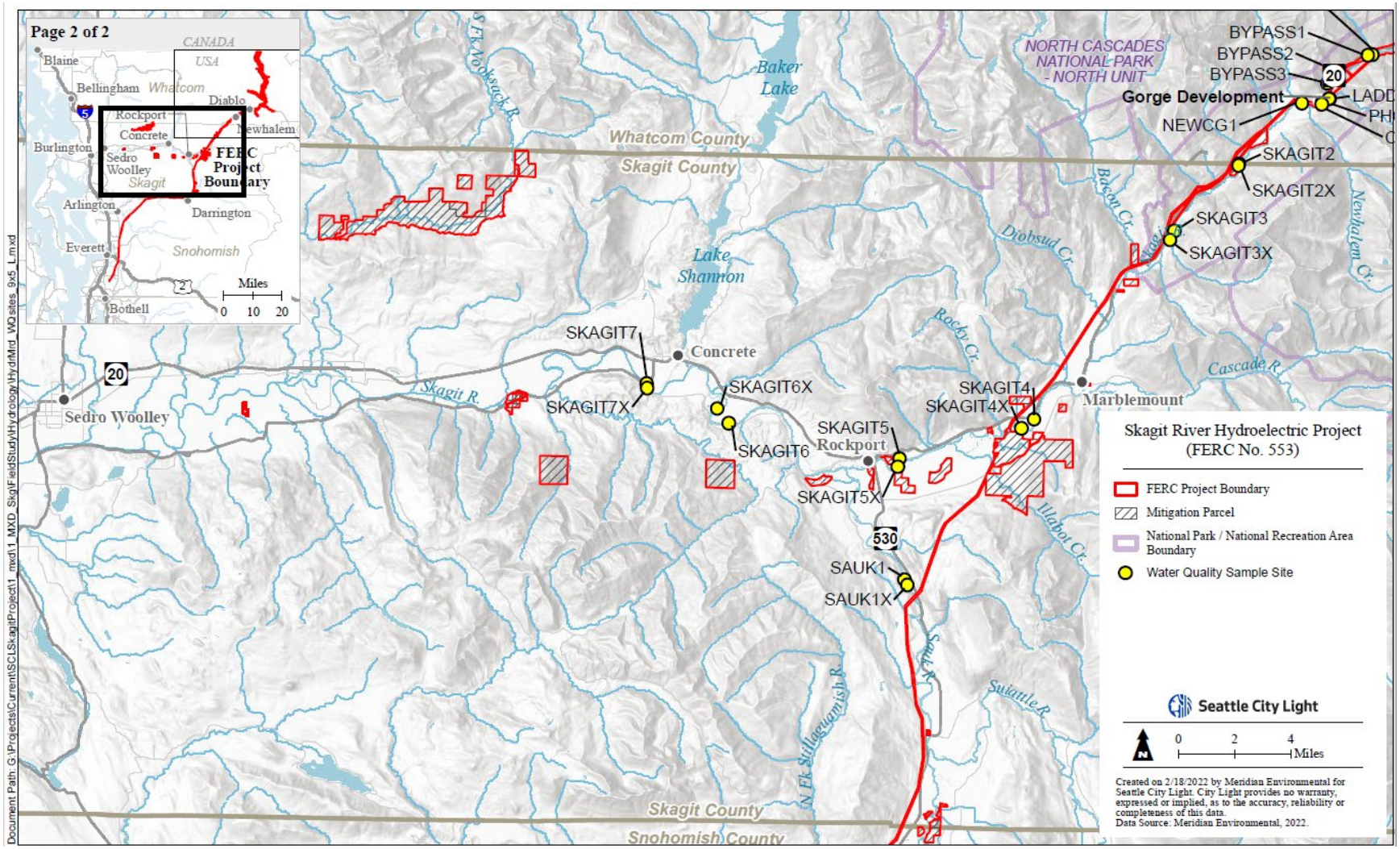
STUDY GOALS AND OBJECTIVES (CONTINUED)

- Riverine reaches (continued)
  - Continuously monitor temperature, DO, pH, TDG, and turbidity below Gorge Powerhouse
  - Continuously measure temperature at six locations in the Skagit River and one location in the Sauk River
  - Sample benthic macroinvertebrates (BMI) at six locations in the Skagit River and one location in the Sauk River

STUDY AREA


Page 1 of 2
CANADA
USA
Blaine
Bellingham
Whatcom
Diablo
Rockport
Concrete
Newhalem
Burlington
Sedro Woolley
Skagit
FERC Project Boundary
Arlington
Darrington
Everett
Snohomish
Bothell
Miles
0 10 20
Canada
TRIB1
ROSS7
Silver Cr.
TRIB2
ROSS4
ROSS3
TRIB3
ROSS9
Little Beaver Cr.
ROSS5
ROSS10
TRIB4
ROSS2
TRIB5
Big Beaver Cr.
TRIB6
Devils Cr.
NORTH CASCADES NATIONAL PARK - NORTH UNIT
ROSS11
ROSS1
TRIB8
TRIB7
TRIB9
ROSS6
Ross Lake
ROSS8
TRIB10
DIABLO1
Goodell Cr.
Stetattle Cr.
Baker R.
Ross Development
GORGE2/4
GORGE1/3
TRIB11
Diablo Development
DIABLO5
BYPASS1
Diablo
DIABLO3
BYPASS2
BYPASS3
DIABLO6
Gorge Development
LADDER1
DIABLO4
NEWCG1
PHOUSE1/2
DIABLO2
CEDARS1
Baker Lake
Bacon Cr.
Whatcom County
Skagit County
SKAGIT2
SKAGIT2X
SKAGIT3
SKAGIT3X
Diobsud Cr.
Newhalem Cr.
Thunder Cr.
NORTH CASCADES NATIONAL PARK - SOUTH UNIT
20
Skagit River Hydroelectric Project (FERC No. 553)
FERC Project Boundary
Mitigation Parcel
National Park / National Recreation Area Boundary
Water Quality Sample Site
Seattle City Light
0 2 4 Miles
Created on 2/18/2022 by Meridian Environmental for Seattle City Light. City Light provides no warranty, expressed or implied, as to the accuracy, reliability or completeness of this data.
Data Source: Meridian Environmental, 2022.
Document Path: G:\Projects\Current\SCL\SkagitProject\1_mxd\1_MXD_SkgtFieldStudyHydrology\HydrMrd_WQsites_9x5_L.mxd

STUDY AREA (CONTINUED)



STUDY METHODS

- Continuous measurements
  - USGS station in upper Skagit River (temperature, DO, pH, turbidity)
  - Below Diablo Dam and in Gorge Lake forebay (TDG)
  - Three stations in the Gorge bypass reach (temperature, DO, turbidity, TDG)
  - Below Gorge Powerhouse (temperature, DO, pH, turbidity, TDG)
  - Six locations in the Skagit River (temperature) at ≈PRMs 91.6, 85.9, 75.6, 69.3, 60.8, and 54.5
  - One location in the Sauk River at RM 2.8

STUDY METHODS (CONTINUED)

- Grab sampling
  - Monthly
    - Three locations in Ross Lake (background turbidity/TSS)
    - Diablo Lake (vertical profiles of temperature, DO, pH) (turbidity/TSS at 1 and 5 meters)
    - Gorge Lake (vertical profiles of temperature, DO, pH) (turbidity/TSS at 1 and 5 meters)
  - During drawdown
    - Ross Lake (turbidity/TSS) at three transects near erosional areas and at 11 tributary mouths
    - Diablo Lake (turbidity/TSS) at one transect in the Thunder Creek Arm

STUDY METHODS (CONTINUED)

- Grab sampling (continued)
  - Monthly during Jun, Jul, Aug, and Sep (fecal coliform/*E. coli*)
    - Ross Lake at Hozomeen Campground, Ross Lake Resort, and three boat access camps
    - Diablo Lake at Colonial Creek Campground and Environmental Learning Center
  - Jul and Sep (BMI) in the Skagit River near PRMs 91.6, 85.9, 75.6, 69.3, 60.8, and 54.5 and in the Sauk River at RM 2.8
  - Opportunistic
    - At three bridges below Gorge Powerhouse (TDG) (added to program post-RSP)
    - Below Gorge Powerhouse (TSS)

RESULTS

- The ISR includes results through October or December 2021, depending on the constituent
- The ISR includes four attachments
  - A: Water Quality Sampling Locations Mapbook
  - B: Water Quality Sampling Locations Photos
  - C: Skagit River Benthic Macroinvertebrate Assessment
  - D: Skagit River Hydroelectric Project Interim Existing Data Summary

RESULTS (CONTINUED)

- Reservoirs
  - Vertical profiles of water temperature, DO, and pH in Diablo and Gorge lakes are consistent with characterization of Project reservoirs in the PAD as oligotrophic (City Light 2020)
  - Turbidity/TSS typically low
  - TDG monitoring in Gorge Lake suggests Diablo Powerhouse may at times increase TDG levels in upper Gorge Lake, near the Diablo Powerhouse. Levels dissipate prior to reaching Gorge Dam

RESULTS (CONTINUED)

- Gorge Bypass Reach/Gorge Powerhouse
  - Water temperature, DO, TDG, and turbidity continuously monitored at three sites in the Gorge bypass reach
  - Avg. DO highest at Gorge Powerhouse (PHOUSE1; 11.6 mg/L) and lowest at BYPASS2 (9.9 mg/L)
  - Water temperatures at PHOUSE1 were less variable and usually cooler than the temperatures recorded at the three BYPASS sites

RESULTS (CONTINUED)

- Gorge Bypass Reach/Gorge Powerhouse
  - Turbidity at Gorge bypass reach and Powerhouse sites is generally low, averaging less than 1 NTU
  - TDG levels typically remained near 100 percent at Gorge bypass reach sites, and 107 percent at PHOUSE1
  - Values at BYPASS1 reached 124 percent during the 7,300 cfs spill event at Gorge Dam in late June
  - Downstream TDG remained near 105 percent saturation during a ~2,000 cfs spill in October

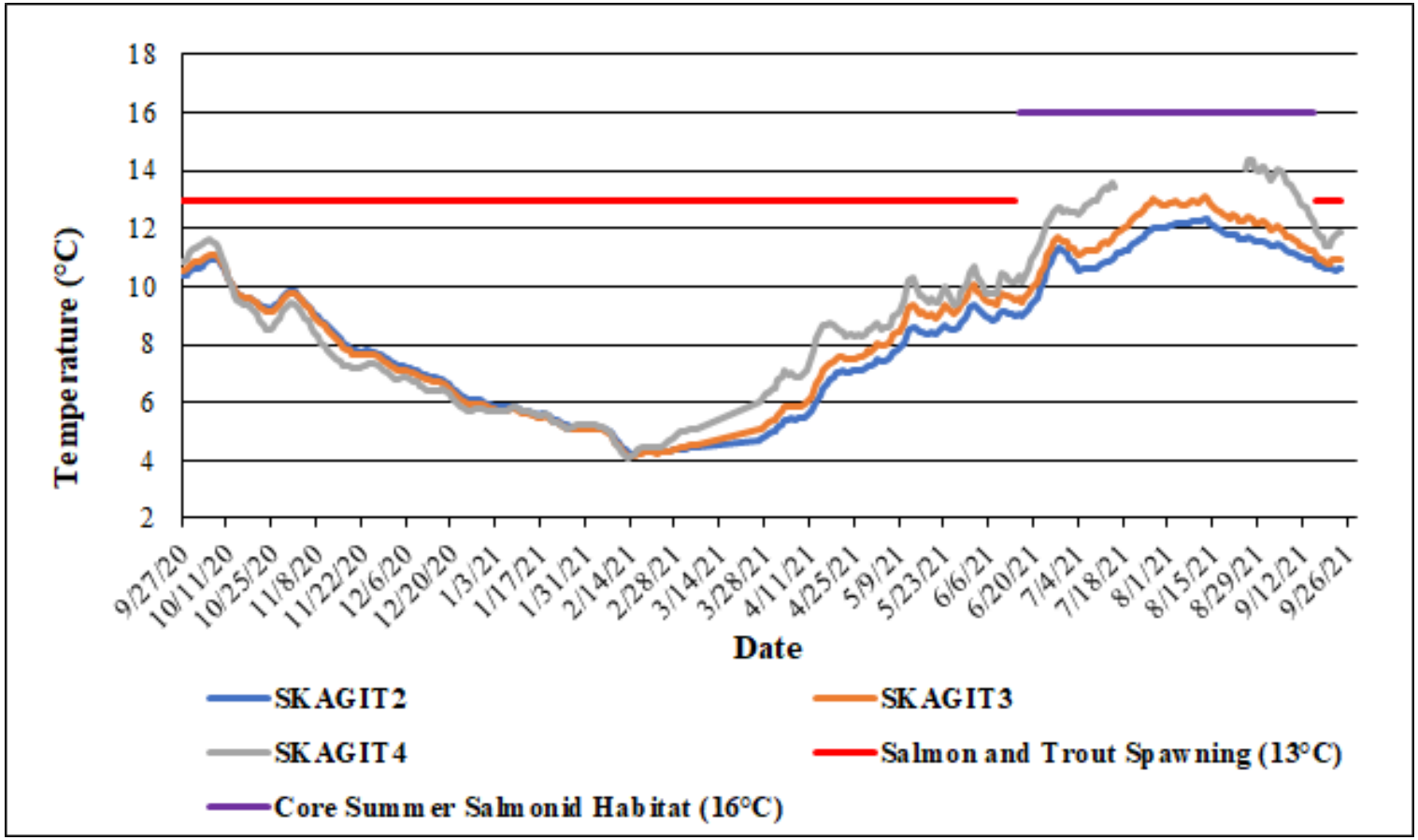
JUNE 2021 SPILL EVENT

RESULTS (CONTINUED)

- Skagit River Downstream of Gorge Powerhouse and Sauk River
  - Temperature
    - Thermographs were deployed at six sites in the Skagit River downstream of Gorge Powerhouse and one site in the lower Sauk River
    - Upstream sites were cooler (PRM 91.6, 85.9, and 75.6); temperatures at the four downstream sites were warmer; temperatures among these sites were nearly identical until mid-summer 2021

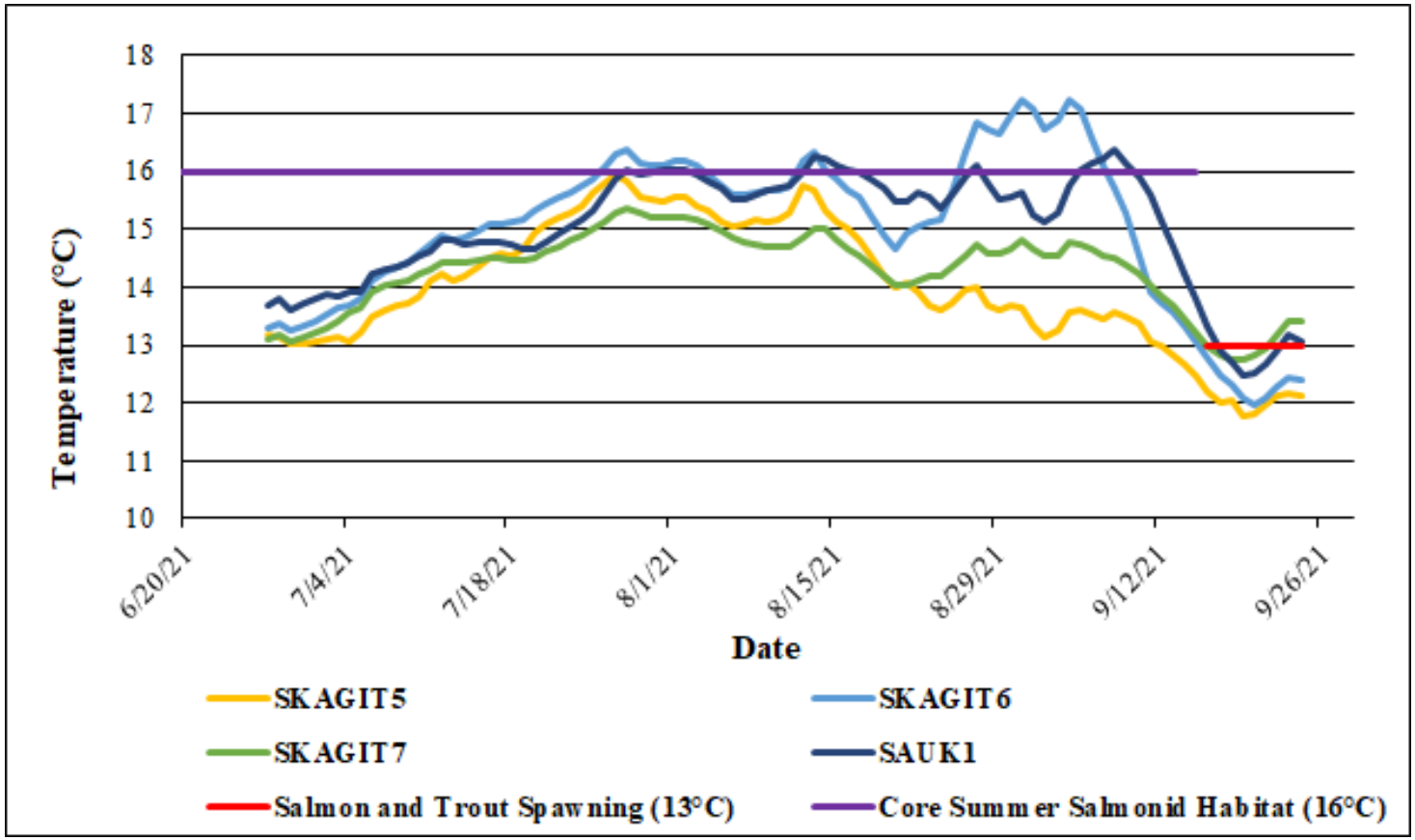
RESULTS (CONTINUED)

- Temperatures – Upper Sites



RESULTS (CONTINUED)

- Temperatures - Lower Sites



RESULTS (CONTINUED)

- Benthic Macroinvertebrates
  - Biological conditions based on the IBI calculations are rated “Good” for the four lowermost sites. Scores are lower for upstream sites; SKAGIT 4X, 3X, and 2X categorized as “Fair”

STUDY VARIANCES

- Addition of opportunistic monitoring of TDG downstream of Gorge Powerhouse
- City Light is relying on data collected by the USGS at the Skagit River inflow
- Starting in September 2021, *E. coli* samples were collected at all fecal coliform sampling sites to conform with a change in Washington State water quality standards

STUDY VARIANCES (CONTINUED)

- Covid-19-related supply-chain impacts delayed deployment of Hydrolab datasondes at two locations in Gorge Lake (delayed until 9/9/21) and one location in the Gorge bypass (delayed until 8/2/21)
- BMI were sampled at all Skagit River sites and in the Sauk River in Aug 2021; sampling in July and Septemer, as identified in the RSP, was not possible due to high flows

STUDY SCHEDULE

Milestone	Date
City Light files ISR	March 2022
Field data collection per RSP continues	Through May 2023
Implement expanded BMI and WQ sampling program	May 2022
WG meetings to update LPs	Spring/Summer 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

FA-01b WATER QUALITY MODELING DEVELOPMENT STUDY

Initial Study Report Meeting

Jeff Fisher | March 21, 2022

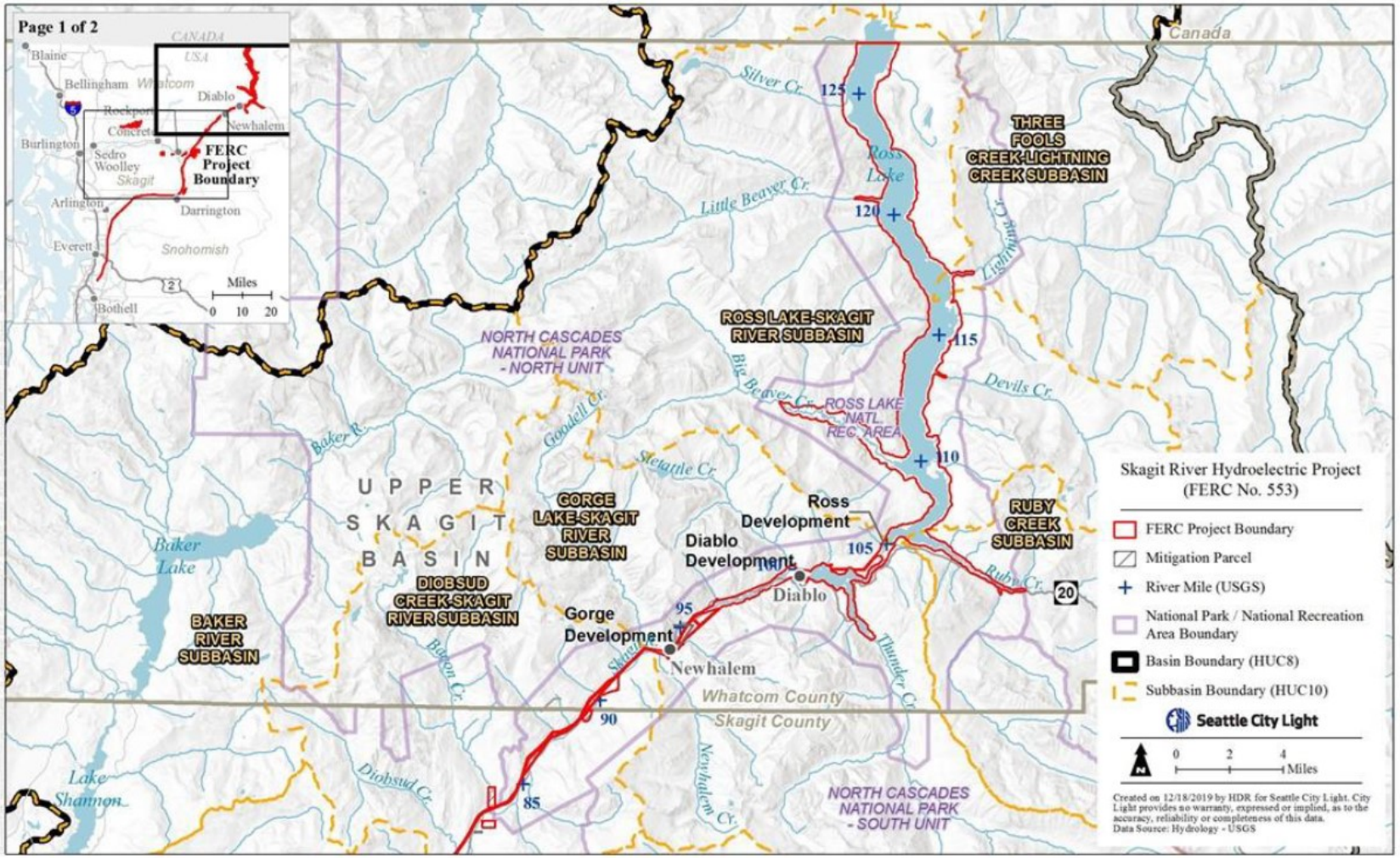
STUDY GOALS AND OBJECTIVES

- Develop and calibrate a set of hydrodynamic, temperature, and water quality models in the CE-QUAL-W2 platform to simulate:
  - Temperature, nutrients, DO, and algae concentrations in Project reservoirs and the Skagit River below Gorge Dam
  - Effects of flow management scenarios–developed collaboratively with LPs–on conditions in Project reservoirs and the Skagit River

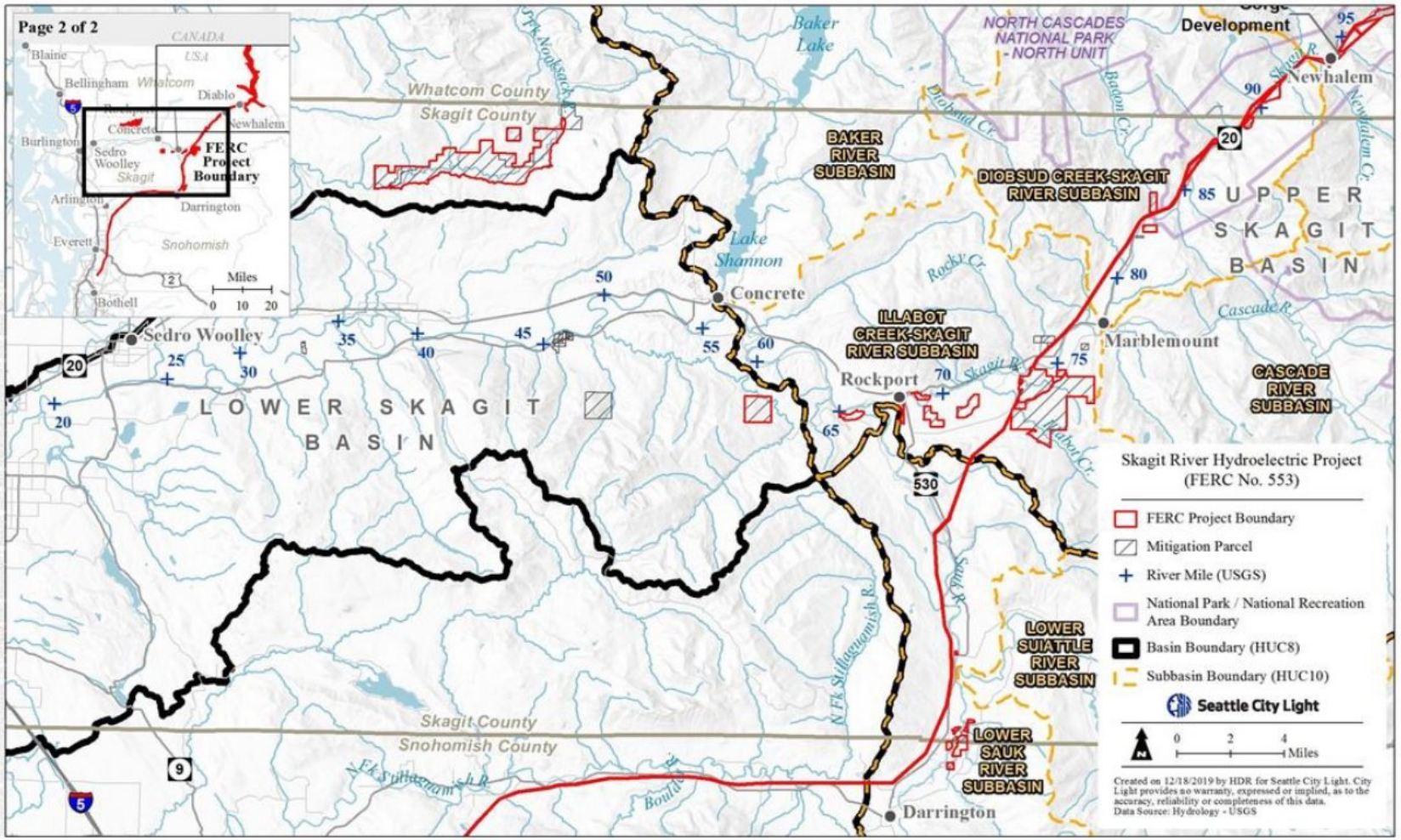
STUDY AREA

- The CE-QUAL-W2 model will simulate conditions in Ross, Diablo, and Gorge lakes
- The Skagit River will be modeled within its main channel (its bankfull width, not its floodplain) from Gorge Dam to PRM 54, just below the Baker River confluence
- The downstream boundary of the model was extended from PRM 65, near the Sauk River confluence, to PRM 54 in January 2022

STUDY AREA (CONTINUED)



STUDY AREA (CONTINUED)



STUDY METHODS

- CE-QUAL-W2 is a two-dimensional, laterally averaged model
  - City Light is using the latest available version, i.e., 4.5 (Wells 2021a)
- Four separate models will be linked, one for each reservoir and one for the river
- Major inputs include:
  - Bathymetry
  - Meteorological data
  - Flow, temperature, and water quality in tributaries

STUDY METHODS (CONTINUED)

- Minor inputs include:
  - Wind sheltering – wind speed on the water's surface may be reduced due to topographic sheltering; it is expected to be important in model calibration
  - Shade – the extent to which topography or vegetation shade water bodies and reduce solar radiation on the water's surface; this may be used during calibration
- Data needed for model development and calibration are being collected

STUDY METHODS (CONTINUED)

- Tasks Remaining for 2022
  - Refinement of meteorological inputs
  - Water balance calibration (nearly complete)
  - Assembly of in-lake and in-river calibration data
  - Initiation of temperature calibration
  - Identify and run temperature scenario simulations
  - Develop water quality model (parameters beyond temperature and hydrodynamics)

RESULTS TO DATE

- Model bathymetry has been defined using previous mapping
  - Will be refined with forthcoming data from new City Light mapping efforts
- Time series have been created for flow and temperature of each tributary to the models
  - Flow from USGS data or estimation
  - Temperature from City Light monitoring data
- Models are debugged with default calibration values

STUDY MODIFICATIONS

- The WQ Model Development Study is consistent with references to temperature modeling contained in the June 9, 2021 Notice and approved by FERC in its SPD dated July 16, 2021. There are no variances from or modifications to the agreed-upon approach for the WQ Model Development Study.

STUDY SCHEDULE

Milestone	Date
Data review for model development	January 2022
Hydrodynamic and temperature model development	March 2022
Hydrodynamic and temperature model calibration	April - May 2022
Hydrodynamic and temperature model scenarios	July -September 2022
Water quality model development	Nov 2022 - Jan 2023
Water quality model calibration	January - March 2023

Seattle City Light

QUESTIONS?

FA-08 FISH ENTRAINMENT STUDY

Initial Study Report Meeting

Jeff Fisher | March 21, 2022

STUDY GOALS AND OBJECTIVES

Study Goal: conduct a desktop evaluation fish entrainment (ENT) and impingement (IMP) at the Project dams and the potential effect on the Project reservoir fish communities

- Objectives
  - Conduct a literature review of historical or comparable ENT studies
  - Describe the physical characteristics of the Project facilities
  - Describe water quality characteristics in the vicinity of the intake structures
  - Estimate intake velocities at each Project intake structure
  - Develop a target species list for ENT and IMP analyses
  - Characterize risk of ENT/IMP to target species based on species' life history characteristics, body size, intake configurations, intake velocities versus fish swim speeds, and trashrack bar spacing
  - Provide a qualitative summary of ENT/IMP potential for target species
  - Estimate probability of passage survival at the Project facilities using site-specific physical/operational parameters, spillway ENT mortality rates, and USFWS Turbine Blade Strike Analysis (TBSA) model

ADDITIONAL STUDY OBJECTIVES

Objectives outlined in the June 9, 2021 Notice:

- Inform a discussion on the need for further entrainment studies during the second year of study and potentially a longer-term study
- Inform future assessments of passage, abundance, migration, and survival of entrainment through turbines, spillway, bypasses or gates for all size classes of Bull Trout, native fishes, and nonnative fishes at each Project structure

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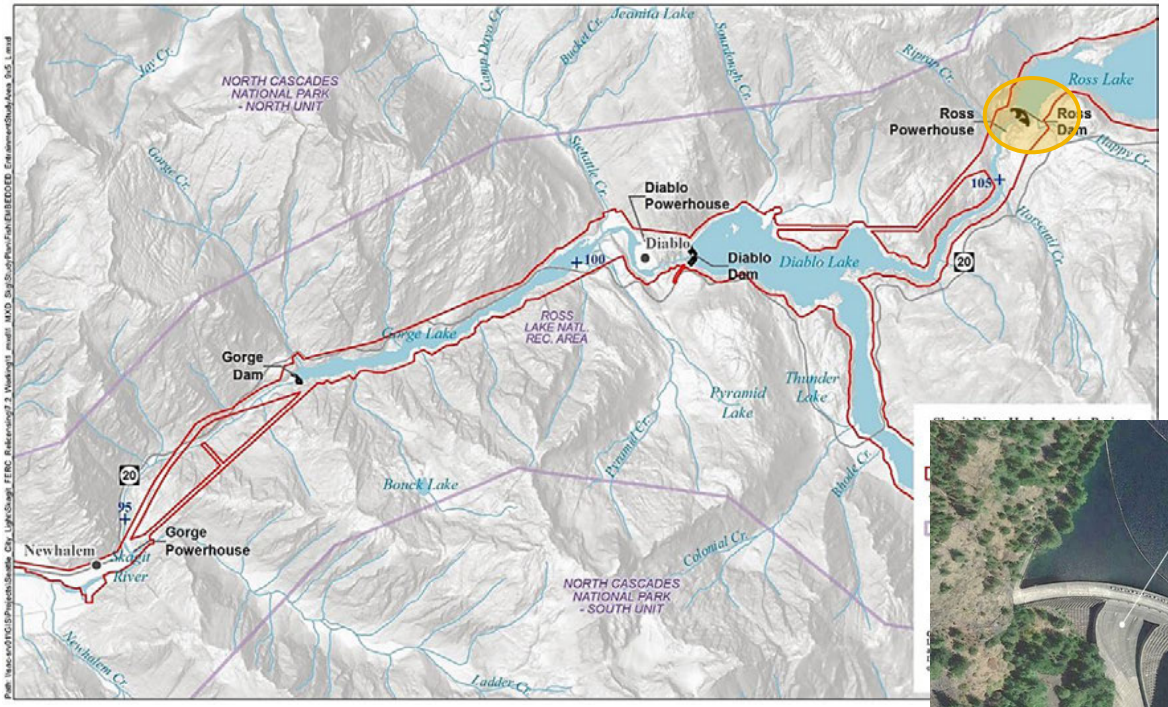
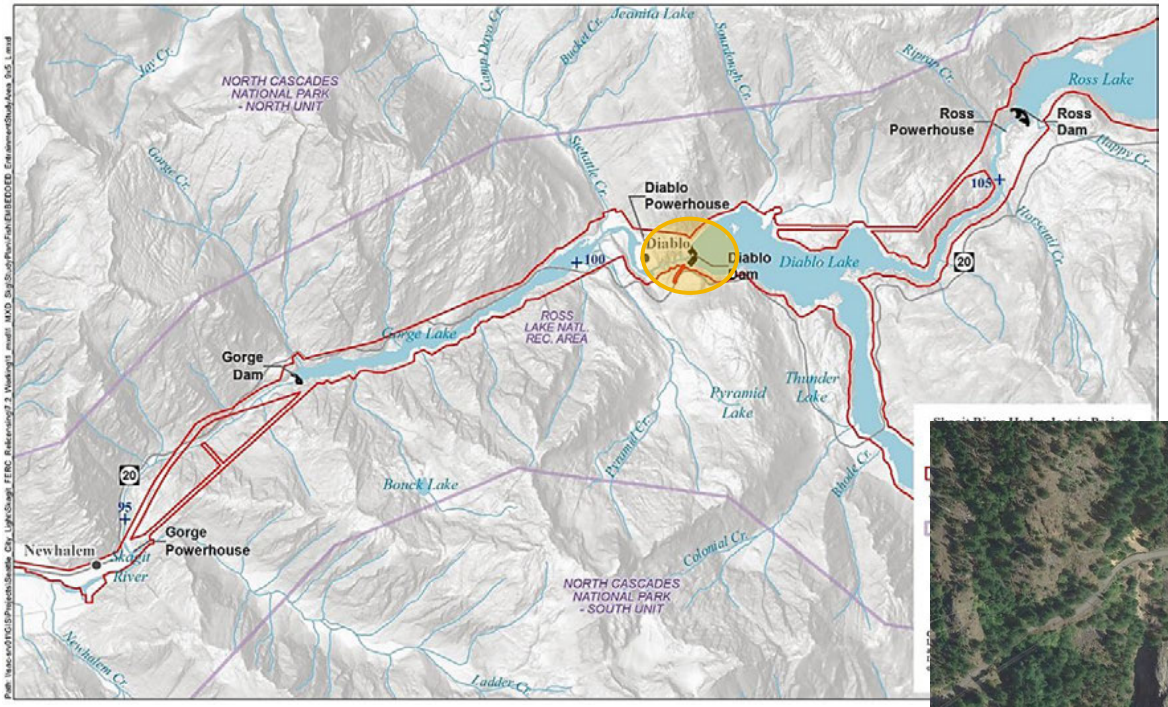
STUDY AREA



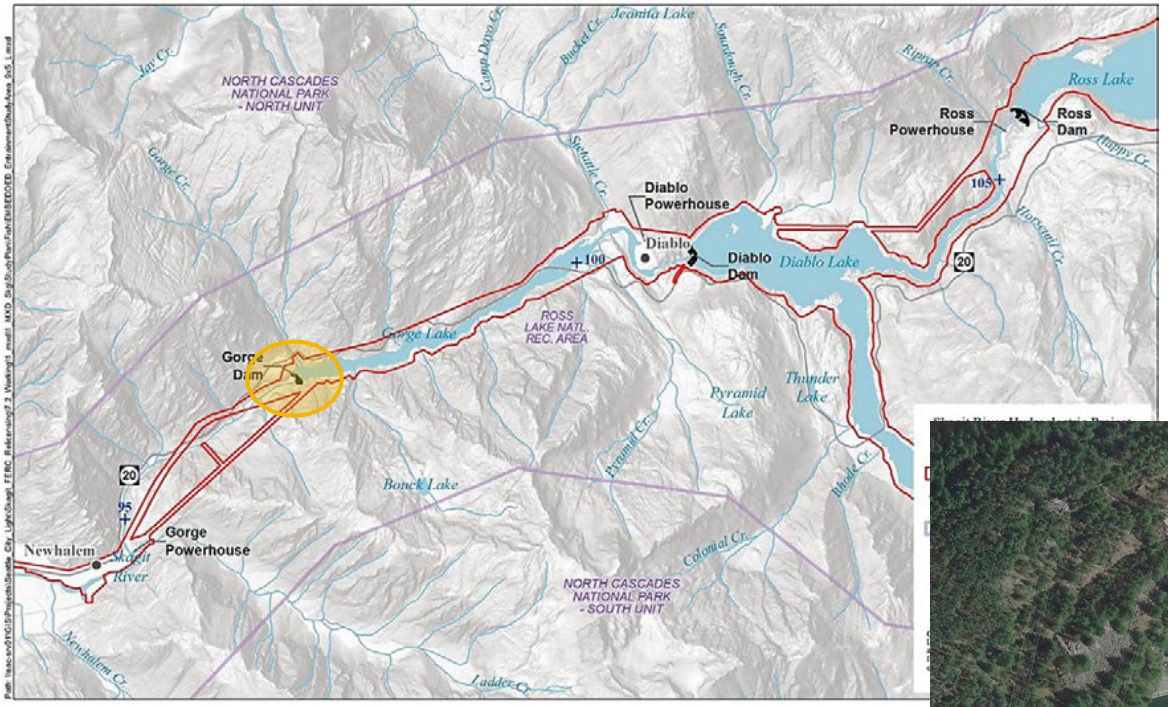
Ross Dam facilities

STUDY AREA



Diablo Dam facilities

STUDY AREA



Gorge Dam facilities

STUDY METHODS

- Qualitative Risk Assessment
  - All reservoir fish species and anadromous salmonids and all life stages
  - Presence and/or proximity to intakes based on fish life history characteristics and behavior
  - Intake structure avoidance based on intake velocities and fish swim speed
  - IMP risk based on fish size versus trashrack spacing
- Estimated fish entrainment rates using EPRI (1997) entrainment database
- Evaluated turbine and spillway mortality using USFWS TBSA model

ISR RESULTS – QUALITATIVE RISK ASSESSMENT

Ross Lake

Species	Life Stage	Present in Lake Habitat	Water Column Depth Preference	Within proximity of intake	Susceptible to Approach Velocity	Susceptible to Through-bar Velocity	Overall Risk of Entrainment or Impingement
Bull Trout	Adult (resident)	No	--	--	--	--	Low
	Adult (adfluvial)	Yes	7-196 ft; commonly <82 ft	Yes	No	--	Low
	Juvenile	No	--	--	--	--	Low
	Eggs, alevins, and/or fry	No	--	--	--	--	Low
Dolly Varden	Adult	Yes	7-196 ft; commonly <82 ft	Yes	No	--	Low
	Juvenile	Possible	Nearshore/littoral	No	--	--	Low
	Eggs, alevins, and/or fry	No	--	--	--	--	Low
Eastern Brook Trout	Adult	Yes	0-25 ft	No	--	--	Low
	Juvenile	No	--	--	--	--	Low
	Eggs, alevins, and/or fry	No	--	--	--	--	Low
Rainbow Trout	Adult	Yes	0-52 ft	No	--	--	Low
	Juvenile	Possible	0-52 ft	No	--	--	Low
	Eggs, alevins, and/or fry	No	--	--	--	--	Low
Cutthroat Trout	Adult	Yes	0-52 ft	No	--	--	Low
	Juvenile	Possible	0-52 ft	No	--	--	Low
	Eggs, alevins, and/or fry	No	--	--	--	--	Low
Redside Shiner	Adult	Yes	Deep water during winter	Yes	No	--	Low
	Juvenile	Yes	Deep water during winter	Yes	Minimum WSE	Yes	Moderate (ENT)
	Eggs, alevins, and/or fry	Yes	Shoreline	No	--	--	Low

ISR RESULTS – QUALITATIVE RISK ASSESSMENT

Diablo Lake

Species	Life Stage	Present in Lake Habitat	Water Column Depth Preference	Within proximity of intake	Susceptible to Approach Velocity	Susceptible to Through-bar Velocity	Overall Risk of Entrainment or Impingement
Bull Trout	Adult (resident)	No	--	--	--	--	Low
	Adult (adfluvial)	Yes	7-196 ft; commonly <82 ft	Yes	No	--	Low
	Juvenile	No	--	--	--	--	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Dolly Varden	Adult	Yes	7-196 ft; commonly <82 ft	Yes	No	--	Low
	Juvenile	Possible	Nearshore/littoral	No	--	--	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Eastern Brook Trout	Adult	Yes	<25 ft	No	--	--	Low
	Juvenile	No	--	--	--	--	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Rainbow Trout	Adult	Yes	0-52 ft	No	--	--	Low
	Juvenile	No	--	--	--	--	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Redside Shiner	Adult	Yes	Deep water during winter	Yes	No	--	Low
	Juvenile	Yes	Deep water during winter	Yes	Minimum WSE	N/A	Moderate (ENT)
	Early Life Stage (eggs, larvae)	Yes	Shoreline	No	--	--	Low

ISR RESULTS – QUALITATIVE RISK ASSESSMENT

Gorge Lake

Species	Life Stage	Present in Lake Habitat	Water Column Depth Preference	Within proximity of intake	Susceptible to Approach Velocity	Susceptible to Through-bar Velocity	Overall Risk of Entrainment or Impingement
Bull Trout	Adult (resident)	No	--	--	--	--	Low
	Adult (adfluvial)	Yes	7-196 ft; commonly <82 ft	Yes	No	--	Low
	Juvenile	No	--	--	--	--	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Dolly Varden	Adult	Yes	7-196 ft; commonly <82 ft	Yes	Minimum WSE	N/A	Moderate
	Juvenile	Possible	Nearshore/littoral	No	--	--	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Eastern Brook Trout	Adult	Yes	<25 ft	No	--	--	Low
	Juvenile	No	--	--	--	--	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Rainbow Trout	Adult	Yes	0-52 ft	Yes	No	--	Low
	Juvenile	No	--	--	--	--	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Redside Shiner	Adult	Yes	Deep water during winter	Yes	Minimum WSE	N/A	Moderate (ENT)
	Juvenile	Yes	Deep water during winter	Yes	Normal and minimum WSE	N/A	Moderate (ENT)
	Early Life Stage (eggs, larvae)	Yes	Shoreline	No	--	--	Low

ISR RESULTS – QUALITATIVE RISK ASSESSMENT

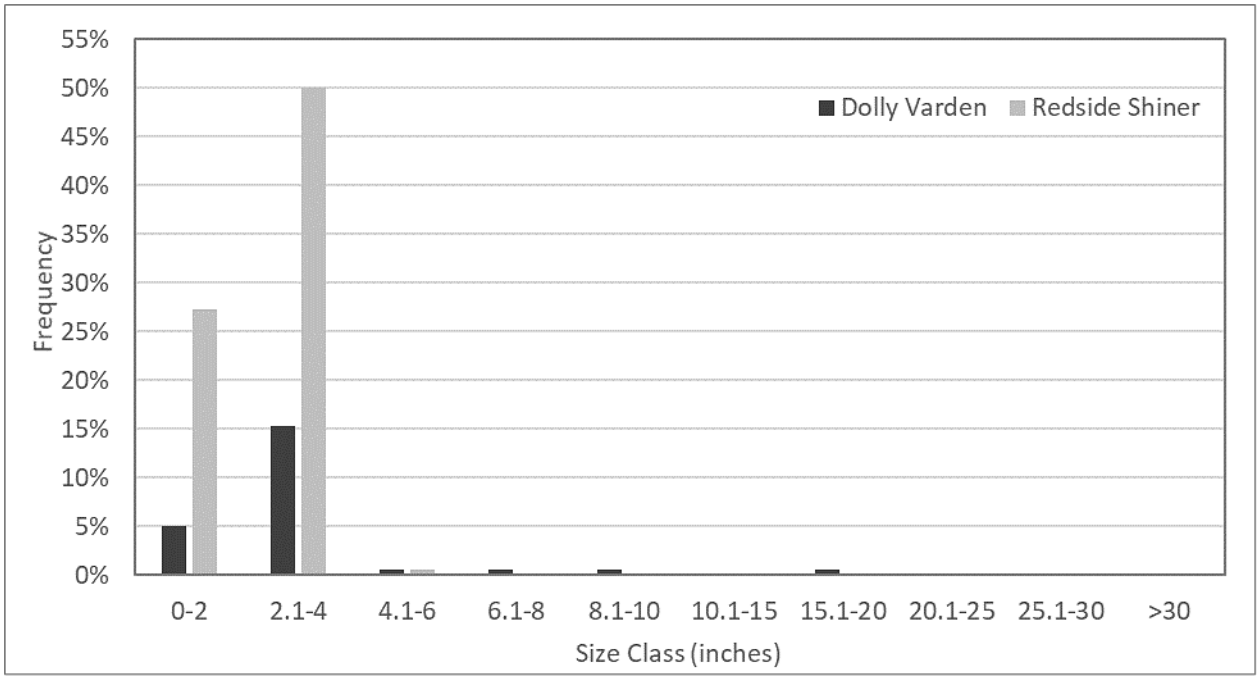
Anadromous Salmonids*

Species	Life Stage	Present in Lake Habitat	Water Column Depth Preference	Within proximity of intake	Susceptible to Approach Velocity	Susceptible to Through-bar Velocity	Overall Risk of Entrainment or Impingement
Chinook Salmon	Adult	No	--	--	--	--	N/A
	Smolt	Yes	Variable	Yes	Yes	N/A	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Chum Salmon	Adult	No	--	--	--	--	N/A
	Smolt	No	--	--	--	--	N/A
	Early Life Stage (eggs, alevins, fry)	Yes (fry)	Variable	Yes	Yes	N/A	Low
Coho Salmon	Adult	No	--	--	--	--	N/A
	Smolt	Yes	Variable	Yes	Yes	N/A	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Pink Salmon	Adult	No	--	--	--	--	N/A
	Smolt	No	--	--	--	--	N/A
	Early Life Stage (eggs, alevins, fry)	Yes (fry)	Variable	Yes	Yes	N/A	Low
Sockeye Salmon	Adult	No	--	--	--	--	N/A
	Smolt	Yes	Variable	Yes	Yes	N/A	Low
	Early Life Stage (eggs, alevins, fry)	No	--	--	--	--	Low
Steelhead Trout	Adult	No	--	--	--	--	N/A
	Smolt	Yes	Variable	Yes	Yes	N/A	Low
	Early Life Stage (eggs, larvae)	No	--	--	--	--	Low

*Assumes fish passage technology installed

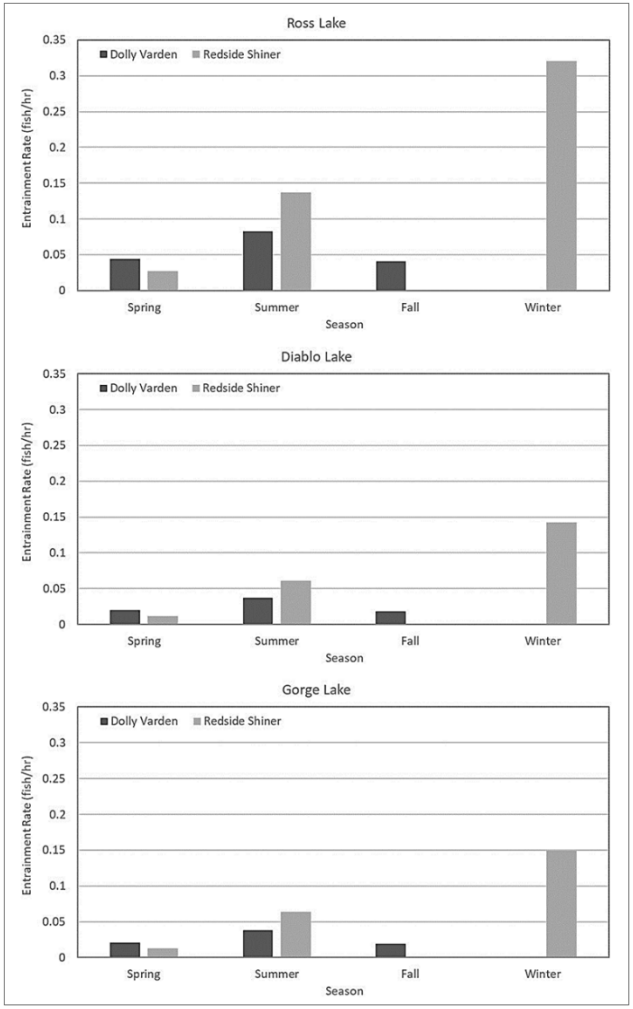
ISR RESULTS – ENTRAINMENT RATE ASSESSMENT

- Redside Shiner and Dolly Varden modeled
- ENT dominated by fish ≤4 inches in length (larger fish are likely able to escape intake velocities)



ISR RESULTS – ENTRAINMENT RATE ASSESSMENT

- Redside Shiner dominates entrainment (77%) with elevated ENT rates in winter
- ENT rate for Dolly Varden may be elevated if seeking thermal refuge during summer
  - Qualitative Risk Assessment suggests risk is only elevated during periods of drawdown when intake velocities are elevated



ISR RESULTS

- Turbine Blade Strike Analysis (TBSA)
  - Turbine mortality based on site-specific physical characteristics for each facility
  - Blade strike potential increases with increasing fish length (97.5% of fish entrained are ≤4 inches)
  - Spillway mortality depends largely on spillway height above the plunge pool
  - Combined turbine + spillway passage estimated survival (%) is provided for 12- and 24-inch salmonids and 3- to 5-inch Redside Shiner
    - Takes into account likelihood of route selection based on average volume of spill

STUDY VARIANCES

- Revised Study Plan originally committed to estimating survival using both, the USFWS (TBSA) model and EPRI (1997) survival database. After review of the EPRI (1997) database, facilities listed did not share adequate facility/turbine specifications with the Project and were not considered representative. Therefore, entrainment survival was estimated using the USFWS TBSA model applying site-specific turbine/intake structure specifications.

