Settlement Agreement for the Relicensing of the Skagit River Hydroelectric Project (FERC Project No. 553)

February 2026

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LIST OF ATTACHMENTS

Attachment A	Off-License Agreement Between the City of Seattle and the United States Department of the Interior, National Park Service
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Settlement Agreement for the Relicensing of the Skagit River Hydroelectric Project (FERC Project No. 553)

This Settlement Agreement for the Relicensing of the Skagit River Hydroelectric Project ("Settlement Agreement") is made and entered into by and among:

City of Seattle by and through its City Light Department ("Seattle" or "Licensee");
United States Department of Commerce, National Marine Fisheries Service ("NMFS");
United States Department of Agriculture, Forest Service ("USFS");
United States Department of the Interior, Fish and Wildlife Service ("FWS");
United States Department of the Interior, National Park Service ("NPS");
United States Department of the Interior, Bureau of Indian Affairs ("BIA");
Washington Department of Fish and Wildlife ("WDFW");
Washington Department of Ecology ("Ecology");
Sauk-Suiattle Indian Tribe ("Sauk-Suiattle");
Swinomish Indian Tribal Community ("Swinomish");
Upper Skagit Indian Tribe ("Upper Skagit");
Skagit County;
Skagit County Dike and Drainage Flood Control Partnership;
Trout Unlimited;
American Whitewater;
North Cascades Institute;
Skagit Fisheries Enhancement Group;

each referred to individually as a "Party" and collectively as "Parties." The Parties shall submit this Settlement Agreement to the Federal Energy Regulatory Commission ("FERC") pursuant to Rule 602(b), 18 Code of Federal Regulations ("CFR") § 385.602(b).

RECITALS

WHEREAS,

A. Seattle is the Licensee for the Skagit River Hydroelectric Project, FERC Project No. 553 ("Project").

B. The Project is located on the Skagit River in Whatcom, Skagit and Snohomish counties in Washington State.

C. The FERC Project license issued in 1995 expired on April 30, 2025. Seattle is currently operating the Project on an annual license.

D. On April 28, 2023, Seattle filed with FERC a final application for a new license to continue operating the Project ("New License").

The Parties have reached resolution of issues related to the New License, as stated in this Settlement Agreement.

TERMS OF AGREEMENT

The Parties hereby agree as follows:

1 General Provisions

1.1 Effective Date of Settlement Agreement

This Settlement Agreement shall become effective as of the date of the last signature affixed hereto.

1.2 Offer of Settlement

Within 30 days of the Effective Date, Licensee shall file an Offer of Settlement with FERC pursuant to Rule 602(b) of FERC's Rules of Practice and Procedure, 18 CFR § 385.602(b). This filing shall consist of an executed copy of this Settlement Agreement, including the Appendices and a Joint Explanatory Statement. The Offer of Settlement also includes, for informational purposes only, other agreements reached between Licensee and other entities addressing non-license terms and conditions outside of the scope of this Settlement Agreement, attached as Attachments A-B.

In the Joint Explanatory Statement, the Parties shall request that FERC: (i) solicit and consider public comments on the Settlement, including the Explanatory Statement pursuant to 18 CFR § 385.602; (ii) make additional information requests to Licensee as appropriate; (iii) accommodate the work by the Parties to complete the Early Implementation Actions under Section 5.1; (iv) consider Licensee's quarterly progress reports regarding Early Implementation Actions described in Section 5.2; and (v) approve the Offer of Settlement and issue a New License that incorporates, without Material Modification as defined herein, the Proposed License Articles, as set forth in this Settlement Agreement. The

Explanatory Statement will explain the advantage of materially advancing the record through the Early Implementation Actions relevant to FERC's environmental analysis.

1.3 Term of Settlement Agreement

The term of this Settlement Agreement shall commence on the Effective Date and shall continue through the term of the New License including any subsequent annual license: (i) unless terminated as provided in Section 7.3; or (ii) until the date of any FERC order approving surrender of the New License.

1.4 Definitions

The following definitions apply to this Settlement Agreement, including all Appendices and Attachments:

401 Certification means the water quality certification that Ecology will decide pursuant to Section 401 of the Clean Water Act ("CWA"), 33 United States Code ("USC") § 1341.

BIA means Bureau of Indian Affairs.

Biological Opinions mean the opinions issued by the NMFS and FWS, respectively, for the purpose of ensuring that the New License complies with the requirements of Section 7 of the Endangered Species Act ("ESA").