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
City Light holds ISR Meeting	March 2022

Seattle City Light

QUESTIONS?

FA-04 FISH PASSAGE TECHNICAL STUDIES PROGRAM

Initial Study Report Meeting

Erin Lowery | March 21, 2022

STUDY GOALS AND OBJECTIVES

- The Fish Passage Study addresses two elements:
  - **Fish Passage Assessment of Existing Features in the Gorge Bypass Reach**: Assessment of upstream passage potential for selected group of target fish species under varying flow regimes at two existing features in the Gorge bypass reach, defined as the 2.5-mile section of the Skagit River from Gorge Dam to the Gorge Powerhouse; and
  - **Fish Passage Facilities Alternatives Assessment**: Assessment to determine the technical feasibility of providing upstream and downstream passage for target fish species at the Project developments, including conceptual designs and preliminary cost estimates for selected fish passage concepts

STUDY GOALS AND OBJECTIVES – COMMON TO BOTH STUDY ELEMENTS

- Follows the goals and objectives from the Revised Study Plan (RSP) for each element
- Consider commitments made in the June 9, 2021 Notice, for FA-04, and applicable commitments under FA-05
- Consider passage of all target species from the RSP and species identified in the Notice, including:

- Steelhead (*Oncorhynchus mykiss*)
- Chinook Salmon (*O. tshawytscha*)
- Coho Salmon (*O. kisutch*)
- Sockeye Salmon (*O. nerka*)
- Pink Salmon (*O. gorbuscha*)
- Chum Salmon (*O. keta*)
- Sea-Run Cutthroat (*O. clarki clarki*)
- Pacific lamprey (*Entosphenus tridentatus*)
- Salish sucker (*Catostomus catostomus*)*
- Bull Trout (*Salvelinus confluentus*)
- Dolly Varden (*S. malma*)

*Passage of some species will be considered incidental

STUDY GOALS AND OBJECTIVES – GORGE BYPASS REACH

- **Fish Passage Assessment of Existing Features in the Gorge Bypass Reach:**
  - Characterizes fish passage potential in Gorge bypass reach
  - Evaluates potential ranges of flow under which two existing features in the Gorge bypass reach may be passable by target species

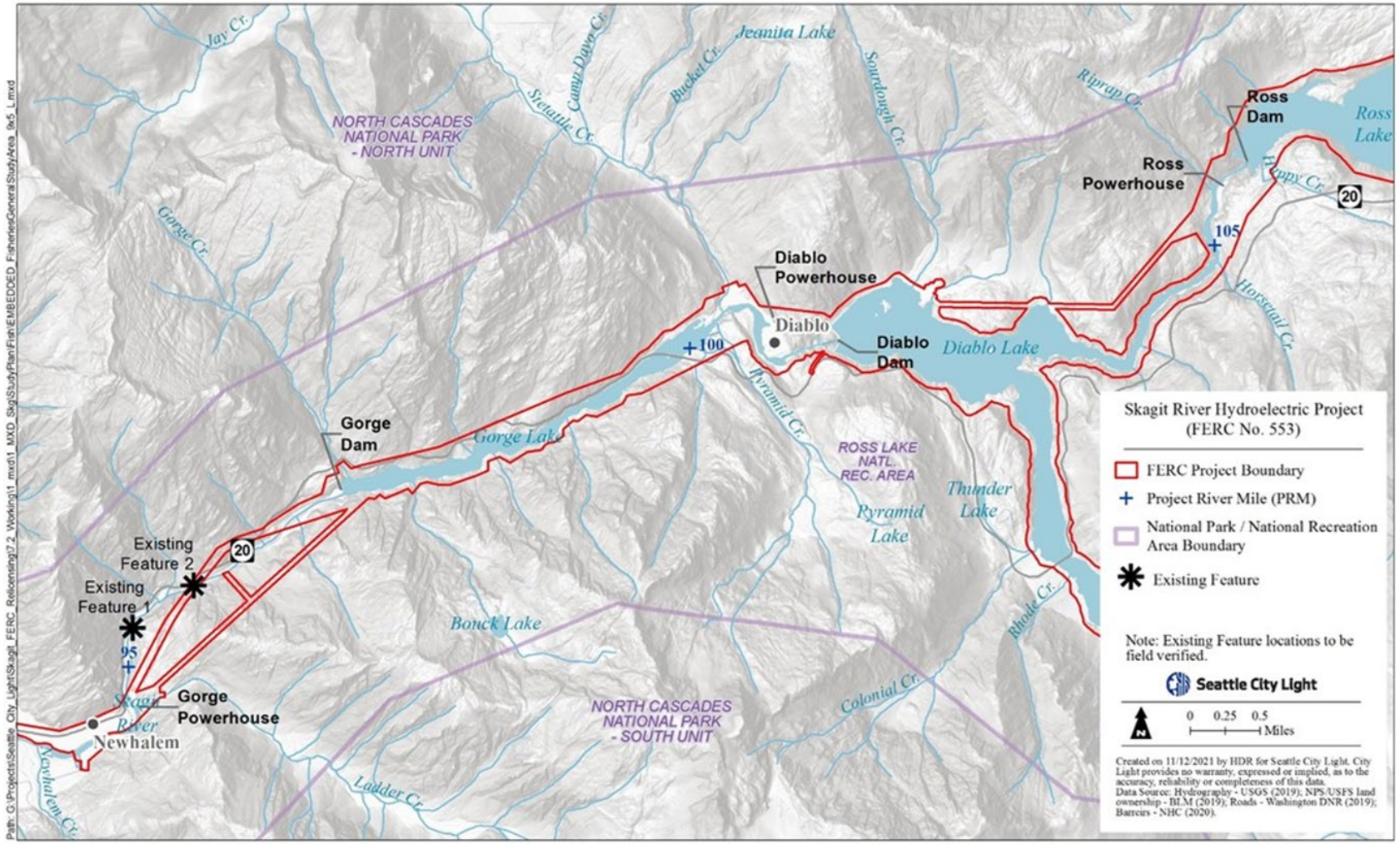
STUDY GOALS AND OBJECTIVES – FACILITIES ASSESSMENT

- **Fish Passage Facilities Alternatives Assessment:**
  - Investigates biological, physical, operational, and engineering factors to determine the feasibility of providing passage at any or all Project developments
  - Includes development of concept-level upstream and downstream passage facilities at the Ross, Diablo, or Gorge developments and/or for the system of all three developments
  - Includes an engineering assessment to determine if specific conceptual scenarios are constructable and at what cost, and if they can perform at a customary standard set by the fisheries management agencies

STUDY AREA

- Gorge Powerhouse to the upstream end of Ross Lake, thereby including all of the Gorge, Diablo, and Ross developments
- Portions of the Gorge bypass reach below Gorge Dam that are outside the Project Boundary as defined under the current license

STUDY AREA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Jeanita Lake
Stetattle Cr.
Camp Dayer Cr.
Bucket Cr.
Sourdough Cr.
Riprap Cr.
NORTH CASCADES NATIONAL PARK - NORTH UNIT
Ross Dam
Ross Lake
Ross Powerhouse
Happy Cr.
20
105
Gorge Cr.
Diablo Powerhouse
Diablo
Diablo Dam
Diablo Lake
Horsetail Cr.
+100
Pyramid Cr.
Gorge Dam
Gorge Lake
ROSS LAKE NATL. REC. AREA
Thunder Lake
Pyramid Lake
Existing Feature 2
Existing Feature 1
20
Bouck Lake
95
Rhode Cr.
Gorge Powerhouse
Skagit River
Newhalem
NORTH CASCADES NATIONAL PARK - SOUTH UNIT
Colonial Cr.
Newhalem Cr.
Ladder Cr.
Skagit River Hydroelectric Project (FERC No. 553)
FERC Project Boundary
Project River Mile (PRM)
National Park / National Recreation Area Boundary
Existing Feature
Note: Existing Feature locations to be field verified.
Seattle City Light
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Miles
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Data Source: Hydrography - USGS (2019); NPS/USFS land ownership - BLM (2019); Roads - Washington DNR (2019); Barriers - NHC (2020).
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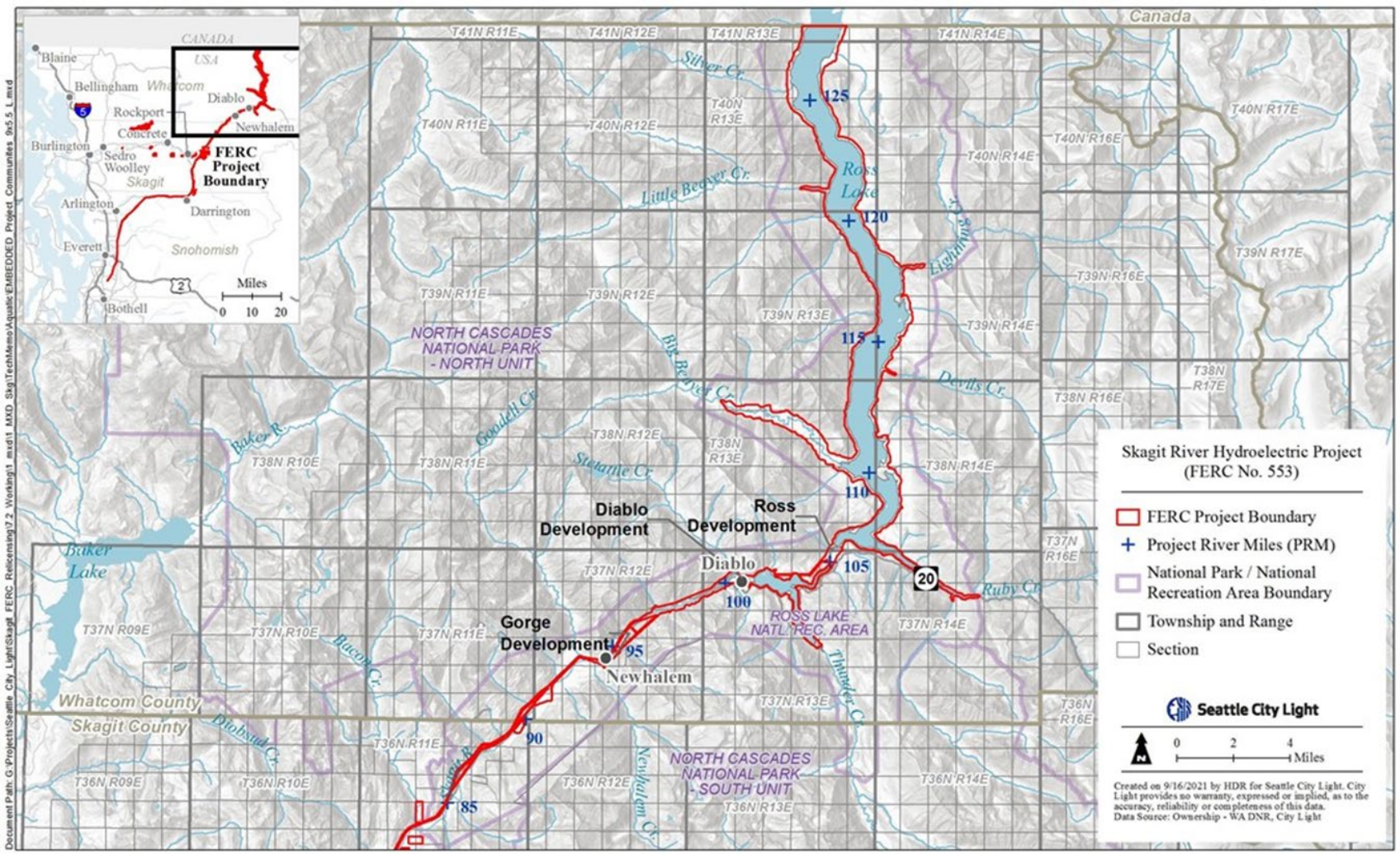
STUDY AREA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Silver Cr.
Big Beaver Cr.
Devils Cr.
Lightning Cr.
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Bacon Cr.
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Newhalem Cr.
NORTH CASCADES NATIONAL PARK - NORTH UNIT
NORTH CASCADES NATIONAL PARK - SOUTH UNIT
ROSS LAKE NATL. REC. AREA
Diablo Development
Ross Development
Gorge Development
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Skagit River Hydroelectric Project (FERC No. 553)
FERC Project Boundary
Project River Miles (PRM)
National Park / National Recreation Area Boundary
Township and Range
Section
Seattle City Light
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Data Source: Ownership - WA DNR, City Light
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STUDY METHODS

- Methods Common to both Fish Passage Study Elements

Bi-weekly meetings with fish passage experts and interested parties from agencies and Indian Tribes.

Technical workshops throughout 2021 with interested LPs.

Study team site visit to the Project study area and nearby similar facilities.

STUDY METHODS FOR FISH PASSAGE ASSESSMENT OF EXISTING FEATURES IN THE GORGE BYPASS REACH

- **This element of the study is closely linked with the FA-05 Bypass Instream Flow Model Development Study**
  - Conducted field investigations in summer of 2021 to characterize and document the physical structure of two existing features in the Gorge bypass reach
  - Commencing in March 2022, the team will synthesize collected data and perform a multi-faceted fish passage assessment of the existing features
  - Results from data synthesis and the Bypass Hydraulic Model will be used to evaluate fish passage potential at existing features in the Gorge bypass reach

STUDY METHODS FOR FISH PASSAGE FACILITIES ALTERNATIVES ASSESSMENT

- Three-stage process for assessing the technical feasibility of providing upstream and downstream fish passage at the Project:

Stage 1

Fish passage conceptual design criteria (complete)

Stage 2

Fish passage conceptual designs

(on-going)

Stage 3

Fish passage feasibility assessment (summer 2022)

RESULTS

- Review of Preliminary, Revised, and Final Draft Design Criteria Document
- Summary of Technical Workshops through 2021
- Summary of Agency Work Sessions through early 2022
- Summary of Progress on Fish Passage Assessment of Existing Features in the Gorge Bypass Reach

STUDY VARIANCES

- **Expert Panel:** Per Section 2. 1 of the RSP, City Light proposed to form a three-member Fish Passage Independent Expert Panel (Expert Panel), which would be available to review reports and provide advisory opinions. The makeup of the Expert Panel was to be determined in collaboration with LPs. As of December 31, 2021, however, City Light and LPs have not convened the Expert Panel and do not intend to do so unless LPs specifically request it during future study stages. This variance does not affect the ability of the study to meet the objectives of the RSP.

- **Schedule Modification:** The Gorge bypass assessment results will be presented in a stand-alone report in summer 2022 instead of the ISR.

STUDY SCHEDULE

Milestone	Date
Draft Concept Development Report (CDR)	January – April 2022
Draft CDR for LP Review	May 2022
Continue bi-weekly AWS meetings	Every other Monday through 2022
City Light files Initial Study Report	March 2022
FA-04 Workshop #4	March 24, 2022
Develop Fish Passage Assessment of Existing Features in the Gorge Bypass Reach	February – October 2022
Draft Assessment of Existing Features for LP Review	July 2022
Develop Fish Passage Assessment	July – December 2022
Draft Fish Passage Assessment for LP Review	September 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

FA-07 RESERVOIR TRIBUTARY HABITAT ASSESSMENT

Initial Study Report Meeting

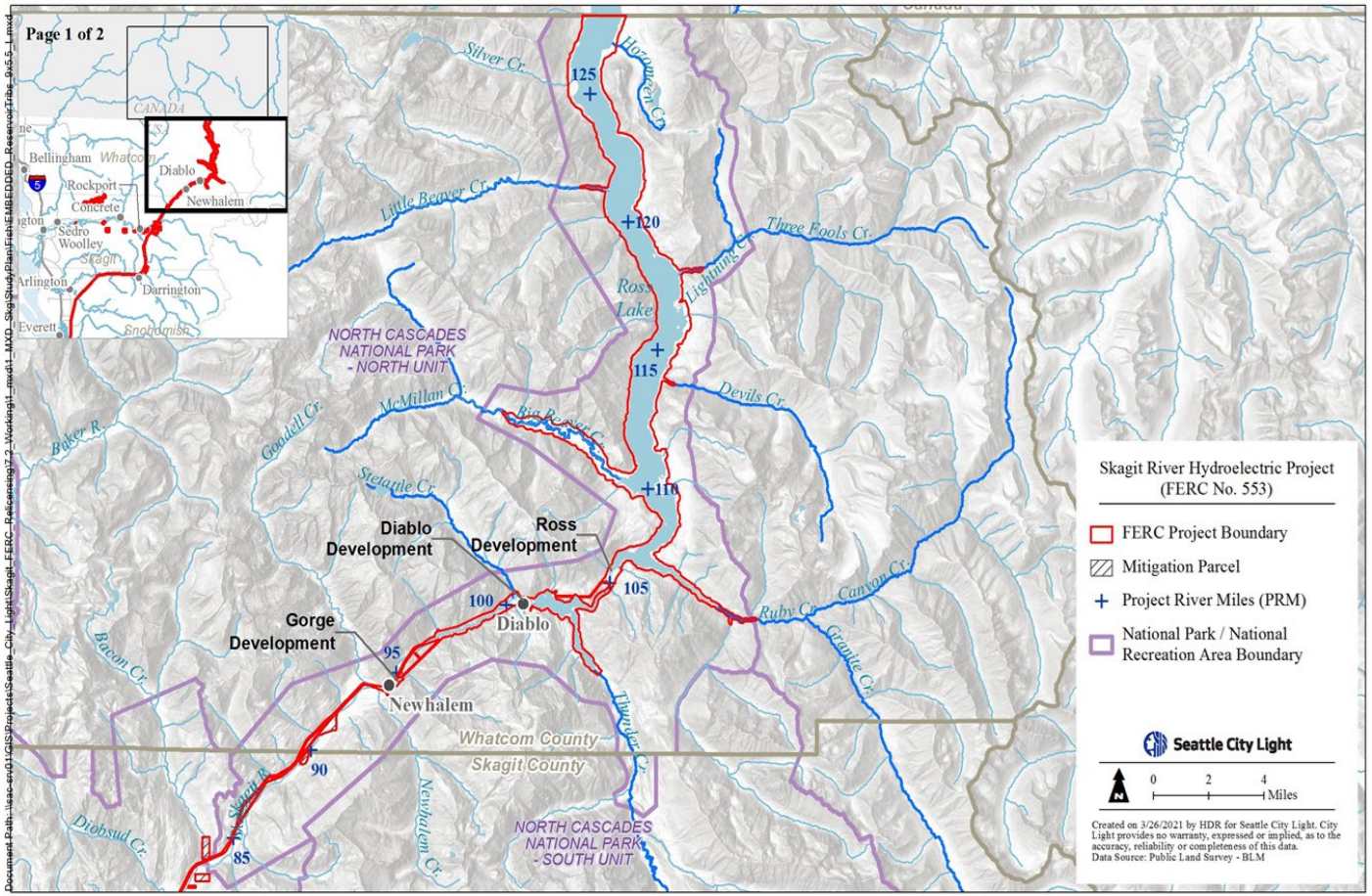
Jeff Fisher | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Map the extent of potential anadromous salmonid habitat in tributaries to Project reservoirs in the U.S. and Canada
- Estimate juvenile anadromous salmonid rearing habitat capacity in select tributary reaches
- Refine rearing habitat capacity values using salmonid growth potential estimates developed for tributaries

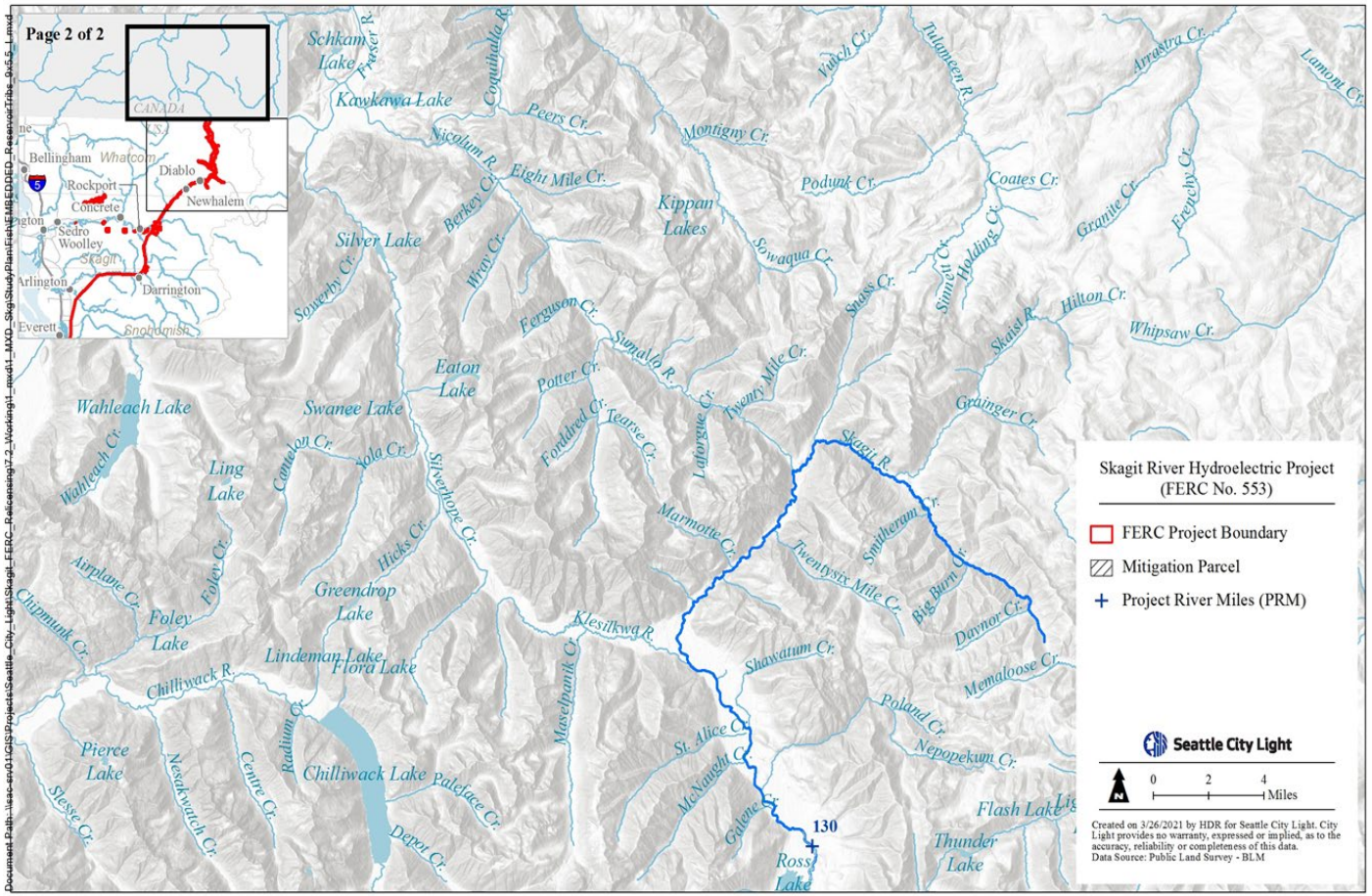
STUDY AREA

Tributaries to Project reservoirs in the U.S. and Canada



STUDY AREA (CONTINUED)

Tributaries to Project reservoirs in the U.S. and Canada



STUDY METHODS

- The NetMap Intrinsic Potential (IP) model is currently being applied to map the extent of potential habitat for Chinook and Coho salmon and steelhead in reservoir tributaries
  - IP modeling predicts habitat availability in GIS using a Digital Elevation Model (DEM)
  - The model uses relationships between landscape features and habitat preferences to generate suitability estimates
  - IP modeling is intended for broad-scale assessments and is used in this study to help define the spatial extent of ground surveys conducted to evaluate habitat capacity

STUDY METHODS (CONTINUED)

- Tasks to be implemented in 2022:
  - Complete IP modeling for anadromous salmonids; habitat suitability criteria will be developed for Sockeye Salmon, a species for which IP models have not been parameterized
  - Based on IP modeling results, tributary reaches will be identified for field surveys and application of the Unit Characteristic Method (UCM) to estimate juvenile anadromous salmonid rearing habitat capacity
  - Rearing capacity estimates derived with the UCM will be refined using salmonid growth potential estimates derived for tributaries as part of the USGS Food Web Study

RESULTS

- Because the FA-07 study is still being scoped in consultation with LPs, no results are available for presentation in the ISR
- Agendas and presentations provided in the four FA-07 workshops held through February are provided as attachments to the ISR
- Draft IP modeling results (i.e., not finalized and therefore not suitable for submittal in the body of the ISR) are included in the attachments to the ISR

STUDY VARIANCES

- There are no variances or proposed modifications to the FERC-approved elements of this study

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	Mar 2022
Complete IP model runs	Mar 2022
Finalize geographic scope for field surveys	Apr 2022
Conduct UCM field surveys	Jul-Oct 2022
Data analysis and report writing	Sep-Dec 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

FA-06 RESERVOIR NATIVE FISH GENETICS

Initial Study Report Meeting

Erin Lowery | March 22, 2022

STUDY GOALS AND OBJECTIVES

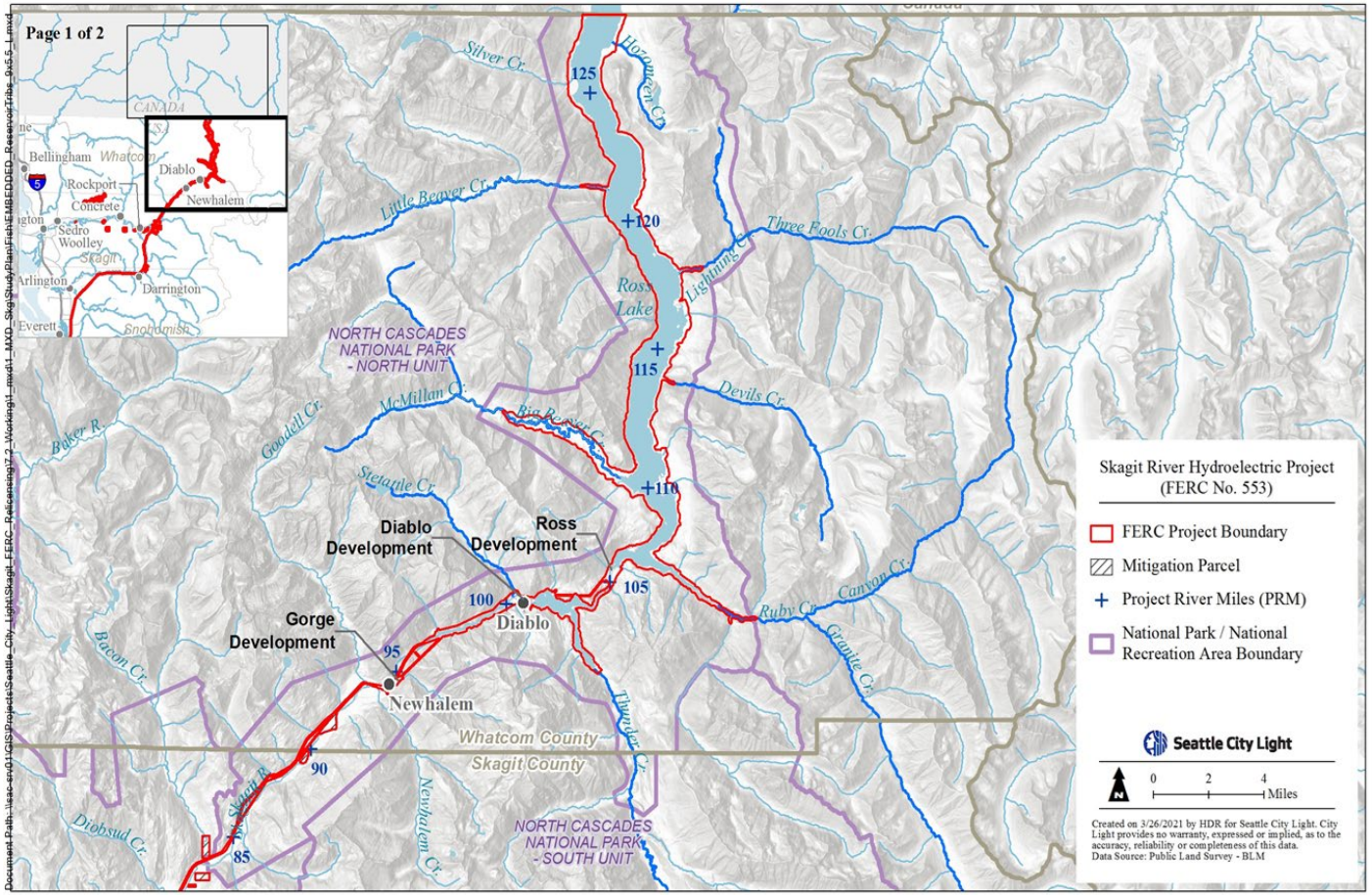
- The goal of this study is to develop a population genetics baseline of sufficient scope to meet the following objectives
- Objectives outlined in the RSP:
  - Determine the population genetic structure of within and among target species (Rainbow Trout, Bull Trout, and Dolly Varden) populations and assess whether management actions are necessary for genetic sustainability
  - Determine the number of fish populations, for each target species, within and among the Project reservoirs
  - Estimate the effective population size (N_e) for each target species and reservoir
  - Identify topics and/or management objectives to be considered in a reservoir fish and aquatics management plan (as part of new license)

ADDITIONAL STUDY OBJECTIVES

- Objectives outlined in the June 9, 2021 Notice
  - Year 2 field collections at spawning grounds for genetics baseline
  - Additional analysis out-of-basin and above/below dams

STUDY AREA

Tributaries to Project reservoirs



STUDY METHODS

- Goals Year 1: assess the availability of target species existing genetic data to address study objectives and determine whether additional field sampling is needed
- Goals Year 2: gather additional field data to address data gaps and use study results to identify potential future reservoir fish management objectives

STUDY METHODS YEAR 1

- Requested available genetic data (microsatellite genotypes) from relevant agencies (USFWS & WDFW)
- Examined data using standard population genetic methods (genetic variation within and among populations)
- Consulted with an Expert Panel of Geneticists and Biologists & LPs with data summaries to determine the extent to which available data addresses LP and City Light objectives

STUDY METHODS YEAR 2

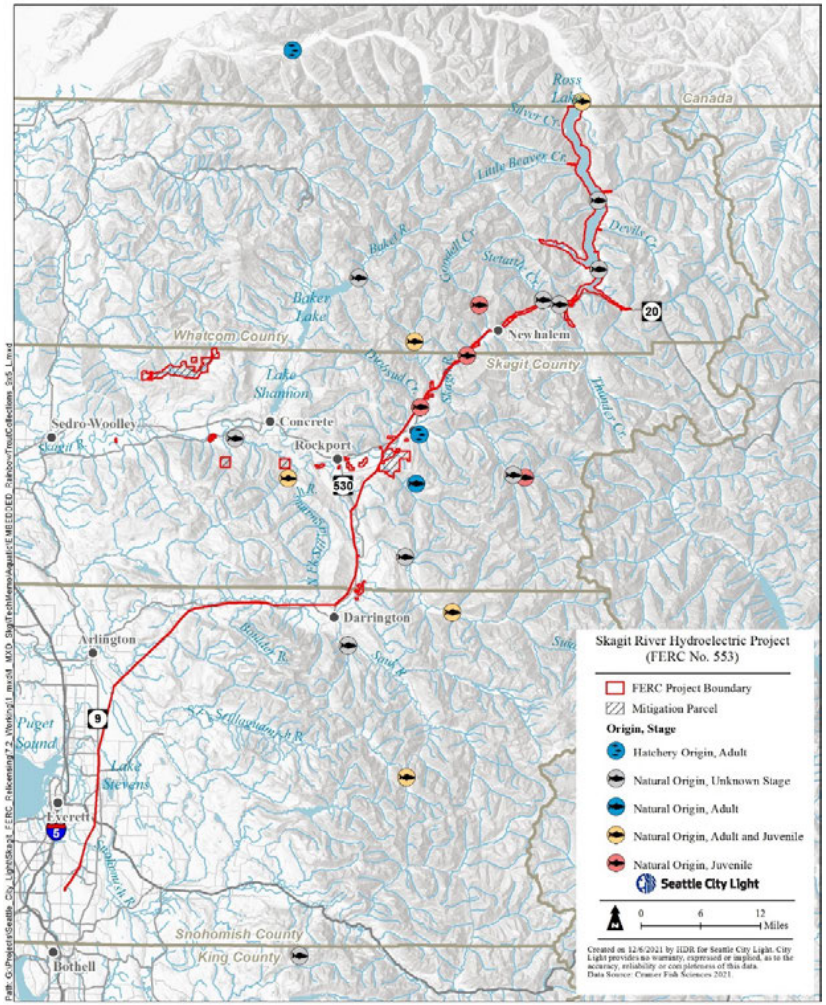
- Collect new tissue samples from native trout/char
- Obtain genotypes using new molecular markers (e.g., SNPs)
- Address City Light objectives and select LP questions that cannot be addressed with available Year 1 data
  - Estimate effective population size (index of viability)
  - Describe hybridization
  - Describe hatchery effects
  - Describe quantitative genetic variation (e.g., migration timing)

RESULTS

- Summary of meetings with EP and LPs
- Summary of Rainbow Trout Data:
  - Collections
  - Genetic summary statistics
- Summary of Bull Trout Data:
  - Collections
  - Identification of related individuals within collections
  - Population determination
  - Genetic summary statistics

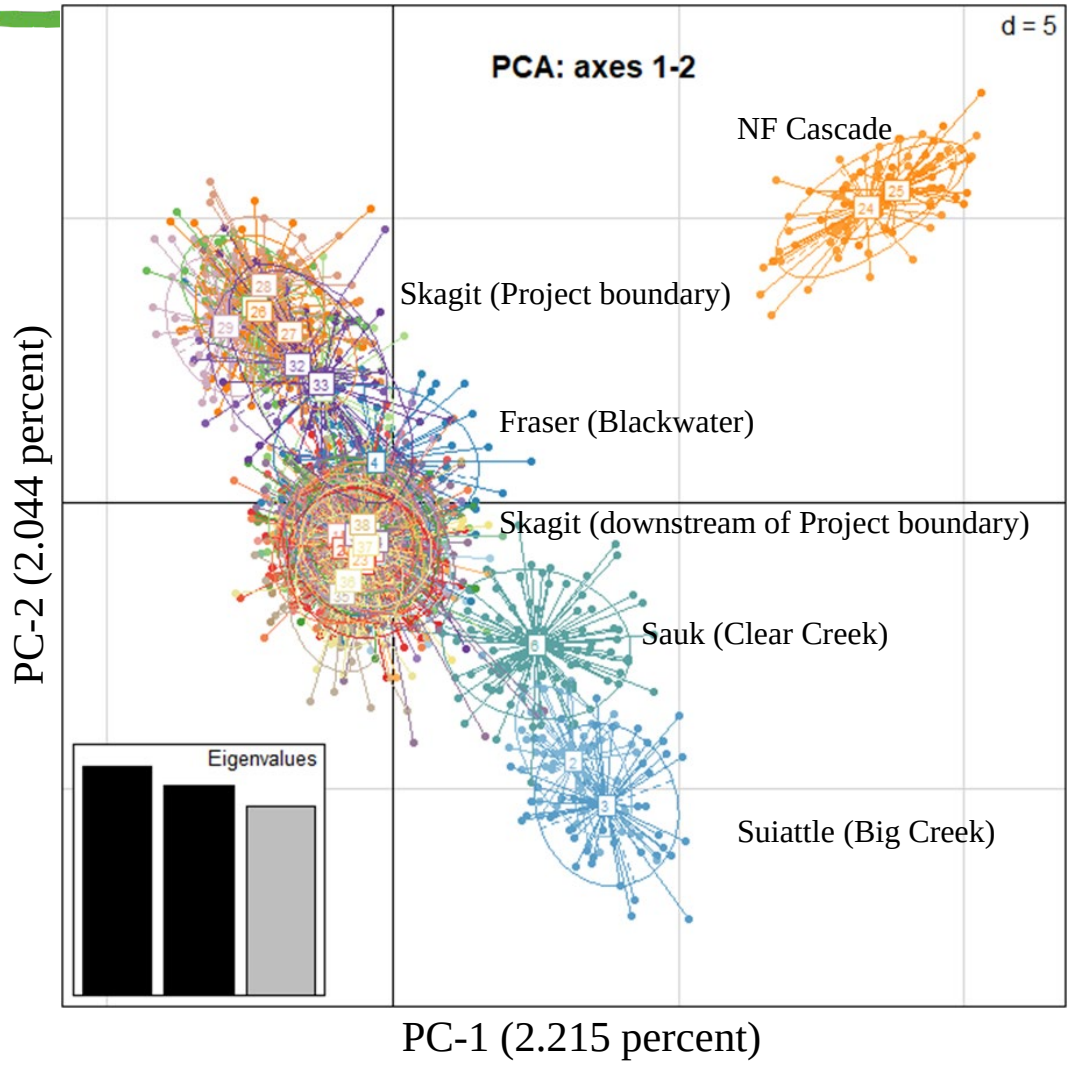
RESULTS: RAINBOW TROUT

- Samples
  - WDFW (Pflug et al. (2013))
    - N=2967
    - 40 collections
      - 8 upstream of Gorge Dam
      - 2 hatcheries
        - Marblemount
        - Chilliwack
    - 15 microsatellites



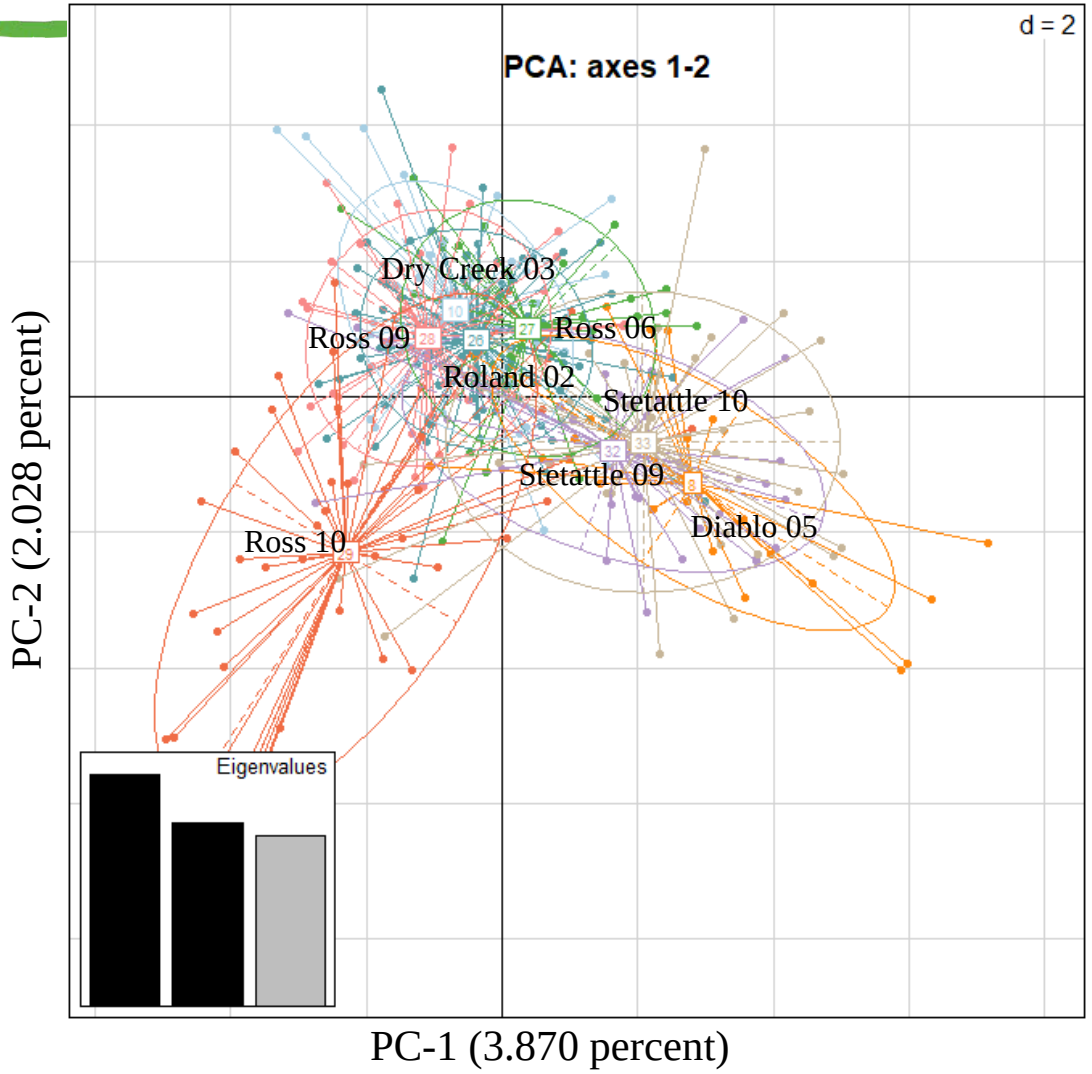
RESULTS: RAINBOW TROUT

- Population structure is congruent with geography



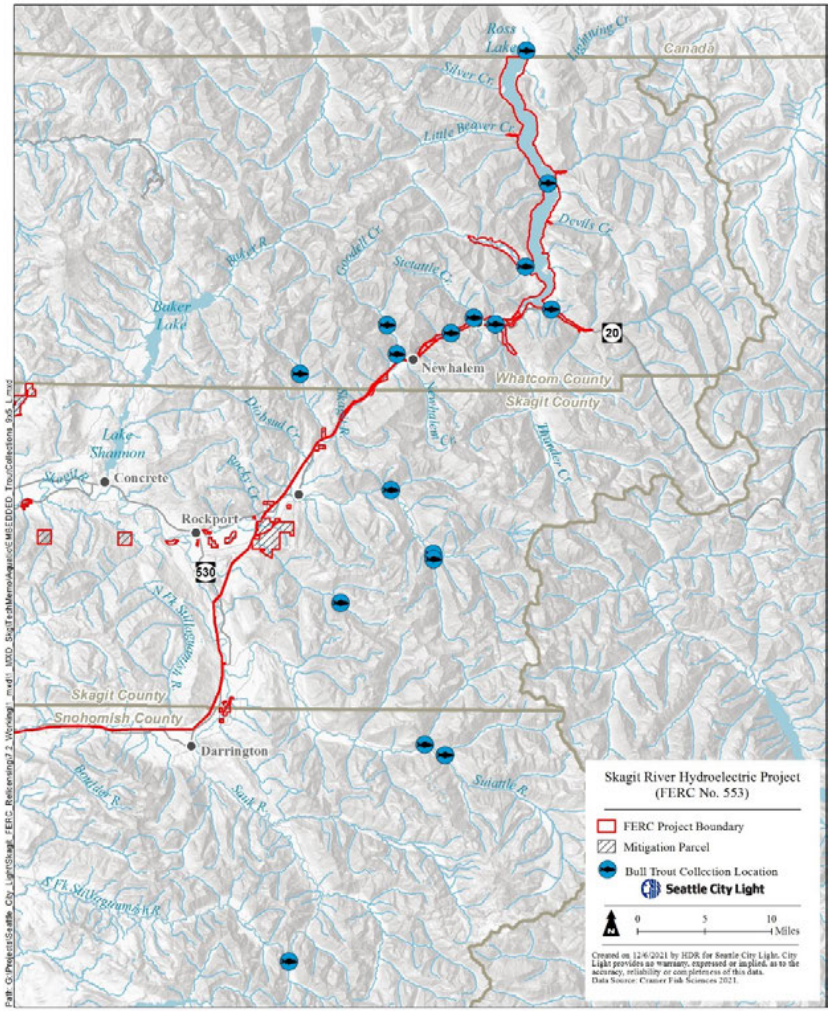
RESULTS: RAINBOW TROUT

- Population structure within the Project area is less distinct

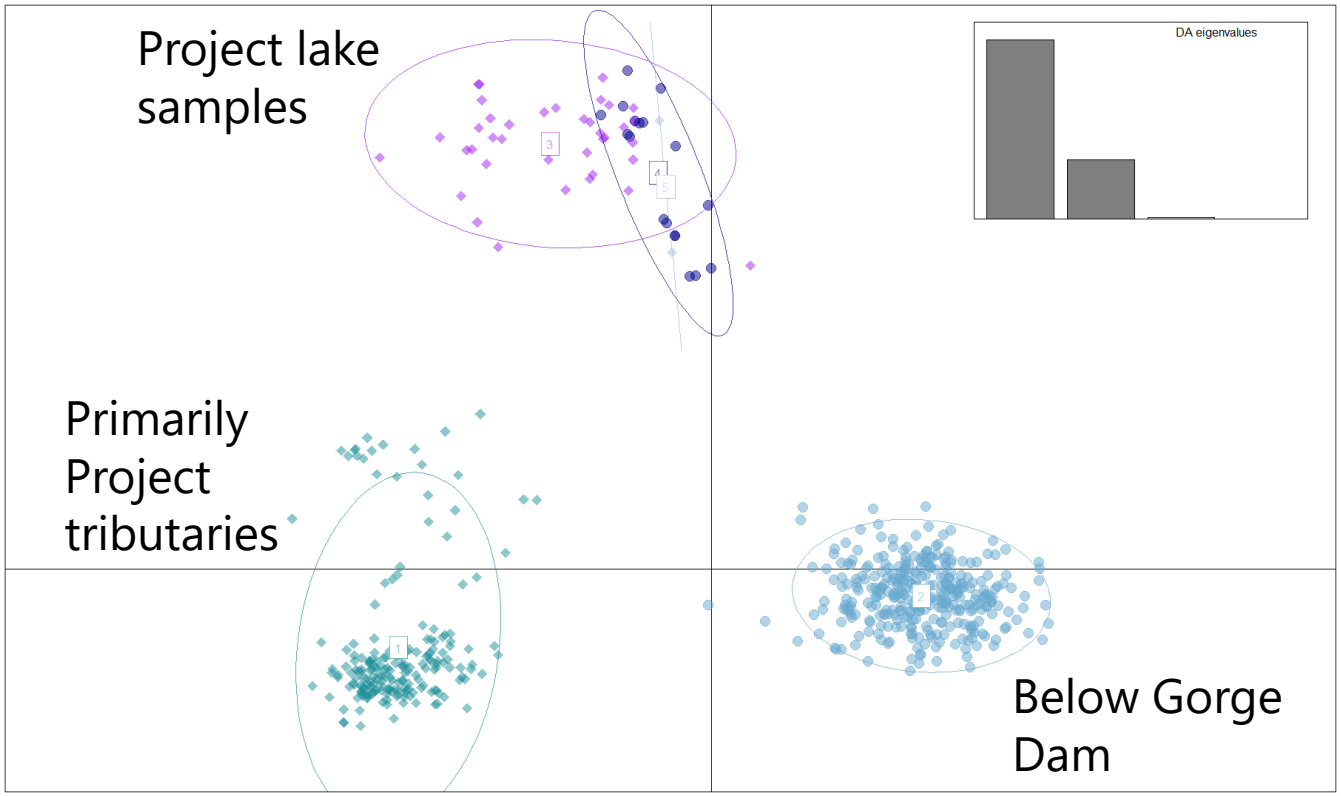


RESULTS: BULL TROUT

- Project Boundary:
  - 10 collections
  - 442 individuals
- Project Vicinity:
  - 11 collections
  - 456 individuals



RESULTS: BULL TROUT



- Population structure is congruent with geography, but hybridization also shapes structure

OUTSTANDING OBJECTIVES YEAR 2

- Collect field data to support genetic baseline analysis of juveniles at reservoir tributary spawning grounds
- Collect and/or coordinate existing samples and activities for out-of-basin and above and below dam analyses
- Continue data collection to address heterozygosity, within- and among-population variance, and relatedness for Dolly Varden in Project reservoirs
- Gather additional data needed to estimate N_e for each population of Bull Trout, Rainbow Trout, and Dolly Varden, with consideration of the ILP study period

STUDY VARIANCES

- There are no variances or proposed modifications to this study

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	Mar 2022
Finalize Year 2 scope	Spring 2022
Sampling permits	Spring summer 2022
Tissue collections	Jul-Oct 2022
Genotyping & analysis	Fall 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

FA-03 RESERVOIR FISH STRANDING AND TRAPPING RISK ASSESSMENT

Initial Study Report Meeting

Jeff Fisher | March 22, 2022

STUDY GOALS AND OBJECTIVES

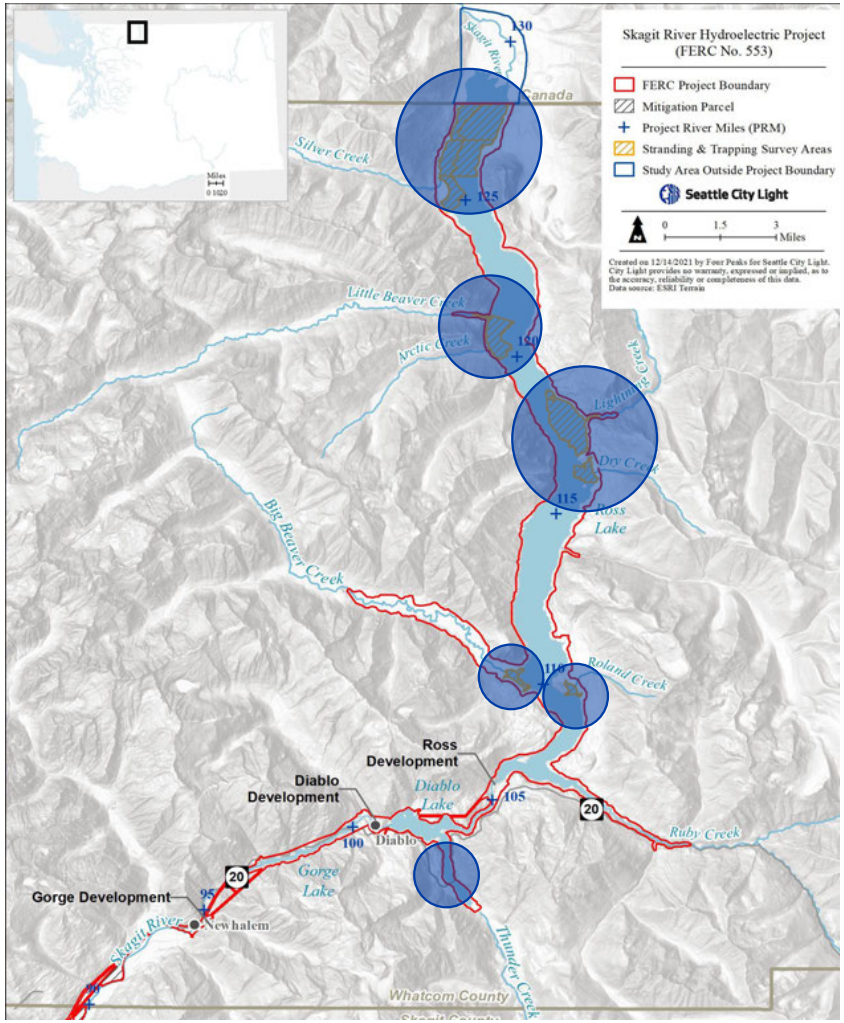
- Objectives outlined in the RSP
  - Identify and map areas that present a stranding and trapping risk to native fish species
  - Survey a subset of these areas to confirm or refute the results of the desktop analysis
  - As needed, update the desktop analysis based on field results

ADDITIONAL STUDY OBJECTIVES

- Objectives outlined in the June 9, 2021 Notice
  - Find a reservoir drawdown rate that avoids, limits, or greatly reduces stranding of fish and juvenile amphibians
  - Identify reservoir elevations that prove problematic for trapping of fish and juvenile amphibians

STUDY AREA

- Survey areas are highlighted
  - Locations identified with input from LPs
  - Preliminary GIS analyses
  - Identified and refined during early reconnaissance



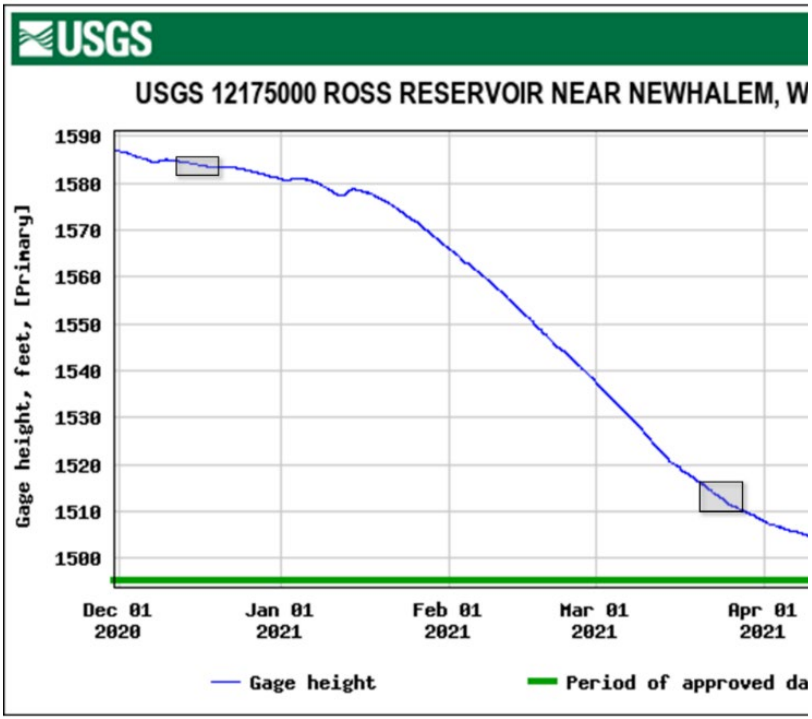
STUDY METHODS

- Reconnaissance
  - Opportunistic survey of Diablo in 2020 and planned surveys of Ross in 2021
- Desktop Analyses
  - GIS analyses and reservoir drawdown analysis for Ross completed in 2021
  - Gorge and Diablo to be completed in 2022 and presented in the USR
- Field Surveys
  - Ross Lake surveyed twice (one remaining)
  - Gorge and Diablo to be surveyed in 2022

STUDY METHODS

Data to be Collected for Every Quadrat	Additional Data to be Collected per each Scenario		
	If Potential Stranding or Trapping Feature Observed	**If Evidence of Predation Observed**	**If Stranded or Trapped Fish Present (All Parameters Collected for Each Species and Life Stage)**
1. Date and time of observations	9. Photograph of S&T feature and bearing of view	14. Description of predator or sign	16. Species
2. Reservoir and survey area	10. Distance to open water	15. Photograph or predator or sign	17. Status (Live/Dead)
3. Weather	11. Length of potential stranding/trapping feature		18. Photograph
4. Survey team members	12. Width of potential stranding/trapping feature		19. Life Stage
5. Quadrat ID	13. Maximum depth of potential stranding/trapping feature		20. Count
6. Latitude and longitude coordinates of observation			
7. Photograph of quadrat and bearing of view			
8. Additional Notes			

PRELIMINARY RESULTS: FIELD RECON RESULTS AND METHODOLOGICAL REFINEMENTS



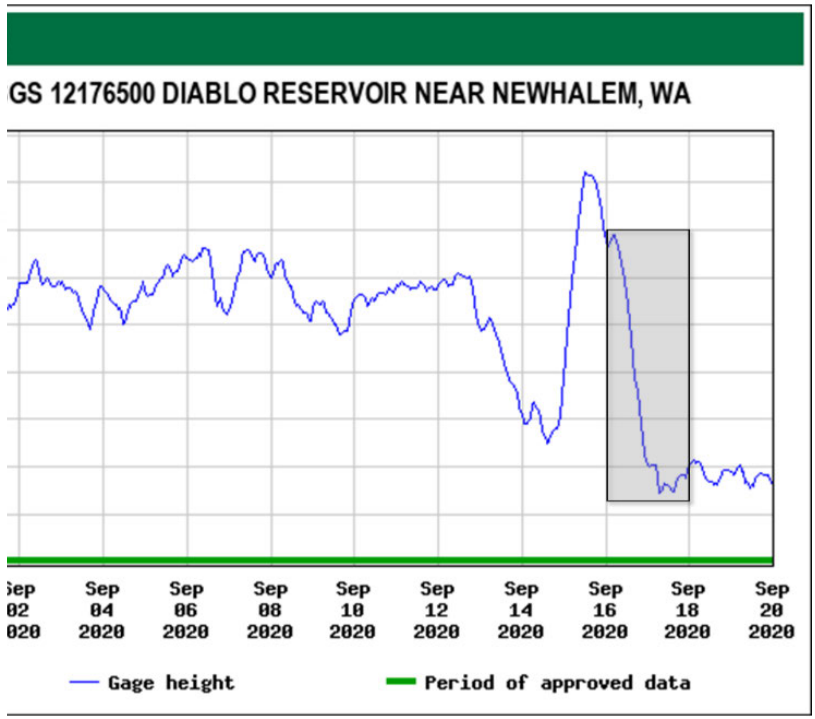
Define Sampling Areas

Overlay Varial Zone with Quadrats

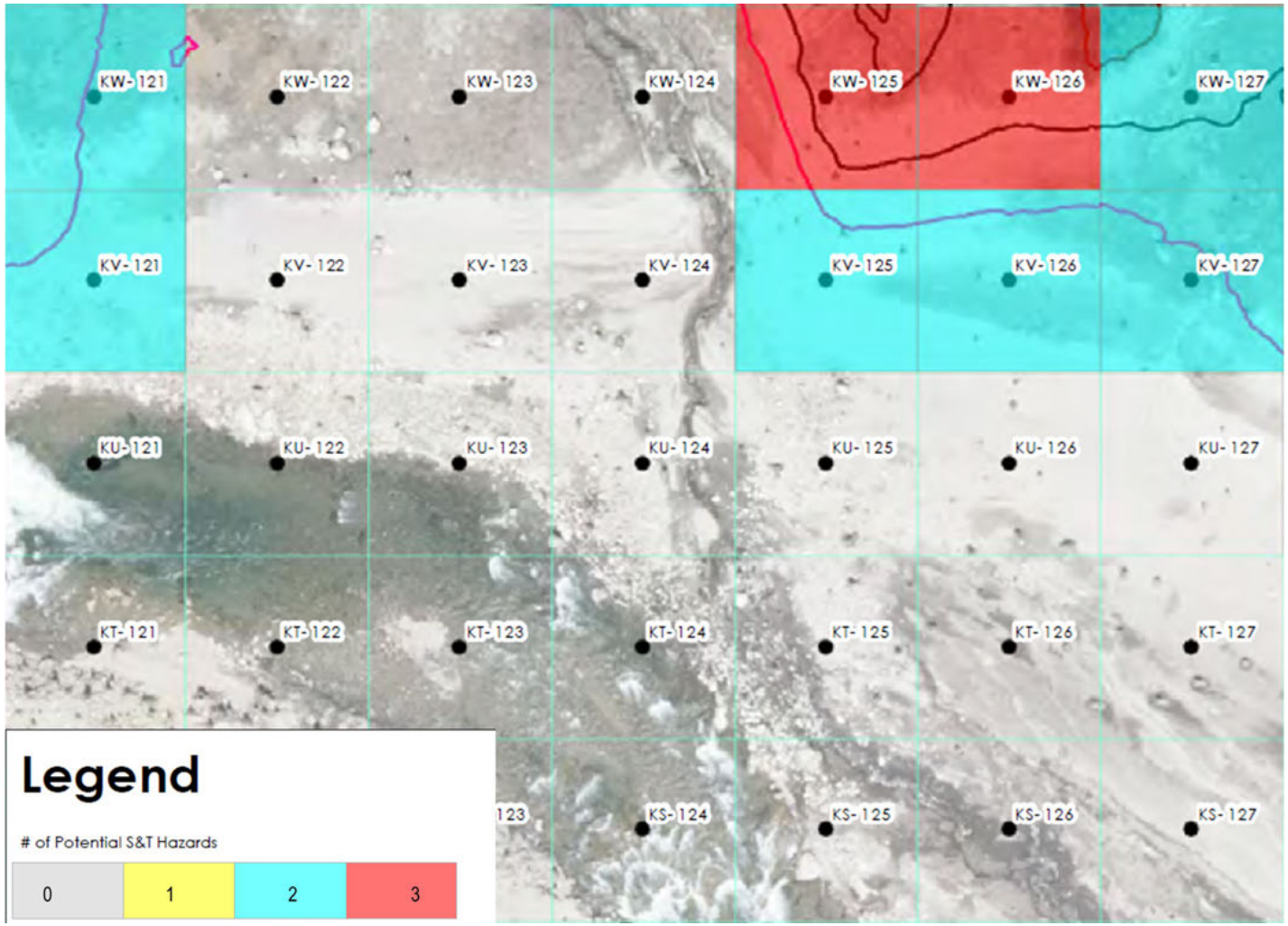
Group Quadrats Based on Low Slope and Sink

Stratify by Elevation

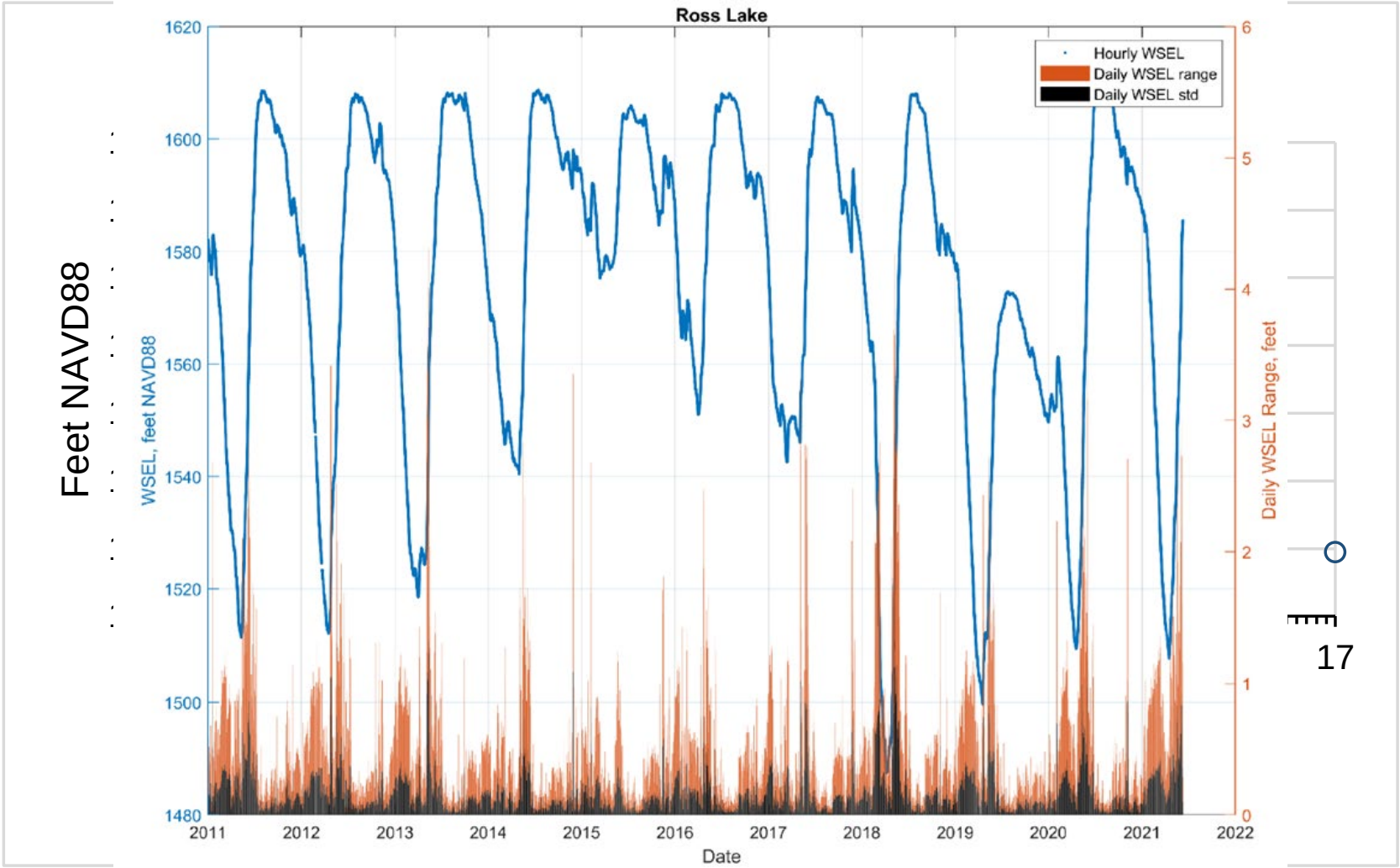
Randomize Within Groups



PRELIMINARY RESULTS: GIS-IDENTIFIED S&T RISK AREAS



PRELIMINARY RESULTS: ROSS LAKE HISTORICAL HYDROGRAPH



STUDY VARIANCES

- Stratified Random Sampling (SRS) and Adaptive Cluster Sampling (ACS) not used when Ross near maximum water surface elevation
- Instead, comprehensive census of dewatered varial zone was undertaken
- Data types collected from potential S&T areas were refined to sample a greater proportion of the dewatered varial zone while minimizing collection of data that does not feed directly into subsequent S&T risk analyses

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	Mar 2022
Complete Ross Field Surveys	Mar-Apr 2022
Survey Gorge and Diablo	May-Nov 2022
GIS Analysis of Gorge and Diablo	July-Aug 2022
Gorge and Diablo Reservoir Drawdown Analysis	Mar-Jun 2022
City Light files Updated Study Report	Mar 2023

Seattle City Light

QUESTIONS?

GE-01 RESERVOIR SHORELINE EROSION STUDY

Initial Study Report Meeting

Kathy Dubé | March 22, 2022

STUDY GOALS AND OBJECTIVES

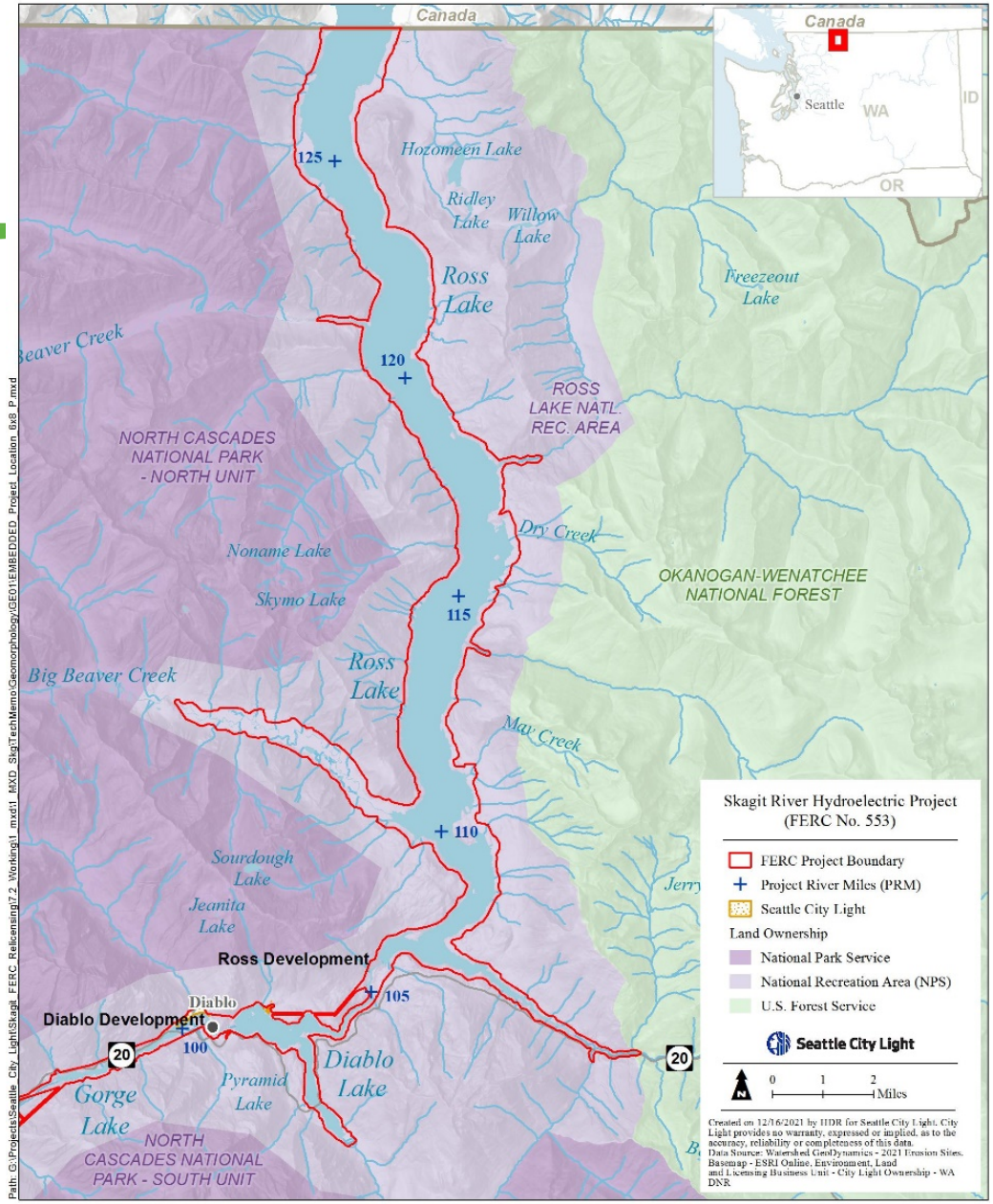
- Goals:
  - Characterize existing erosion along shorelines
  - Identify Project-related factors resulting in erosion
- Objectives:
  - Update & review 1990 reservoir erosion inventory
  - Identify types of erosion & factors to categorize areas with similar erosion patterns and rates
  - Estimate shoreline erosion rates at representative un-monitored sites

STUDY GOALS AND OBJECTIVES (CONT.)

- Objectives (cont.):
  - Correlate existing erosion rate data to estimate ongoing erosion rates at unmeasured sites
  - Evaluate the condition & effectiveness of existing shoreline erosion control measures
- SPD modifications:
  - Erosion measurements at five 1990 study sites in Ross Lake:
    - 10 Mile Island
    - Lightning Creek
    - Big Beaver
    - Rowland Creek
    - Arctic Creek
- NOA commitments:
  - assess deposition & erosion in Ross Lake drawdown zone
    - combined GE-01 & GE-03 effort

STUDY AREA

- Reservoir Shorelines
- SPD: Ross Lake
  - 10 Mile Island
  - Lightning Creek
  - Big Beaver
  - Rowland Creek
  - Arctic Creek
- NOA:
  - normal drawdown zone of Ross Lake



STUDY METHODS

- Implemented:
  - Analyze existing information including 1990 erosion inventory
  - Field inventory on shorelines of Ross and Diablo lakes
  - Shoreline bank retreat rates

STUDY METHODS (CONT.)

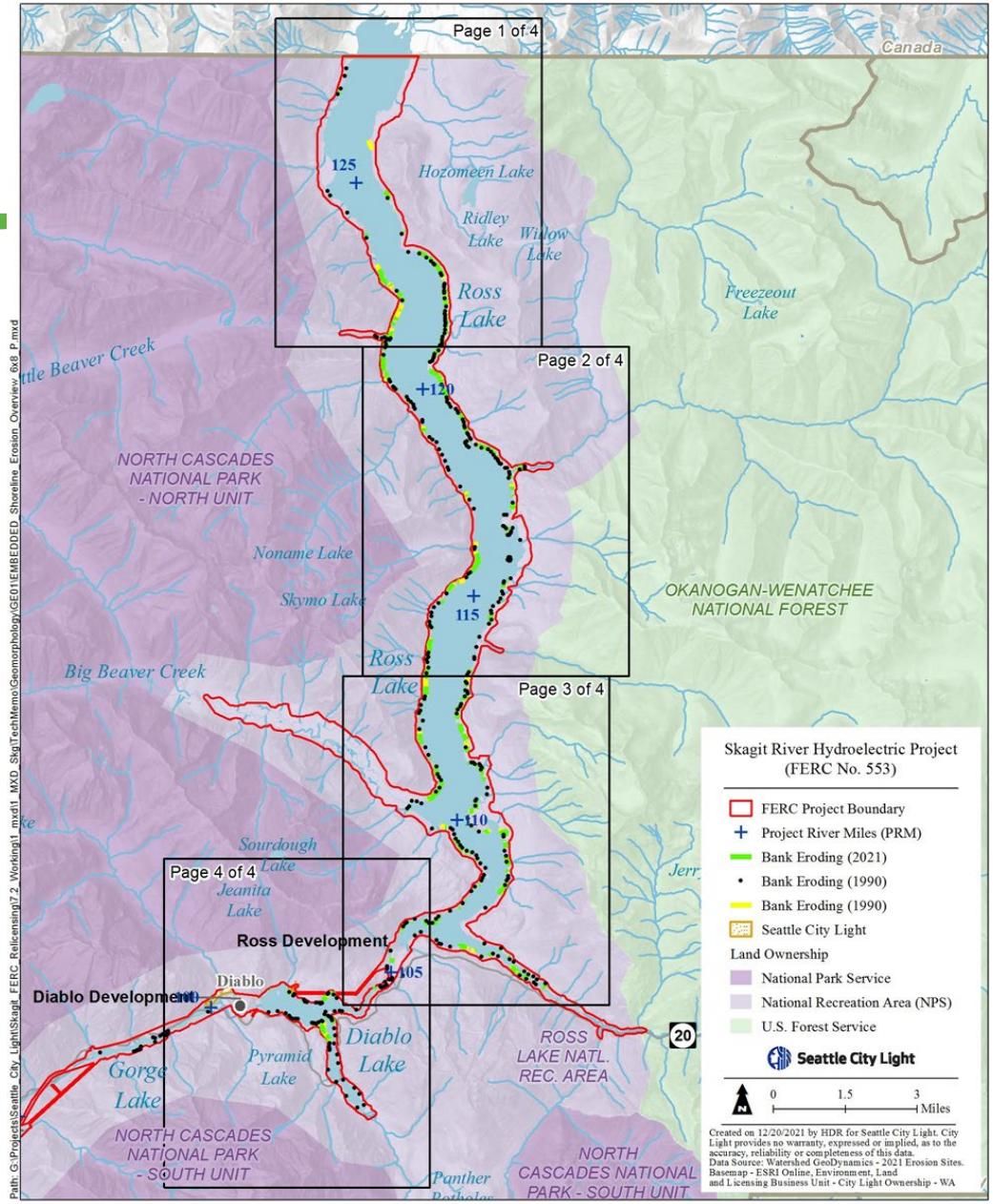
- To be implemented in 2022:
  - Field inventory of shoreline of Gorge Lake
  - Map erosion in Ross Lake drawdown zone
    - Coordinating with GE-03 Reservoir Deposition Study
  - Further analyses to be reported on in USR

PRELIMINARY RESULTS

- Shoreline erosion processes
  - Undercut banks, slides, slumps, raveling, rills, gullies, trampling
- Factors affecting shoreline erosion
  - Wave action, reservoir fluctuations, frost, seeps, recreation use, road runoff, shoreline development

PRELIMINARY RESULTS (CONT.)

- Detailed maps showing 1990 and 2021 eroding areas, GIS data & photographs available
- Ross Lake:
  - 1990-76,479 feet eroding
  - 2021-74,272 feet eroding
- Diablo Lake:
  - 1990-8,038 feet eroding
  - 2021-4,556 feet eroding



PRELIMINARY RESULTS (CONT.)

- Condition of existing erosion control measures
  - Most in good shape; three sites need major repairs
- Initial assessment of bank retreat rates
  - NPS field monitoring and 1990-2018 aerial photograph comparison showed fairly good agreement across a wide range of retreat rates
  - Additional analyses and extrapolation to other sites planned for USR

STUDY VARIANCES

- Gorge Lake fieldwork did not occur in 2021
  - Lake level and scheduling constraints
- Will occur in spring 2022 along with Ross Lake drawdown erosion field work

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Fieldwork	February – May 2022
Data entry, QA/QC, and analysis	April 2022 – February 2023
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

GE-03 RESERVOIR DEPOSITION STUDY

Initial Study Report Meeting

Kathy Dubé | March 22, 2022

STUDY GOALS AND OBJECTIVES

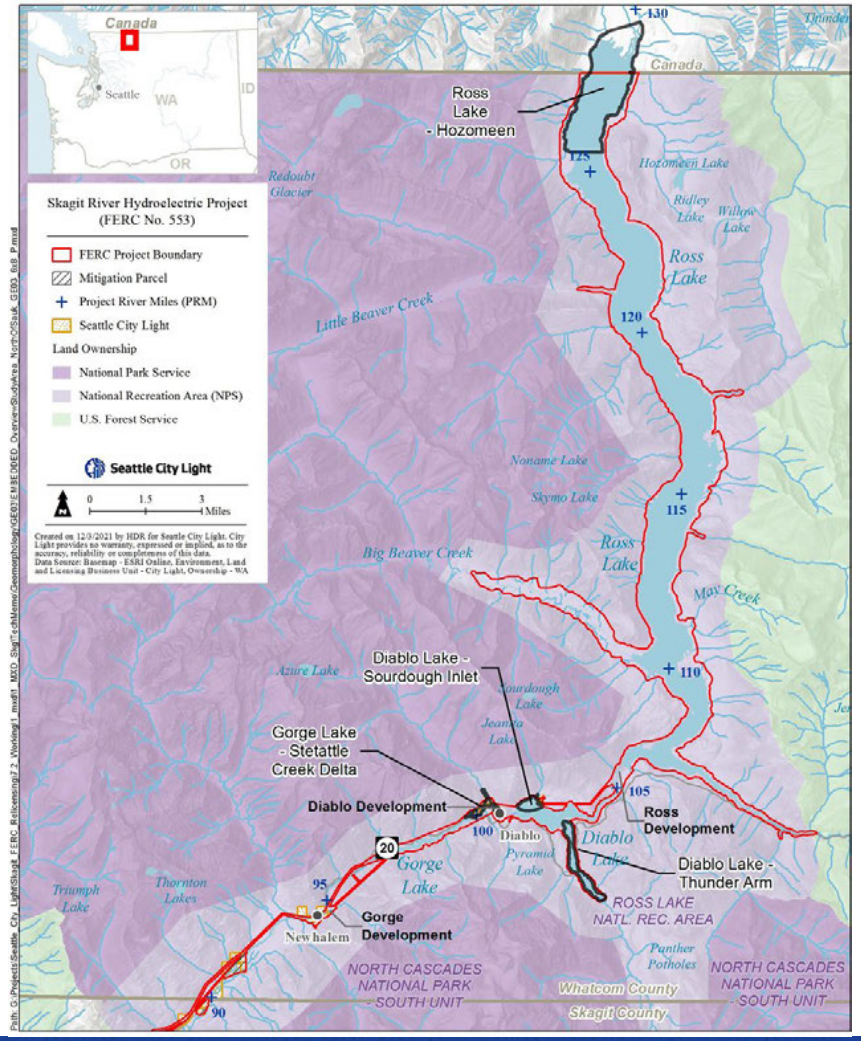
- Goal: evaluate the effects of reservoir deposition on four delta/inlet locations:
  - Hozomeen Inlet (Ross Lake)
  - Sourdough Creek (Diablo Lake)
  - Thunder Arm (Diablo Lake)
  - Stetattle Creek (Gorge Lake)
- Objectives:
  - Describe and map location and history of sediment deposition
  - Determine rate and grain size of sediment input
  - Identify likely future deposition zones/patterns with respect to recreation and operation impacts

STUDY GOALS AND OBJECTIVES (CONT.)

- SPD modifications:
  - None
- NOA commitments:
  - Quantify sediment supply by grain size in Ross, Diablo, Gorge as an average annual rate using DHSVM, historical contours, and updated bathymetry
  - Assess deposition and erosion in Ross Lake drawdown zone:
    - Combined GE-01 & GE-03 effort
  - Use 1-D backwater model to estimate magnitude and location of reservoir backwater effects in four study deltas as appropriate

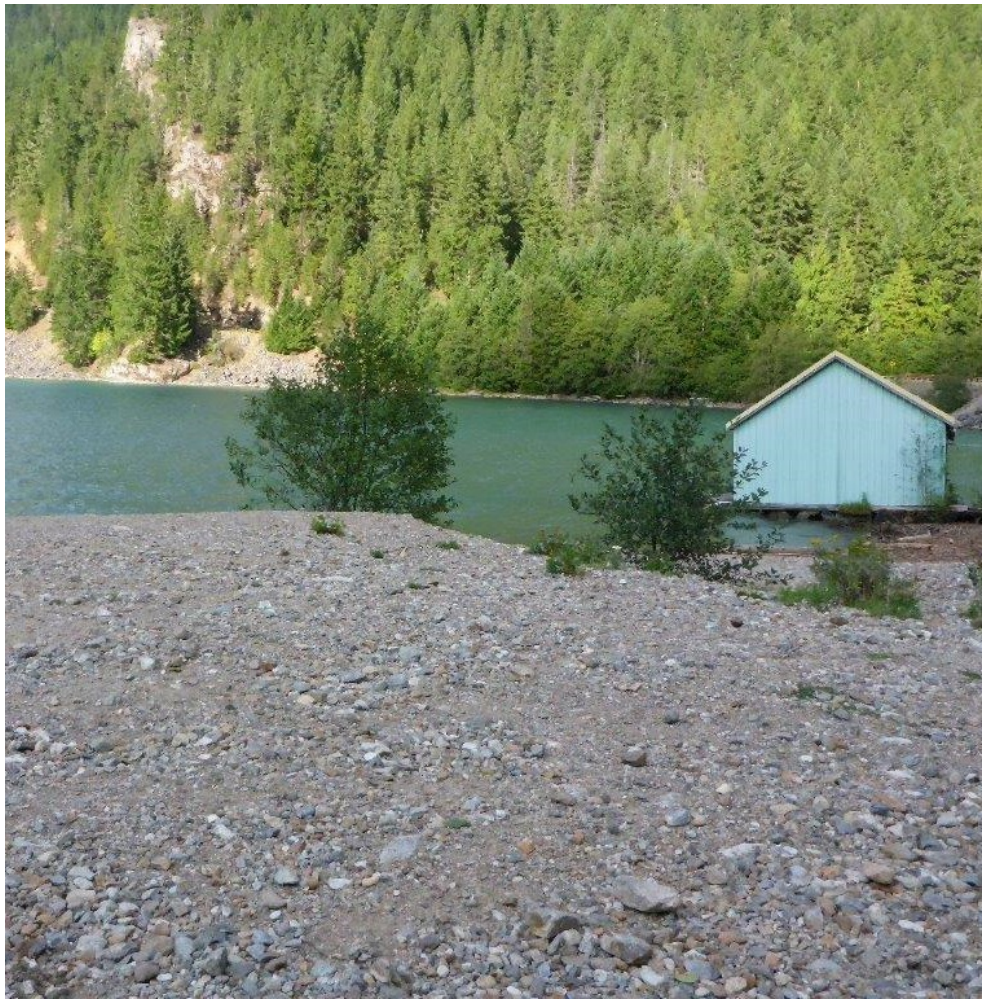
STUDY AREA

- Four delta/inlet areas:
  - Hozomeen
  - Thunder Arm
  - Sourdough
  - Stetattle Creek
- NOA:
  - Normal drawdown zone of Ross Lake



STUDY METHODS

- Implemented:
  - Field data collection in four delta/inlets
    - Surficial substrate mapping
    - Pebble counts
    - Stream profiles/cross sections
  - Stetattle Creek deposition rates/transport analysis



STUDY METHODS (CONT.)

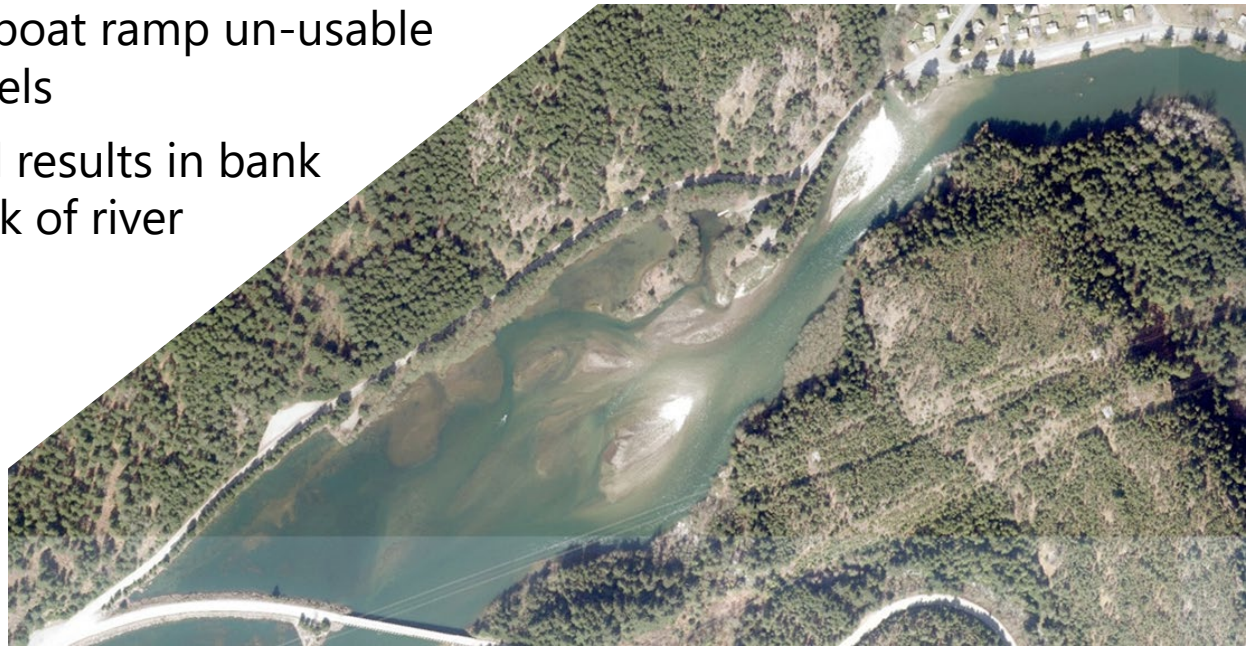
- To be implemented in 2022:
  - Collect and analyze bathymetry in reservoirs
  - Map deposition in Ross Lake drawdown zone
    - NOA
    - Coordinated with GE-01 Reservoir Erosion Study
  - Estimate reservoir deposition amounts/rates/grain size
  - Analyze transport/deposition/backwater effects in Hozomeen, Thunder, Sourdough
  - Future deposition amounts/patterns
  - Further analyses to be reported on in USR

PRELIMINARY RESULTS

- Hozomeen area:
  - Little deposition, primarily fine-grained, not an issue for boat ramps
- Thunder Arm:
  - Thunder Creek – deposition during 2003 flood resulted in deposition/upstream riparian vegetation impacts
  - Rhode/Colonial Creek active alluvial fans affect boat house/boat ramp/campground
- Sourdough Creek:
  - Active alluvial fan crosses road, deposition at beach/ City Light boathouse

PRELIMINARY RESULTS (CONT.)

- Stetattle Creek
  - Primary delta (cobble/boulder at mouth of creek)
    - Diablo Powerhouse tailwater
  - Secondary delta (cobble/gravel/sand upstream of Highway 20)
    - Deposition makes boat ramp un-usable during low lake levels
    - Mid-channel island results in bank erosion on left bank of river



STUDY VARIANCES

- Field work, analyses, and reporting will extend into 2022
- Existing LiDAR in Thunder Creek and Skagit River in the Hozomeen area will be used for analysis
  - Sufficient detail (do not need field-surveyed topography)

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Fieldwork	February–May 2022
Data entry, QA/QC, and analysis	April 2022 – February 2023
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

GE-04 GEOMORPHOLOGY STUDY

Initial Study Report Meeting

Andy Haas | March 22, 2022

STUDY GOALS AND OBJECTIVES

Goals

- Characterize current condition of aquatic habitat
- Characterize how Project-related changes in peak flows affect geomorphic processes

Objectives

- Use aerial photographs, LiDAR, and field data to characterize channel patterns, distribution of aquatic habitat, side channels/off-channel habitat, substrate, sediment delivery, and large wood
- Determine flow rates that result in redd scour
- Investigate process flows that result in geomorphic and habitat change

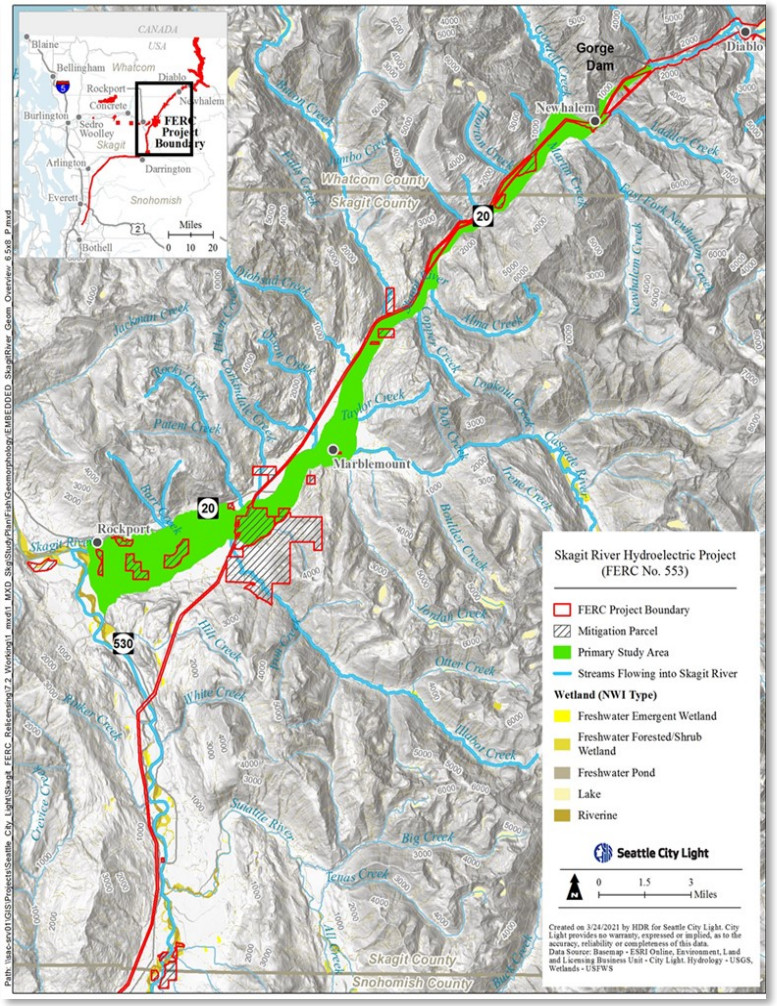
JUNE 9, 2021 NOTICE ADDITIONAL COMMITMENTS*

- Develop a one-dimensional (1-D) HEC-RAS model for stream flow from the Sauk River to the estuary
- Extend sediment transport models to incorporate reaches downstream of the Sauk River confluence
- Inventory and describe the fate of large woody debris (LWD) that enters the three Project reservoirs
- Calibrate sediment transport models to at least the 10-year recurrence interval
- Deploy a network of continuous data loggers monitoring stage in off-channel floodplain habitats
- Assess the feasibility of sediment and wood augmentation
- Quantify sediment supply into Ross Reservoir as an annual rate

** Note: This list captures the "high-level" commitments associated directly with implementation of the GE-04 Geomorphology Study. A full accounting of the of the commitments identified in the June 9, 2021 Notice can be found in Section 6 of the ISR.*

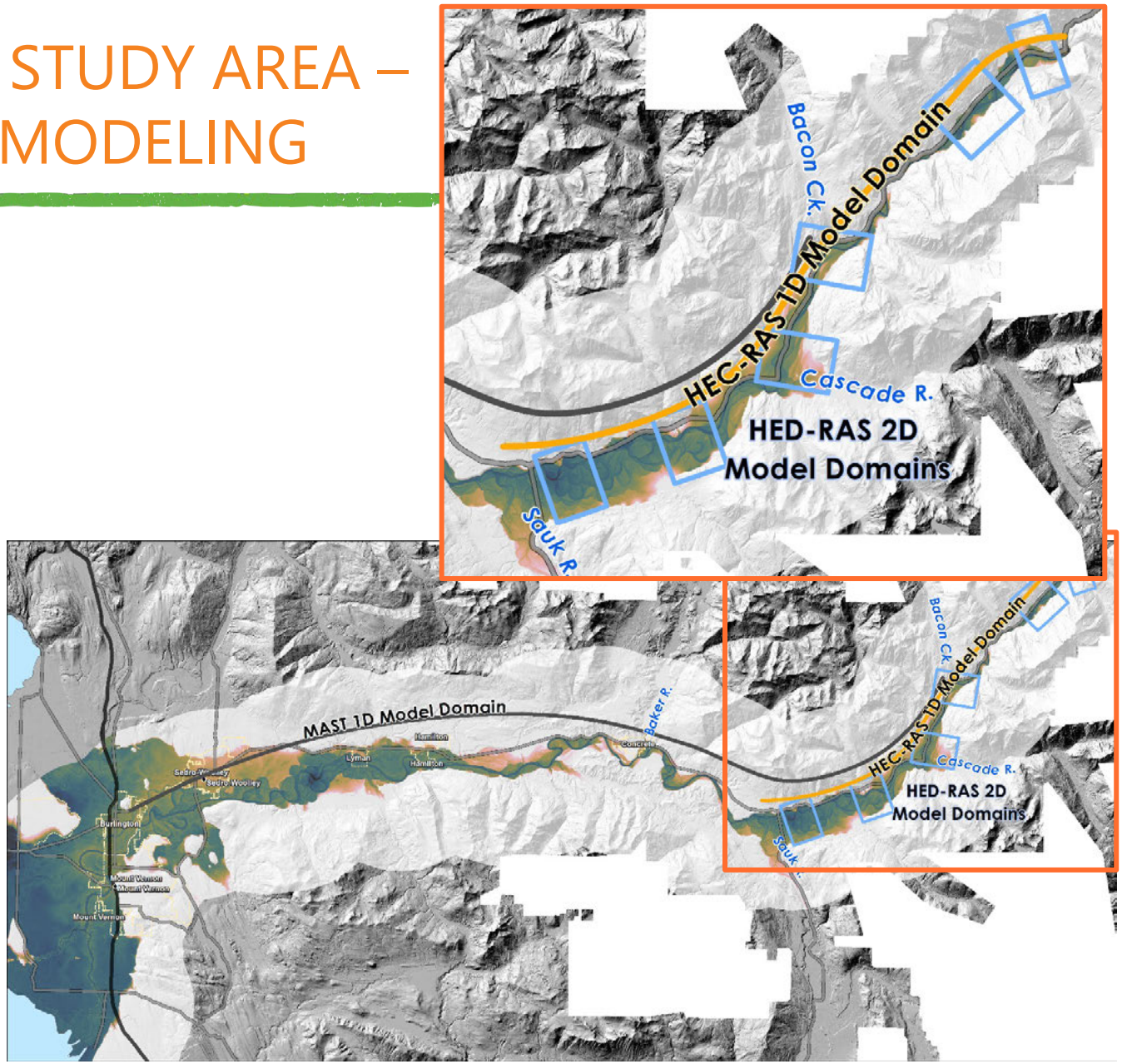
PRIMARY STUDY AREA

- 30-mile segment of the Skagit River between Gorge Dam and the Sauk River confluence
- Side channels and off-channel habitat



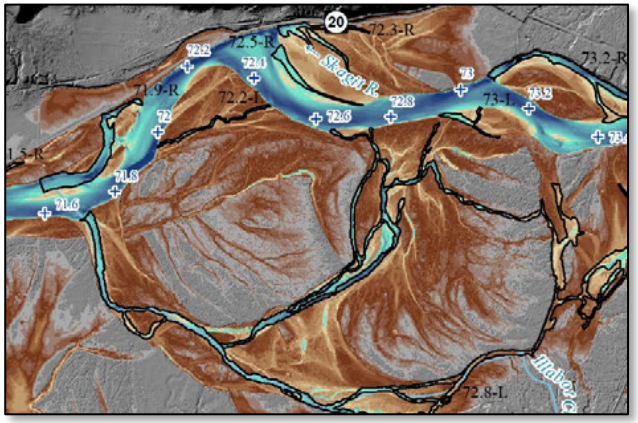
EXPANDED STUDY AREA – SEDIMENT MODELING

- **UBCRM**
  - Systematic Application
- **RAS 1D**
  - Reaches 2-7
- **RAS 2D**
  - Subreaches
- **MAST 1D**
  - Bacon Ck to Gravel-Sand Transition



METHODS – GEOMORPHIC CHANGE

- Active channel areas and channel evolution
  - Mapped using LiDAR and aerial photos time series 1944-2019
  - Width, sinuosity, and braiding intensity
  - Relative elevation map to analyze channel evolution (2022)



- Lateral channel migration rates
  - Identified using Ecology's Channel Migration GIS Toolbox
  - Compared to peak flow conditions, changes to sediment inputs and large wood loading
- Bank erosion
  - Field mapped location and grain size
  - Used with channel migration analysis to estimate bank erosion sediment input (2022)
- Aggradation and incision
  - Trends evaluated (2022)
- LiDAR (2022) to assess geomorphic change resulting from 2021 flood

METHODS – AQUATIC HABITAT

- Mainstem, side channel and off-channel habitat
  - Unit classification and boundaries delineated
  - Field survey to validate unit classification and boundaries
  - Metrics consistent with Puget Sound Status and Trend Monitoring Program
  - 56 side channels and off-channel sites identified in consultation with LPs (July 2021)
- Tributaries
  - Assess potential fish passage issues at tributary mouths
  - Low flow field surveys in the lower 500 feet
- FA-02 Instream Flow Model Study Integration – velocity, depth, cover
  - Incorporate large wood, fish cover and substrate data (2022)
  - Evaluate and quantify habitat conditions for salmonid rearing and spawning
  - Hydraulic conditions will be used to evaluate connectivity, availability of side and off-channel habitats at various flows and conditions

METHODS – SEDIMENT AND SUBSTRATE

- Bed sediment material characterization
  - Wolman pebble counts of surficial material
  - Bulk samples of the material below surficial armor layer
  - Facies mapping covering the active channel

- Evaluation of bed material mobility and further analysis of grainsize data will be completed:
  - In conjunction with development of the sediment transport modeling program
  - Following completion of the FA-02 Instream Flow Modeling Study

- Interpretation and analysis of pebble count lithology data ongoing and will be reported on in the USR

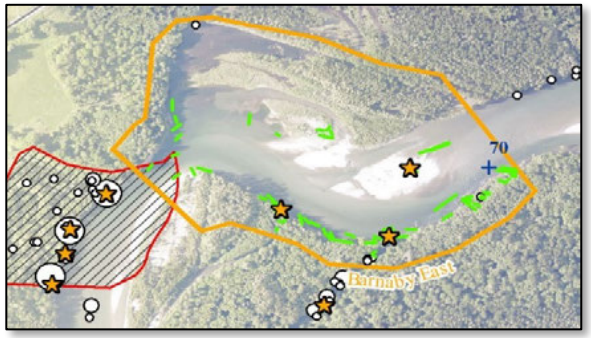
METHODS – SEDIMENT TRANSPORT

- Sediment transport modeling program identified in collaboration with LPs (2022)
  - UBCRM – assess river hydraulic geometry and propensity for side channel or multi-channel morphologic adjustments based on prescribed hydrologic and sediment loading scenarios
  - HEC-RAS 1D - quantify long-term channel bed and hydraulic profiles of the Skagit River
  - HEC-RAS 2D - quantify erosion and deposition processes related to key morphologic and habitat features identified at six subreaches identified in collaboration with LPs
  - MAST 1D - quantify width adjustments of the Skagit River to existing and potential future flow release scenarios and evaluate patterns of bed material mobility downstream of Sauk River
- Scour monitors installed at 19 spawning locations 2019-2021
- RFID-tagged sediment tracer particles deployed at 6 locations in early Nov 2021
- WSDOT bedload measurements and acoustic bedload monitoring
- A multiple linear regression model to estimate fine sediment yield above Project

METHODS - LARGE WOOD INVENTORY AND TRANSPORT

- Large Wood Inventory Skagit River Above Sauk River Confluence
  - Historical aerial analysis of changes in large wood from 1979-2019
  - August 2021 field survey of large wood and log jams in the Skagit river, 56 side channels and 20 tributaries
  - Detailed field surveys in ten half-mile reaches

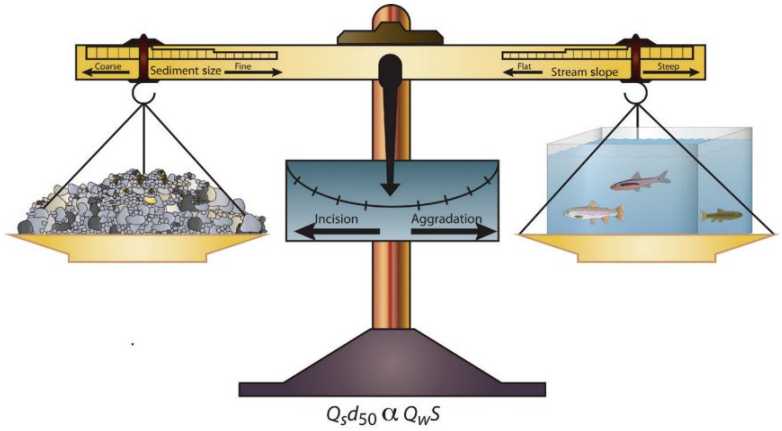
- Large Wood Tracking and Transport
  - Install RFID tags on 200 pieces of wood in mainstem, tributaries, side channels, and aggregate pond wood to track movement
  - Large wood transport analysis to be completed in 2022 in coordination with FA-02 Instream Flow Model



- Large Wood Recruitment
  - Determine large wood bank recruitment potential
  - Large wood recruitment analysis will use channel migration zones, current erosion rates, and riparian zone data from TR-01
- Large Wood Augmentation
  - Per the June 9, 2021 Notice, locations and methods for wood augmentation will be developed

METHODS – PROCESS FLOWS

- Process flows will be evaluated in 2022 utilizing IHA software
  - Integrate data from hydraulic models, sediment transport models, and scour monitoring
  - Analyze initiation of bedload movement at banks, tributary mouths, and side channels
  - Predict connectivity of side channels and off channel habitat at various flows
- Process flows will be determined and analyzed in 2022 as part of an iterative process involving other study teams and LPs



From Lane, E. W. (1955).