Current License means the license issued in 1995 by FERC to Seattle for the continued operation and maintenance of the Project pursuant to Section 15 of the Federal Power Act ("FPA"), 16 USC § 808, including any subsequent annual licenses prior to the New License.

CWA means the Clean Water Act, 33 USC §§ 1251 *et seq.*

CZMA means the Coastal Zone Management Act, 16 USC §§ 1451 to 1465.

CZMA Consistency Decision means a Coastal Zone Management Act ("CZMA") decision that Ecology will make pursuant to its authority under the CZMA.

Disputing Party means any Party that provides Notice of dispute, any Party that is the subject of a Notice of dispute, and any Party that provides Notice of its intent to participate in the dispute resolution process under Section 6.

Early Implementation Actions means actions to be carried out before issuance of the New License, as stated in Appendix 4.

Ecology means Washington State Department of Ecology.

Effective Date means the date set forth in Section 1.1.

ESA means the Endangered Species Act, 16 USC §§ 1531 *et seq.*

FERC means the Federal Energy Regulatory Commission.

Federal and State Agency Party means each Party that is a federal or state agency or department as applicable.

FPA means the Federal Power Act, 16 USC §§ 791a *et seq*.

FWS means the U.S. Fish and Wildlife Service.

Licensee means City of Seattle.

Magnuson-Stevens Act means the Magnuson-Stevens Fishery Conservation and Management Act, 16 USC §§ 1801 *et seq*.

Management Plan means those plans described in Appendices 6-18, which are submitted to FERC for inclusion in the New License, as well as plans not yet in existence but that will be developed pursuant to the Proposed License Articles.

Mandatory Condition or Prescription means a condition or prescription submitted to FERC under authority of Section 4(e) or Section 18 of the FPA, 16 USC §§ 797(e), 811.

Material Modification means a modification (including addition, deletion, or other change) to a Proposed License Article that materially impairs a Party's bargained-for benefits or interests under this Settlement Agreement.

Examples of Material Modifications include but are not limited to modifications that cause: (i) significant effects on Licensee's costs or power generation; (ii) significant effects on a Party's resource protection interests or obligations; and (iii) FERC's failure to approve the capital improvement projects proposed by Licensee in Exhibit C Section 3.0 of the final application for a new FERC license.

Examples of modifications that are not Material Modifications include but are not limited to: (i) changes made to Proposed License Articles after the Effective Date of the Settlement Agreement that are consistent with the Settlement Agreement; (ii) FERC's inclusion of standard articles from the L-Form (as defined by 18 CFR § 2.9) in the New License; (iii) the inclusion of standard administrative terms in Mandatory Conditions or Prescriptions, 401 Certification, CZMA Consistency Decision, WSRA Section 7(a) Determination, or Biological Opinions; (iv) reservation of authority by FERC or a Federal and State Agency Party as provided in Section 3.2; (v) a requirement that Licensee obtain a license amendment to implement a requirement in the New License, provided that each Party reserves its rights to contest any amendment that involves a Material Modification; and (vi) FERC's expansion of the Project Boundary yielding a result other than that identified in this Material Modification definition.

New License means the license issued by FERC to City of Seattle for the continued operation and maintenance of the Project pursuant to Section 15 of the FPA, 16 USC § 808, including any subsequent annual licenses, replacing the current license issued in 1995.

NMFS means the National Marine Fisheries Service.

Notice means a written communication that meets the requirements of Section 8.8.

NPS means the National Park Service.

Party or **Parties** means the signatories to this Settlement Agreement.

Permit means any federal, state, regional, or local permit, license, authorization, certification, determination, or approval legally required for Licensee to implement any element of the New License.

PM&E means protection, mitigation, and enhancement.

Project means the Skagit River Hydroelectric Project, FERC No. 553.

Proposed License Articles means the proposed license articles in Appendix 1, as may be subsequently modified pursuant to their terms and submitted to FERC for inclusion in the New License.

Settlement Agreement means this Settlement Agreement, including all Appendices 1-23. The Settlement Agreement shall not include Attachments A-B, which are related agreements addressing non-license terms and conditions, attached for FERC's informational purposes only.

Tribes means the Sauk-Suiattle Indian Tribe, the Swinomish Indian Tribal Community, and the Upper Skagit Indian Tribe.

WDFW means the Washington Department of Fish and Wildlife.

WSRA means the Wild and Scenic Rivers Act, 16 USC §§ 1271 *et seq.*

Year means the year relative to issuance of the New License. Thus, the year in which the New License is issued is Year One.