PRELIMINARY RESULTS – GEOMORPHIC CHANGE

Completed Work

- Low rates of channel migration (<0.5 ft/yr) in most reaches; moderate rate of channel migration (4 ft/yr) in Reach 6 (Rocky Creek to Sauk River)
- Total length of side channel relatively stable over time
- River complexity index relatively stable over time

Next Steps

- Estimation of sediment inputs from bank erosion
- Evaluation of vertical channel changes with comparison to previous survey and analysis of USGS gaging records
- Geomorphic change mapping incorporating 2022 LiDAR

PRELIMINARY RESULTS – AQUATIC HABITAT

Completed Work

- Glide habitat most prevalent by surface area followed by off-channel habitat
- Reach 6 provides the largest amount of habitat, highest unit density, largest pool area and area of side channel and off-channel habitat
- Reach 2B has the highest habitat diversity, high pools per channel width, and a large proportion of side channel and off-channel habitat by area
- No tributaries were found to present passage barriers to adult salmon

Next Steps

- Integration of substrate and cover data into habitat analysis
- Evaluation of Reach 1 (Bypass Reach) using results from FA-05
- Evaluation of results of the hydraulic model (FA-02) for additional information on habitat function, edge habitat analysis, average and bankfull depth

PRELIMINARY RESULTS – SIDE CHANNELS AND OFF-CHANNEL HABITAT

Completed Work

- 56 features identified: side channels (26 perennial, 15 seasonal, 4 inactive); off-channel habitat (5 perennial, 2 seasonal); both (4 features)
- Most reaches relatively stable except for Reach 6 which has been increasing in both quantity and quality

Next Steps

- Integrate substrate and cover data into habitat analysis
- Further analyze hydrologic data over the timeframe of the retrospective analysis as one causal factor for increases and decreases in floodplain habitat
- Integrate with hydraulic model (FA-02) for additional information on habitat function and connectivity
- Integrate side channel analysis with hydraulic model, geomorphic channel change, and sediment transport modeling for process flow evaluation

PRELIMINARY RESULTS – SUBSTRATE/SEDIMENT

Completed Work

- 43 bulk samples and 51 lithologic-specific pebble counts
- Sediment at the bar-head predominantly composed of cobble and gravel, with moderate spatial variability at the reach-scale
- Surface pebble count results indicate D50 values typically of 64 to 91 mm and D84 values in the range of 91 to 128 mm
- Grainsize distribution of the subsurface material dominated by gravel-sized material, with characteristic D50 values ranging from 20 to 50 mm

Next Steps

- Evaluation of bed material mobility and further analysis of grainsize data will be completed in conjunction with the sediment transport modeling program and following completion of the FA-02 Hydraulic Model

PRELIMINARY RESULTS - LARGE WOOD INVENTORY AND TRANSPORT

Completed Work

- Aerial analysis 1979-2019. Similar distribution with increase in numbers
- 4,084 large wood pieces and 80 jams (59% of wood in jams)
- Significantly higher density of wood in side channels
- Pools associated with larger diameter wood with rootwads
- RFID tags installed on 184 large wood pieces. Significant movement during high flows

Next Steps

- Continued historical analysis of large wood
- Aerial imagery wood survey of Gorge Bypass reach and Shovel Spur rapids
- Install remaining RFID tags and continue to track large wood movement
- Complete large wood transport and recruitment analysis
- Conduct a large wood augmentation analysis

STUDY VARIANCES

Aquatic Habitat

- Tributary analysis methods were modified to include multiple metrics (instead of just depth) to assess passage barriers, consistent with methods described in the WDFW Fish Passage Manual (2019).

Bulk Sample Volume and Hybrid Grainsize Classification Method

- In consultation with LPs, the hybrid approach of Rice and Haschenburger (2004) was added to ensure that bulk samples appropriately represent the grainsize distribution of coarse material.

Sediment Transport Modeling Program

- A modeling program to fulfill the RSP and the June 9, 2021 Notice was developed in collaboration with LPs during a series of workshops held on July 20, July 27, September 28, and November 9, 2021.

Large Wood

- Large wood will be inventoried in the Gorge Bypass reach using high resolution drone imagery and large wood will be inventoried in the Shovel Spur rapids reach using 2021 aerial images as opposed to field inventories.

- An initial inventory of large wood using filtered LiDAR was not completed because the available LiDAR data was not high enough resolution to delineate large wood features. Large wood was instead inventoried using only aerial images.

STUDY SCHEDULE

Milestone	Date
LP Workshops	Monthly
City Light files Initial Study Report	March 2022
2022 Fieldwork	Feb 2022-September 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

GE-02 EROSION AND GEOLOGIC HAZARDS AT PROJECT FACILITIES AND TRANSMISSION LINE RIGHT-OF-WAY STUDY

Initial Study Report Meeting

Kathy Dubé | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Goals:
  - Characterize where Project activities are affecting erosion, mass wasting, and runoff that could affect other resources
  - Determine where existing erosion, mass wasting, channel migration/bank erosion have the potential to affect Project facilities

STUDY GOALS AND OBJECTIVES (CONT.)

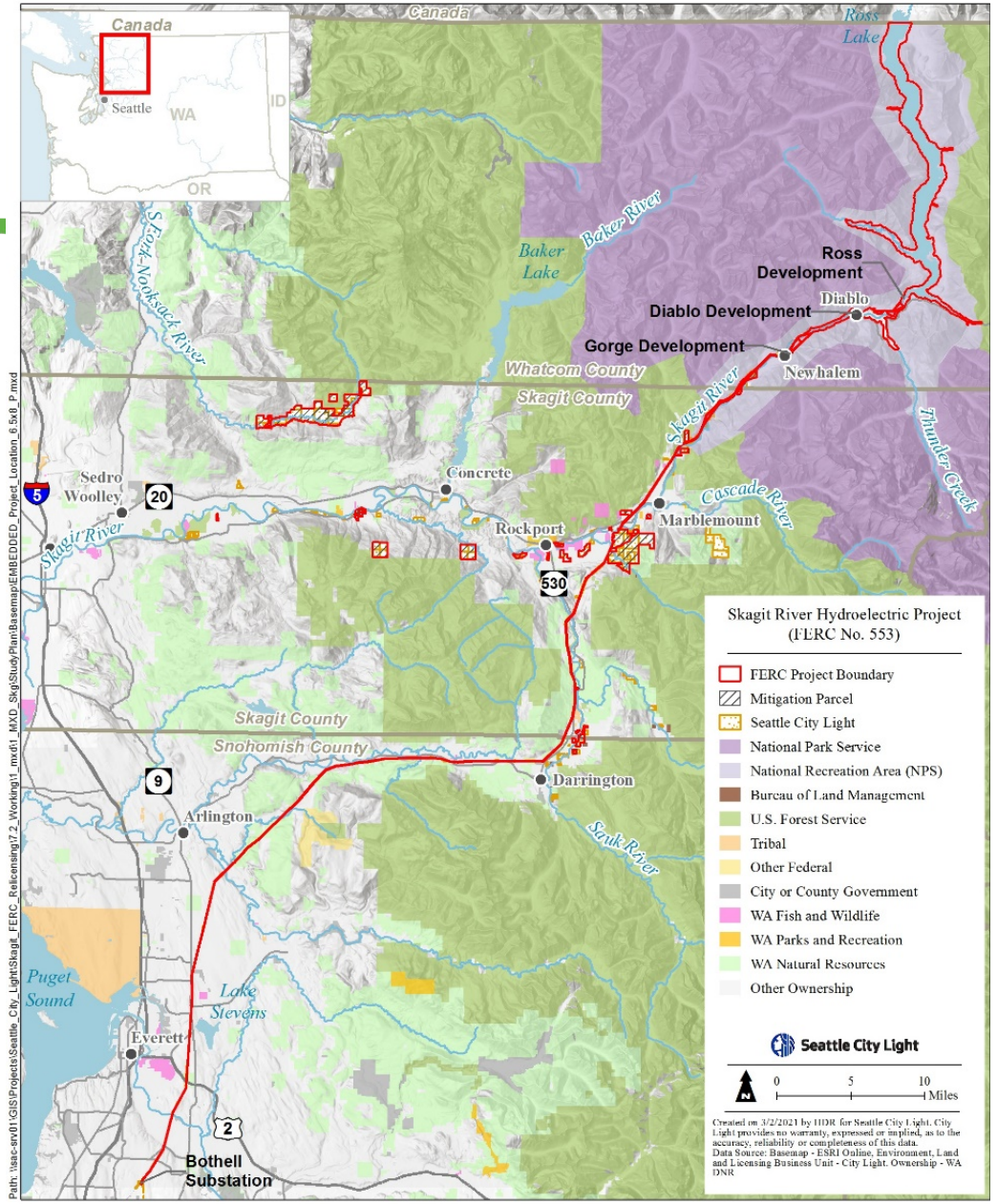
- Objectives:
  - Identify, map, inventory areas of erosion, runoff, mass wasting, culvert condition affected by Project facilities, routes, townsites, or transmission towers
  - Identify where Project maintenance activities along the T-line and study routes have the potential to cause erosion, sedimentation, or altered hydrologic connectivity to water bodies

STUDY GOALS AND OBJECTIVES (CONT.)

- Objectives (cont.):
  - Identify current instream and riparian habitat conditions at T-line stream crossings where channel migration, bank erosion, or mass wasting are potentially affected by Project O&M
  - Identify mass wasting and channel erosion hazards that could affect Project facilities, routes, or transmission towers
  - Characterize study route-stream crossing structures so that hydraulic capacity, erosion, fish passage can be assessed

STUDY AREA

- Land within the Project Boundary from Ross Dam to the Bothell Substation
  - Mass wasting expanded to encompass steep slopes surrounding transmission line ROW and City Light's assets
- Shorelines (Ross, Diablo, and Gorge lakes) are covered in GE-01



STUDY METHODS

- Implemented:
  - Mass Wasting:
    - Review existing information
    - Identify and map past/existing mass wasting features
    - Landslide and rockfall susceptibility analyses
  - Erosion and Runoff from Project-Related Townsites and Study Routes:
    - Review existing information and pre-field analysis*
    - Phase I: study route field inventory*
    - WA Road Surface Erosion Model (WARSEM)

* = task continuing into 2022

STUDY METHODS (CONT.)

- Implemented (cont.):
  - Channel Migration and Stream Crossings
    - Compilation of transmission line maintenance procedures near stream crossings*
    - Project-related townsite streambank conditions

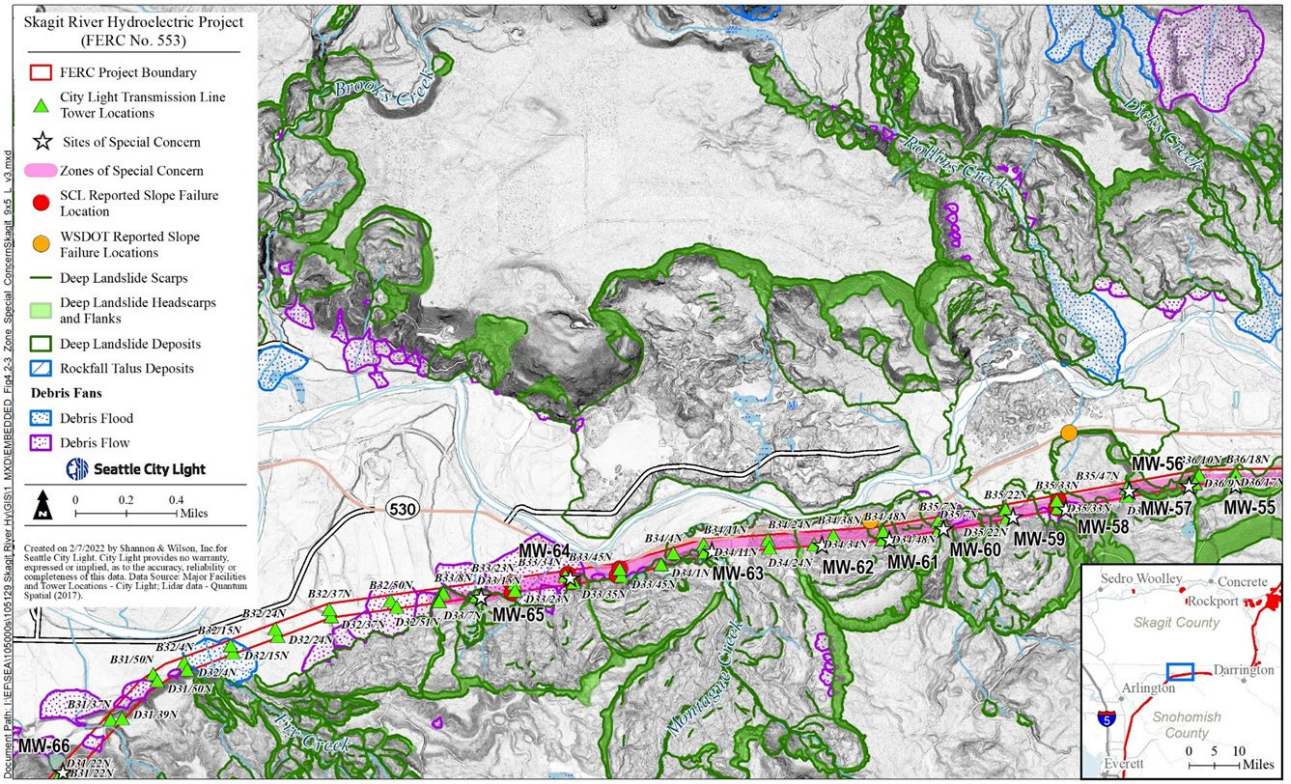
* = task continuing into 2022

STUDY METHODS (CONT.)

- To be implemented in 2022:
  - Erosion and Runoff from Project-Related Townsites and Study Routes
    - Phase II: fish passage assessment at road/stream crossing structures
  - Channel Migration and Stream Crossings
    - Channel migration analysis
    - Stream/riparian/bank condition at channel migration zone and transmission line maintenance locations

PRELIMINARY RESULTS – MASS WASTING

- Existing mass wasting features
- Future susceptibility analysis
- Summary of areas of special concern



PRELIMINARY RESULTS – TOWNSITES AND STUDY ROUTES

- Erosion and Runoff from Project-Related Townsites and Study Routes
  - Inventory of townsite roads and study routes (124 miles)
    - Culverts (158), bridges (7), fords (4)
      - Condition, dimensions
      - Stream/no stream; potential fish bearing
    - Road function issues (surfacing, grading, drainage)
    - Estimate of surface erosion from hydrologically connected road/trail segments

PRELIMINARY RESULTS – CHANNEL MIGRATION AND STREAM CROSSINGS

- Channel Migration and Stream Crossings
  - Summary of T-line maintenance procedures near stream crossings
  - Assessment and maps of streambank condition in townsites – hydrologic modifications

STUDY VARIANCES

- Study plan schedule has been modified to fulfill study goals and objectives with fieldwork in 2022

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Fieldwork	February – September 2022
Data entry, QA/QC, and analysis	March 2022 – February 2023
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

TR-01 VEGETATION MAPPING STUDY

Initial Study Report Meeting

Rory Denovan | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Goal:
  - Develop a complete and systematic vegetation mapping geographic information system (GIS) database

STUDY GOALS AND OBJECTIVES (CONT.)

- Objectives:
  - Compile existing information and use remote sensing to develop model to map vegetation to USNVC* Group level
  - Provide supplemental information on:
    - WDFW Priority Habitats and Species (PHS)
    - Species of Greatest Conservation Needs (SGCN)
    - Species of concern to NPS
    - Important Tribal resources

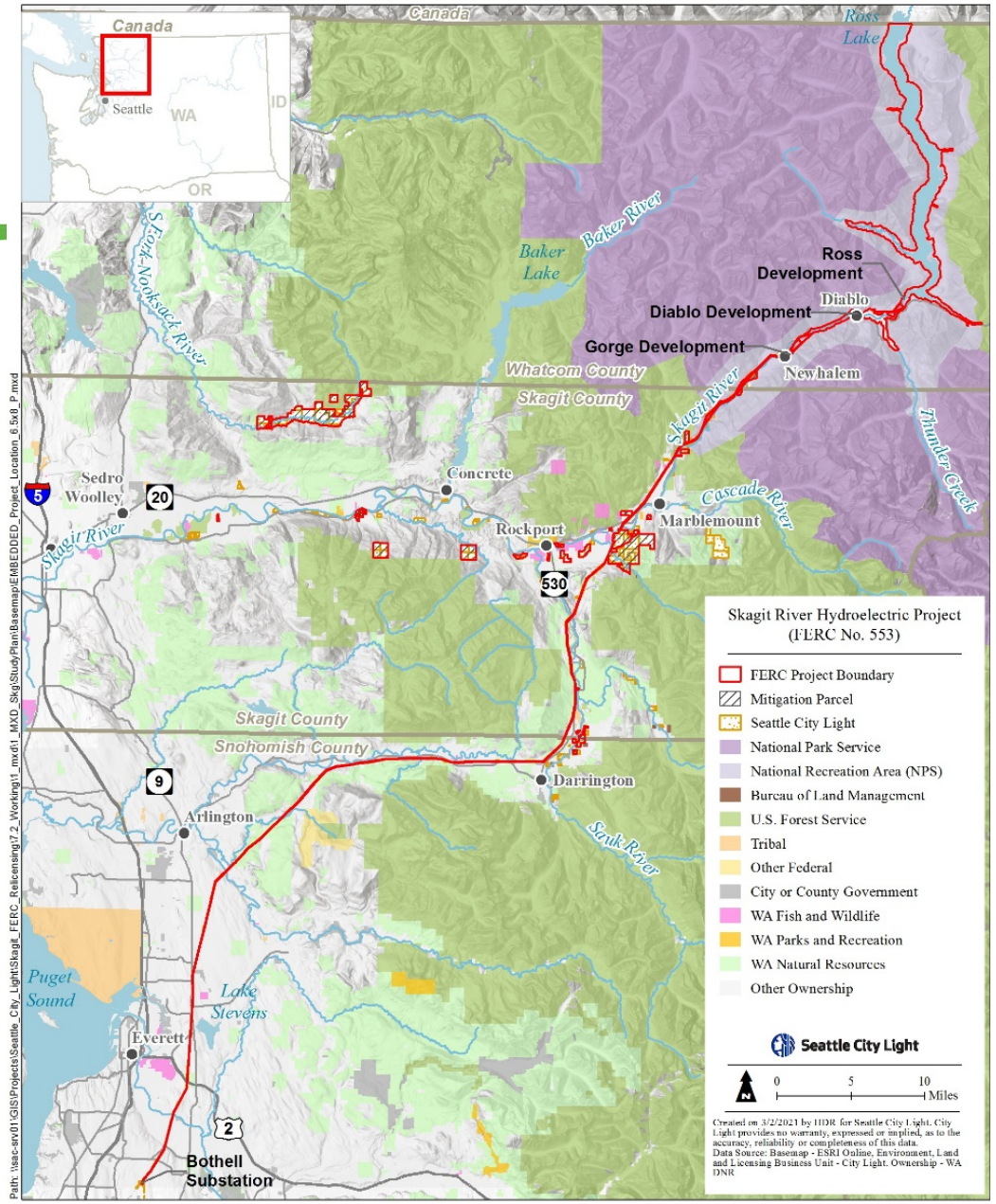
* = U.S National Vegetation Classification

STUDY GOALS AND OBJECTIVES (CONT.)

- SPD modifications:
  - None
- NOA commitments:
  - Proposed no changes

STUDY AREA

- Land within the Project Boundary and a 0.5-mile buffer
- Channel migration zone (CMZ) from Gorge Powerhouse to the confluence of Sauk and Skagit rivers



STUDY METHODS

- Implemented:
  - Compile and review existing data
  - Develop model
    - Conduct field assessments
    - Model verification
    - Accuracy assessment
  - Correlation to WDFW Priority Habitats and Species (PHS) and State Wildlife Action Plan (SWAP) habitats
  - Develop and finalize vegetation map

RESULTS

- Total of 35 unique cover types were mapped in the study area
  - 10 USNVC upland groups
  - 8 USNVC riparian and wetland groups
  - 3 USNVC cultural groups
  - 1 USNVC modified cultural cover type
  - 2 'other' vegetated cover types
    - (i.e., grass-dominated and recently burned)
  - 3 non-vegetated cover types
  - 8 custom cover types created to classify modified vegetation along the transmission line ROW

RESULTS

- Dominant cover types throughout the study area:
  - North Pacific Maritime Douglas-fir – Western Hemlock Rainforest Group (G240)
  - North Pacific Red Alder – Bigleaf Maple – Douglas-fir Rainforest Group (G237)

RESULTS

- G240 (Douglas-fir – Western Hemlock)
  - 58% of vegetation within RLNRA
  - 41% of vegetation outside RLNRA
  - 75% of mitigation lands
- G237 (Red Alder – Bigleaf Maple – Douglas-fir)
  - 14% of vegetation within RLNRA
  - 28% of vegetation outside RLNRA
  - 12% of mitigation lands
- G240 contained the highest percentage of tall trees (> 90 feet) based on the canopy height model

RESULTS

- North Pacific Lowland Riparian Forest and Woodland Group (G851)
  - Dominant riparian/wetland USNVC cover type in RLNRA
  - Majority of this cover is in Big Beaver Valley
  - Dominant riparian cover type outside of the RLNRA (along transmission line ROW) and in mitigation lands

RESULTS

- Based on WDFW Priority Habitat and Species (PHS) data, one priority habitat and 20 priority species are mapped within the study area
  - Most occurrences in G237 and G240 cover
- WDFW State Wildlife Action Plan (SWAP) data maps habitat ranges of 23 Species of Greatest Conservation Need (SGCN)
- Survey crews recorded 1,311 individual occurrences of 118 culturally-important plant species

STUDY SCHEDULE

- **Study is complete**

Seattle City Light

QUESTIONS?

TR-02 WETLAND ASSESSMENT

Initial Study Report Meeting

Rory Denovan | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Goal:
  - Map and describe wetlands within the study area that may be affected by Project operations and to rate the capability of these wetlands to provide water quality, hydrologic, and habitat functions

STUDY GOALS AND OBJECTIVES (CONT.)

- Objectives:
  - Gather information on wetlands currently mapped
  - Refine existing maps derived from remote sensing and map wetlands in a uniform manner based on the USFWS' Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979)
  - Document plant species in sampled wetlands
  - Use the WA State Wetland Rating System for Western WA (Hruby 2014) to assess wetland functions and values
  - Identify possible sources of any observed impairments

STUDY GOALS AND OBJECTIVES (CONT.)

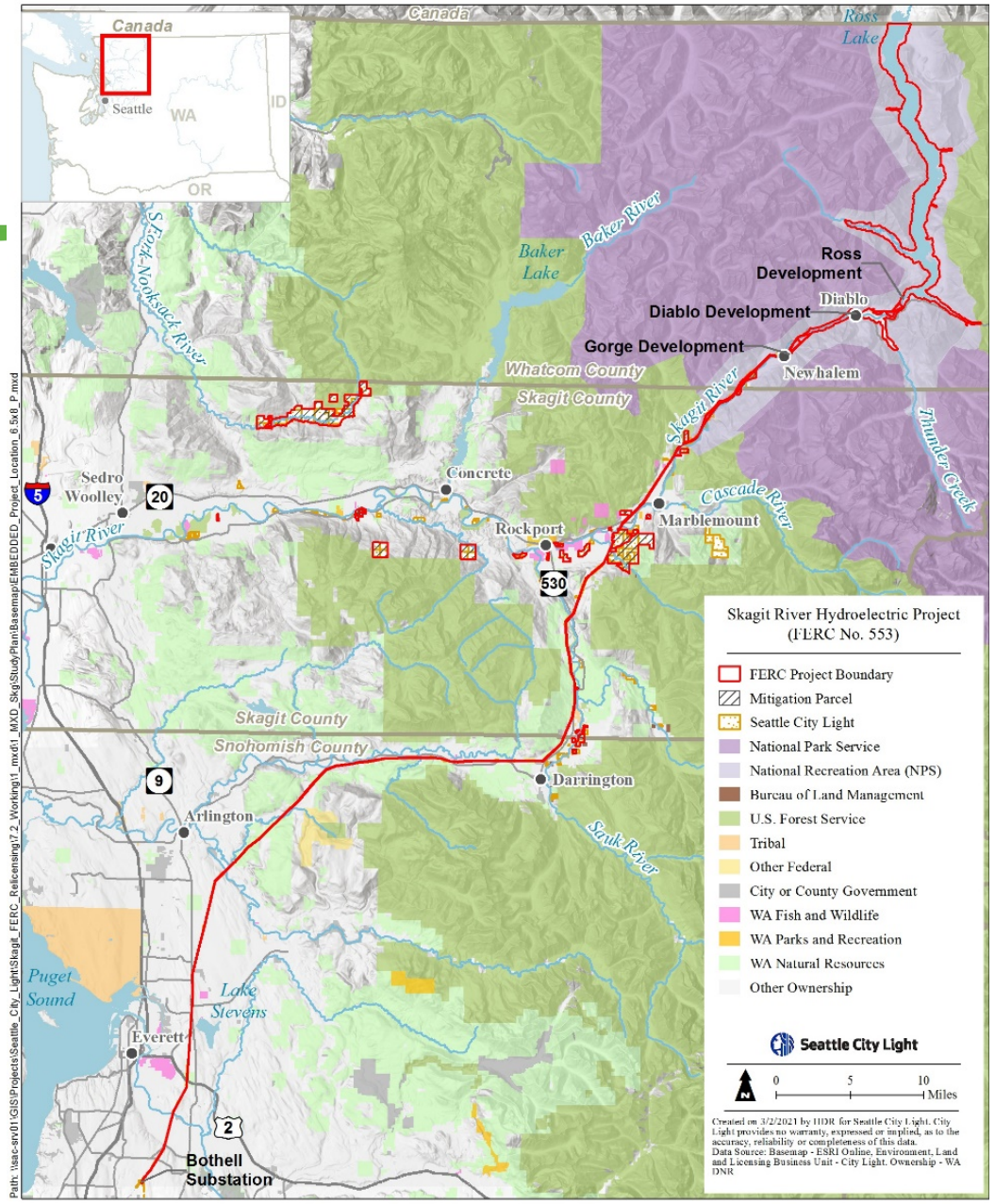
- Objectives:
  - Provide basic habitat-related data to inform other efforts:
    - RTE plants
    - Invasive plants
    - Beaver habitat
    - Amphibian habitat
    - Geomorphology
    - Fish and aquatics
  - Provide basic habitat mapping for select:
    - WDFW Priority Habitats and Species (PHS)
    - Species of Greatest Conservation Needs (SGCN)
    - Species of concern to NPS
  - Provide information for assessing important tribal resources, including forage for culturally important wildlife and plants

STUDY GOALS AND OBJECTIVES (CONT.)

- SPD modifications:
  - None
- NOA commitments:
  - Proposed no changes

STUDY AREA

- Area within the Project Boundary and the channel migration zone (CMZ)
  - Field sampling emphasized wetlands where there is the greatest potential for Project effects



STUDY METHODS

- Implemented:
  - Compile and review existing data
  - Develop model
    - Collect model training data in field
    - Run model (iterative)
    - Accuracy assessment
  - Identify potential disturbance areas
  - Wetland field assessments
  - Develop and finalize wetland map

RESULTS

- 2,540 acres of wetlands mapped in study area
  - 421 individual wetland polygons
- 1,775 acres (70%) of wetlands are within the Project Boundary
  - Remaining 765 acres (30%) are outside the Project Boundary, primarily in Skagit River CMZ portion of the study area

RESULTS

- Majority of wetlands within areas of potential project effects were Category III wetlands
- Higher rated Category II wetlands were also present throughout entire study area
  - Commonly associated with large, diverse wetland complexes that extend outside of Project Boundary
- Several Category II wetlands are also associated with various sloughs of fish and wildlife mitigation lands

RESULTS

- Reed canarygrass dominates 82% of wetlands along Ross Lake
- Wetlands at or above normal maximum water surface elevation are less diverse
- Wetlands below normal maximum water surface elevation have greater species richness

STUDY VARIANCES

- 2 Variances:
  - Some wetlands were assessed and rated remotely instead of in the field
    - At unsafe or inaccessible sites
  - Survey crews recorded the 3 dominant tree, shrub, and herbaceous species, instead of comprehensive list of all plants
    - Allowed for a rapid assessment in the field to complete the rating form
    - Enabled study team to minimize collection of data that would not feed into subsequent analyses

STUDY SCHEDULE

- **Study is complete**

Seattle City Light

QUESTIONS?

TR-03 RARE, THREATENED, AND ENDANGERED PLANTS STUDY

Initial Study Report Meeting

Rory Denovan | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Goal:
  - Provide information to determine whether, and the extent to which, certain Project operations and maintenance (O&M) activities may have the potential to adversely affect rare, threatened, and endangered (RTE) plant species

STUDY GOALS AND OBJECTIVES

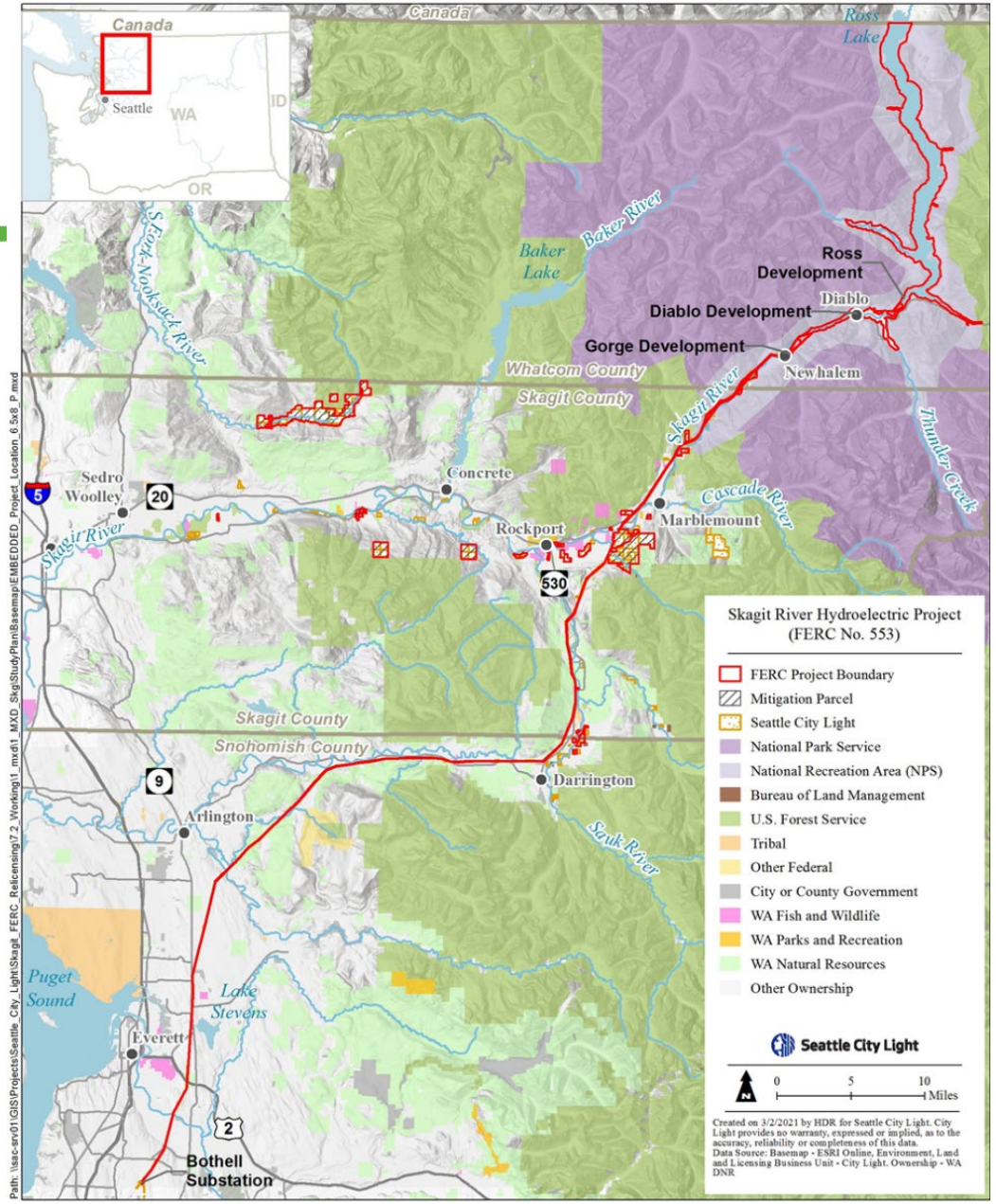
- Objectives:
  - Identify a list of RTE plant species that require protection based on federal or state regulation and that have a reasonable likelihood of occurring within the study area
  - Identify habitats with the highest potential for RTE plant species occurrence and determine where Project-related activities could have an effect on such habitats
  - Develop a confidential map depicting RTE plant species locations

STUDY GOALS AND OBJECTIVES (CONT.)

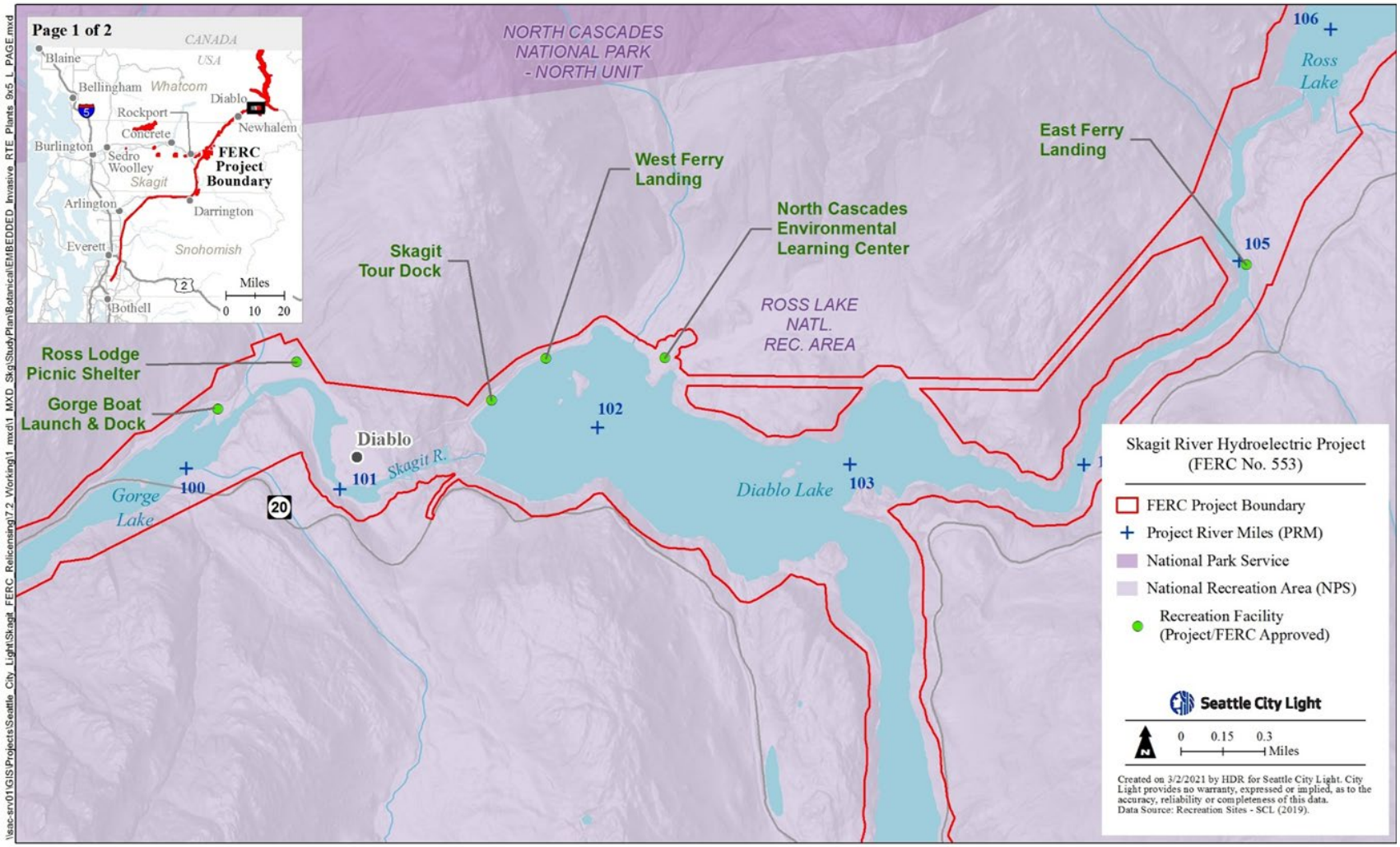
- SPD modifications:
  - None
- NOA commitments:
  - Proposed no changes

STUDY AREA

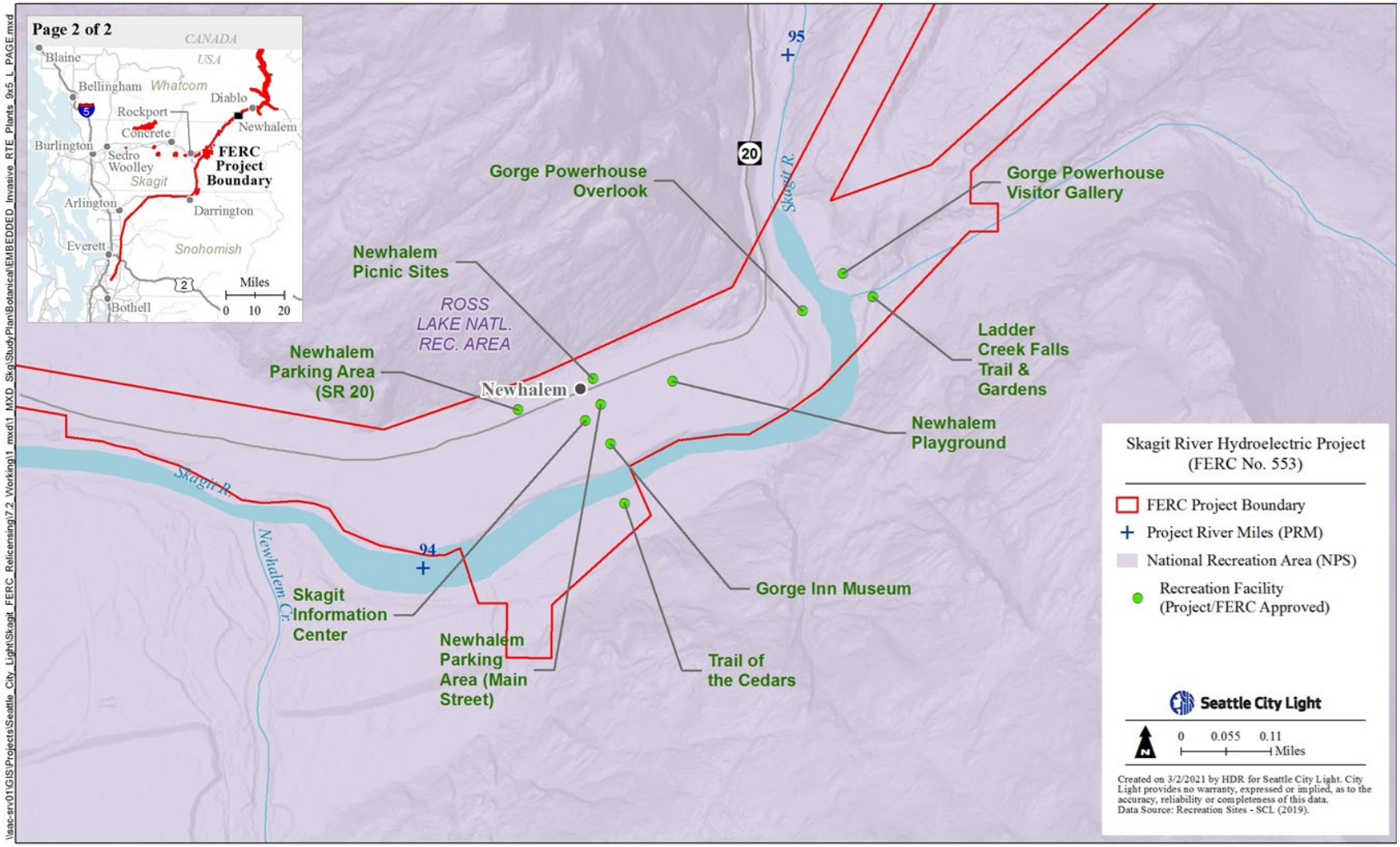
- Land within the Project Boundary that is subject to Project-related O&M and/or Project-related recreation



STUDY AREA (CONT.)



STUDY AREA (CONT.)



STUDY METHODS

- Implemented:
  - Develop target list of RTE plants
  - Gather data and prepare for field effort
  - Determine survey locations
    - where habitats coincided with areas that could be affected by Project-related activities
  - Conduct field surveys*
  - Develop map

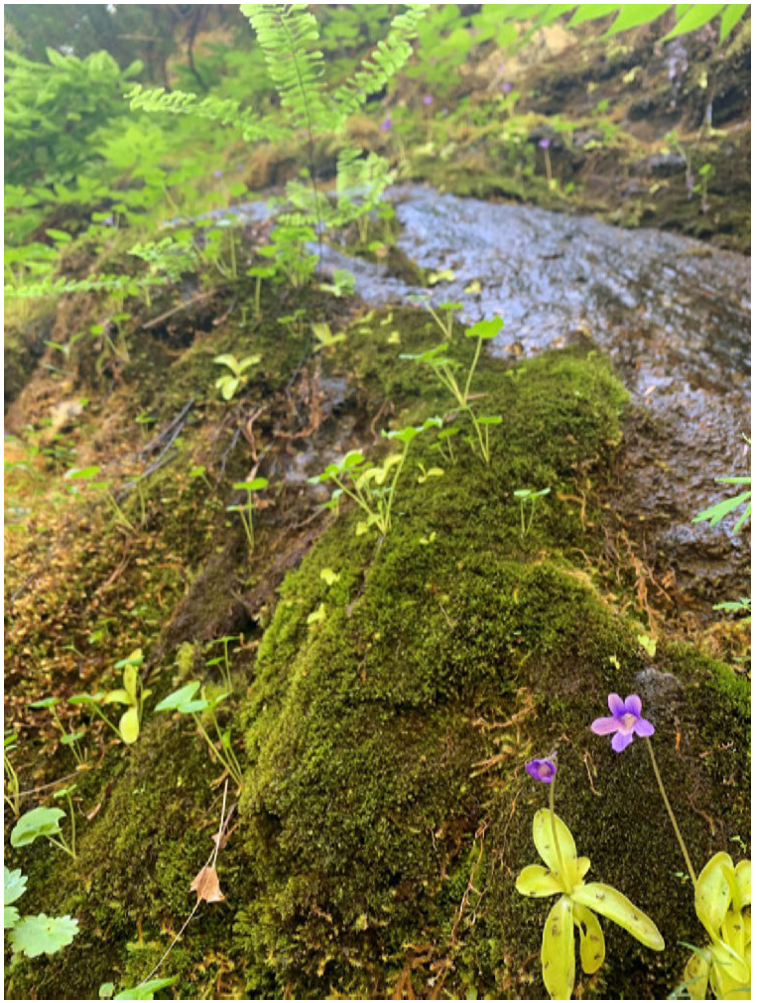
* = task continuing into 2022

STUDY METHODS

- To be implemented in 2022:
  - Field surveys at areas not visited during the 2021 field season and areas where surveys occurred outside of the peak flowering times:
    - Ross Lake Big Beaver Creek outlet
    - Diablo Lake
    - Transmission line ROW locations
    - O'Brien Slough and Finney Creek fish and wildlife mitigation lands

RESULTS

- 23 vascular plant species and two lichen species have potential to occur in the study area



RESULTS

- Higher intensity surveys conducted at:
  - 39 wetlands
  - 48 streams/riparian areas
  - 16 seeps
  - 11 upland forest areas
  - 5 upland meadows
  - 17 rocky outcrops
- No RTE plants were observed

STUDY VARIANCES

- City Light will extend field work into 2022 to fulfill the goals and objectives
  - Due to the varying phenology of the target RTE plant species, crews were unable to inspect all potentially suitable habitat at the optimal time for every target RTE plant species
  - Additional surveys are planned for 2022 to capture areas not visited during the 2021 field season and areas where surveys occurred outside of the peak flowering times

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Field planning and permitting	February – May 2022
Fieldwork	June – September 2022
Data entry, QA/QC, and analysis	September – December 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

TR-04 INVASIVE PLANTS STUDY

Initial Study Report Meeting

Rory Denovan | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Goal:
  - Document occurrences of a target list of plant species designated as invasive, which could potentially be spread by Project operations and maintenance (O&M) and Project-related recreation activities, and to assess effects

STUDY GOALS AND OBJECTIVES

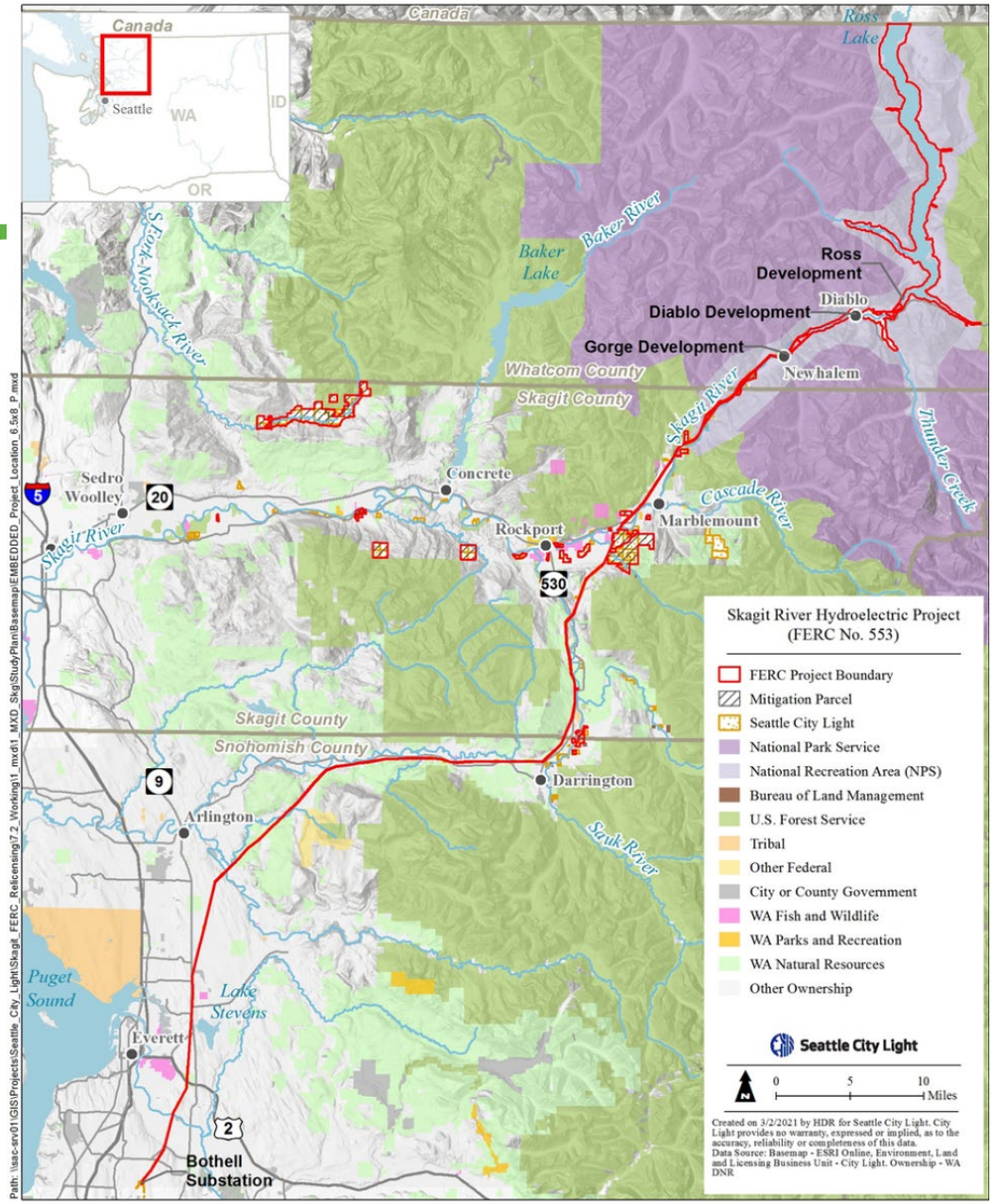
- Objectives:
  - Develop a **target list of invasive plant species** that have the potential to cause significant ecological or economic damage within the study area
  - Identify locations within the study area where there are **Project-related disturbance and pathways** for invasive plant species dispersal
  - Develop a **map depicting invasive plant species** locations, based on existing data and field verification
  - Describe the **status, distribution, likely vectors, and limiting factors** for target invasive plant species

STUDY GOALS AND OBJECTIVES (CONT.)

- SPD modifications:
  - None
- NOA commitments:
  - Proposed no changes

STUDY AREA

- Land within the Project Boundary and the banks of the Skagit River to the confluence with the Sauk River



STUDY METHODS

- Implemented:
  - Review existing information and develop target list
  - Determine survey locations
  - Gather data and prepare for the field effort
  - Conduct field surveys (at *most* locations)
  - Process and QA/QC data
  - Develop map

STUDY METHODS

- 2022 surveys at:
  - Riparian areas of the Skagit River from Gorge Dam to the confluence with the Sauk River
  - O'Brien Slough and Finney Creek mitigation lands
    - Along study routes and 50-ft buffer

RESULTS

- 2021 field efforts:
  - 45 target invasive plant species were observed
  - Recorded over 7,600 occurrences and/or populations of invasive plant species

RESULTS (CONT.)

- Reed canarygrass was observed along ~34 miles (50 percent), of the 68-mile shoreline of Ross Lake
- 9 additional target invasive species were observed along Ross Lake
  - All occurred in the drawdown zone, primarily along the northeast shore close to the Canadian border

RESULTS (CONT.)

- Twelve target invasive plant species observed along Diablo Lake
  - Individual occurrences or in small patches of fewer than 10 individuals

- Eleven target invasive plant species observed along Gorge Lake
  - Small populations comprised of fewer than 50 individuals

RESULTS (CONT.)

- Reservoirs: most prolific species or high potential to alter ecosystems
  - Ross Lake
    - Reed canarygrass (*Phalaris arundinacea*)
    - Mouse-ear hawkweed (*Hieracium pilosella*)
    - Diffuse knapweed (*Centaurea diffusa*)
    - Spotted knapweed (*C. stoebe*)
    - Canadian thistle (*Cirsium arvense*)
  - Gorge Lake
    - Common viper's bugloss (*Echium vulgare*)
    - Lesser periwinkle (*Vinca minor*)
    - Herb-Robert
    - Flannel mullein
    - Greater burdock (*Arctium lappa*)
  - Diablo Lake
    - Common tansy (*Tanacetum vulgare*)
    - Reed canarygrass
    - Spotted knapweed
    - Scot's broom (*Cytisus scoparius*)
    - Herb-Robert (*Geranium robertianum*)
    - Flannel mullein (*Verbascum thapsus*)

RESULTS (CONT.)

- Highest invasive species diversity observed in the Newhalem and Diablo townsites
  - 33 target invasive species each
- Many species introduced as landscape ornamentals are spreading

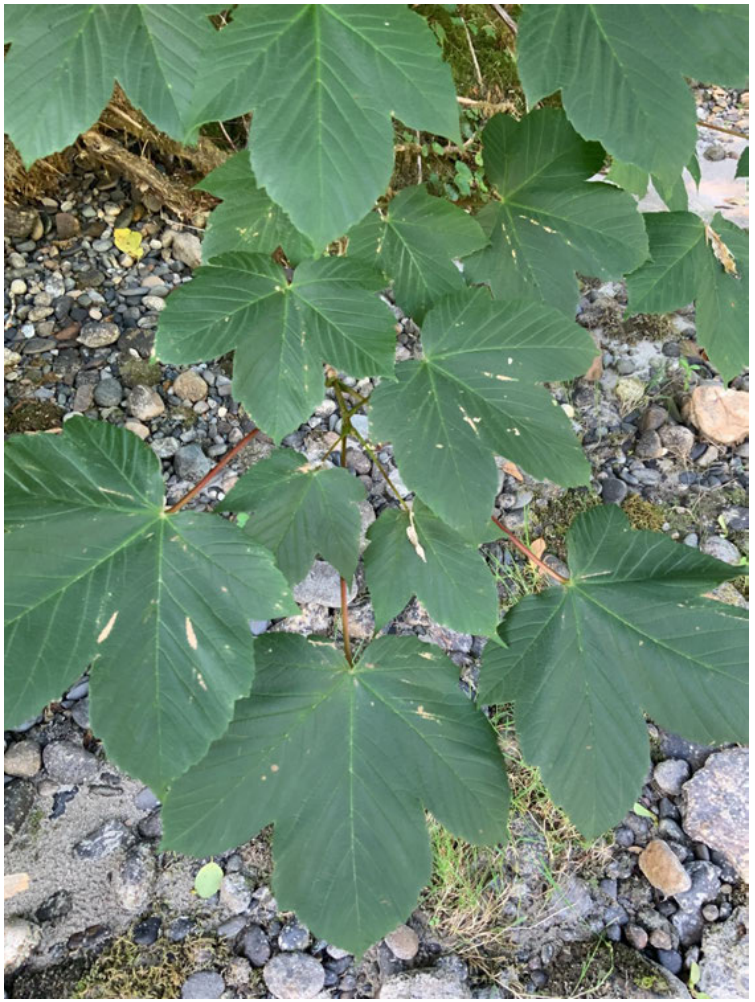
RESULTS (CONT.)

- RLNRA: T-line ROW dominated by native trees, shrubs, and forbs
  - Invasive cover most dense near T-line towers

- Outside RLNRA: populations of invasive plant species were larger and more frequent

RESULTS (CONT.)

- Sycamore maple: furthest downstream occurrence at ~PRM 87.5 (between Damnation and Alma creeks) on a gravel bar with other invasive target species
- Japanese knotweed: very little observed throughout study area
  - Points to effective collaboration with Skagit Weed Management Area and Skagit Fisheries Enhancement Group



STUDY VARIANCES

- Population estimates for ubiquitous species were not calculated
  - Percent cover of ubiquitous species recorded instead
- City Light will extend field work into 2022 to fulfill goals and objectives
  - Time constraints, lack of boat and driver availability in 2021
  - O'Brien Slough and Finney Creek fish and wildlife mitigation lands
  - Skagit River riparian areas

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Field planning and permitting	February – April 2022
Fieldwork	April – September 2022
Data entry, QA/QC, and analysis	June – December 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

TR-05 MARBLED MURRELET STUDY

Initial Study Report Meeting

Ron Tressler | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Goals:
  - Map potentially suitable marbled murrelet nesting habitat within the study area
  - Assess the likelihood of marbled murrelet nesting

STUDY GOALS AND OBJECTIVES (CONT.)

- Objectives:
  - Develop map of potentially suitable nesting habitat within the study area using existing vegetation mapping data from NPS, data developed for the TR-01 Vegetation Mapping Study, and criteria identified in the scientific literature to determine areas of potentially suitable murrelet nesting habitat
  - Use the map to select appropriate locations for radar-based surveys to document murrelet flight activity upriver of Thornton Creek and along Project reservoirs, focusing on areas near Project facilities and existing and likely future maintenance and construction noise sources

STUDY GOALS AND OBJECTIVES (CONT.)

- Objectives:
  - Conduct limited habitat assessments to verify the accuracy of the mapping of potentially suitable marbled murrelet nesting habitat
  - Conduct peak nesting season (May-July) simultaneous radar and audio-visual surveys at selected sites to assess the likelihood of presence of marbled murrelets. If present, determine the relative abundance of birds at each survey site within the Project Boundary

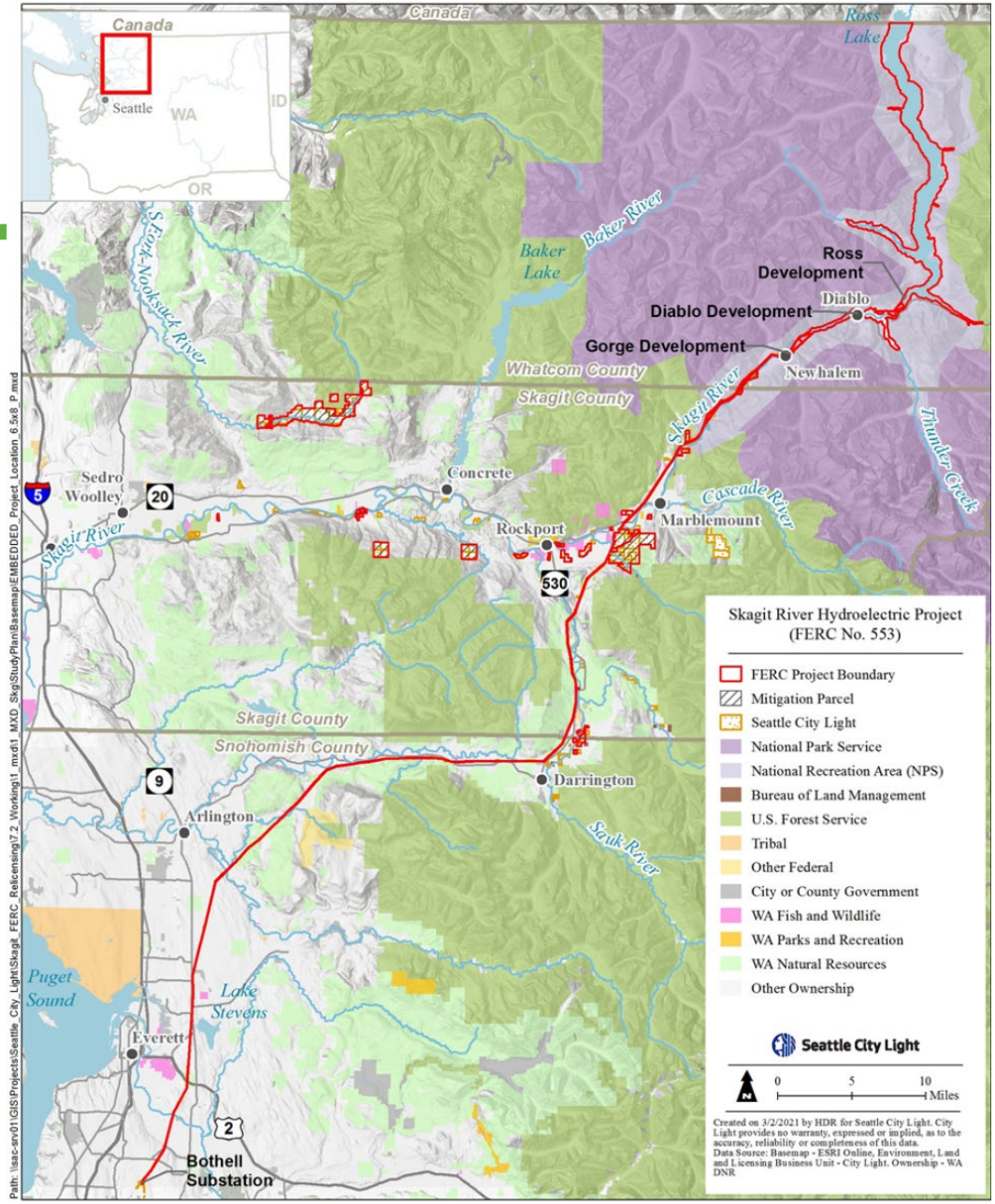
STUDY GOALS AND OBJECTIVES (CONT.)

- SPD modifications:
  - None
- NOA commitments:
  - Proposed no changes

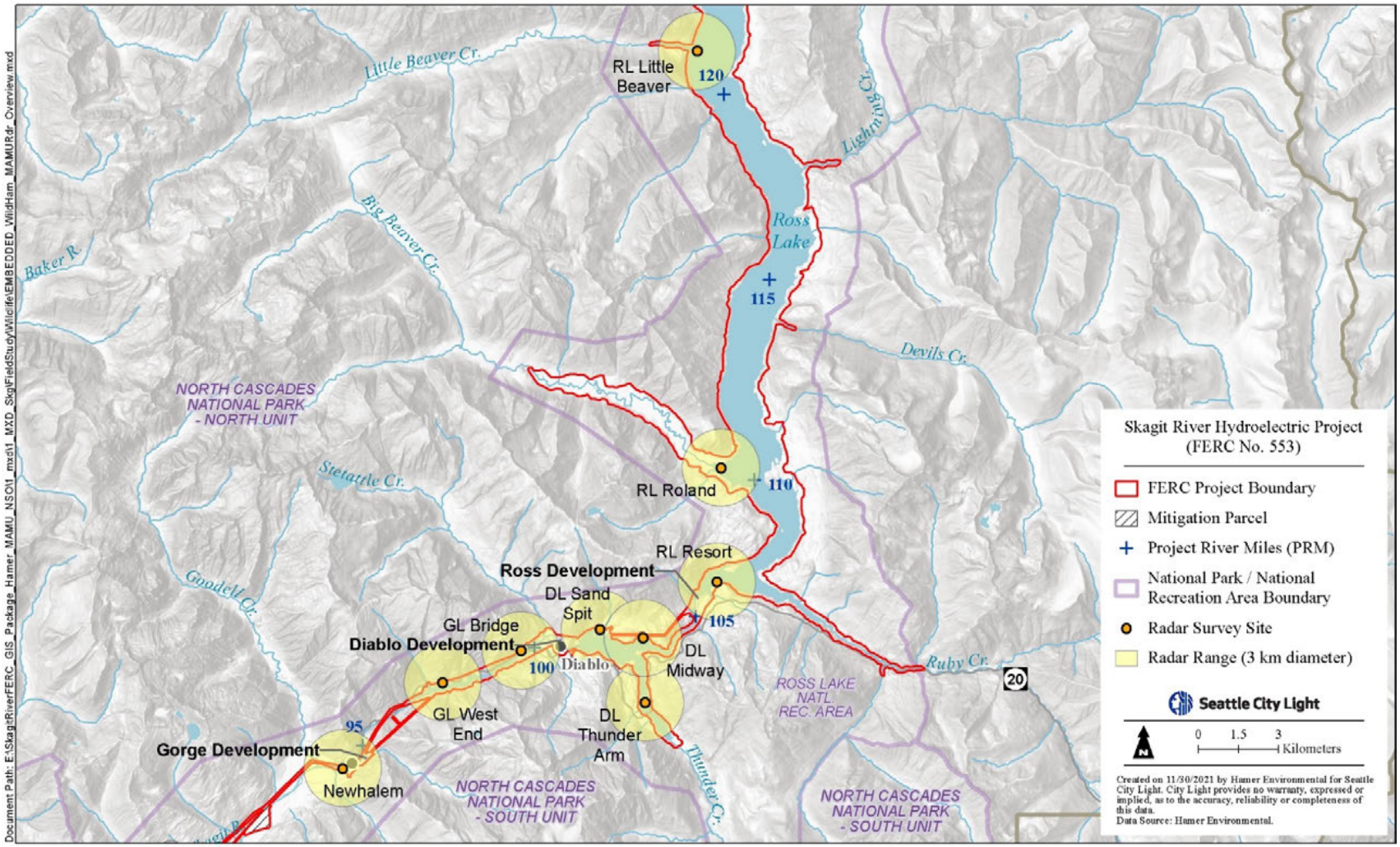
Credit: Alaska Fish and Game

STUDY AREA

- Lands within the Project Boundary and a 0.5-mile buffer

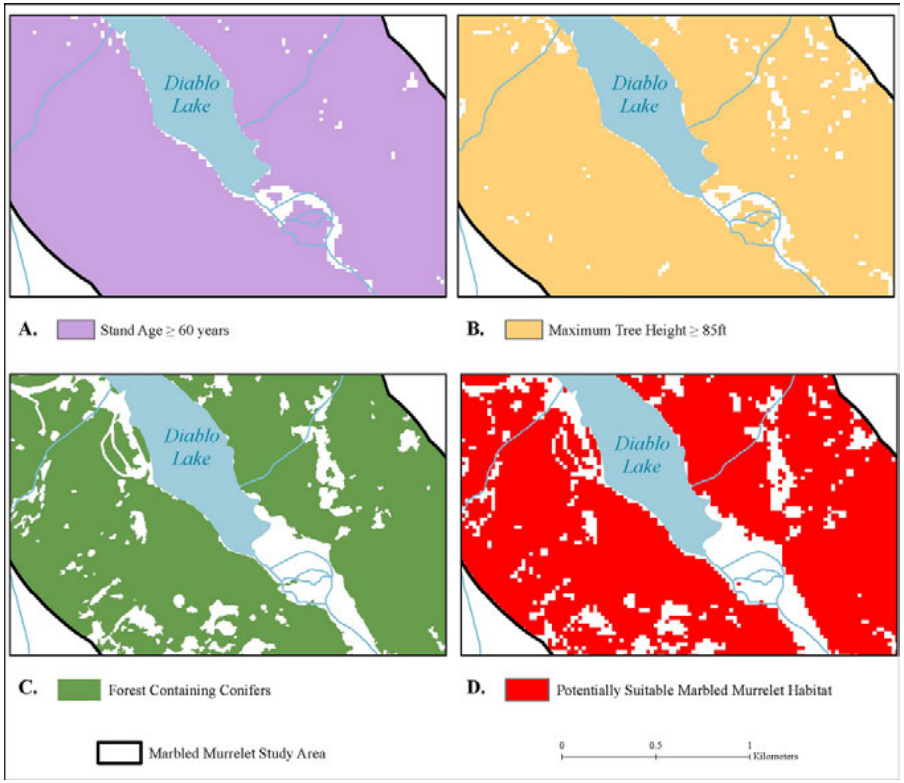


STUDY AREA (CONT.) – SURVEY LOCATIONS



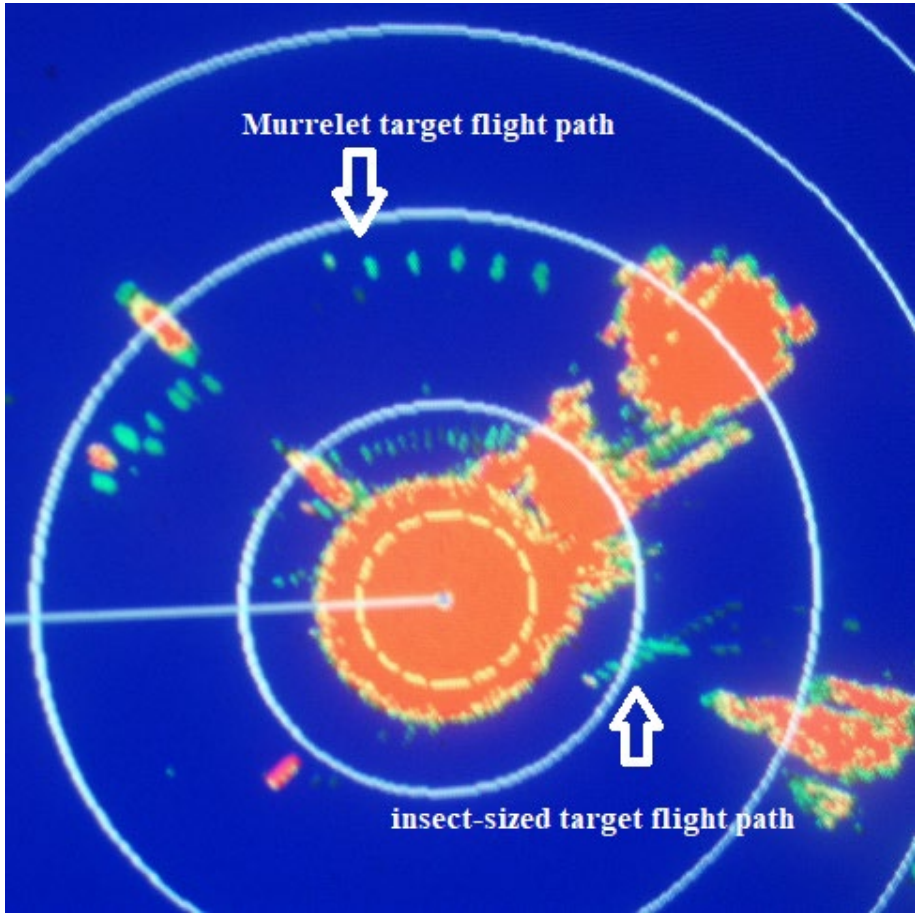
STUDY METHODS

- Implemented:
  - Map potentially suitable marbled murrelet habitat
    - Murrelet habitat criteria from the literature
    - GIS Model using forest composition and structural characteristics



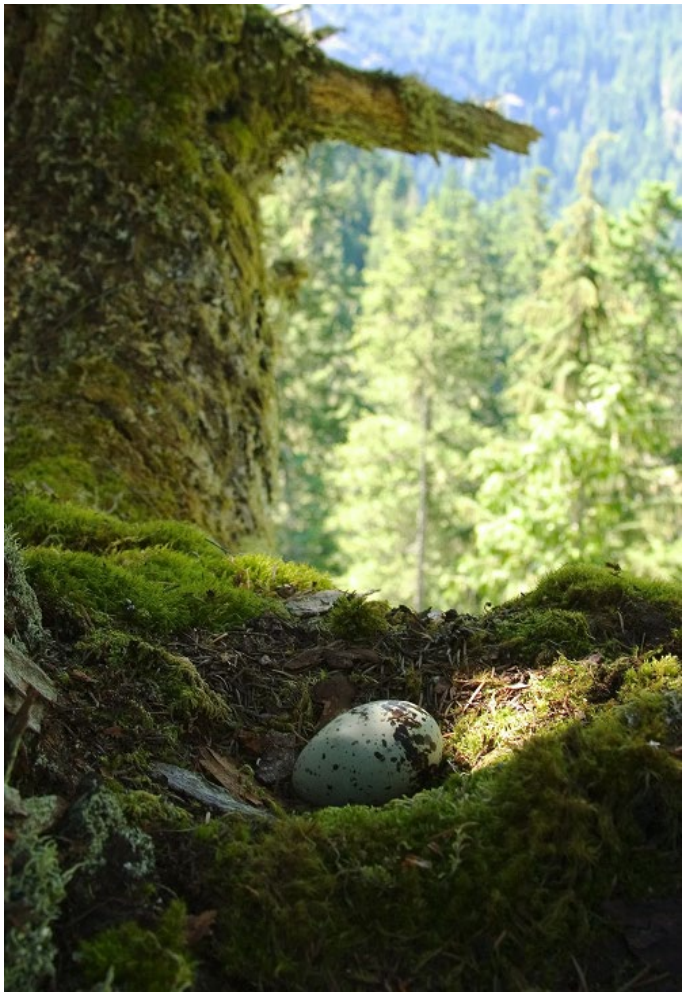
STUDY METHODS

- Implemented:
  - Conduct limited field habitat assessments
  - Conduct radar and audio-visual surveys
    - May (Visit 1)
    - June (Visits 2 and 3)
    - July (Visits 4 and 5)



RESULTS - HABITAT MODEL & FIELD ASSESSMENT

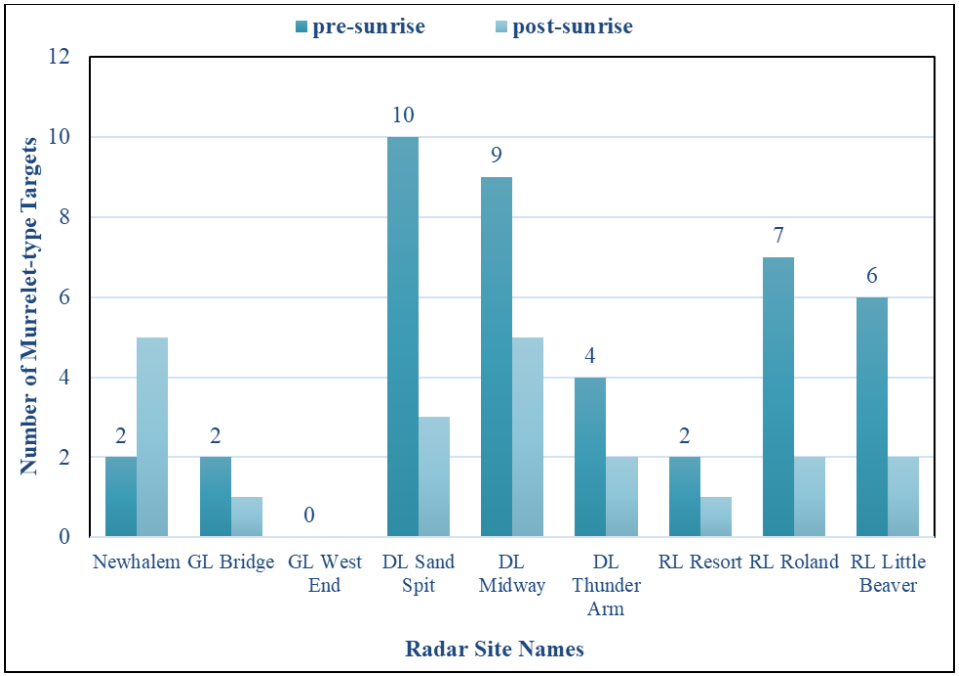
- Habitat model identified 28% (40,487 acres) of the study area as potentially suitable marbled murrelet nesting habitat
- RLNRA, the largest segment of the study area, has greatest amount of potentially suitable nesting habitat
  - 47% percent (26,570 acres) of the segment
- Field-based habitat assessments consistent with the habitat model results



Credit: Nick Hatch, U.S. Department of Agriculture

RESULTS (CONT.) - RADAR & AUDIO-VISUAL SURVEYS

- 63 murrelet-type targets were detected by radar, 42 of these targets were detected pre-sunrise
- Mean passage rate of 1.4 ± 0.2 murrelet-type targets per morning indicates **very low use** of the study area
  - Most flights detected over water -> reservoirs and major creeks as transiting flyways



- No targets using circling flight path (would be indicator of nesting)
- No marbled murrelets were detected by the AV surveyor
  - Not uncommon at sites with low proportions of murrelets

STUDY VARIANCES

- Potentially suitable marbled murrelet nesting habitat model data variance:
  - Washington DNR data used instead of LiDAR-derived data to map potential habitat

<u>LiDAR-derived data</u>

- Did not provide full coverage of study area
- Extremely fine resolution required further data analyses to aggregate to a scale compatible with other model data

<u>WA DNR data</u>

- Covers entire study area
- Suitable and relatively fine resolution for model
- Derived from field measurements and remotely sensed data
- Updated every two years

STUDY VARIANCES (CONT.)

- Radar data processing and analysis variance:
  - Manual tracking of targets by experienced radar technician supplemented automated radar tracking software instead of automated tracking alone
  - Automated tracking was problematic on its own due to issues with wave and ground clutter
- **Study goals and objectives were met**

STUDY SCHEDULE

- **Study is complete**

Seattle City Light

QUESTIONS?

TR-06 GOLDEN EAGLE HABITAT ANALYSIS

Initial Study Report Meeting

Ron Tressler | March 22, 2022

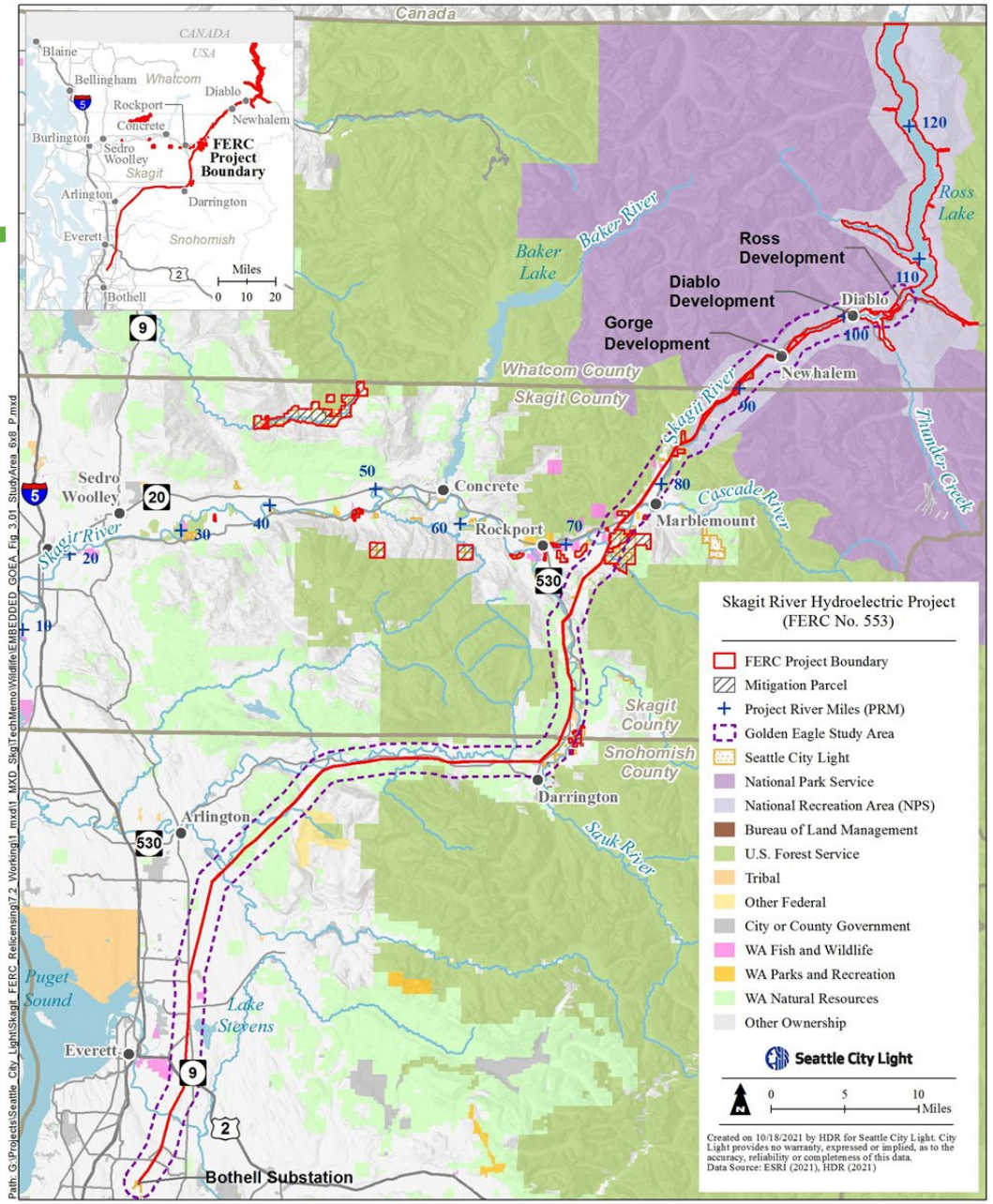
STUDY GOALS AND OBJECTIVES

- Goals:
  - Map golden eagle nesting and foraging habitat, concentration areas, and movement routes
  - Identify risk associated with potential collision with Project transmission lines

- Objectives
  - Characterize areas of potentially suitable golden eagle nesting, foraging, and movement corridors
  - Identify historic golden eagle observations and habitats
  - Conduct Geospatial Risk Assessment (GRA) to identify areas of potential golden eagle collision risk

STUDY AREA

- Transmission line right-of-way (ROW) between Ross Powerhouse and Bothell Substation and a 1-mile buffer on either side of the ROW



STUDY METHODS

- Summarize important habitat parameters identified in the literature
- Map observations and potential nesting and foraging habitat
  - A habitat suitability model was developed to map nesting and foraging habitat in the study area
- Conduct GRA to identify areas of relatively high risk of golden eagle collision with the transmission lines

RESULTS

- Based on historical observational data, golden eagles are uncommon to rare in and near study area and no known nest sites occur within 5 miles of the study area
  - In the study area, golden eagles are most commonly observed during migration periods
  - Small number concentrate near river estuaries outside of study area during the winter

RESULTS

- Modeled moderate- and high-quality nesting habitat highly limited in study area (Mapbook B)
  - Concentrated between Newhalem and Ross Dam
  - Consistent with historical observations
- Modeled moderate- and high-quality foraging habitat was uncommon in study area (Mapbook C)
  - Primarily in Goodell Fire burn area, clear cuts, agricultural fields, and along the transmission line ROW

RESULTS

- GRA suggests extremely low collision risk due to:
  - Low abundance
  - Visual acuity and agility of eagles
  - Currently limited nesting and foraging habitat
- Higher *relative** risk is located:
  - Where moderate- or high-quality nesting or foraging habitat intersects transmission line
  - AND where topographic features suggest movement across transmission line within or near moderate- & high-quality habitat

***** "high," "moderate," and "low" risk describe different portions of transmission line *relative* to one another rather than beyond the extent of the study area

STUDY VARIANCES

- Maps of historic golden eagle observations were not included due to sensitive information and confidentiality concerns
  - Observational data (individuals and nests) were still incorporated into the model

STUDY SCHEDULE

- **Study is complete**

Seattle City Light

QUESTIONS?

TR-07 NORTHERN GOSHAWK HABITAT ANALYSIS

Initial Study Report Meeting

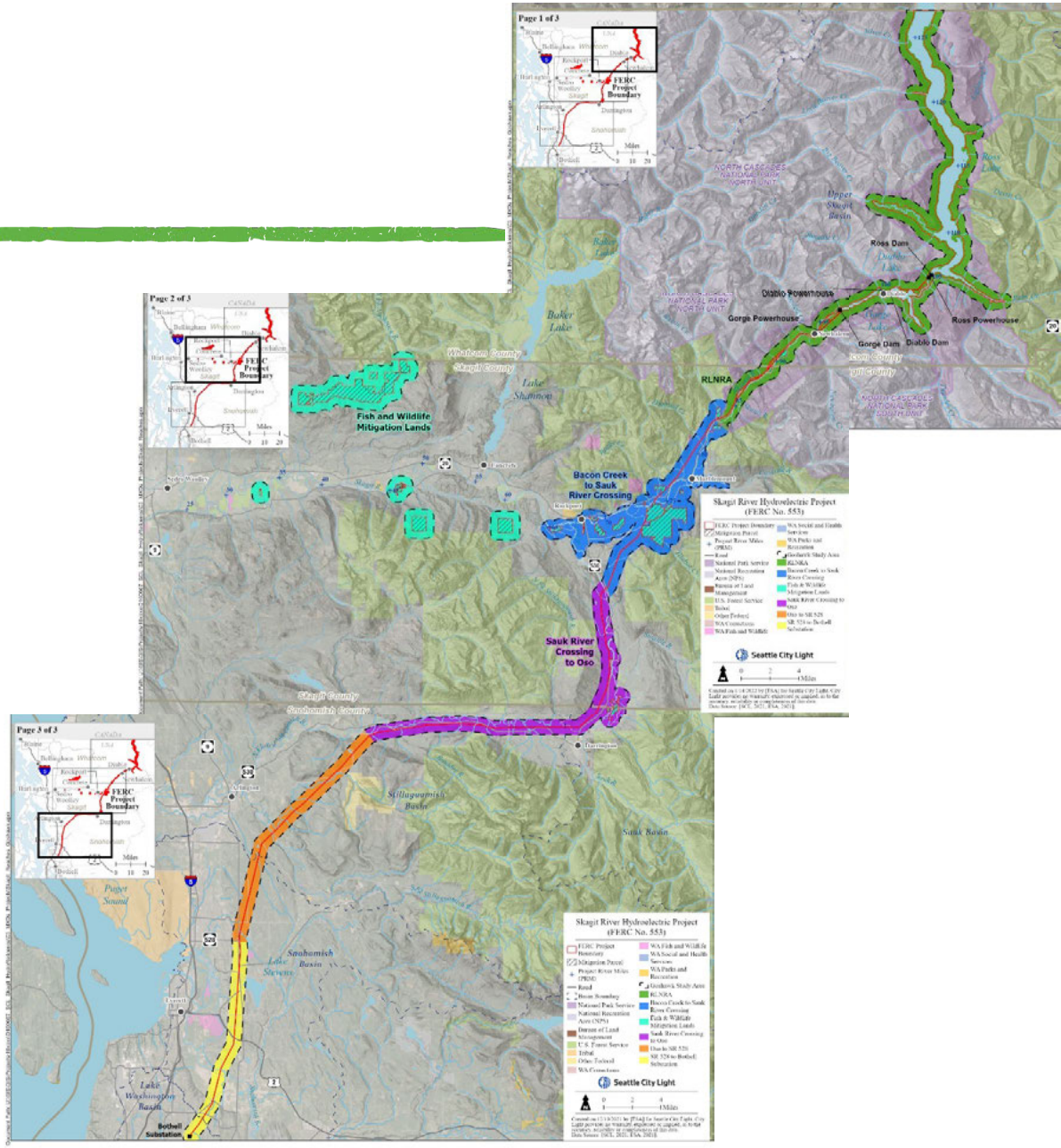
Ron Tressler | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Identify and develop a map of suitable goshawk nesting habitat within the study area

STUDY AREA

- Lands within the Project Boundary and a 0.5-mile buffer



STUDY METHODS

- Review scientific literature and consult with species experts and agency staff to identify goshawk nesting habitat suitability criteria
- Use GIS to identify and map potentially suitable habitat for nesting, post-fledgling area (PFA), and foraging using the data from:
  - TR-01 Vegetation Mapping Study
  - LiDAR-derived data on tree heights
  - Other existing data resources

STUDY METHODS

- Modelled four tiers of potentially suitable habitat:

Tier	Habitat	Criteria
1	Forested habitat	mean tree height > 20 ft
2	PFA	forests ≥ 69 acres
3	Nest Area	mean tree height ≥ 75 feet
4	Potentially Suitable Nesting Habitat	mature forest ≥ 38 acres (also mapped areas with trees >113 ft *within Tier 4*)

RESULTS

- 20,889 acres of potentially suitable goshawk nesting habitat mapped
  - 15% of the 142,220-acre study area
  - 2,506 acres in Project Boundary
    - 2% of study area habitat acreage
    - 12% of total mapped habitat
  - 18,383 acres in 0.5-mile study area buffer
    - 13% of total study area
    - 88% of total mapped habitat

RESULTS

- Mapped potentially suitable nesting habitat
  - RLNRA:
    - 10,915 ac (52% of total)
    - Majority around Ross Lake
  - Outside of RLNRA:
    - Bacon to Sauk River Crossing segment – 4,912 ac (24%)
    - Fish and Wildlife Mitigation Lands segment – 3,358 ac (16%)
    - Sauk River Crossing to Oso segment – 1,704 ac (8%)
  - No suitable habitat mapped in southern-most study segments:
    - Oso to SR 528 and SR 528 to Bothell Substation

STUDY VARIANCES

- Two minor variances:
  - Conservation Biology Institute mapping of old-growth and late seral stage forests of the North Cascades was not used in the GIS model because LiDAR data and TR-01 Vegetation Mapping Study products provided higher resolution canopy data
  - LiDAR was high resolution and adequate to identify potentially suitable goshawk nesting components – field reviews were not needed for this study
- Study goals and objectives were accomplished

STUDY SCHEDULE

- **Study is complete**

Seattle City Light

QUESTIONS?

TR-08 SPECIAL-STATUS AMPHIBIAN STUDY

Initial Study Report Meeting

Ron Tressler | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Goals:
  - Identify areas of potentially suitable breeding habitat for the special-status amphibians, Columbia spotted frog and Oregon spotted frog, within the study area
  - Assess the likelihood that either species occurs in areas with Project-related activity, including at Project recreation facilities
  - Document occurrences of western toad, and the locations and types of habitats used around the study area
  - Collect relevant information on populations where these species are found, including numbers, life stages, habitat, and locations

STUDY GOALS AND OBJECTIVES (CONT.)

- Objectives:
  - Develop a preliminary, working map of potentially suitable breeding habitat (i.e., habitats used for oviposition [egg-laying] and larval rearing) for special-status amphibians within the study area using existing, publicly available aerial imagery, wetland and soil maps, and vegetation data

STUDY GOALS AND OBJECTIVES (CONT.)

- Objectives (cont.):
  - Conduct field reconnaissance in areas where additional information is needed to verify or correct preliminary assumptions of habitat suitability
  - Catalog and map incidental observations of special-status amphibians and other amphibians (including non-native bullfrogs) recorded during other studies

STUDY GOALS AND OBJECTIVES (CONT.)

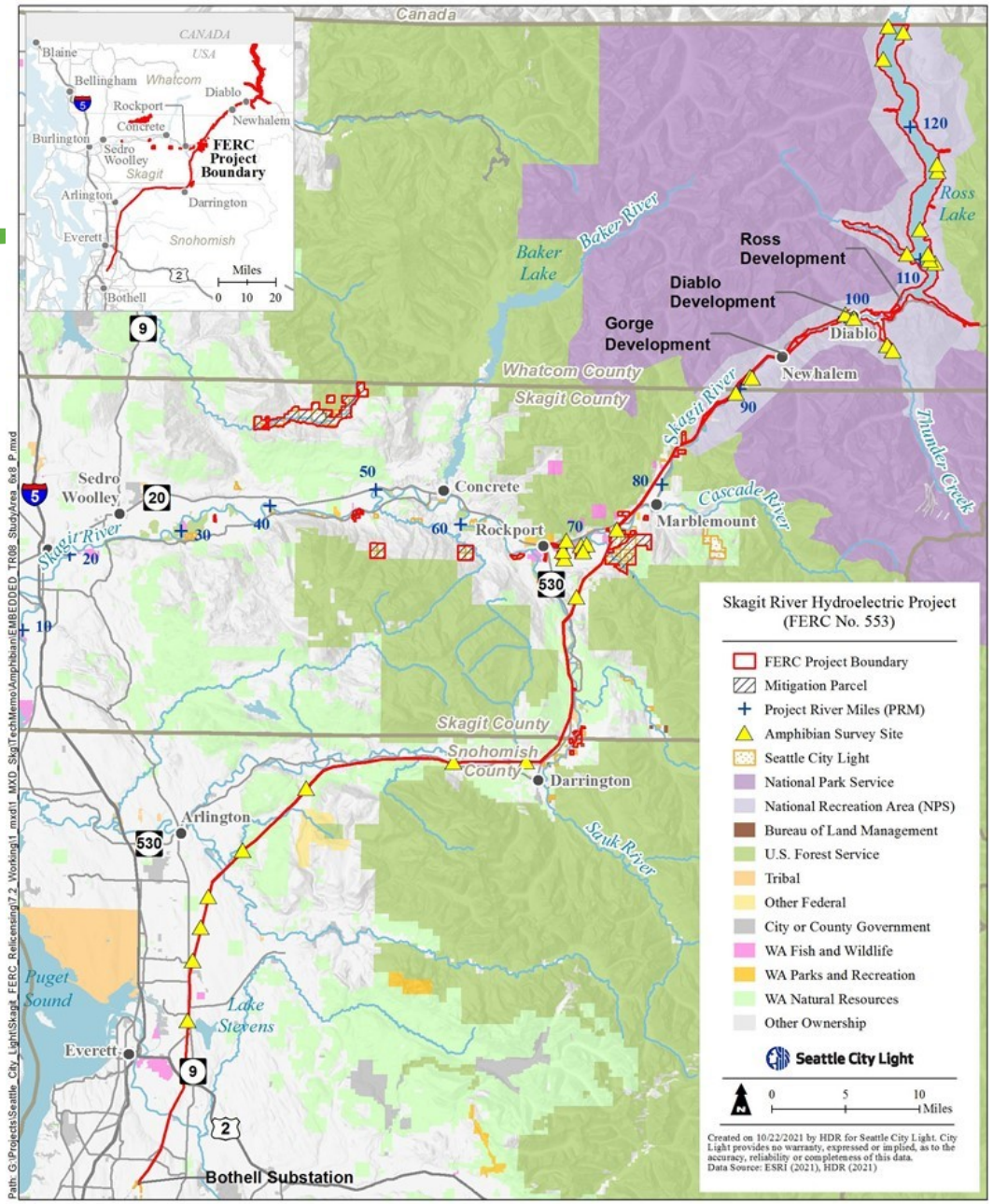
- Objectives (cont.):
  - Perform field survey in potentially suitable habitat with Project-related activity or at Project recreation facilities and where additional information is needed on species occurrence, relative abundance, and life history timing
  - Prepare report including narrative descriptions of field reconnaissance and survey areas and relevant habitat characteristics, information regarding potentially suitable areas that were not surveyed, and final maps

STUDY GOALS AND OBJECTIVES (CONT.)

- SPD modifications:
  - None
- NOA commitments:
  - Proposed no changes

STUDY AREA

- Project Boundary with emphasis on locations where suitable habitat and potential Project effects may intersect



STUDY METHODS

- Implemented:
  - Identify and map potentially suitable habitat
  - Habitat assessment
  - Field reconnaissance and amphibian surveys


Northern red-legged frog egg mass

STUDY METHODS (CONT.)

- To be implemented in 2022:
  - Additional investigations at sites on Ross Lake, County Line Ponds, and Newhalem Pond
  - Additional follow-up field work could also be warranted if there are incidental observations of special-status amphibians at other locations in the study area early in 2022 that require further investigation

RESULTS

- No wetlands in the study area fully met criteria for potential Oregon spotted frog habitat
  - Included 75 mapped wetlands along the T-line evaluated based on information from TR-02, aerial imagery, and other available information
- Conditions suitable for Columbia spotted frog were not apparent in the study area on the Project reservoirs
  - Conditions at north end of Ross Lake will be evaluated during the egg laying season in 2022 to fully confirm
- Field investigations, including egg mass surveys, were completed from March 23-April 6 at lowland sites
  - 9 sites along the T-line (1 additional site was surveyed later for larvae)
  - 9 sites in the Skagit River floodplain between Gorge Powerhouse and the Sauk River confluence

RESULTS (CONT.)

- Neither species of spotted frog was found during field investigations.
- Three common amphibian species were found widely at lowland sites—northwestern salamander, Pacific chorus frog, and northern red-legged frog. Long-toed salamander, an early breeding species, was not found, but likely occurs at some sites.
- Western toad was not found at sites along the ROW. However, several large wetlands extending outside the ROW may contain suitable habitat in the form of permanent ponds or lakes.

RESULTS (CONT.)

- Field investigations were completed at 13 sites at the Project reservoirs from June 15-August 5, including 10 sites on Ross Lake
- Western toad was found at four sites on Ross Lake with detection of adults or juveniles
- Other species detected at Ross Lake were Pacific chorus frog and long-toed salamander (tentative identification at one site)
- Western toad tadpoles were found at the large Newhalem Pond and County Line Ponds, along with Pacific chorus frog and northern red-legged frog

STUDY VARIANCES

- Parts of some wetlands that extended outside Project Boundary were surveyed (positive variance)
- Schedule was modified:
  - Access to the north end of Ross Lake is particularly difficult during the drawdown; appropriate survey timing for ranid egg mass detection in this area was impractical in April-May 2021, but will occur in 2022
  - Possible sightings of unidentified ranid frogs by NPS and western toad breeding activity on Ross Lake were too late for follow-up visits in 2021 before rising water levels flooded these sites, and therefore will occur in 2022

STUDY VARIANCES (CONT.)

- Schedule was modified (cont.):
  - Follow-up visits at presumed western toad oviposition sites at County Line Ponds and Newhalem Pond (where tadpoles were subsequently found) also could not occur in 2021 but will occur in 2022

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Field planning and permitting	January – March 2022
Fieldwork	April – August 2022
Analysis	September – December 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

TR-09 BEAVER HABITAT ASSESSMENT

Initial Study Report Meeting

Ron Tressler | March 22, 2022

STUDY GOALS AND OBJECTIVES

- Goals:
  - Provide information that can be used to address the ongoing beaver conflicts at the Project's Chum salmon off-channel sites (spawning channels)
  - Characterize beaver habitat conditions in the study area to inform a Project effects assessment and development of protection, mitigation, and enhancement (PME) measures

STUDY GOALS AND OBJECTIVES (CONT.)