2 Scope of Settlement Agreement

2.1 Purpose

The purpose of this Settlement Agreement is to resolve among the Parties all issues that have or could reasonably have been raised by the Parties in connection with the continued operation and maintenance of the Project under the New License. This Settlement Agreement proposes Licensee's obligations for the protection, mitigation and enhancement ("PM&E") of resources affected by the Project. Each Party intends that: (i) these measures, if approved without Material Modification, will satisfy applicable statutory and regulatory requirements for a New License and (ii), except as otherwise provided in this Settlement Agreement, no PM&E measures other than those stated in Appendices 1 and 5-18 are necessary in order to satisfy applicable requirements for a New License. The Parties agree

that this Settlement Agreement is fair and reasonable, and consistent with the standards for submittal and approval of an Offer of Settlement, under 18 CFR § 385.602(b). Finally, this Settlement Agreement specifies the procedures to be used among the Parties to resolve disputes if the New License includes a Material Modification, or related to implementation of the New License.

2.2 No Precedent, Argument, Evidence, or Admission

This Settlement Agreement is made with the express understanding that it constitutes a negotiated resolution among the Parties of the issues in the relicensing proceeding for this Project. Accordingly, this Settlement Agreement shall not be offered against a Party as precedent, argument, evidence, or admission, regarding any issue of fact or law that may arise in any legal proceeding, except that this Settlement Agreement may be offered to establish its existence, or to interpret or enforce its terms consistent with applicable law. This section shall survive any termination of this Settlement Agreement.

2.3 Settlement Negotiations are Confidential

To the fullest extent permitted by law, including 18 CFR § 385.606, all discussions, communications, drafts, work papers, and notes relating to this Settlement Agreement are confidential. This provision does not apply to any information that was in the public domain prior to the development of this Settlement Agreement or that became part of the public domain at some later time through no unauthorized act or omission by any Party. This provision also does not apply to: (a) any information held by a federal agency that is not protected from disclosure pursuant to the Freedom of Information Act or other applicable law; or (b) any information held by a state or local agency that is not protected from disclosure pursuant to the Washington Public Records Act or other applicable state or federal law. A withdrawing Party shall continue to maintain the confidentiality of all settlement communications to the extent permitted by applicable law. Nothing in this Section 2.3 is intended to or shall be construed as prohibiting the filing of appropriate material in support of this Settlement Agreement with FERC or another regulatory agency. This section shall survive any termination of this Settlement Agreement.

3 Reservation of Rights and Satisfaction of Legal Responsibilities

3.1 No Pre-Decisional Determination

Nothing in this Settlement Agreement is intended or shall be construed to be a pre-decisional determination by any Federal and State Agency Party. Each Federal and State Agency Party may give due consideration to any relevant information in related decision-making, including the 401 Certification process, CZMA Consistency Decision process, WSRA Section 7(a) Determination, or ESA consultation, as appropriate under applicable law.

3.2 Reservation of Rights

3.2.1 Nothing in this Settlement Agreement is intended to, or shall be construed to, affect the authority or obligation of any Party to fulfill its legal responsibilities or to comply with any applicable judicial decision or order. Among other things, this reservation permits a reservation of authority in a 401 Certification, provided that each other Party reserves its right to contest the exercise of such reservation if it results in a Material Modification. This reservation also permits a reservation of authority in a Mandatory Term or Condition or Prescription, provided that each other Party reserves its right to contest the exercise of such reservation if it results in a Material Modification.

3.2.2 Each Party reserves any authority it may have pursuant to the FPA in the event that: (a) this Settlement Agreement is not filed with FERC; (b) the Party withdraws from this Settlement Agreement pursuant to the procedures set forth in Section 7.1; or (c) this Settlement Agreement is terminated pursuant to Section 7.3. Any other Party reserves the right to contest the existence and/or exercise of any such authority.

3.3 Availability of Funds

Implementation of this Settlement Agreement by any Party other than Licensee is subject to the availability of funds. Nothing in this Settlement Agreement shall be interpreted as, or constitute a commitment or requirement that the Federal Agency Parties obligate or pay funds in violation of the Anti-Deficiency Act, 31 USC § 1341 and other applicable law; or that a federal official expend federal funds not appropriated by Congress.

4 Commitments Related to Submittal of Proposed License Articles and Issuance of New License

4.1 Filings and Submittals Consistent with Settlement Agreement

4.1.1 In applicable regulatory proceedings in which it participates, each Party shall support the incorporation of the Proposed License Articles into the New License.

4.1.2 Each Party intends that, throughout the term of this Settlement Agreement, its filings before FERC or in other regulatory or judicial proceedings will not support, propose, impose, or adopt any measure that is a Material Modification unless necessary based on relevant new information, or if required to fulfill statutory, regulatory, or court-ordered responsibilities.

4.1.3 If a Party files a pleading or other document with FERC or another regulatory agency advocating a Material Modification, any other Party may: (a) oppose the Material Modification; (b) request that FERC or the other regulatory agency disapprove the Material Modification; and (c) explain what other reasonable measures should be included in and/or excluded from the New License if the Material Modification is approved. The Parties shall make best efforts to

resolve any dispute related to a potential Material Modification as described in this section in a timely manner, pursuant to the dispute resolution process under Section 6.

4.2 FPA Sections 10(a) and 10(j) Recommended Terms and Conditions

Following Licensee's filing of the Offer of Settlement, any Party's recommendations or comments submitted to FERC under FPA Sections 10(a) or 10(j) shall not contain a Material Modification, except as provided under Section 3.1 and 3.2. If any Section 10(a) or 10(j) recommended term or condition submitted to FERC contains a Material Modification, the Settlement Agreement shall be deemed modified to conform to the Section 10(a) and 10(j) recommended terms and conditions unless a Party provides Notice to the other Parties that it disputes the Section 10(a) or Section 10(j) recommended term or condition and initiates the dispute resolution process under Section 6 within thirty (30) days after the submission to FERC.

4.3 Mandatory Conditions and Prescriptions

4.3.1 If any Mandatory Condition or Prescription submitted to FERC contains a Material Modification, the Settlement Agreement shall be deemed modified to conform to the Mandatory Condition or Prescription unless a Party provides a Notice of dispute to the other Parties under Section 6.2.1 within thirty (30) days after the submission to FERC. Except as otherwise provided in Section 4.3.2, the Disputing Parties shall complete the dispute resolution process under Section 6 prior to seeking other legal remedies.

4.3.2 A Disputing Party reserves the right to seek administrative and/or judicial review of any Mandatory Condition or Prescription containing a Material Modification or defend against such review after Notice of dispute but prior to completing the dispute resolution process if necessary to meet a filing deadline, in which case the Disputing Parties will complete the dispute resolution process at the earliest practicable time. If the Parties subsequently agree to modify this Settlement Agreement to conform to the Material Modification, the Disputing Party shall withdraw or dismiss any administrative or judicial action, or recommend such withdrawal or dismissal, as appropriate.

4.3.3 Except as provided in Section 4.8.3 for omissions based on jurisdiction, or if this Settlement Agreement is terminated pursuant to Section 7.3, if any Mandatory Condition or Prescription submitted to FERC contains a Material Modification after a final and non-appealable administrative or judicial decision, this Settlement Agreement shall be deemed modified to conform to that decision.

4.3.4 Regarding any Mandatory Condition or Prescription (regardless of whether preliminary or final) filed with FERC in this proceeding that does not contain a Material Modification, each Party waives any rights it may have to request an agency trial-type hearing on disputed issues of material fact under Sections 4(e)

and 18 of the FPA, to propose alternatives under Section 33 of the FPA, or to seek any other legal remedy. Under the foregoing circumstance, the Parties shall not support any trial-type hearing or other form of administrative or judicial challenge requested by any non-Party and shall support the Federal Agency Parties as appropriate, if a trial-type hearing or other remedy is requested by a non-Party. If an entity requests a trial-type hearing, a Party may intervene to support this Settlement Agreement, and the Federal Agency Parties shall use good faith efforts to defend its challenged Mandatory Conditions and Prescriptions.

4.3.5 Regarding any Mandatory Condition or Prescription (regardless of whether preliminary or final) filed with FERC in this proceeding that contains a Material Modification, each Party reserves its rights to challenge the Mandatory Condition or Prescription or request an agency trial-type hearing on issues of material fact under Sections 4(e) and 18 of the FPA and to propose alternatives under Section 33 of the FPA.

4.4 Mandatory Conditions and Prescriptions Specific to Fishways

This Section 4.4 states additional commitments among the Parties related to the Skagit Fish Passage Program described in the Skagit Fish Passage Program License Article (FA LA-01) and the Skagit Fish Passage Program Plan (Appendix 5).