- Objectives:
  - Use existing information from the Indian Tribes and FCC/NCC to summarize beaver conflicts at spawning channels
  - Summarize results of GE-04 and FA-02 that relate to beaver habitat and use in the spawning channels to assess hydrologic and geomorphologic conditions at spawning channels for use in assessing management options

STUDY GOALS AND OBJECTIVES (CONT.)

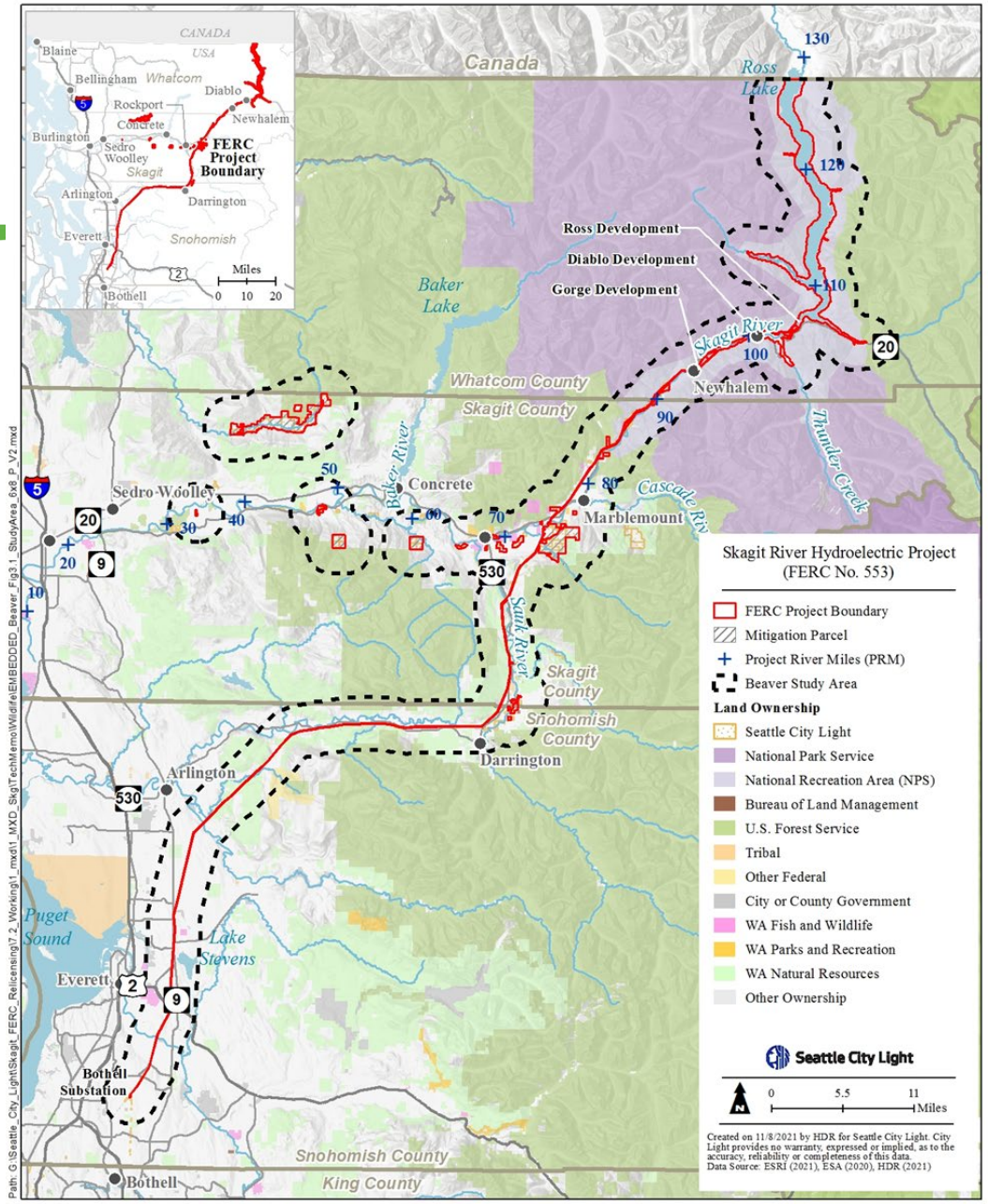
- Objectives (cont.):
  - Identify beaver habitat and active beaver territories based on a combination of existing information as well as field observations by biologists during relicensing studies throughout the study area
  - Assess beaver habitat in the study area using the BIP model in combination with morphological habitat, vegetation, and ownership/land use characteristics ultimately to assess ongoing Project effects from City Light's management of flow, vegetation, and roads, and to inform potential PME measures, which could include beaver relocation if deemed appropriate

STUDY GOALS AND OBJECTIVES (CONT.)

- SPD modifications:
  - None
- NOA commitments:
  - Proposed no changes

STUDY AREA

- Project Boundary and a 2-mile buffer



STUDY METHODS

- Implemented:
  - Review existing conditions and management activities at channels
  - Map beaver occurrence within the Project Boundary
  - Beaver habitat assessment
    - BIP model:
      - Upper and lower Skagit, Nooksack, Stillaguamish, and Sauk watersheds
    - WDFW BIP online data:
      - Sammamish watershed in the Marysville to Bothell area

STUDY METHODS

- To be implemented:
  - Review FA-02 Instream Flow Model Development Study results
    - Model and flow-habitat maps are anticipated to be available in 2022
  - Beavers and beaver sign incidental observations
    - Other relicensing studies ongoing in 2022

RESULTS – SPAWNING CHANNEL CONFLICTS

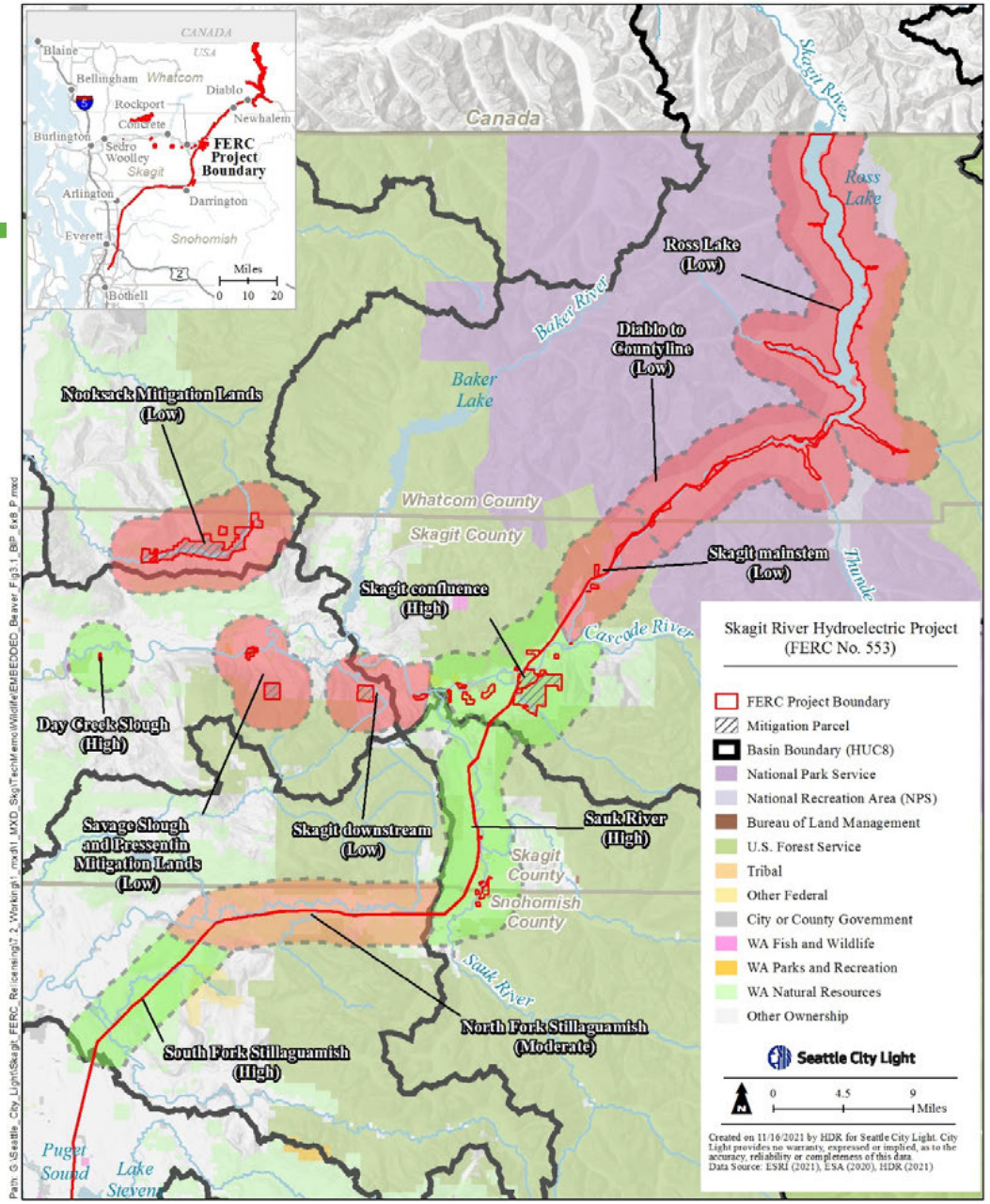
- General decline in Chum spawner abundance since 2014
  - Beaver dams have been a factor, but beaver dam occurrence has also been generally declining in recent years due to ongoing management efforts
- County Line ponds - most beaver activity
- Powerline channel - least beaver activity
  - Likely due to exclusion devices: pond leveler and fish ladder
- Beaver dam impacts on spawning habitat:
  - Slow water, capture sediment -> embedded spawning substrate
  - Confinement of the channel limiting alternate flow paths -> fish passage barrier

RESULTS – BEAVER OBSERVATIONS AND HABITAT QUALITY

- 143 miles of stream segments mapped by BIP
  - 8% high (3) intrinsic potential
  - 5% moderate (2)
  - 18% low (1)
  - 69% no (0)
- Beaver/beaver sign observed on 45 stream segments
  - Most observations between Sauk River confluence and County Line ponds
  - 82% were on streams with BIP > 0

RESULTS (CONT.)

- Study area segments with high potential for beaver habitat
  - Skagit/Sauk Confluence
  - Sauk River
  - South Fork Stillaguamish
- Low to no potential habitat upstream of Marblemount
  - Steep, ravine-like



STUDY VARIANCES

- Objective to summarize results of the GE-04 Geomorphology Study and FA-02 Instream Flow Model Development Study was not completed in 2021
  - GE-04 and FA-02 reports are still in development
    - Available applicable information was reviewed and summarized from GE-04 field visits
  - FA-02 is a 2-year study
    - Instream flow model and flow-habitat maps are anticipated to be available in 2022
    - Results will be reviewed and summarized in the Beaver study report to be included in the USR

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Review and summarize results of FA-02 and GE-04	March – September 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

TR-10 NORTHERN SPOTTED OWL HABITAT ANALYSIS

Initial Study Report Meeting

Ron Tressler | March 22, 2022

STUDY GOALS AND OBJECTIVES

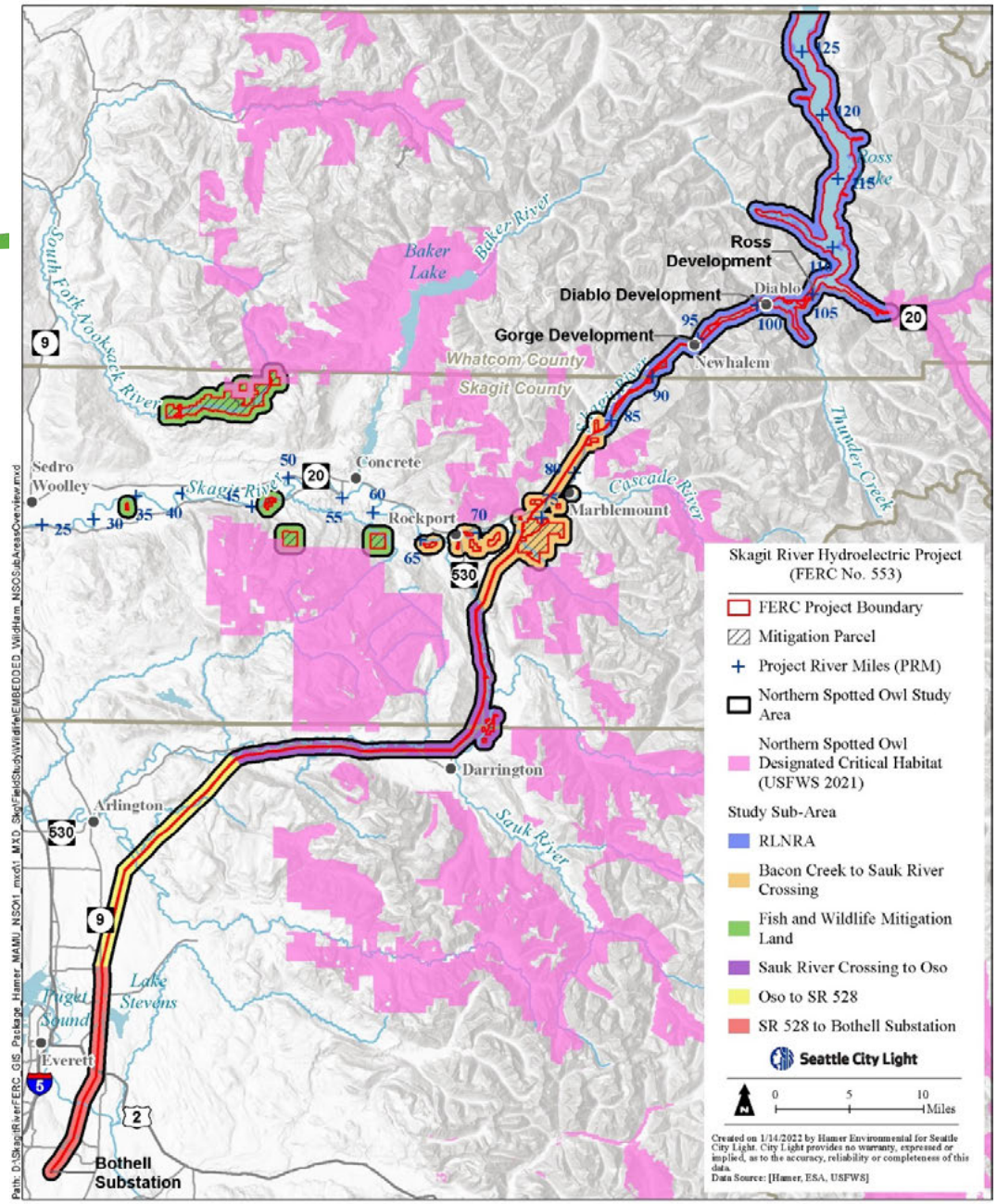
- Goals:
  - Identify and map potentially suitable northern spotted owl (NSO) (*Strix occidentalis caurina*) nesting, roosting, and foraging (NRF) habitat within and near (i.e., within 0.5 mile) the Project Boundary

STUDY GOALS AND OBJECTIVES (CONT.)

- SPD modifications:
  - None
- NOA commitments:
  - Proposed no changes

STUDY AREA

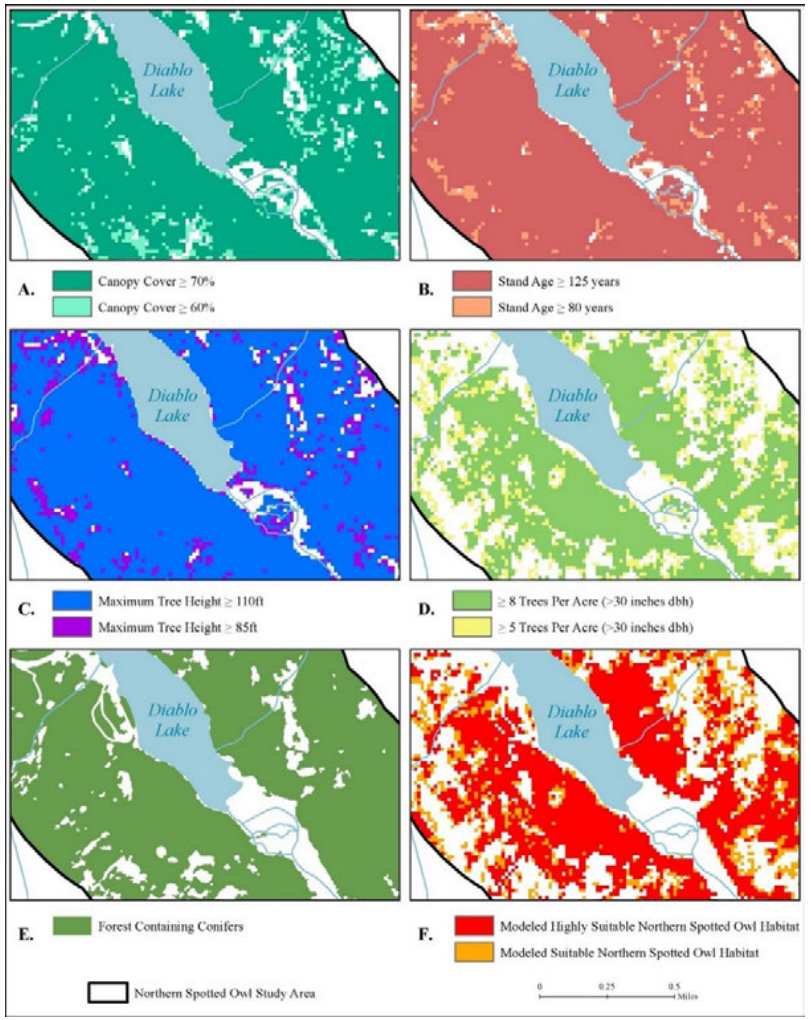
- Project Boundary and a 0.5-mile buffer



USFWS NSO Critical Habitat indicated in pink

STUDY METHODS

- Literature review of habitat requirements
- Use GIS model including forest structural characteristics to identify and map potentially suitable NRF habitat



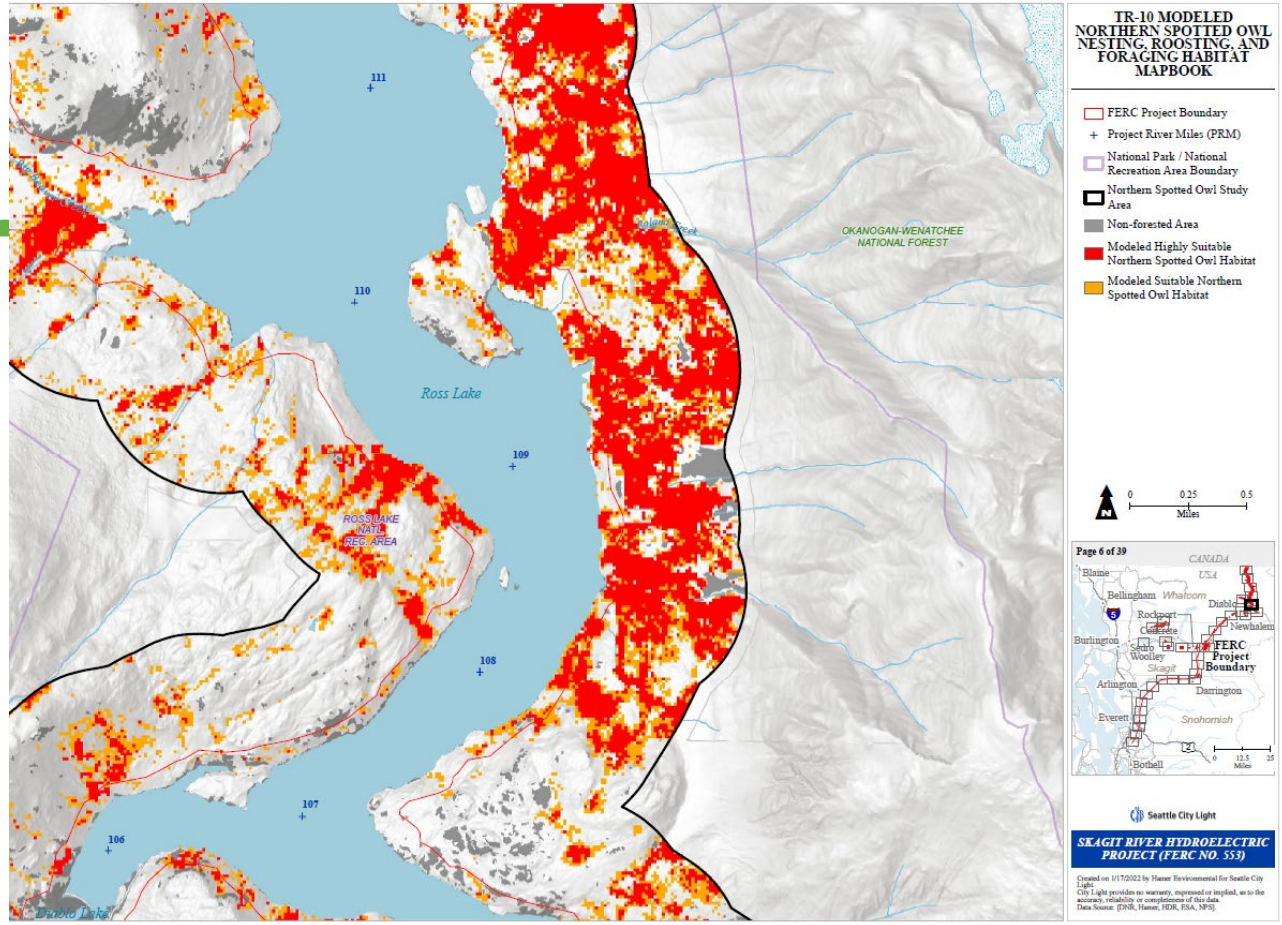
RESULTS

- Relatively low amount of potential NSO NRF habitat in Project vicinity
- NSO NRF Habitat Suitability Model identified
  - o potentially suitable NSO NRF habitat: ~13,600 acres
    - 9.6% of total study area
  - o potentially *highly* suitable NSO NRF habitat: ~6,700 acres
    - 4.7% of total study area

Credit: Delphin Ruche

RESULTS

*Model outputs indicate areas of potentially suitable and potentially highly suitable NSO NRF habitat; ***model does not predict or determine NSO presence or habitat use***



- As expected, RLNRA (the largest segment of the study area), has the greatest amount of modeled suitable NSO NRF habitat, with:
  - 71.8 percent of the modeled suitable NSO habitat
  - 80.2 percent of the modeled *highly* suitable habitat

STUDY VARIANCES

- Two minor variances:
  - Used WA DNR maximum tree height data layer instead of LiDAR-derived CHM
    - LiDAR-derived canopy height model had several gaps within the NSO study area
    - Extremely high resolution resulted in extremely patchy outputs that under-selected suitable habitat
  - Used WA DNR stand age layer instead of CBI data layer for mapped old growth and late seral forests
    - CBI data did not provide specific stand age info needed to both identify and differentiate between suitable and highly suitable habitat
  - **Study goals and objectives were accomplished**

STUDY SCHEDULE

- **Study is complete**

Seattle City Light

QUESTIONS?

SY-01 SYNTHESIS STUDY

Initial Study Report Meeting

Jason Hall | March 23, 2022

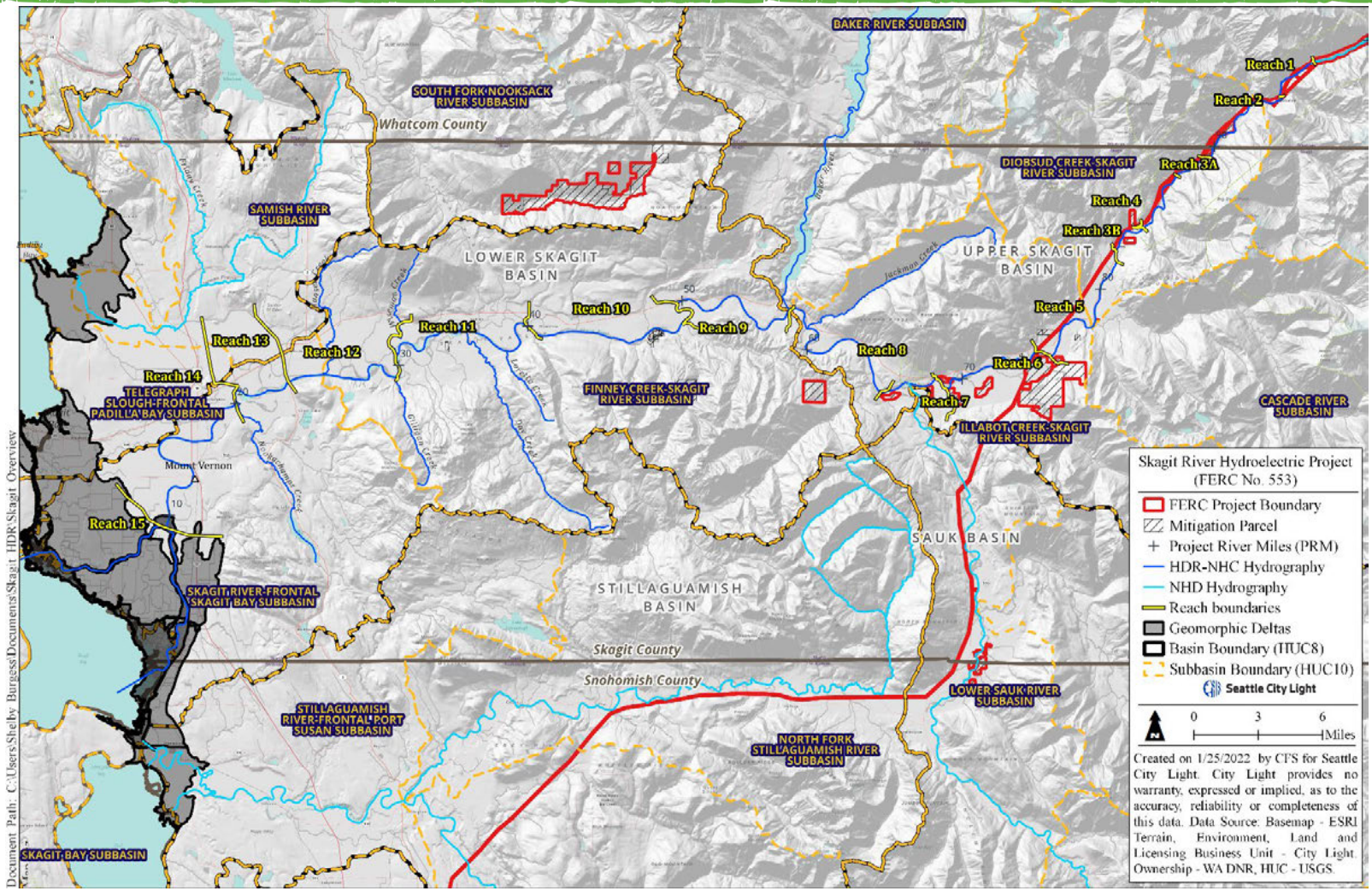
STUDY GOALS AND OBJECTIVES

- Compile, analyze, and summarize available data and studies on anadromous fish resources in lower Skagit River
- Characterize factors affecting populations
- Develop conceptual life history models
- Develop hypotheses to understand potential Project impacts and other contributing factors

STUDY AREA

- The study area is the Skagit River from the Sauk River confluence to the Skagit delta and estuary. Based on the preliminary data review and consultation with LPs at the December 2021 Work Group Meeting, the study area for the Synthesis Study has been clarified to include the following extent:
  - The lower mainstem Skagit River from the Sauk River confluence to Skagit Bay
  - Large tributaries to the lower Skagit River including Baker River, Jackman Creek, Day Creek, Gilligan Creek, Loretta Creek, Hansen Creek, Wiseman Creek, and Nookachamps Creek
  - The Sauk River and its confluence reach with the mainstem Skagit River
  - The geomorphic Skagit River delta including the Swinomish delta, North and South Fork Skagit River deltas, and the northern portion of the Stillaguamish River delta
  - Skagit Bay and Padilla Bay

STUDY AREA


BAKER RIVER SUBBASIN
SOUTH FORK NOOKSACK RIVER SUBBASIN
Whatcom County
SAMISH RIVER SUBBASIN
LOWER SKAGIT BASIN
UPPER SKAGIT BASIN
DIOBSUD CREEK-SKAGIT RIVER SUBBASIN
FINNEY CREEK-SKAGIT RIVER SUBBASIN
ILLABOT CREEK-SKAGIT RIVER SUBBASIN
CASCADE RIVER SUBBASIN
TELEGRAPH SLOUGH-FRONTAL PADILLA BAY SUBBASIN
SKAGIT RIVER-FRONTAL SKAGIT BAY SUBBASIN
SKAGIT BAY SUBBASIN
STILLAGUAMISH BASIN
STILLAGUAMISH RIVER-FRONTAL PORT SUSAN SUBBASIN
NORTH FORK STILLAGUAMISH RIVER SUBBASIN
SAUK BASIN
LOWER SAUK RIVER SUBBASIN
Skagit County
Snohomish County
Mount Vernon
Reach 1
Reach 2
Reach 3A
Reach 3B
Reach 4
Reach 5
Reach 6
Reach 7
Reach 8
Reach 9
Reach 10
Reach 11
Reach 12
Reach 13
Reach 14
Reach 15
Skagit River Hydroelectric Project (FERC No. 553)
FERC Project Boundary
Mitigation Parcel
Project River Miles (PRM)
HDR-NHC Hydrography
NHD Hydrography
Reach boundaries
Geomorphic Deltas
Basin Boundary (HUC8)
Subbasin Boundary (HUC10)
Seattle City Light
0 3 6 Miles
Created on 1/25/2022 by CFS for Seattle City Light. City Light provides no warranty, expressed or implied, as to the accuracy, reliability or completeness of this data. Data Source: Basemap - ESRI Terrain, Environment, Land and Licensing Business Unit - City Light. Ownership - WA DNR, HUC - USGS.
Document Path: C:\Users\Shelby Burgess\Documents\Skagit HDR\Skagit Overview

STUDY METHODS

- **Step 1: Data Compilation**
- Step 2: Data Analysis
- Step 3: Life Stage Factors Affecting Target Species
- Step 4: Identification of Key Uncertainties

STUDY METHODS

- **Step 1: Data Compilation**
  - **1.1:** Identify and compile potentially relevant sources
  - **1.2:** Screen and attribute sources with relevant information
  - **1.3:** Summarize available information (data inventory)
  - **1.4:** Extract quantitative data

STUDY METHODS

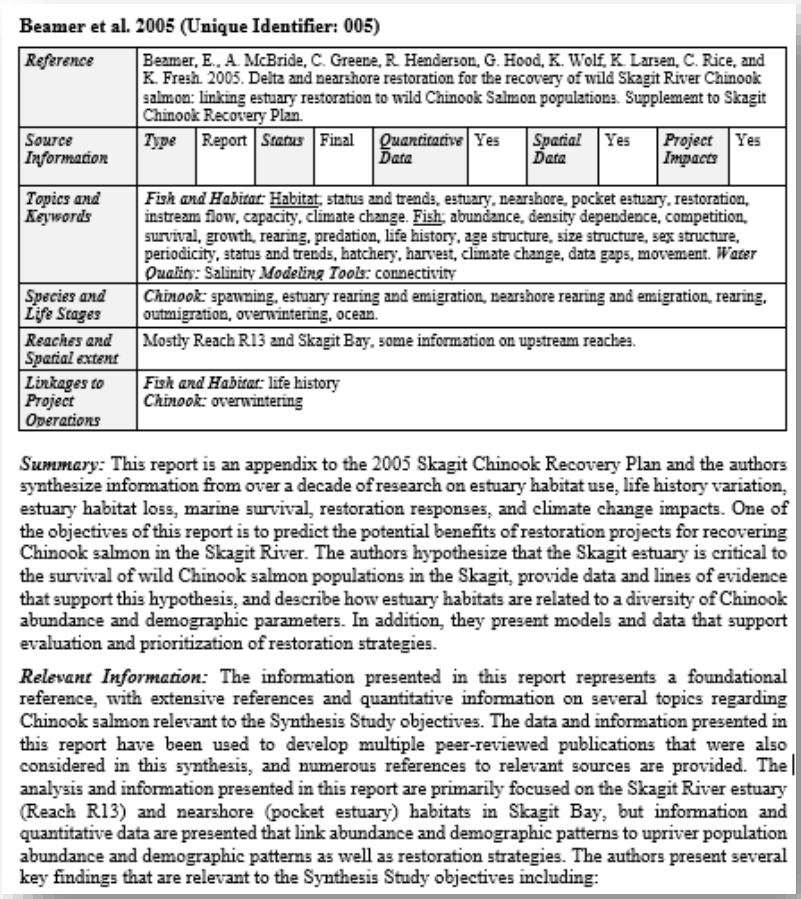
- **Step 2: Data Analysis**
  - **2.1:** Develop life-history-based conceptual models
  - **2.2:** Identify linkages between target species and factors affecting resource conditions
- **Step 3: Life Stage Factors Affecting Target Species**
  - **3.1:** Identify key factors
  - **3.2:** Develop hypotheses
- **Step 4: Identification of Key Uncertainties**
  - **4.1:** Identify data gaps and monitoring needs

RESULTS

- Reference database developed with keywords for topics, target species/life stages, and data flags
- 441 potential sources identified
  - Digital copies archived for 317
  - Screened and categorized
    - 101 Tier 1 Sources (1st priority)
    - 159 Tier 2 Sources (2nd priority)
    - 88 Other sources (Out of study area or basin)
    - 23 GE-04 Geomorphology Study sources
    - 70 future studies, datasets, online sources

RESULTS

- Annotated bibliographies and data inventory completed for 11 sources
- Proof of concept/support ISR
- Headers with summary of topics, species/life stages, spatial extent
- Summary of source and relevant information for Synthesis Study



Beamer et al. 2005 (Unique Identifier: 005)

Reference	Beamer, E., A. McBride, C. Greene, R. Henderson, G. Hood, K. Wolf, K. Larsen, C. Rice, and K. Fresh. 2005. Delta and nearshore restoration for the recovery of wild Skagit River Chinook salmon: linking estuary restoration to wild Chinook Salmon populations. Supplement to Skagit Chinook Recovery Plan.									
Source Information	*Type*	Report	*Status*	Final	*Quantitative Data*	Yes	*Spatial Data*	Yes	*Project Impacts*	Yes
Topics and Keywords	*Fish and Habitat:* Habitat; status and trends, estuary, nearshore, pocket estuary, restoration, instream flow, capacity, climate change. Fish; abundance, density dependence, competition, survival, growth, rearing, predation, life history, age structure, size structure, sex structure, periodicity, status and trends, hatchery, harvest, climate change, data gaps, movement. *Water Quality:* Salinity *Modeling Tools:* connectivity									
Species and Life Stages	*Chinook:* spawning, estuary rearing and emigration, nearshore rearing and emigration, rearing, outmigration, overwintering, ocean.									
Reaches and Spatial extent	Mostly Reach R13 and Skagit Bay, some information on upstream reaches.									
Linkages to Project Operations	*Fish and Habitat:* life history *Chinook:* overwintering									

Summary: This report is an appendix to the 2005 Skagit Chinook Recovery Plan and the authors synthesize information from over a decade of research on estuary habitat use, life history variation, estuary habitat loss, marine survival, restoration responses, and climate change impacts. One of the objectives of this report is to predict the potential benefits of restoration projects for recovering Chinook salmon in the Skagit River. The authors hypothesize that the Skagit estuary is critical to the survival of wild Chinook salmon populations in the Skagit, provide data and lines of evidence that support this hypothesis, and describe how estuary habitats are related to a diversity of Chinook abundance and demographic parameters. In addition, they present models and data that support evaluation and prioritization of restoration strategies.

Relevant Information: The information presented in this report represents a foundational reference, with extensive references and quantitative information on several topics regarding Chinook salmon relevant to the Synthesis Study objectives. The data and information presented in this report have been used to develop multiple peer-reviewed publications that were also considered in this synthesis, and numerous references to relevant sources are provided. The analysis and information presented in this report are primarily focused on the Skagit River estuary (Reach R13) and nearshore (pocket estuary) habitats in Skagit Bay, but information and quantitative data are presented that link abundance and demographic patterns to upriver population abundance and demographic patterns as well as restoration strategies. The authors present several key findings that are relevant to the Synthesis Study objectives including:

STUDY VARIANCES OR MODIFICATIONS

- Study Area
  - The study area description has been revised to include the Sauk River, larger geomorphic delta extent (including Swinomish and portions of the Stillaguamish River delta), and nearshore habitats in Skagit Bay and Padilla Bay, based on preliminary data review and comments from LPs during the preliminary Synthesis Study Work Group meeting
- Species List
  - The target species for the Synthesis Study has been expanded to include Pacific Lamprey
- Schedule
  - *See next slide*

STUDY SCHEDULE

Milestone	Date
File ISR Report	March 2022
Step 1: Complete for Tier 1 Sources	June 2022
Step 2: Data Analysis	June 2022 – March 2023
Step 3: Life Stage Factors Affecting Target Species	June 2022 – March 2023
Step 4: Identification of Key Uncertainties	*Completed in coordination with Steps 2-3*

Seattle City Light

QUESTIONS?

RA-01 RECREATION USE AND FACILITY ASSESSMENT

Initial Study Report Meeting

Matt Paquette | March 23, 2022

STUDY GOALS AND OBJECTIVES

- Determine the condition of area facilities, impacts, and accessibility
  - Determine the condition of the Project recreation facilities
  - Evaluate accessibility at recreation facilities and trails
  - Document recreational use and access impacts (e.g., erosion, user-created trails, trash/waste disposal, etc.)
  - Evaluate the usable periods of the Gorge Lake Boat Launch ramp

STUDY GOALS AND OBJECTIVES

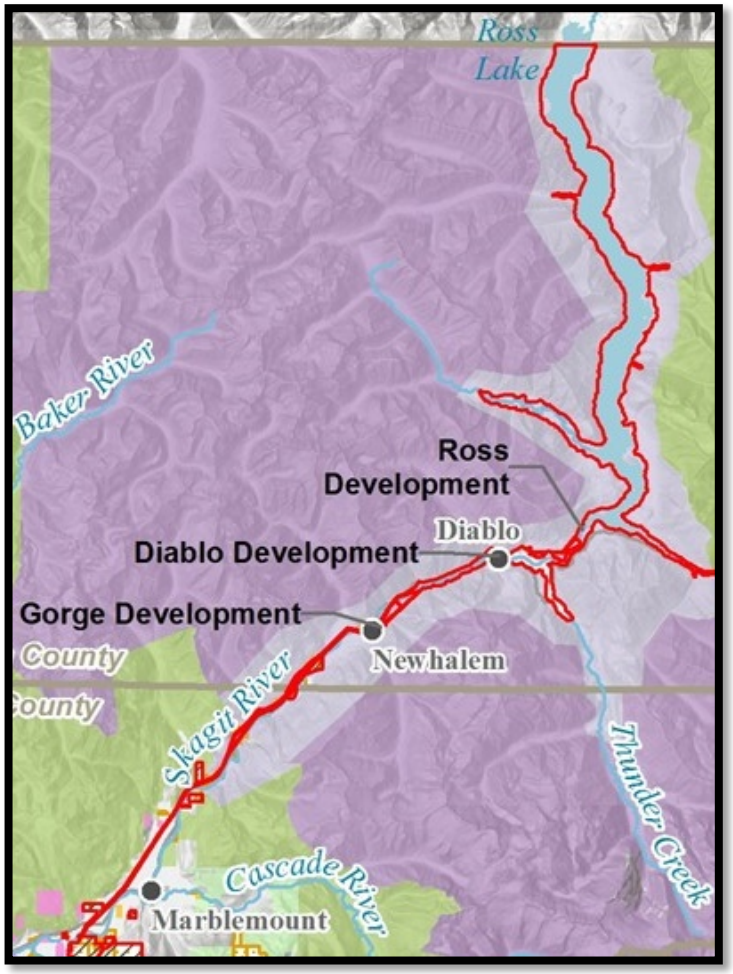
- Determine the preferences, attitudes, and characteristics of the study area's recreation users
  - Describe recreation visitors and their trip characteristics
  - Describe user preferences and expectations at recreation facilities
  - Identify any recreation issues such as safety, conflicts, and crowding
  - Describe recreation visitors' activities at recreation facilities
  - Describe recreation visitors' access experience and any potential barriers to participation in recreation activities
  - Describe recreation visitors' socio-demographic characteristics

STUDY GOALS AND OBJECTIVES

- Identify current recreation use and activities
  - Identify the amount, type, and spatial and temporal distribution of existing and desired recreation use
  - Identify the current recreation facility capacity/occupancy
  - Identify recreation opportunities that may have unmet demand
  - Identify potential constraints or barriers to recreation use
  - Assess the regional uniqueness/significance of opportunities
- Estimate future recreation use and activities
  - Roughly estimate future recreation demand within the study area through the term of the new license (30 to 50 years)

STUDY AREA

- Lands and waters within and adjacent to the Project Boundary at:
  - Ross, Diablo, and Gorge Lakes
  - Newhalem and Diablo townsites
  - Skagit River from Newhalem downstream to Marblemount
- Note: approximately 50 study sites with varying methods by site

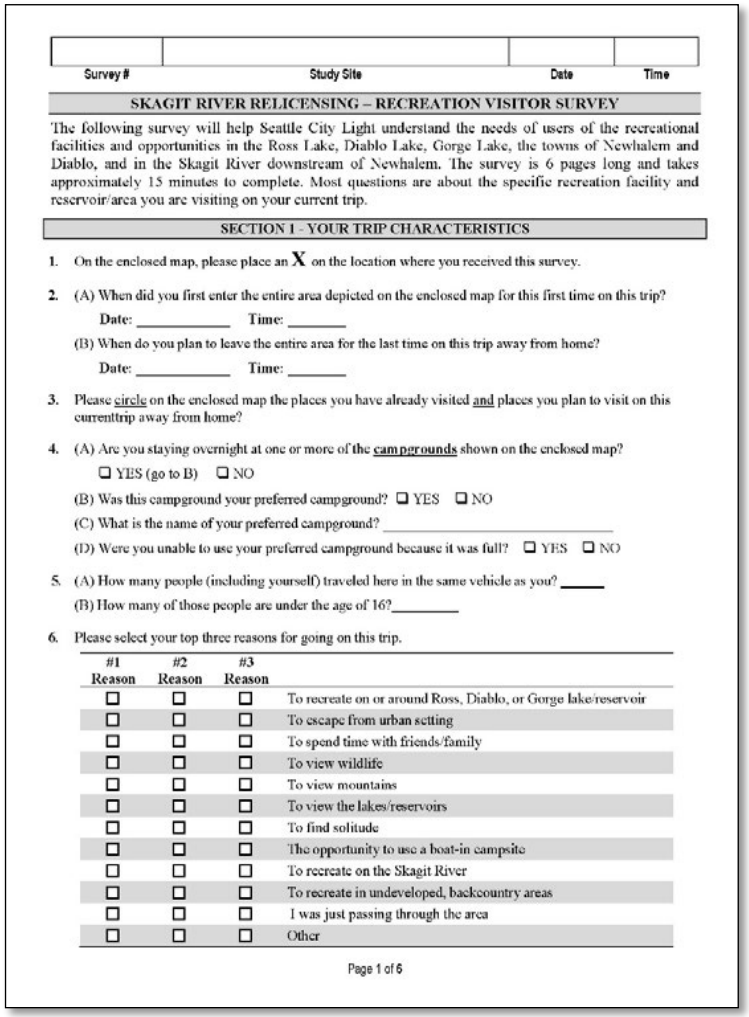


STUDY METHODS

Methods Implemented in 2021

- Inventory and evaluate existing recreation facilities
  - Condition, accessibility compliance, and use impact assessments
  - Qualitative trail accessibility assessment
  - Gorge Lake Boat Launch ramp assessment
- FERC Study Plan Determination (SPD) Modifications
  - Trail Accessibility – include Diablo to Ross Lake portage route
  - Facility Inventory - evaluate trailhead signs for trail conditions (e.g., level of difficulty)

STUDY METHODS



Survey #	Study Site	Date	Time

SKAGIT RIVER RELICENSING – RECREATION VISITOR SURVEY

The following survey will help Seattle City Light understand the needs of users of the recreational facilities and opportunities in the Ross Lake, Diablo Lake, Gorge Lake, the towns of Newhalem and Diablo, and in the Skagit River downstream of Newhalem. The survey is 6 pages long and takes approximately 15 minutes to complete. Most questions are about the specific recreation facility and reservoir/area you are visiting on your current trip.

SECTION 1 - YOUR TRIP CHARACTERISTICS

1. On the enclosed map, please place an **X** on the location where you received this survey.
2. (A) When did you first enter the entire area depicted on the enclosed map for this first time on this trip?
   Date: _____ Time: _____
   (B) When do you plan to leave the entire area for the last time on this trip away from home?
   Date: _____ Time: _____
3. Please circle on the enclosed map the places you have already visited and places you plan to visit on this currenttrip away from home?
4. (A) Are you staying overnight at one or more of the campgrounds shown on the enclosed map?
   ☐ YES (go to B) ☐ NO
   (B) Was this campground your preferred campground? ☐ YES ☐ NO
   (C) What is the name of your preferred campground? _____
   (D) Were you unable to use your preferred campground because it was full? ☐ YES ☐ NO
5. (A) How many people (including yourself) traveled here in the same vehicle as you? _____
   (B) How many of those people are under the age of 16?_____
6. Please select your top three reasons for going on this trip.