4.4.1 Consistent with Section 2 above, each Party concludes that: (i) the Skagit Fish Passage Program Plan (Appendix 5) (FP3) will be the basis for the development of the Fish Passage Implementation Plan (Section 5e of Appendix 5) (FPIP) and (ii) the FPIP, if developed consistent with the terms below and then approved by FERC without Material Modification as a condition of the New License, will satisfy applicable statutory and regulatory requirements for the New License. However, as stated in Section 3.1 above, nothing in this Settlement Agreement is intended or should be construed as a pre-decisional determination by any Federal or State Agency Party. The Parties acknowledge that the Feasibility Criteria in Appendix 5 are material to the Parties' interests in the development of the FPIP and (following FERC's approval) implementation thereof and failure to include the Feasibility Criteria in the FPIP may constitute a Material Modification.

4.4.2 Within 60 days after the Effective Date, the Parties will establish and convene a meeting of the Skagit License Implementation Committee (SLIC) Fish Passage Workgroup (FP Workgroup). As provided in the SLIC Governance Document, the FP Workgroup consists of: Licensee, NMFS, FWS, NPS, Ecology, BIA, WDFW, and Tribes. Before issuance of the New License, the FP Workgroup will oversee the development and timely completion of: (i) the studies and reports that are identified in the FP3 which will be implemented as Early Implementation Actions (Section 5 of Appendix 5) and (ii) the FPIP itself.

4.4.3 The Parties with authority to impose Mandatory Conditions and Prescriptions

expect to submit such conditions in compliance with their statutory and regulatory authorities in response to FERC's issuance of the Ready for Environmental Analysis ("REA") notice. These submittals may be considered Material Modifications if inconsistent with the Feasibility Criteria, the Skagit Fish Passage Program License Article (FA LA-01) and the FPIP (if available at the time of the REA notice) or FP3 (if the FPIP is not available at that time). These submittals shall take into account the studies and reports that are identified in the FP3 which will be implemented as Early Implementation Actions (Section 5 of Appendix 5), to the extent available when FERC issues the REA notice.

4.4.4 If, during development of the FPIP, the Passage Program Cost and Schedule Report (Section 5b of Appendix 5) shows that the Skagit Fish Passage Program cannot be implemented in a manner consistent with the Feasibility Criteria (Section 6 of Appendix 5), then Licensee or any other Party may initiate the dispute resolution process stated in Section 6 below.

4.4.5 If FERC approves the FPIP without Material Modification, but Licensee thereafter makes an Implementation Decision (as defined in the Skagit Fish Passage Program Plan (Section 5 of Appendix 5) concluding that further implementation of the FPIP would be inconsistent with the Feasibility Criteria (Section 6 of Appendix 5), Licensee or any other member of the Fish Passage Work Group may initiate the dispute resolution process stated in FA LA-01.

4.5 ESA and Magnuson-Stevens Act Consultation

4.5.1 Biological Opinion/EFH Conservation Measures

4.5.1.1 The Parties recognize that FERC will consult with NMFS and FWS pursuant to Section 7 of the ESA, and NMFS and FWS will likely prepare Biological Opinions evaluating the effect of FERC's proposed action on ESA-listed species. The Parties further recognize that FERC will engage in Essential Fish Habitat ("EFH") consultation with NMFS under the Magnuson-Stevens Act. By signing this Settlement Agreement, NMFS and FWS are not making a pre-decisional determination of the outcome of any consultation. Further, NMFS is not making any pre-decisional determinations regarding EFH conservation recommendations necessary to meet its obligations under the Magnuson-Stevens Act.

4.5.1.2 The Parties anticipate that the Proposed License Articles will be the basis for Section 7 consultation between FERC and both NMFS and FWS, and that any Biological Opinion relating to relicensing of the Project will evaluate that proposed federal action.

4.5.1.3 Nothing in this Settlement Agreement limits or waives the authority of NMFS and FWS to take whatever action they deem necessary to comply

with applicable law.

4.5.1.4 NMFS and FWS intend, based upon existing analyses and information, that the Proposed License Articles will be adequate to avoid a jeopardy finding for species presently listed as threatened or endangered.

4.5.1.5 If a Party determines that any Biological Opinion (including Incidental Take Statement) issued pursuant to Section 7 of the ESA results in a Material Modification, this Settlement Agreement shall be deemed modified to conform to the provisions of the Biological Opinion, unless a Party provides Notice of dispute and initiates the dispute resolution process under Section 6 within thirty (30) days after the Biological Opinion is filed with FERC. Dispute resolution will consider modifications to the Settlement Agreement, not the disputed Biological Opinion. A Party may withdraw from this Settlement Agreement based on a Material Modification after complying with the dispute resolution process under Section 6.