#1 Reason	#2 Reason	#3 Reason	
☐	☐	☐	To recreate on or around Ross, Diablo, or Gorge lake/reservoir
☐	☐	☐	To escape from urban setting
☐	☐	☐	To spend time with friends/family
☐	☐	☐	To view wildlife
☐	☐	☐	To view mountains
☐	☐	☐	To view the lakes/reservoirs
☐	☐	☐	To find solitude
☐	☐	☐	The opportunity to use a boat-in campsite
☐	☐	☐	To recreate on the Skagit River
☐	☐	☐	To recreate in undeveloped, backcountry areas
☐	☐	☐	I was just passing through the area
☐	☐	☐	Other

Page 1 of 6

2022 Methods

- Field data collection tasks
  - Identify recreation uses and visitor attitudes, beliefs, and preferences
    - Observation surveys (use counts)
    - Visitor surveys
    - Trail counters
- Research/data analysis tasks
  - Estimate current recreation use at recreation resource areas
  - Identify future use and demand opportunities

STUDY METHODS

FERC SPD Modifications for 2022 Tasks

- Observation/Use Counts
  - Hourly counts over 4-hour block sampling period
- Visitor Survey Sites
  - Added Marble Creek Campground, Newhalem Campground, and Canyon Creek Trailhead
- Sampling Area and Size
  - Three areas (i.e., Ross Lake, Diablo/Gorge Lakes, and Skagit River) each with 384 responses per survey area (1,152 total)

STUDY METHODS

FERC SPD Modifications for 2022 Tasks (continued)

- Survey Instrument
  - NPS/USFS survey instrument + map
- Trail Counters
  - Added East Bank Trail counters near Hozomeen Campground & Roland Point
  - Calibrate counters monthly for 1-hour period each
  - Consult with the Nlaka'pamux Council, the Nlaka'pamux Coalition, and other interested LPs regarding the appropriate location of the counters to capture trail use in the vicinity of culturally sensitive areas

RESULTS

Physical Inventory – Condition Assessment

- City Light assessed 14 Project recreation facilities
- Generally, the condition of the facilities were good overall with minimal facilities or amenities in fair or poor condition
  - Diablo Dam Parking Area – only facility in fair condition overall (older/aging facility)
  - Fair/poor condition at selected individual amenities (e.g., picnic tables, vehicle barriers/striping, damaged surfacing)


Newhalem Picnic Site


Diablo Dam Parking Area

RESULTS

Physical Inventory – Accessibility Assessment

- City Light assessed 37 Project & non-Project facilities
  - 2015 Architectural Barriers Act standards for federal facilities
  - 2010 ADA Standards for Accessible Design (USDOJ) for City Light facilities
- Study plan has a 3-tier accessibility rating system

ACCESSIBILITY RATING CATEGORIES & CITY LIGHT'S 2021 ASSESSMENT		
Inaccessible	**Partially Accessible**	**Accessible**
Little or no consideration for accessibility. Clearly not in compliance with current ADA or ABA standards.	Some accessible facilities, but in disrepair or not up to current ADA or ABA standards (e.g., slopes too steep, docks inaccessible, etc.).	High quality of accessibility. Facilities appear fully consistent with current ADA or ABA standards.
22 facilities (59%)	14 facilities (38%)	1 facility (2%)

RESULTS

Physical Inventory – Use Impact Assessment

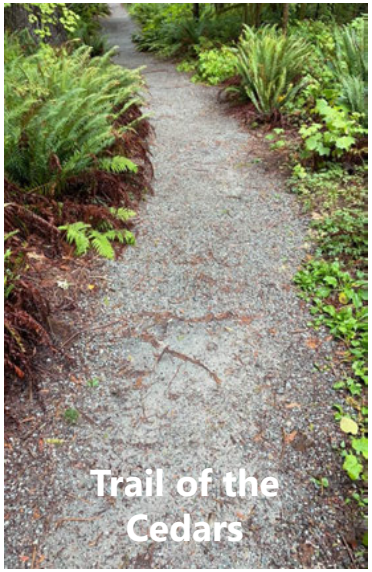
- City Light assessed 38 Project and non-Project facilities
- Overall, City Light observed very few signs of use impact at the developed recreation facilities

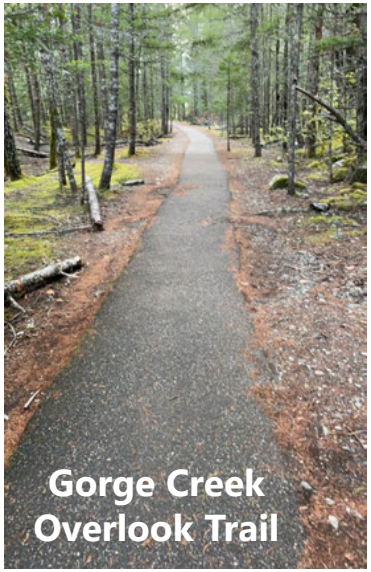
- Most common observed impacts are inherent to developed recreation sites (e.g., large bare ground/hardened areas)
- Infrequent signs of litter/sanitation issues, tree or vegetation cutting or damage, user-created trails, erosion associated with recreation use
- User-created trails were rarely observed, except at boat-in campsites connecting to satellite areas (i.e., other campsites and shoreline areas)

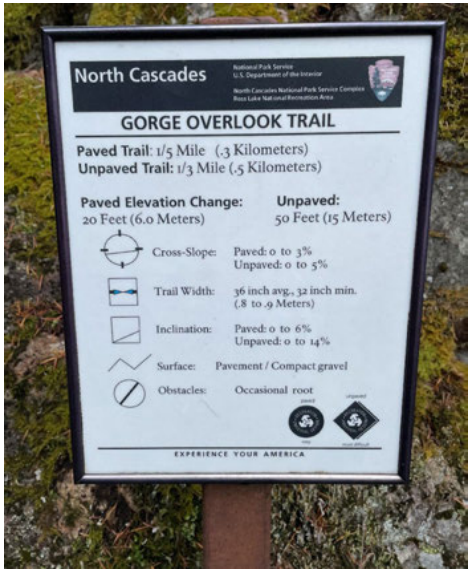
RESULTS

Qualitative Trail Accessibility Assessment

- City Light assessed 8 trails (2 Project trails / 6 non-Project trails)
- Two trails have limited constraints and most of the trail meets accessible standards (Trail of the Cedars and Gorge Creek Overlook)
- Only Gorge Creek Overlook Trail has a trail conditions sign



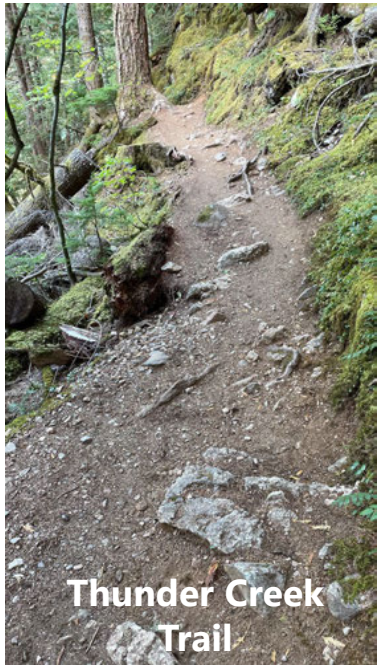


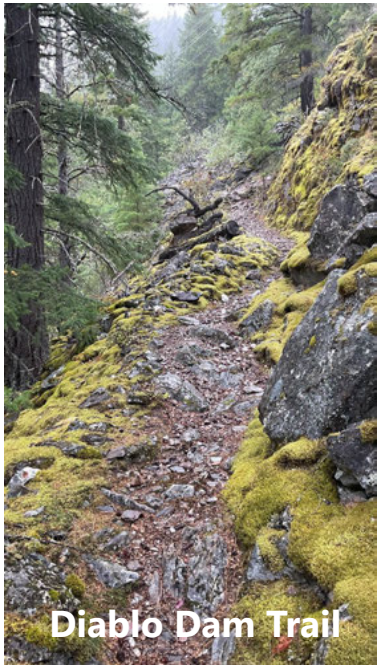


RESULTS

Qualitative Trail Accessibility Assessment (continued)

- Remaining six trails have notable/prevalent constraints, including steep running and cross slopes, tread obstacles, loose/rocky and inconsistent surfacing or compactness, and narrow tread widths





RESULTS

Diablo-to-Ross Lake Portage Route Accessibility

- Route consists of Project and non-Project facilities and services to move visitors between Diablo and Ross Lakes

Step 1 (Diablo Lake)	Step 2 (Diablo Lake surface)	Step 3 (Diablo Lake)	Step 4 (transition between lakes)	Step 5 (Ross Lake)
A-West Ferry Landing or B-Colonial Creek Boat Launch	A-Ferry Service (Cascadian) or B-Paddle	A-East Ferry Landing or B-NPS Portage Dock	A-Ross Dam Haul Road (hike) or B-Ross Lake Resort shuttle (vehicle)	Ross Lake Resort Dock

- Overall, the portage route does not meet accessible standards
  - Some facilities have accessible elements (ferry landings and Colonial Creek Boat Launch), but most do not
  - Key Constraints: West Ferry Landing steps, ferry boat, NPS portage dock steps, Ross Dam Haul Road (steep), resort shuttle, and resort dock

RESULTS

Gorge Lake Boat Launch Ramp Assessment

- Functional elevation range is 5 vertical ft from 883 ft to 878 ft
- Constructed elevations
  - top of ramp = 883 ft
  - bottom of ramp = 875 ft
  - functional 3 vertical ft above constructed bottom (878 ft)
- Next Steps (2022)
  - identify the usable periods of the ramp
  - requires OM-01 Operations Model Study output (daily median reservoir water surface elevations for the period of record)

STUDY VARIANCES

- No variances to the FERC-approved study

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
2022 Fieldwork Planning & Coordination	January-April 2022
2022 Fieldwork-Surveys & Use Counts	May-October 2022
2022 Fieldwork-Trail Counters	May-October 2022
Data Analysis	November-December 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

RA-02 GORGE BYPASS REACH SAFETY AND WHITEWATER BOATING STUDY

Initial Study Report Meeting

John Gangemi| March 23, 2022

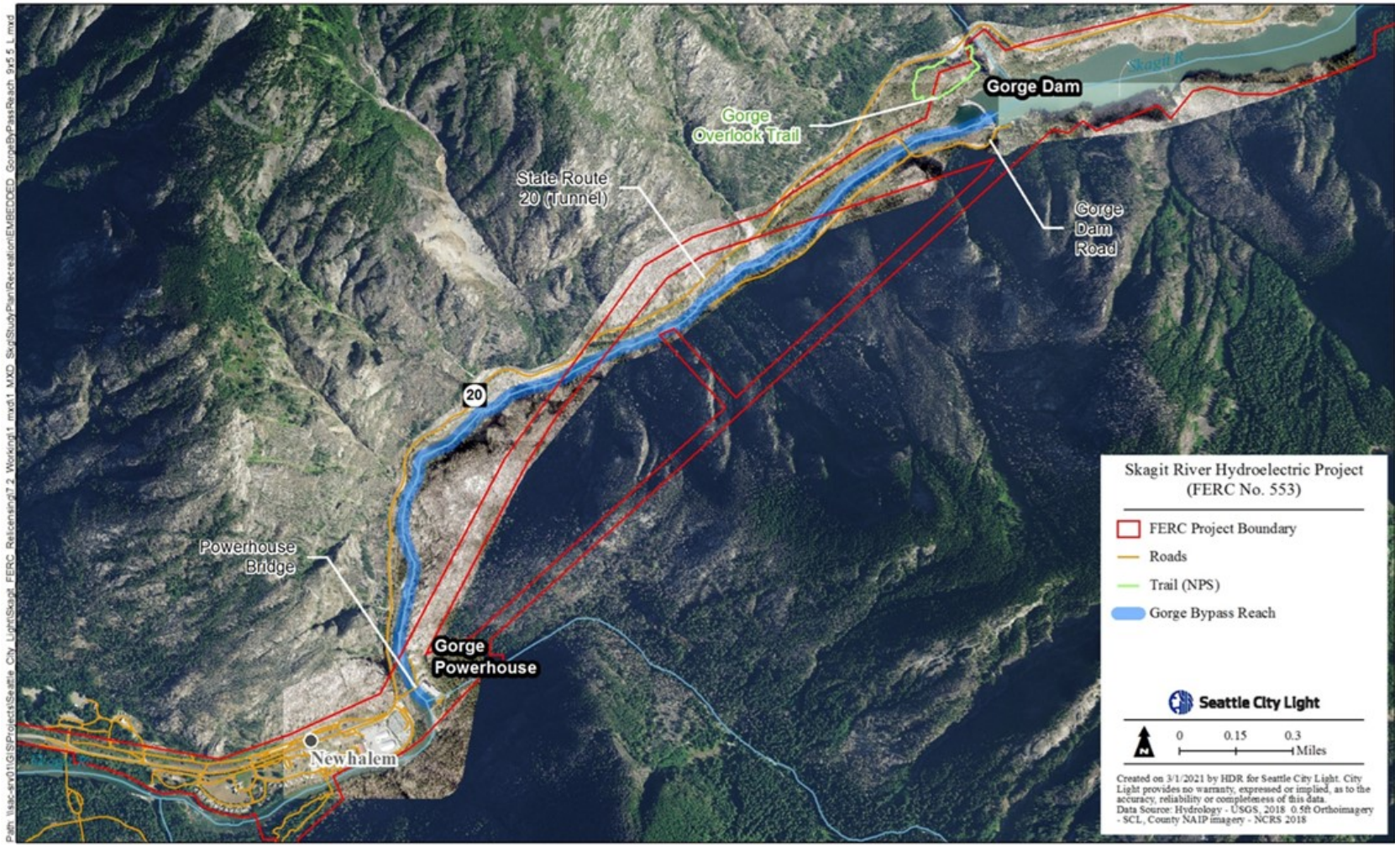
STUDY GOALS AND OBJECTIVES

- Describe the whitewater boating opportunity in the Gorge bypass reach including the whitewater difficulty, character of rapids, number of portages, suitability for expert paddlers, and uniqueness of opportunity
- Determine the range of flows that would provide whitewater boating opportunities in the Gorge bypass reach
- Quantify the frequency, timing, duration, magnitude, and rate of change of spill events from Gorge Dam annually within the whitewater boating flow range
- Assess the feasibility of expert whitewater boating, including public safety, effects on generation, and cost of providing whitewater boating in the Gorge bypass reach

STUDY GOALS AND OBJECTIVES (CONT.)

- If boating is determined feasible, compare the results of this assessment with an estimate of potential whitewater boating use
- If boating is determined feasible, identify existing and potential river access needs and routes and challenges with utilizing those routes, including potential effects to natural, cultural, and other Project resources from increased public access

STUDY AREA


Gorge Dam
Gorge Overlook Trail
State Route 20 (Tunnel)
Gorge Dam Road
20
Powerhouse Bridge
Gorge Powerhouse
Newhalem
Skagit River Hydroelectric Project (FERC No. 553)
FERC Project Boundary
Roads
Trail (NPS)
Gorge Bypass Reach
Seattle City Light
0
0.15
0.3
Miles
Created on 3/1/2021 by HDR for Seattle City Light. City Light provides no warranty, expressed or implied, as to the accuracy, reliability or completeness of this data.
Data Source: Hydrology - USGS, 2018 0.5ft Orthoimagery - SCL, County NAIP imagery - NCRS 2018

STUDY METHODS

- Level 1 Desktop Analysis
  - Literature review
  - Structured interviews
  - Evaluate the physical characteristics of the Gorge bypass river channel
  - Analyze spill hydrology in Gorge bypass
  - Evaluate existing river access options
  - Summarize natural and cultural resource management goals and studies for the Gorge bypass reach
  - Decision criteria for progression to Level 2

STUDY METHODS

- Level 2 Field Reconnaissance
  - Shore based observations of planned spills
  - Evaluate potential whitewater boating flow volumes to assess the following:
    - River access
    - Navigability
    - Whitewater difficulty
    - Estimate a suitable flow range for Level 3 Multiple Flow Evaluation
  - Focus Groups
  - Decision criteria for progression to Level 3

STUDY METHODS

- Level 3 Multiple Flow Evaluation
  - Interdisciplinary assessment of potential effects on natural and cultural resources for Level 3 multiple flow study
  - On-water multiple flow evaluation
    - Single flow evaluation form
    - Comparative flow evaluation form
    - Focus group
  - Updated Study Report

RESULTS

Level 1 Desktop Analysis

- Summary of existing whitewater boating opportunities in the Skagit River basin
- Structured interviews with whitewater boaters familiar with the Gorge bypass reach
- Gorge dam spill hydrology (frequency, volume, duration and rate of change)
- Summary of pre-reconnaissance site visit
- Matrix of resource studies intersecting with Gorge bypass
- Level 1 decision criteria
- Recommendations for Level 2 Field Reconnaissance

RESULTS

Level 2 Field Reconnaissance

- Study participant observations of spills
- Focus group questions and discussion
- Summary of Level 2 Field Reconnaissance
- Level 2 decision criteria
- Recommendations for Level 3 Multiple Flow Evaluation contingent on tribal outreach and review of results from other ISRs

STUDY VARIANCES

- Added the pre-reconnaissance site visit for Level 1 Desktop Analysis
- Combined Level 1 and Level 2 interim reports into single report
- Scheduled planned spills for Level 2 Field Reconnaissance

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Level 3 Tribal & Resource Coordination	February-April 2022
Level 3 Multiple Flow Evaluation	Summer 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

RA-03 PROJECT FACILITY LIGHTING INVENTORY

Initial Study Report Meeting

Michael Aronowitz | March 23, 2022

STUDY GOALS AND OBJECTIVES

Goal

- Inventory Project facilities located within the Project Boundary and Ross Lake National Recreation Area (RLNRA) that utilize lighting at night

Objectives

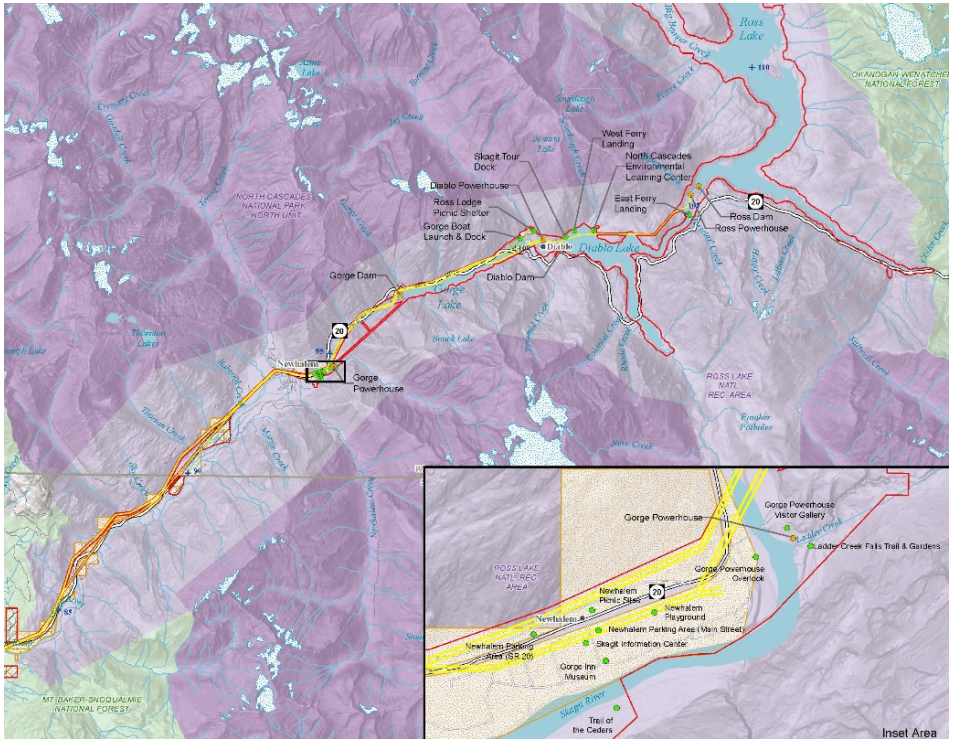
- Identify Project facilities within the RLNRA that utilize outdoor nighttime lighting and describe characteristics of the luminaires
- Describe outdoor lighting needs at each Project facility and the operating periodicity, design, and intensity of lights being used

STUDY AREA

All Project facilities within the Project Boundary and within the RLNRA that utilize lighting at night

Project Facilities:

- Generating facilities
- O&M support areas
- Newhalem and Diablo townsites, including housing
- Transmission, transportation, and communications infrastructure
- Visitor service/recreation areas



STUDY METHODS

- Daytime and Nighttime Visits - catalog the physical characteristics of existing lighting
- "As Found" Lighting Inventory – field data used to document existing luminaires
- Study was completed in 2021 (1-year study)
- No variances from the Study Plan Determination

RESULTS

"As-Found" Lighting Inventory

- Inventory includes:
  - Physical characteristics of luminaires
  - Nighttime lighting measurements, including illuminance and luminance
- Detailed inventory provided in the ISR (Attachment B), including summary tables and photographs of luminaires (examples on next pages)

RESULTS

As-Found Lighting Inventory Example (Attachment B)

Newhalem typical post-top light pole

Category	Description
Source Quantity	1 source per luminaire
Locations	Newhalem development area
Mounting / Height	post-top, 20 ft tall
Luminaire Condition	good condition
Source Voltage	277 V
Source Type	LED
Estimated CCT	4000 K
Source Wattage[1]	--
Source Distribution	Type V,[2] area lighting
Nighttime Lighting Documentation	See **Table 5.1-2**
Shielding	full cut-off, no uplight
Ballast / Driver Information[1]	--
Luminaire Control Method	individual photocell
Hours of Operation	dusk to dawn
Safety and Security Concerns	pedestrian path visibility / comfort
Purpose	pedestrian path illumination / general area lighting
Functionality	functioning properly
Historical Significance	N/A

1 Source wattage and driver information unavailable.
2 Type V defines how light is dispersed from the luminaire. Refer to IESNA Light Distribution Type definitions (Rea and IESNA 2000).

RESULTS

As-Found Lighting Inventory Example (Attachment B)

Newhalem typical post-top light pole

Distance from Source (ft)	Horizontal Illuminance (E_H) (FC)	Source Lens Luminance (cd/m^2)[2]
0 (Nadir)	0.25	--
15	0.19	--
30	0.12	4,208
45	0.10	--
60	0.06	--

1 As noted in Section 4, nighttime luminance and illuminance measurements were recorded for representative luminaires, and only for luminaires that were easily accessible for accurate measurements.

2 Lens luminance measurements only conducted at a distance of 30 ft.

RESULTS

Potential Improvements for Luminaires

- ISR identifies potential strategies for improving luminaires
  - Assessing if the light is required at a location
  - Lowering intensity
  - Controlling direction of illumination
  - Limiting or changing the lighting spectrum
  - Limiting duration of emitted light
- ISR identifies specific opportunities for implementing improvements

STUDY VARIANCES

- No variances to the FERC-approved study

STUDY SCHEDULE

Milestone	Date
Data Collection	June – September 2021
City Light files Initial Study Report	March 2022

Seattle City Light

QUESTIONS?

RA-04 PROJECT SOUND ASSESSMENT

Initial Study Report Meeting

Michael Aronowitz | March 23, 2022

STUDY GOALS AND OBJECTIVES

Goal:

- Develop estimates of Project-related noise to facilitate analysis of how Project-related noise may affect other resources

Objectives:

- Inventory, assess, and measure/identify the Project facilities, equipment, and activities that emit noise throughout the Project Boundary
- Identify when Project-related features, maintenance activities, and operations produce noise (i.e., day/night, seasons, etc.)
- Identify/delineate noise-sensitive land uses representative of other noise-sensitive land uses in the study area
- Perform spring and summer unattended noise measurements for a continuous 7-day period to document existing noise levels at noise-sensitive locations
- Model Project-related noise and develop noise contour maps showing how Project-related noise propagates/attenuates throughout the Sound study area

STUDY GOALS AND OBJECTIVES

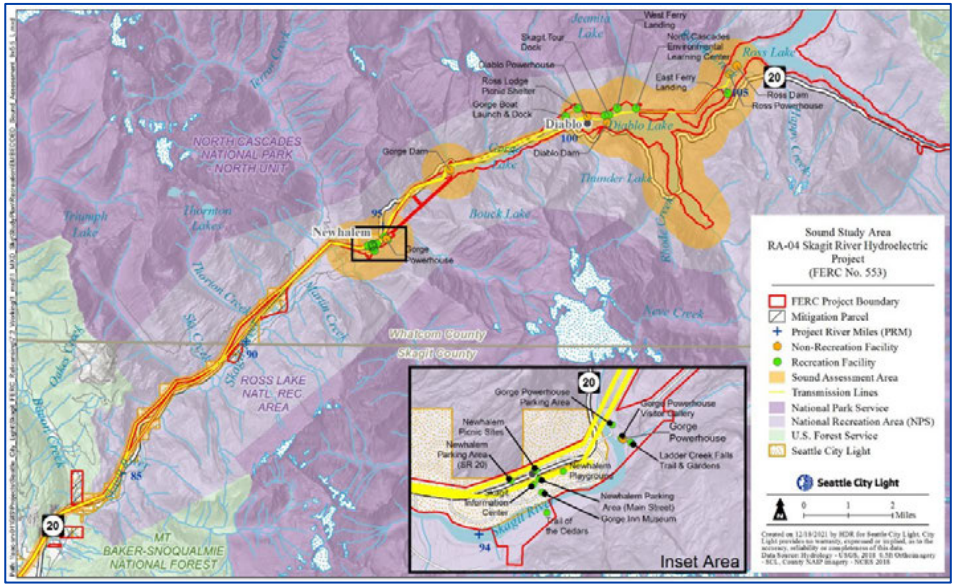
FERC Study Plan Determination (SPD) Additions

- City Light shall consult with the National Park Service and other interested LPs on the locations of the long-term (7-day) measurement sites
- City Light shall calculate L_{nat} values for each measurement site

STUDY AREA

- 0.6 miles from Project-related facilities and operations within the Project Boundary
  - In response to requests from LPs, City Light agreed to extend the noise modeling study area within North Cascades National Park to the point that modeled noise levels attenuate to the L_{90} value measured at the nearest long-term unattended noise measurement location, which may be beyond 0.6 miles

- For corona noise specifically, the study area is a 500-foot buffer on either side of Project transmission lines



STUDY METHODS

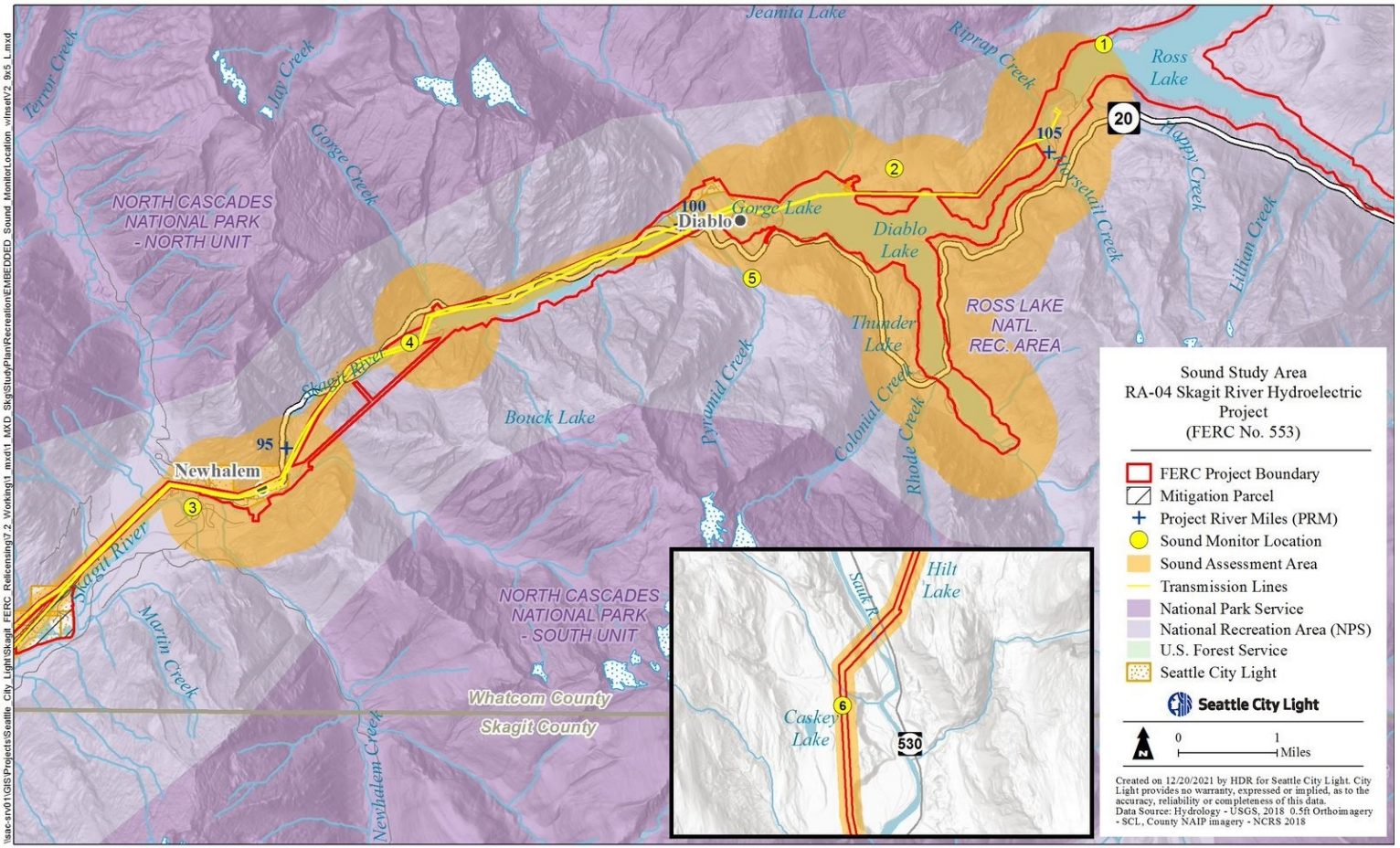
The Project Sound Assessment methods consist of inventory, measurement, and modeling tasks

Inventory Tasks

- Inventory noise-emitting Project facilities and activities
  - Initiated in 2021 and will be completed in 2022
- Assess land use
  - In 2021, six primary and six alternative locations were selected for the long-term noise measurement task in consultation with NPS and City Light's cultural resources team

STUDY METHODS

Long-term Ambient Noise Measurement Locations



STUDY METHODS

Measurement Tasks

- Conduct short-term noise measurements
  - 2021: measured emissions from stationary Project noise sources
- Conduct long-term 7-day ambient noise measurements
  - 2021: completed summer period measurements (Aug-Sept 2021)
  - 2022: will conduct spring measurements
- Process 7-day ambient noise measurement results
  - 2021: characterized hourly outdoor noise levels (L_{min}, L_{max}, L_{eq}, L_{10}, L_{33}, L_{50}, and L_{90}) from the summer period
  - 2022: will determine the L_{nat} as well as process the ambient noise measurement results from the spring 2022 measurement task

STUDY METHODS

Modeling Tasks

- Noise Modeling - to evaluate transmission line (corona) noise and noise from other Project features and activities
  - 2021: created a preliminary base noise model version
  - 2022: will add corona noise to the base noise model, which will become the basis for up to 9 additional noise models designed to depict different combinations of activities, circumstances, and/or events

RESULTS

Measurement Tasks

- Conducted summer ambient noise measurements at six long-term measurement sites
  - Locations: Ross Dam, Diablo Lake Trail, Pyramid Lake Trail, Gorge bypass reach, Newhalem Creek Campground, and Caskey Lake
  - ISR includes summary and hourly measurement results
- Measured noise emissions from stationary Project noise sources
  - powerhouses
  - switchyards

RESULTS

Summer Ambient Noise Measurement Summary

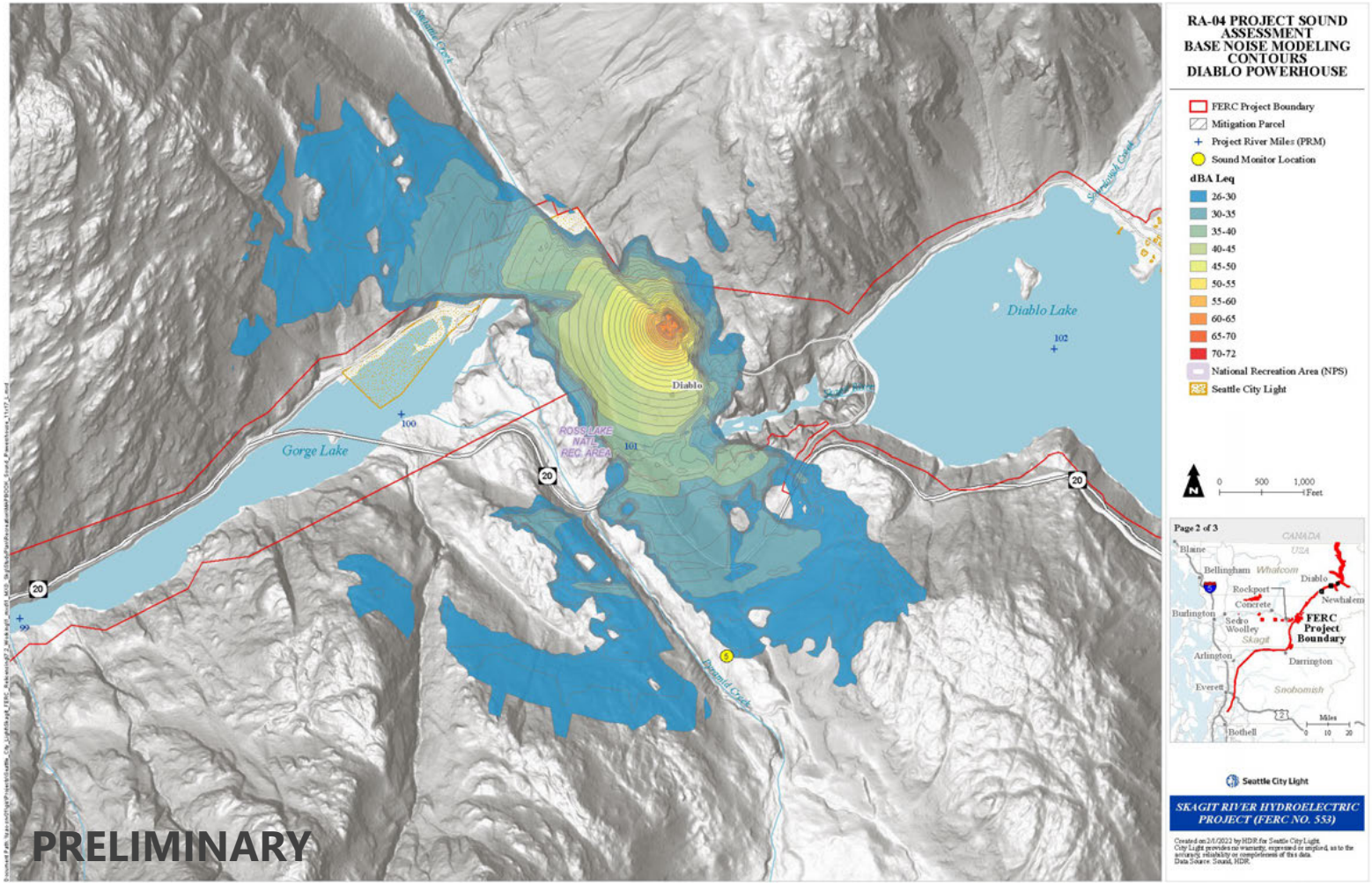
Measurement Location	Avg. Hourly L_{eq}	Overall L_{min}	Avg. Hourly L_{min}	Overall L_{max}	Avg. Hourly L_{max}	Daily L_{max} Sources	Avg. Hourly L_{10}	Avg. Hourly L_{33}	Avg. Hourly L_{50}	Avg. Hourly L_{90}
Ross Lake	39	20	28	75	56	Dogs, bird, helicopter, jet	42	37	36	31
Diablo Lake Trail	33	17	24	70	50	Helicopter, foliage, jet overflights	35	32	30	27
Pyramid Lake Trail	43	40	41	71	53	Noon siren, bird, hikers, helicopter	43	42	42	42
Gorge Bypass Reach	39	26	30	78	56	Helicopter, traffic, hiker	41	37	36	33
Newhalem Creek Campground	39	32	35	84	56	Noon siren, car horn	39	38	37	36
Caskey Lake	33	22	26	79	53	Helicopter, logging trucks, bird	33	31	30	28

RESULTS

Modeling Tasks

- Study team identified additional Project-related noise sources that will be a part of the base noise model and nine model variants
  - Some data from short-term source noise measurements (powerhouses), but most noise data will come from existing information
- Prepared a preliminary base noise model (contour maps), but ongoing Project-related noise source inputs are needed to finalize the model and nine model variants, including:
  - stationary/mobile sources
  - corona (transmission line)
  - helicopter noise

RESULTS


RA-04 PROJECT SOUND ASSESSMENT
BASE NOISE MODELING CONTOURS
DIABLO POWERHOUSE
FERC Project Boundary
Mitigation Parcel
Project River Miles (PRM)
Sound Monitor Location
dBA Leq
26-30
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
70-72
National Recreation Area (NPS)
Seattle City Light
Diablo Lake
Gorge Lake
Diablo
ROSS LAKE NATL REC AREA
Page 2 of 3
FERC Project Boundary
Seattle City Light
SKAGIT RIVER HYDROELECTRIC PROJECT (FERC NO. 553)
PRELIMINARY

STUDY VARIANCES

- No variances to the FERC-approved study

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
2022 Fieldwork	April-June 2022
Noise Modeling	October 2021-November 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

RA-05 LOWER SKAGIT RIVER RECREATION FLOW STUDY

Initial Study Report Meeting

John Gangemi | March 23, 2022

STUDY GOALS AND OBJECTIVES

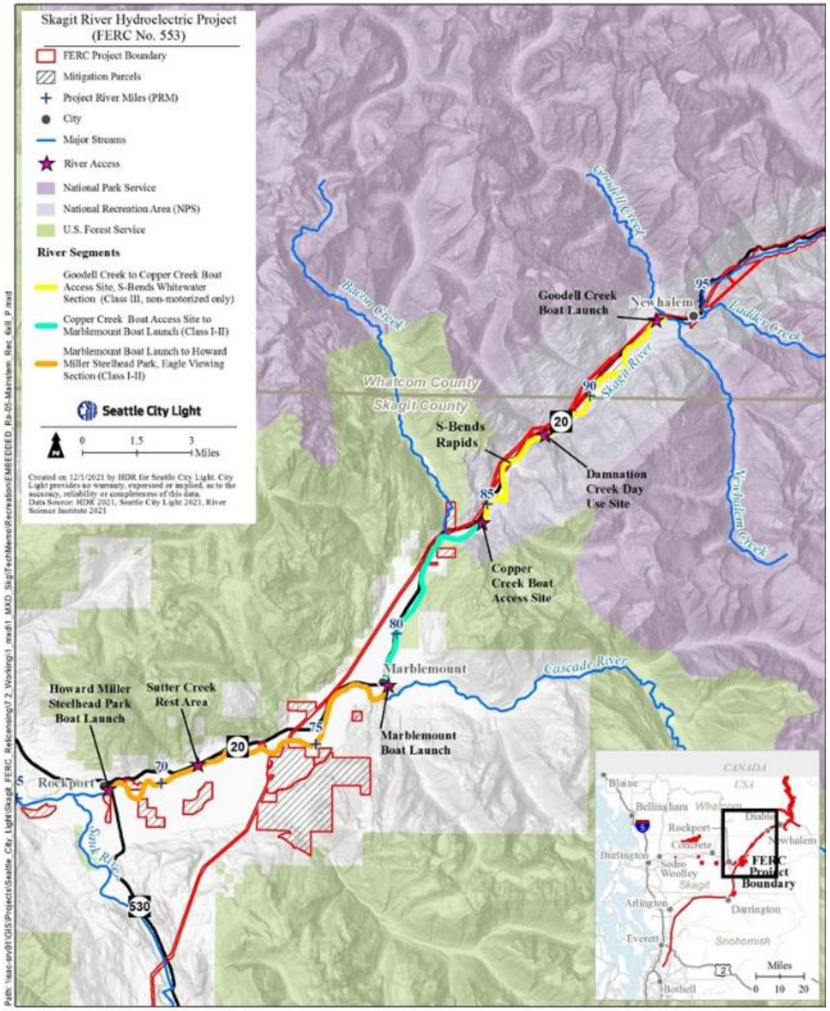
- Describe the recreation boating opportunity in the Skagit River from Goodell Creek Boat Launch to the Howard Miller Steelhead Park near Rockport, including:
  - Delineating the respective recreation segments
  - Access locations
  - Whitewater difficulty
  - Character of rapids
  - Number of portages
  - Watercraft types
  - Uniqueness of opportunity

STUDY GOALS AND OBJECTIVES

- Determine the range of boatable flows for watercraft types for the distinct recreation segments

- Quantify the frequency, timing, duration, magnitude, and rate of change of flows downstream of the Gorge Powerhouse within the boating flow range

STUDY AREA



Skagit River Hydroelectric Project (FERC No. 553)
FERC Project Boundary
Mitigation Parcels
Project River Miles (PRM)
City
Major Streams
River Access
National Park Service
National Recreation Area (NPS)
U.S. Forest Service
River Segments
Goodell Creek to Copper Creek Boat Access Site, S-Bends Whitewater Section (Class III, non-motorized only)
Copper Creek Boat Access Site to Marblemount Boat Launch (Class I-II)
Marblemount Boat Launch to Howard Miller Steelhead Park, Eagle Viewing Section (Class I-II)
Seattle City Light
Miles
Goodell Creek Boat Launch
Newhalem
S-Bends Rapids
Damnation Creek Day Use Site
Copper Creek Boat Access Site
Marblemount
Marblemount Boat Launch
Howard Miller Steelhead Park Boat Launch
Sutter Creek Rest Area
Rockport
Whatcom County
Skagit County
Cascade River
FERC Project Boundary

STUDY METHODS

- **Literature Review** - existing information describing river recreation opportunities and boatable recreation flows
- **Recreation Flow Survey** - online survey
- **Structured Interviews** - interviews with knowledgeable individuals in the recreation boating community and resource agencies
- **Hydrology Analysis** - frequency, timing, duration, magnitude of the range of boatable flows for respective watercraft for each river segment
- **S-Bends Portage Assessment**

RESULTS

Literature Review

- Whitewater guidebooks
- American Whitewater River Library
- American Whitewater North Cascades boater survey
- Historic maps of whitewater boating opportunities in the North Cascades
- Direct observations

RESULTS

River Segments

River Segment	Put-in Location	Take-out Location	Length (mi)	Gradient (feet/mi)	White-water Difficulty	Watercraft Type	Typical Season of Use	Guidebook Flow Range (cfs)	Information Source
Goodell Creek to Copper Creek	Goodell Creek Boat Launch	Copper Creek Boat Access Site	8.7	12	II-III	Non-motorized segment: kayaks, canoes, inflatable kayaks (Iks), standup paddleboards (SUPs), rafts, dories	TBD based on survey results and interviews	1,500-15,000	Bennett, American Whitewater
Copper Creek to Marblemount	Copper Creek Boat Access Site	Marble-mount Boat Launch	5.9	10	I-II	kayaks, canoes, Iks, SUPs, rafts, dories		1,500-12,000	American Whitewater
Marblemount to Rockport	Marble-mount Boat Launch	Howard Miller Steelhead Park	10.6	8	I-II	kayaks, canoes, Iks, SUPs, rafts, dories, motorized boats		2,000-7,000	Bennett

RESULTS

Recreation Flow Survey

- Launched November 9, 2021
- Announcements to Skagit Licensing Participants
- Pushed recreation flow survey URL to national and regional river recreation groups
- Posted laminated signs at river access points

RESULTS

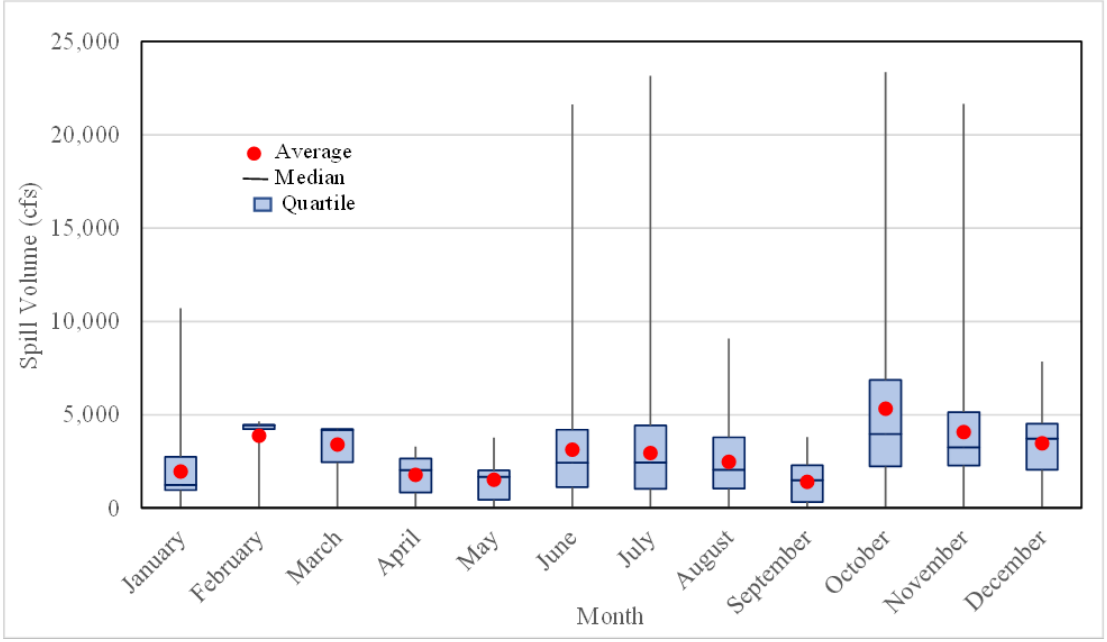
Structured Interviews

- Structured interviews will be scheduled in 2022 via phone or computer except where opportunities present themselves for in-person interviews
- NPS and USFS identified list of resource agency staff with direct knowledge of the Skagit River
- Obtained contact list for commercial outfitters operating on the Skagit River
- Online recreation flow survey participants can self-identify for structured interview

RESULTS

Hydrology Analysis

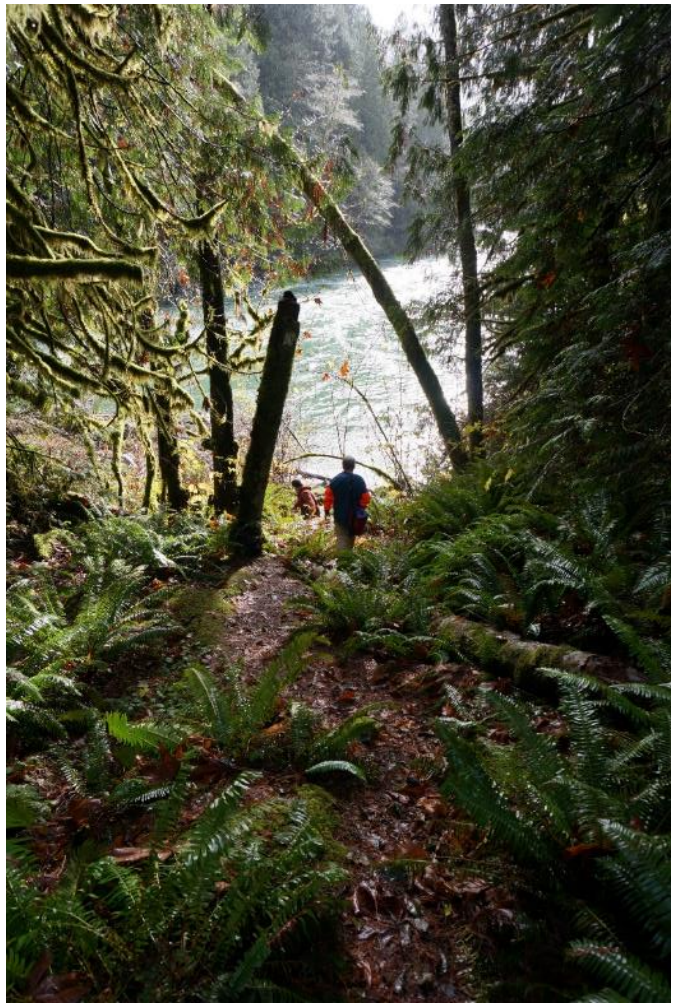
- Conducted using the range of boatable recreation flows for respective watercraft documented through the recreation flow survey and structured interviews



RESULTS

S-Bends Portage Assessment

- Site visits conducted on July 27, 2021 and November 6, 2021
- Documented trail conditions and parking on SR 20



STUDY VARIANCES

- No variances to the FERC-approved study

STUDY SCHEDULE

Milestone	Date
City Light files Initial Study Report	March 2022
Structured interviews	Ongoing in 2022
Recreation flow survey (online)	Ongoing in 2022
Hydrology analysis of boating flow preferences per river segment	September 2022
City Light files Updated Study Report	March 2023

Seattle City Light

QUESTIONS?

CULTURAL RESOURCES STUDIES

Initial Study Report Meeting

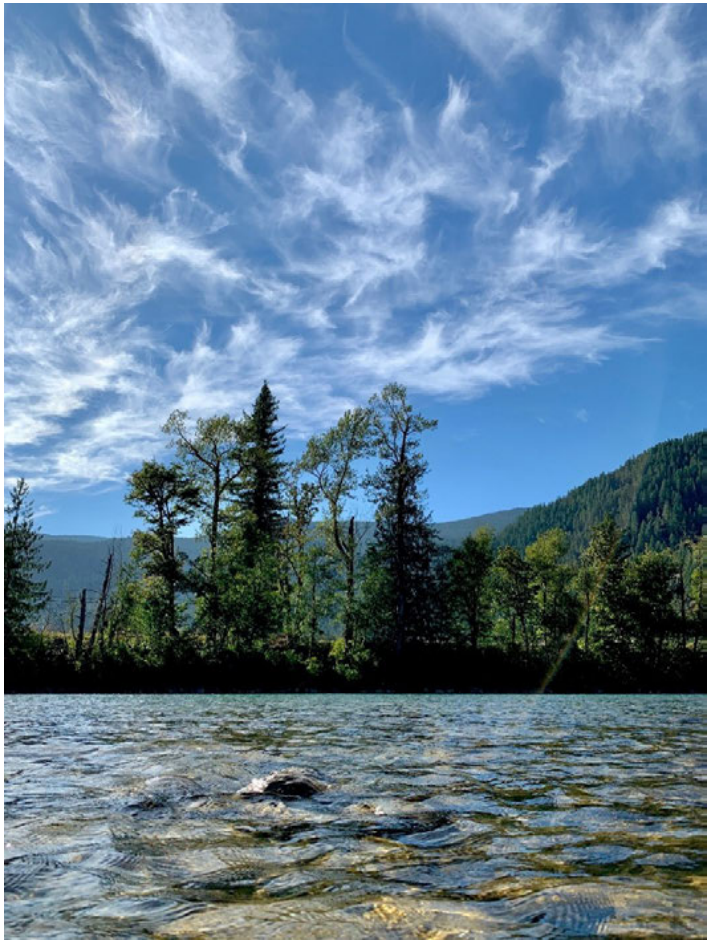
Andrea Weiser | March 23, 2022

SKAGIT RELICENSING CULTURAL RESOURCES STUDIES

Confidential information will not be shared in this meeting

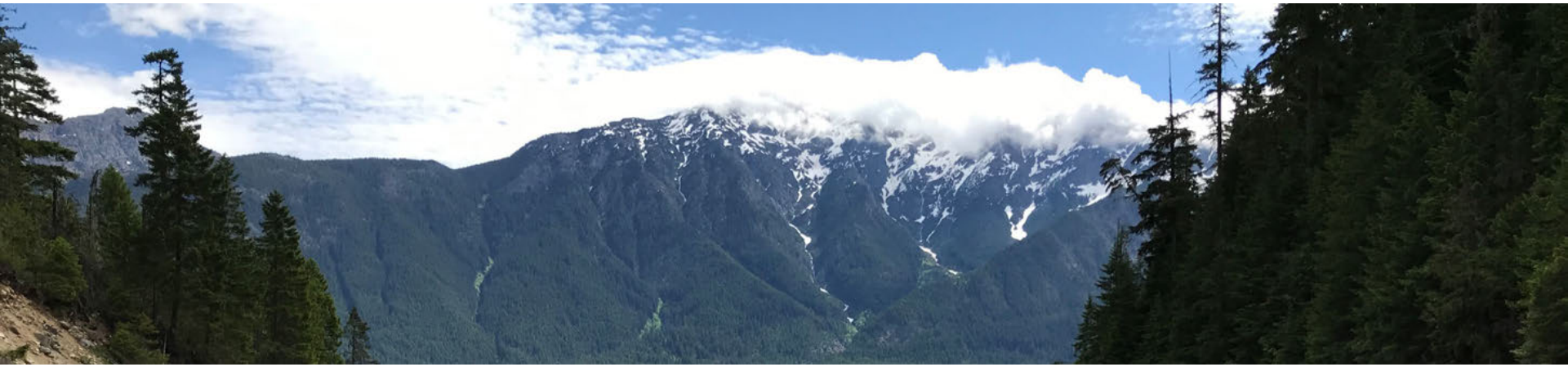
Four cultural resources studies are being implemented for the relicensing:

- CR-01 Cultural Resources Data Synthesis
- CR-02 Cultural Resources Survey
- CR-03 Gorge Bypass Reach Cultural Resources Survey
- CR-04 Inventory of Historic Properties with Traditional Cultural Significance



NHPA SECTION 106 PROCESS

- A primary goal of the relicensing cultural resources studies is to assist FERC with its Section 106 of the National Historic Preservation Act (NHPA) compliance requirements.
- Section 106 requires federal agencies to consider the effects of their *undertakings* on historic properties. Relicensing an existing hydroelectric project is a federal *undertaking*.



HISTORIC PROPERTY

- *Historic property* means:
  - any precontact or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP)
  - includes artifacts, records, and remains that are related to and located within such properties; and
  - includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria
- For Section 106 compliance, resources need only be evaluated for their eligibility; listing in the NRHP is *not required*.

THE SECTION 106 PROCESS

Section 106 Review Process

36 CFR § 800.3-7

INITIATE the process

- Determine undertaking
- Coordinate with other reviews
- Identify SHPO/THPO, Indian tribes/NHOs, and other parties
- Plan to involve the public

No undertaking with potential to affect historic properties?

NO

IDENTIFY historic properties

- Determine APE and scope of effort
- Make reasonable and good faith effort to identify
- Determine National Register eligibility
- Consult SHPO/THPO, Indian tribes/NHOs, and other parties
- Involve the public

No historic properties present or affected?

NO

ASSESS adverse effects

- Apply Criteria of Adverse Effects
- Consult SHPO/THPO, Indian tribes/NHOs, and other parties
- Involve the public

No historic properties adversely affected?

NO

RESOLVE adverse effects

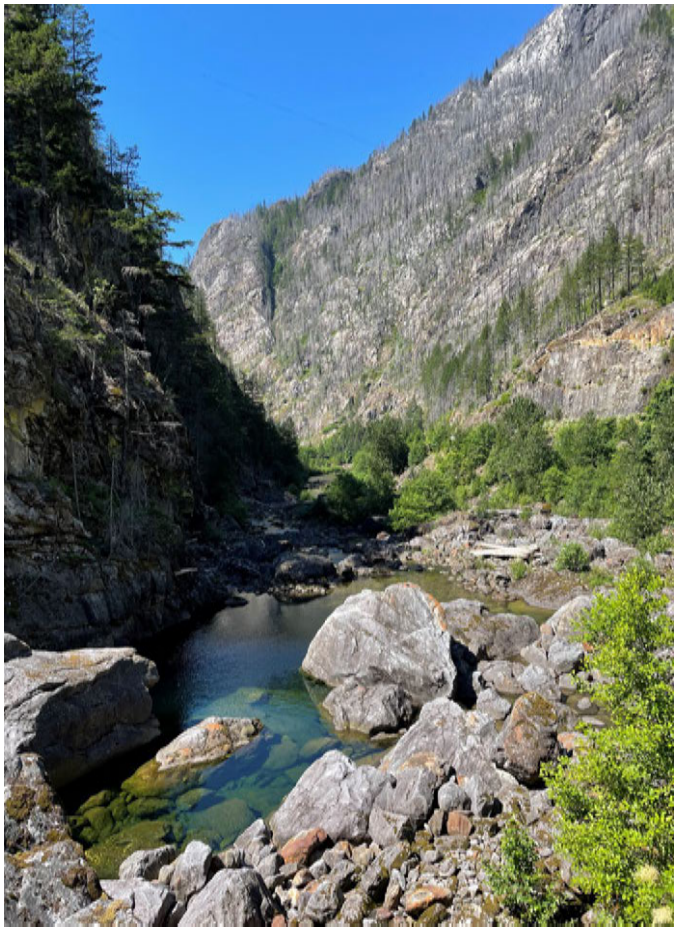
- Develop and consider alternatives or modifications to avoid, minimize, or mitigate adverse effects
- Notify the ACHP
- Consult SHPO/THPO, Indian tribes/NHOs, and other parties
- Involve the public

AGREEMENT or Council Comment

PROCEED

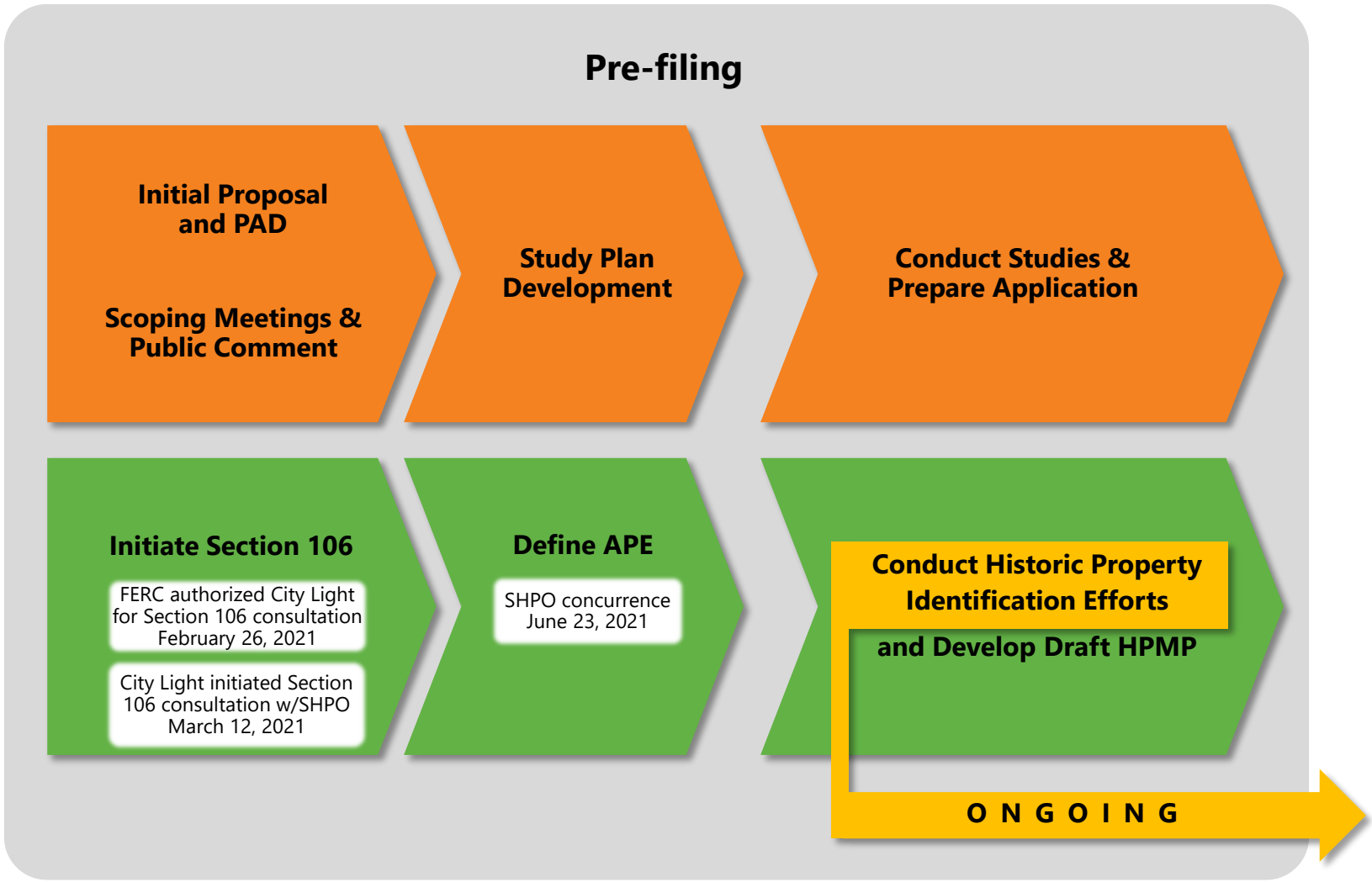
CONSULTATION

HOW THE SECTION 106 PROCESS IS USUALLY COMPLETED FOR FERC RELICENSINGS

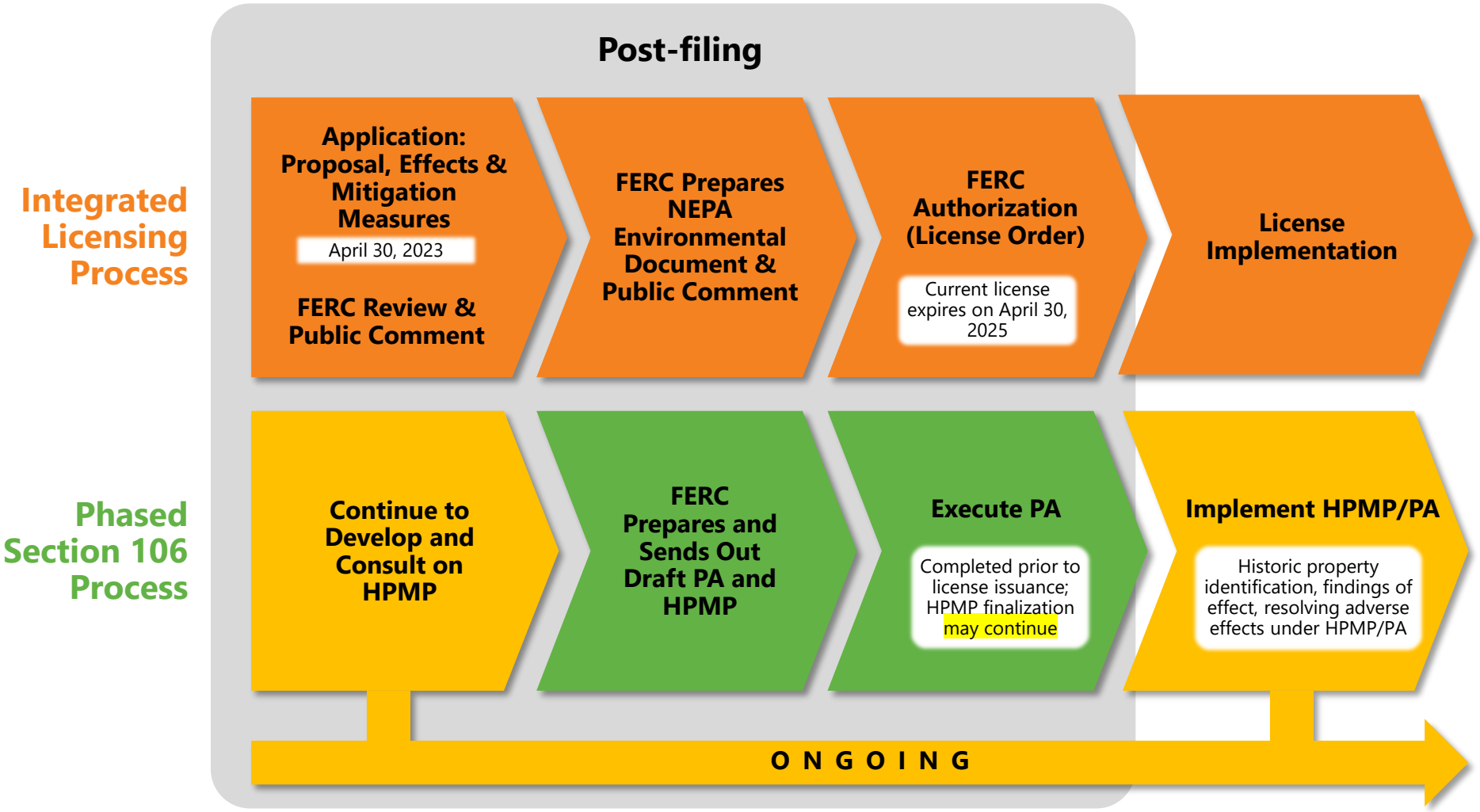


- A FERC hydroelectric license can last for 30-50 years
- FERC cannot identify all the potential adverse effects on historic properties prior to issuance of a license
- A programmatic agreement (PA) allows for completion of Section 106 through a phased process that can be conducted over time (36 CFR §800.4(b)(2))
- City Light anticipates that the PA for the Project will require the development of a Historic Properties Management Plan (HPMP) that will outline the protocols and procedures for managing and considering historic properties throughout the life of the new license

INTEGRATED LICENSING & PHASED SECTION 106 PROCESSES



INTEGRATED LICENSING & PHASED SECTION 106 PROCESSES



Seattle City Light

QUESTIONS?

CR-01 CULTURAL RESOURCES DATA SYNTHESIS STUDY

Initial Study Report Meeting

Andrea Weiser | March 23, 2022

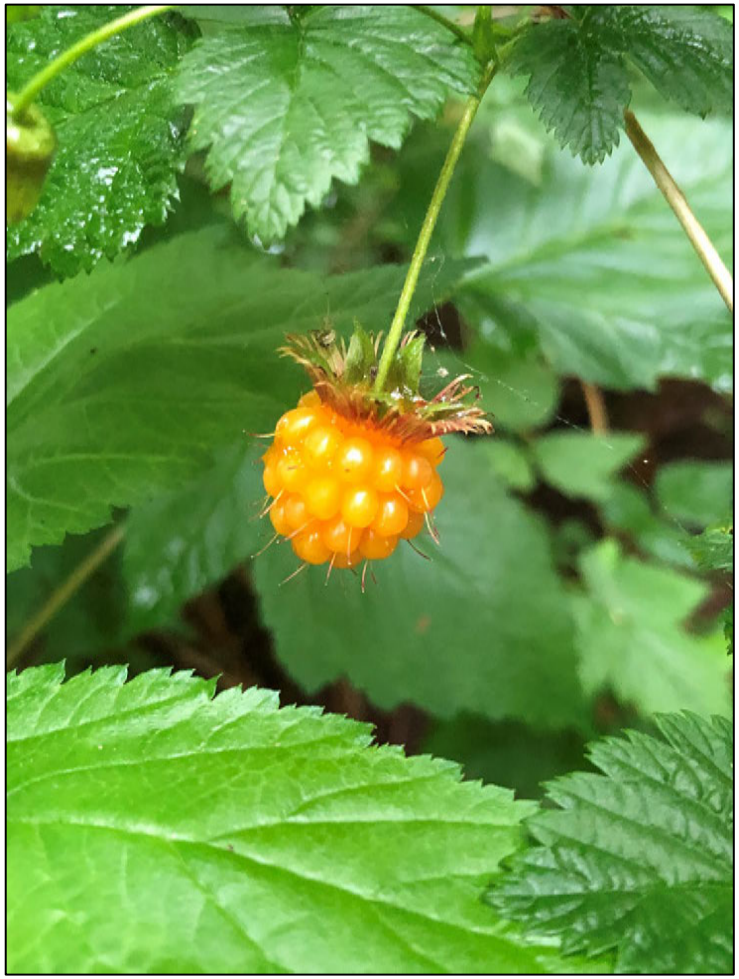
CR-01: GOALS AND OBJECTIVES

Goals

- Develop baseline dataset for known cultural resources within study area
- Use Information to facilitate design of relicensing studies, assessment of effects, and cultural resource management planning

Objectives

- Collate/synthesize existing data within study area - archaeological, historical, and ethnographic
- Document American Indian and Canadian First Nation associations with study area

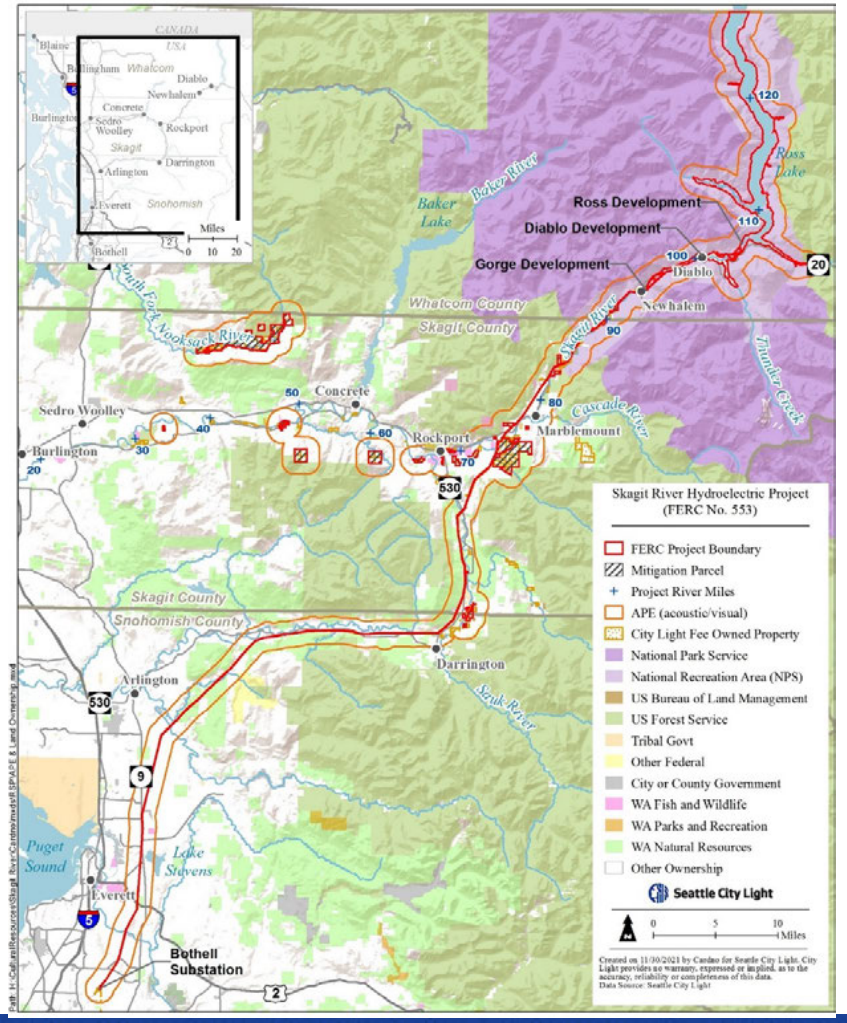


CR-01: STUDY OBJECTIVES, CONTINUED

- Build upon baseline collectively with the CRWG
- Identify data gaps and potential next steps (e.g., updates, new studies, and consultation)
- Identify areas of potential direct and indirect Project effects
- Use baseline condition to help identify potential means for protection, mitigation, and enhancement measures and management plans
- Provide status of previous Memorandums of Agreement (MOA) and associated stipulations

CR-01: STUDY AREA

- The CR-01 Study Area is the Project's Area of Potential Effects (APE)
- The APE is a specific term of art that relates to determining effects to "historic properties" as defined in the National Historic Preservation Act (NHPA)
- The APE is roughly 1 mile out from (surrounding) the Project boundary



CR-01: STUDY METHODS

This study was an overview based on desktop research. No fieldwork has occurred as part of the study. The following steps have been completed or are in progress:

- A list was compiled of available resources
- NPS in-house data was reviewed
- Outreach to Indian Tribes/First Nations
- Date lists were compiled
- Files to be uploaded to Document Management System in 2022
- Existing requirements for current license were reviewed
- Technical reports (confidential and non-confidential) written

CR-01: RESULTS

- Study serves as a desktop review. **No fieldwork or NRHP evaluations** were completed as part of the study
- Includes three reports for FERC study process:
  - Part 1 – Traditional Cultural Properties, Privileged *(already filed)*
  - Part 2 – Archaeological Resources, Privileged
  - Part 3 – Public Summary and Historic Built Environment
- Study includes summaries of existing cultural resources data (sites, built environment, TCPs, and investigations) available at WISAARD, published reports, Tribal repositories, and online historic records and maps
- Data collected provides background information for the other cultural resources studies and development of a HPMP for the new license

CR-01: STUDY VARIANCES

- **Inaccessible Data:** Several repositories and facilities were not accessible due to closures associated with the COVID19 pandemic. These include local libraries, historical societies, and museums. Such document reviews will be completed as needed if repositories become accessible and particular research topics are identified as relevant under implementation of CR-02 Cultural Resources Survey, CR-03 Bypass Cultural Resources Survey, and CR-04 Properties with Traditional Cultural Significance Study.

CR-01: STUDY SCHEDULE

Milestone	Date
Document Collection & Review	February 2020 – August 2021
Draft Summary Reports (n=3)	Winter 2020 and Fall 2021
Final Summary Reports (n=3)	Winter 2020 and Spring 2022
Initial Study Report	March 2022
City Light files Updated Study Report	March 2023

- Section 106 consultation
  - Consulting parties have reviewed Parts 1, 2, and 3
  - Part 1 filed with FERC
  - Parts 2 and 3 to be revised based on comments received
  - After revision, Parts 2 and 3 to be submitted to SHPO for 30-day Section 106 review. After concurrence they will be filed with FERC.

Seattle City Light

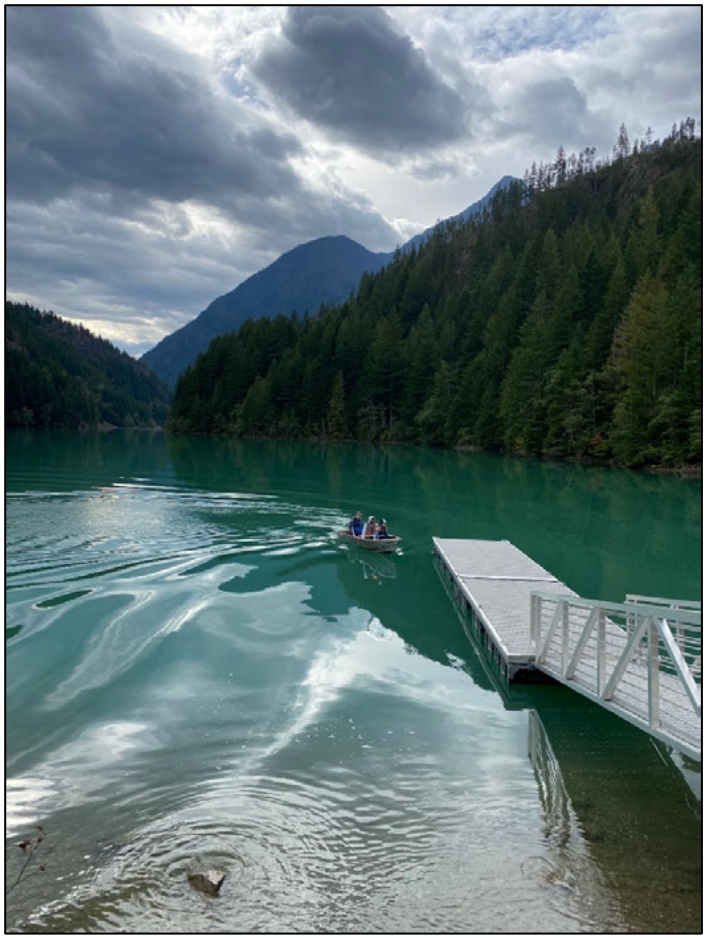
QUESTIONS?

CR-02 CULTURAL RESOURCES SURVEY

Initial Study Report Meeting

Andrea Weiser | March 23, 2022

CR-02: STUDY GOALS AND OBJECTIVES



- Complete cultural resources survey for archaeological and historic built environment resources
- Identify and record cultural resources within the survey areas
- Complete initial evaluation of NRHP eligibility, if possible
- Preliminarily evaluate the potential effects on NRHP-listed and eligible resources
- Summarize results of potential Project effects on historic properties
- Recommend any additional work to evaluate NRHP eligibility and Project effects, as applicable

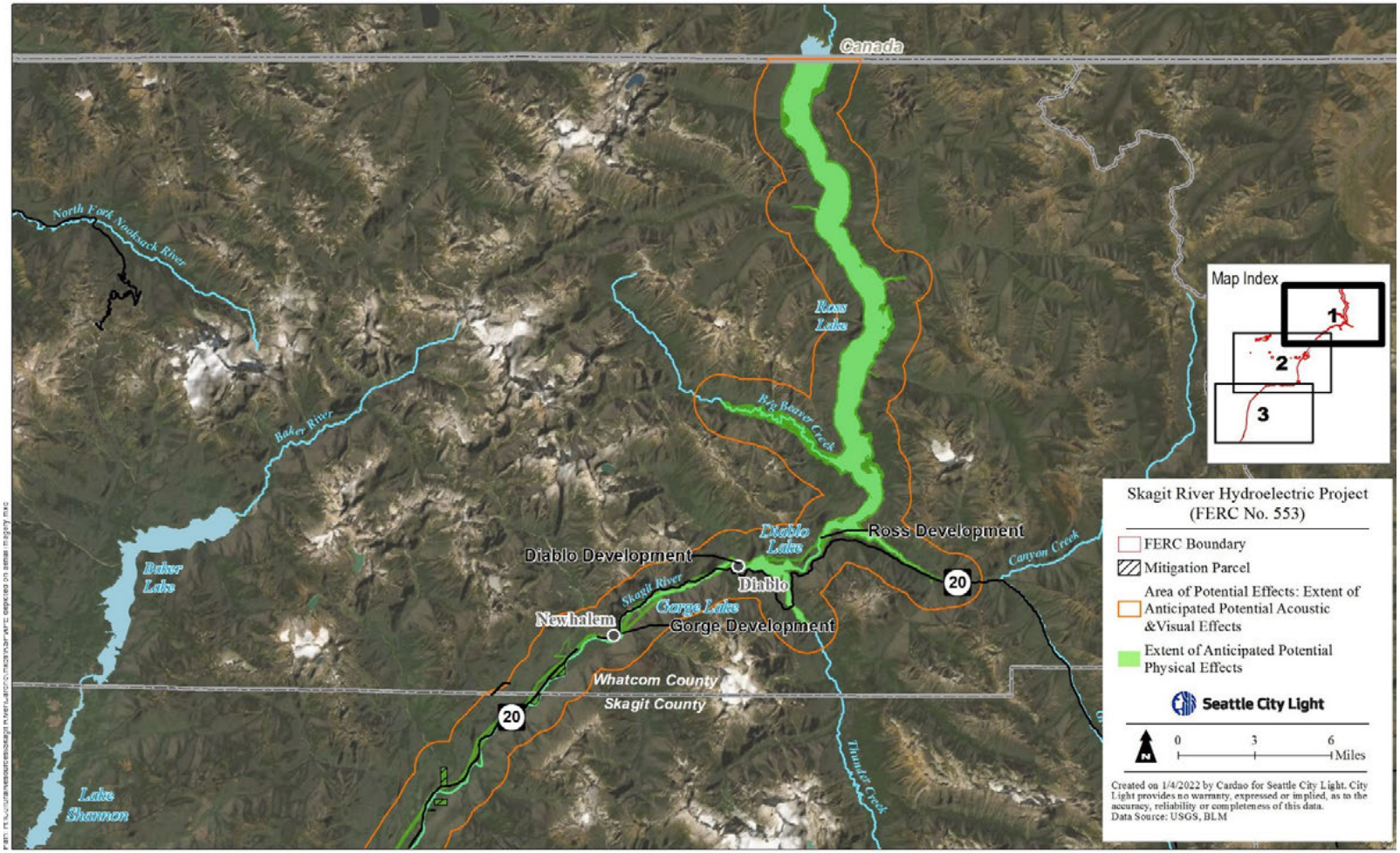
CR-02: STUDY GOALS AND OBJECTIVES

- In its July 16, 2021 Study Plan Determination, FERC approved the Cultural Resources Survey with the following recommendations:
  - City Light to include the Nlaka'pamux Nation Bands Coalition as a consultation party for the study
  - City Light to include the Nlaka'pamux Nation Tribal Council's recordation procedures into the study methods

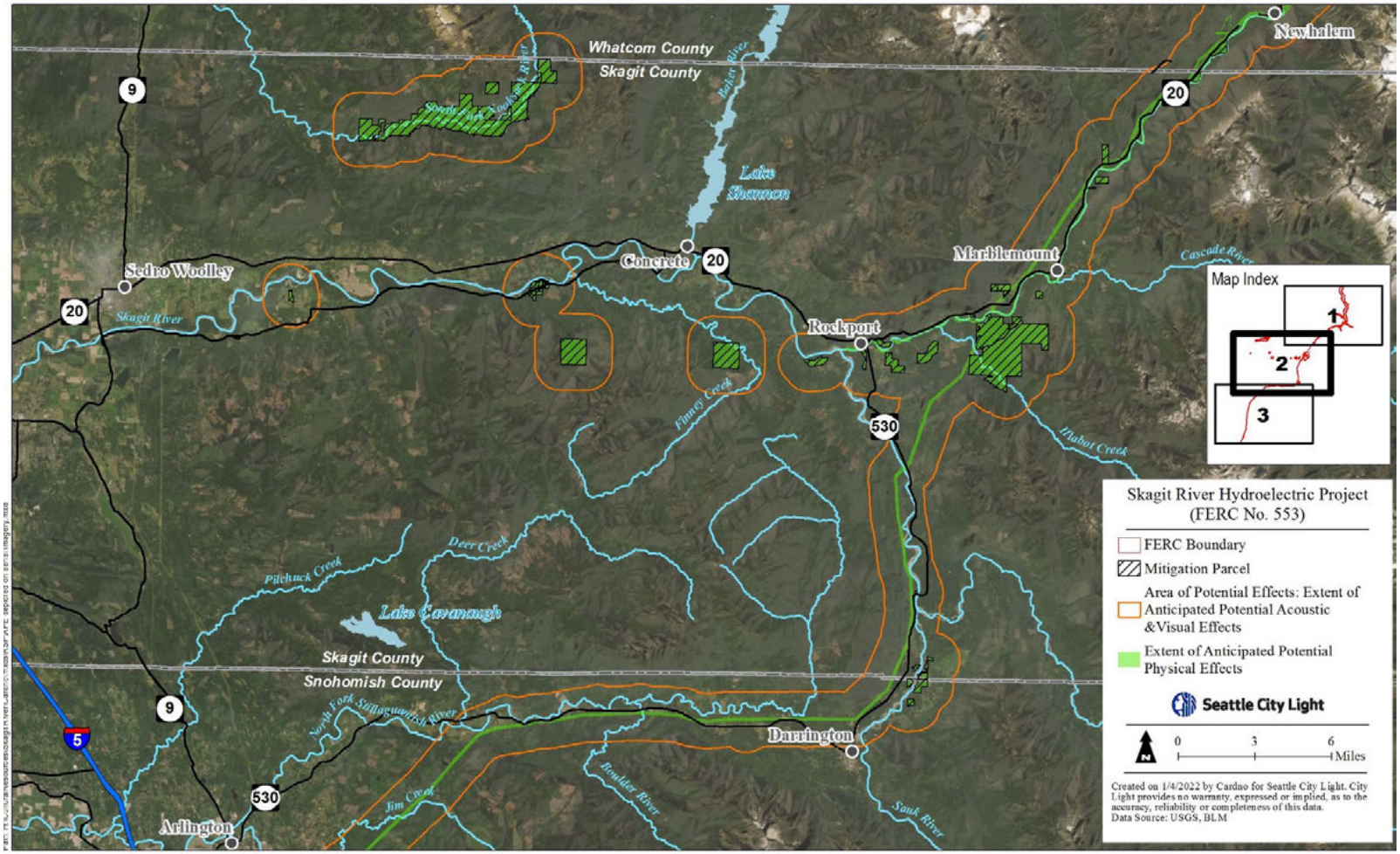
CR-02: STUDY AREA

- Study Area is the portion of the APE delineated for anticipated potential physical effects, where effects can be clearly demonstrated and/or expected

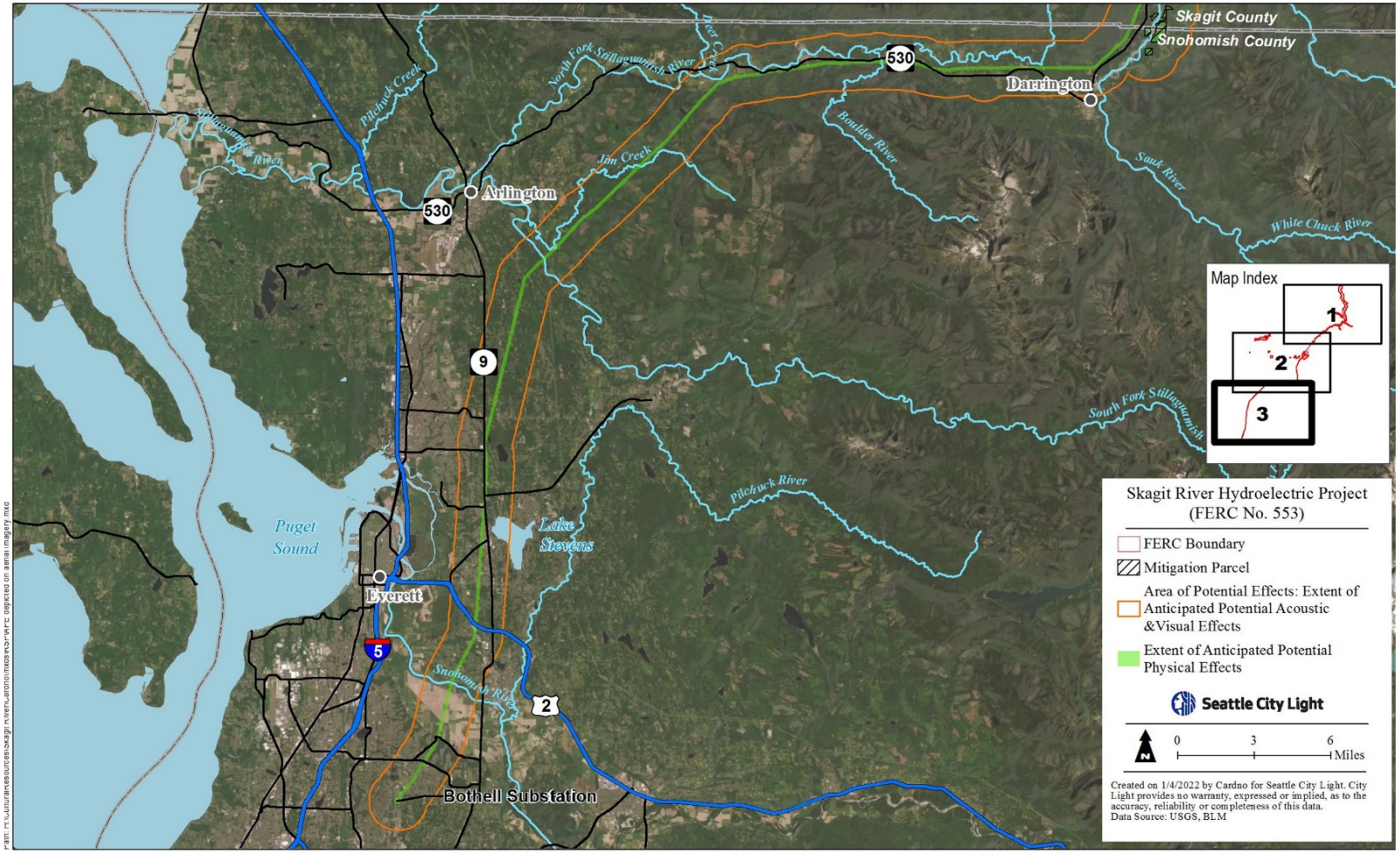
CR-02: STUDY AREA (MAP 1)



CR-02: STUDY AREA (MAP 2)



CR-02: STUDY AREA (MAP 3)



CR-02: STUDY METHODS

- **Step 1:** Develop Research Design and Establish the Survey Areas with the Cultural Resources Work Group
  - DAHP predictive model, existing data, landform geographies, and Project activities were used to prioritize survey areas
- **Step 2:** Conduct Cultural Resources Survey
  - Archaeological resources pedestrian and subsurface (shovel probe) surveys
  - Historic built environment resources reconnaissance-level survey
- **Step 3:** Post-field Documentation
  - Forms for archaeological sites/isolates and historic property inventory (HPI)
  - Data analysis and cultural/historic context development
  - Mapping
- **Step 4:** Prepare Reports
  - Confidential and public reports
  - Recommendations of NRHP eligibility and Project effects

CR-02: INTERIM RESULTS

- Field efforts for this study began on September 7, 2021
- Pedestrian and subsurface surveys have occurred on accessible properties including those belonging to City Light and NPS, as well as within the right-of-way within the transmission line corridor between Newhalem and the Sauk River
- ISR includes preliminary results of fieldwork completed as of October 14, 2021
  - Mapbooks and tables of survey progress
  - Summary of newly identified or revisited archaeological and historic built environment resources
    - A total of 118 archaeological resources (68 sites and 50 isolates) have been recorded and/or revisited
    - Of the archaeological sites, 55 are historic, 9 are precontact, and 4 are multicomponent. Isolates included historic objects
    - 21 historic built environment resources (structures, buildings, and a site)
- Study will inform development of the HPMP for the new license

CR-02: STUDY VARIANCES

- To date, there are no variances from, or proposed modifications to, the FERC-approved study plan for the Cultural Resources Survey

CR-02: STUDY SCHEDULE

Milestone	Date
Develop Research Design/Survey Areas	Winter – Fall 2021
Fieldwork – Year 1	June – October 14, 2021
Fieldwork – Year 2	October 15, 2021 – September 2022
Post-Field Documentation/Analysis	September 2021 – December 2022
Initial Study Report	March 8, 2022
City Light files Updated Study Report	March 8, 2023

- Survey continuation – archaeological and architectural history survey
- Survey to complete: Ross, Diablo, and Gorge Lakes, Transmission line corridor, Skagit River shorelines

Seattle City Light

QUESTIONS?

CR-03 GORGE BYPASS REACH CULTURAL RESOURCES SURVEY

Initial Study Report Meeting

Andrea Weiser | March 23, 2022

CR-03: STUDY GOALS AND OBJECTIVES

Goals

- To assess the potential effects of the Project's O&M on archaeological and historic built environment resources within the Gorge bypass reach that are included in or eligible for listing in the NRHP

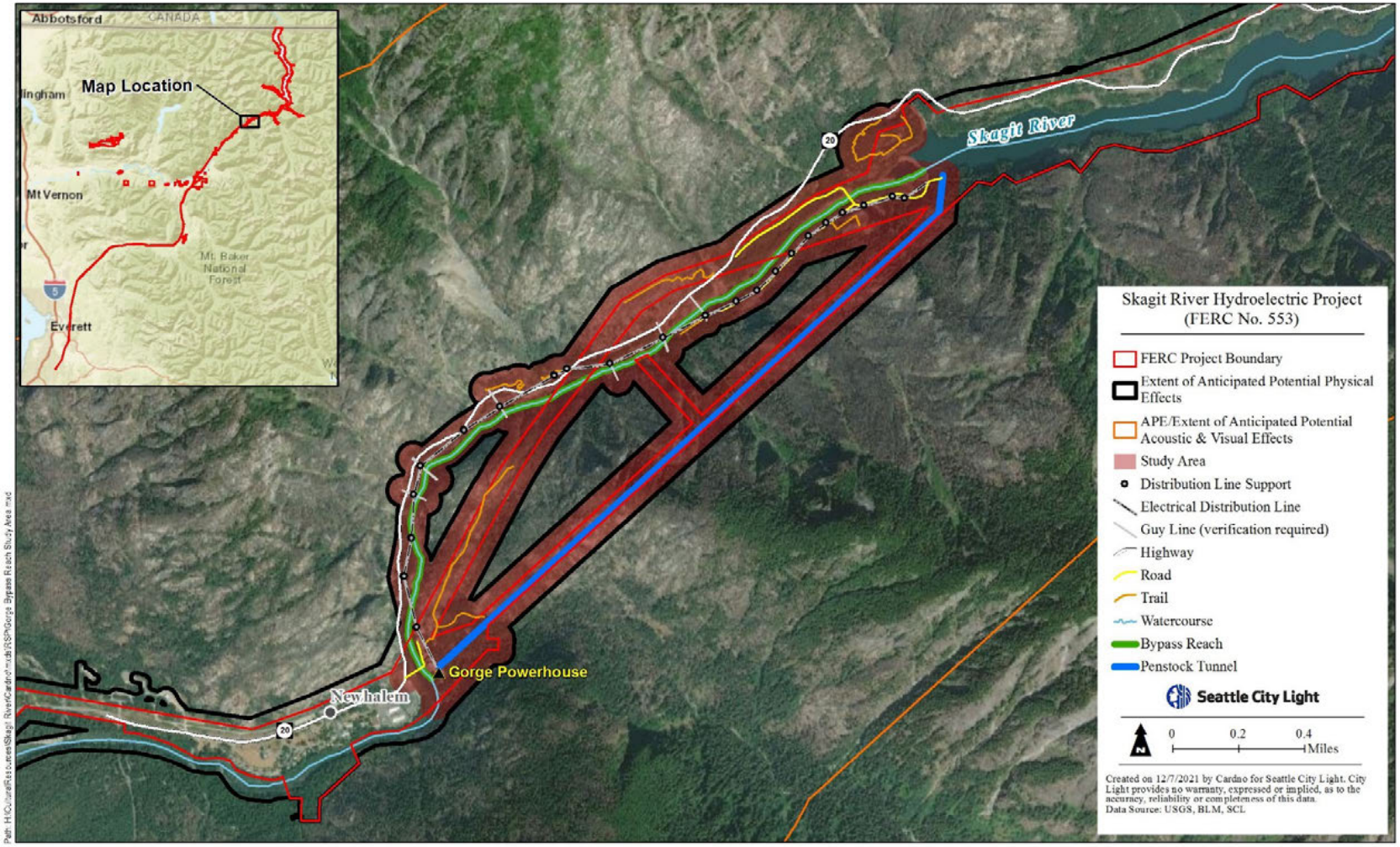
Objectives

- Primarily to provide sufficient information to assist FERC in compliance with Section 106 of the NHPA and other cultural resources regulations and executive orders

CR-03: STUDY AREA

- Study Area focuses on a 589-acre portion of the APE at the Bypass reach
- This includes the following:
  - Gorge bypass reach (historic river channel to OHWM) from the Gorge Dam to the Gorge Powerhouse
  - Penstock underground tunnel
  - Transmission, stabilization, and distribution lines between the Gorge Dam and the Gorge Powerhouse
  - City Light access trails between the Gorge Dam and the Gorge Powerhouse
  - Gorge Dam, access road, and bridge
  - Gorge Dam south bank access roads
  - 250 ft buffer around these areas

CR-03: STUDY AREA MAP



CR-03: STUDY METHODS

- **Step 1:** Reviewed Study Area with the CRWG
- **Step 2:** Developed Research Design
  - Develop design with CRWG
  - Review existing literature/conduct interviews
- **Step 3:** Conducted Fieldwork
  - Acquired necessary archaeological permits
  - Conducted pedestrian and subsurface (shovel probe) surveys for archaeological and historic built environment resources
- **Step 4:** Post-field Documentation
  - Site/isolate and historic property inventory (HPI) forms
  - Data analysis and cultural/historic context development
  - Mapping
- **Step 5:** Prepared Reports
  - Recommendations of NRHP eligibility and Project effects
  - Confidential and public reports – *to be reviewed per Section 106*

CR-03: RESULTS

- The study report is privileged; includes background context, results of fieldwork, and recommendations of NRHP eligibility and Project effects
- Fieldwork completed August 2-11 and September 7, 2021, pedestrian survey and subsurface shovel probing
- 19 archaeological sites recorded/revisited in study area - five recommended eligible for the National Register of Historic Places (NRHP)
- 17 historic built environment resources and 2 historic districts noted during survey
- Report attachments include site inventory forms, artifact catalog, artifact inventory tables, shovel probe descriptions, and the final Research Design
- Results from the study will be incorporated into the HPMP for the new license

CR-03: STUDY VARIANCES

- **Historic Built Environment Recordation:** the study noted the presence of one historic built environment resource, the Gorge Creek Bridge (DAHP Property No. 710275/45WH607). This is a State Route (SR) 20 bridge that is owned and maintained by WSDOT. Although it is located within the study area, it was not recorded for the study given that it does not have potential to be affected by the Project, nor is it owned or maintained by City Light.

- **Reporting:** the Research Design originally identified the development of two study reports – one for archaeological resources and one for historic built environment resources. However, a separate historic built environment study report was not necessary given no historic built environment resources were documented under the study.

CR-03 STUDY SCHEDULE

Milestone	Date
Review Study Area	January – March 2021
Develop Research Design	March – August 2021
Fieldwork	August – September 2021
Post-Field Documentation/Analysis	September – December 2021
Initial Study Report	March 8, 2022

- Section 106 consultation
  - Consulting party 30-day review period underway
  - SHPO 30-day review period to follow

Seattle City Light

QUESTIONS?

CR-04 INVENTORY OF HISTORIC PROPERTIES WITH TRADITIONAL CULTURAL SIGNIFICANCE

Initial Study Report Meeting

Andrea Weiser | March 23, 2022

CR-04: GOALS AND OBJECTIVES

Goals

- To ensure historic properties with traditional cultural significance to Indian Tribes and First Nations are identified and assessed for potential adverse effects from Project O&M under a new license

Objectives

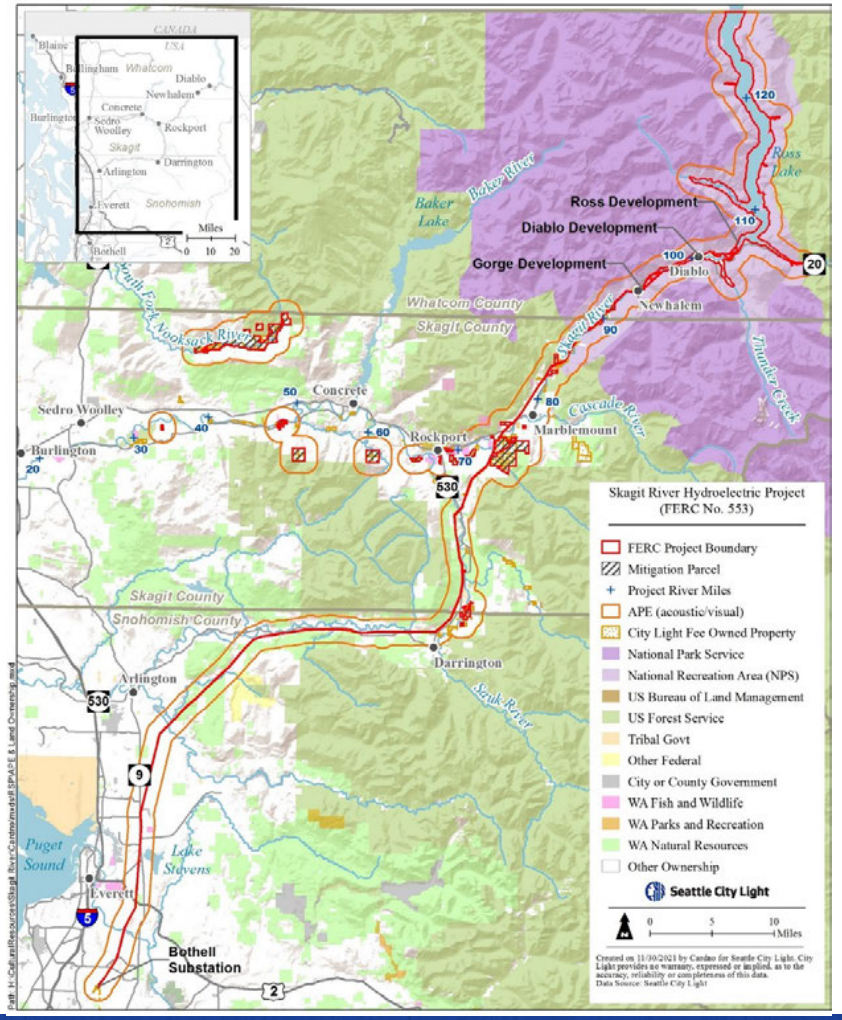
- Assist FERC in compliance with Section 106 of the NHPA

FERC SPD Recommendation

- City Light included the Nlaka'pamux Nation Bands Coalition as a consulting party during the study

CR-04: STUDY AREA

- The Study Area is the Project APE



CR-04: STUDY METHODS

- **Step 1:** Selection of Ethnographers
  - Input from Indian Tribes/First Nations
- **Step 2:** Tribal/First Nations Outreach
  - Outreach with individual Indian Tribes/First Nations
  - Develop research design and confidentiality agreements with participating communities
- **Step 3:** Ethnohistoric and Ethnographic Data and Information Gathering
  - Background research, data compilation, interviews
  - Site visits or pedestrian surveys
- **Step 4:** Historic Properties with Traditional Cultural Significance Documentation and NRHP Evaluation
  - Additional site visits/surveys, as needed
  - Identify and evaluate resources for NRHP eligibility

CR-04: STUDY METHODS, CONT.

- **Step 5:** Consider Project-Related Adverse Effects on Historic Properties with Traditional Cultural Significance
  - Recommendations for preliminary determinations of effects on historic properties
  - Recommended treatment measures
- **Step 6:** Reporting
  - Confidential and public summary reports

CR-04: STUDY STATUS

- Step 1 completed. Lead and supporting ethnographers selected through consultation with the Indian Tribes and Canadian First Nations and virtual interviews with the candidates
- 7 Indian Tribes and First Nations have elected to participate in the study:
  - Confederated Tribes of the Colville Reservation
  - Nlaka'pamux Nation Bands Coalition
  - Nlaka'pamux Nation Tribal Council
  - Sauk-Suiattle Indian Tribe
  - Stillaguamish Tribe of Indians
  - Stó:lō Nation
  - Swinomish Indian Tribal Community
- Nlaka'pamux Nation Tribal Council initiated field survey in Ross Lake in 2021 and will continue in 2022
- Study will inform development of the HPMP for the new license

CR-04: STUDY VARIANCES

- To date, there are no variances from the FERC-approved study plan.
- There are two modifications from the FERC-approved study plan:
  - The APE study area was updated based on comments received from the Section 106 consulting parties and DAHP. The updated APE was filed with FERC on May 10, 2021. The DAHP concurred with the APE update on June 23, 2021.
  - An updated schedule for study implementation is included in the study report.

CR-04: STUDY SCHEDULE

Milestone	Date
Selection of Ethnographers	January – December 2021
Tribal/First Nations Outreach	December 2021 – March 2022
Data and Information Gathering	January – June 2022
NRHP-eligibility evaluation	March – October 2022
Consider Project Effects	March – December 2022
Initial Study Report	March 8, 2022
City Light files Updated Study Report	March 8, 2023

- Next Steps:
  - Tribal/First Nations Coordination and Ethnohistoric and Ethnographic Data
  - Documentation and NRHP Evaluation
  - Consideration of Project-Related Adverse Effects on Historic Properties
  - Reporting

Seattle City Light

QUESTIONS?