4.5.1.6 A Disputing Party may, in addition and to the extent provided by applicable law, seek administrative and/or judicial review of any Biological Opinion that the Party believes contains a Material Modification. The Parties shall follow the dispute resolution process under Section 6 in order to consider modification of this Settlement Agreement, to the extent reasonably practicable, prior to pursuing such administrative or judicial review. If all Parties subsequently agree to modify this Settlement Agreement to conform to the Material Modification, the Disputing Party or Parties shall withdraw or dismiss any administrative or judicial action, or recommend such withdrawal or dismissal, as appropriate.

4.5.1.7 Unless this Settlement Agreement is terminated pursuant to Section 7.3, if any Biological Opinion contains a Material Modification after a final and non-appealable administrative or judicial decision, this Settlement shall be deemed modified to conform to that decision.

4.6 CWA 401 Certification and CZMA Consistency Decision

4.6.1 Authorities Under the CWA and CZMA

Nothing in this Settlement Agreement is intended to or shall be construed to restrict or affect the authorities of Ecology under the CWA and CZMA and other appropriate requirements of state law.

4.6.2 401 Certification and CZMA Decision

4.6.2.1 The Parties recognize that Ecology has not issued a 401 Certification or CZMA Consistency Decision related to the New License. Pursuant to FERC regulations, Licensee shall request a 401 Certification from

Ecology. Licensee shall also submit a CZMA Consistency Certification to Ecology. By entering this Settlement Agreement, Ecology is not making a pre-decisional determination of the outcome of the 401 Certification and the CZMA Consistency Decision.

4.6.2.2 As to Licensee's application for a 401 Certification, the Parties, other than Ecology, respectfully request that Ecology accept and incorporate, without Material Modifications, as conditions to the 401 Certification issued to Licensee, all Proposed License Articles that are within Ecology's jurisdiction pursuant to Section 401 of the CWA. The Parties, other than Ecology, agree that if the 401 Certification is consistent with the "Anticipated Conditions in the Clean Water Act Section 401 Water Quality Certification" (Appendix 21), it will not contain a Material Modification.

Ecology anticipates, based upon existing analyses and information, that the Proposed License Articles will be consistent with Section 401 of the CWA. Ecology also anticipates that the Proposed License Articles will be consistent with the CZMA and applicable enforceable policies of the state's Coastal Zone Management Program, including the Water Pollution Control Act, the Shoreline Management Act, and the Washington Clean Air Act, subject to Licensee's compliance with any permitting requirements under these specific authorities for implementation of the specific License measures or specific Settlement Agreement obligations.

4.6.2.3 Ecology reserves any right to amend the 401 Certification, if it determines that, based on relevant new information, or if required to fulfill statutory, regulatory, or court-ordered responsibilities, the provisions in the 401 Certification no longer demonstrate compliance with water quality standards and other applicable requirements of state law.

4.6.2.4 If Ecology denies with prejudice Licensee's request for a 401 Certification or objects to the CZMA Consistency Certification, and such denial or objection becomes final or is affirmed by a final and non-appealable administrative or judicial decision, and therefore prevents relicensing of the Project, this Settlement Agreement shall terminate.

4.6.2.5 If any 401 Certification or CZMA Consistency Decision contains a Material Modification, this Settlement Agreement shall be deemed modified to conform to the provisions of the Certification or Consistency Decision, unless a Party provides Notice to the other Parties that it objects and initiates the dispute resolution process under Section 6 within thirty (30) days after the Certification or Consistency Decision is filed with FERC. Dispute resolution will consider modifications to the Settlement Agreement, not the disputed 401

Certification or CZMA Consistency Decision. Ecology shall not be required to participate in such dispute resolution. If any 401 Certification or CZMA Consistency Decision contains a Material Modification of this Settlement Agreement, a Party may withdraw from this Settlement Agreement after the Parties comply with the dispute resolution process under Section 6.

4.6.2.6 A Disputing Party may, in addition and to the extent provided by applicable law, seek administrative and/or judicial review of (i) any denial of a Licensee request for 401 Certification or any objection to a Licensee CZMA Consistency Decision or (ii) any 401 Certification or CZMA Consistency Decision that contains a Material Modification. The Parties shall follow the dispute resolution process under Section 6 in order to consider modification of this Settlement Agreement, to the extent reasonably practicable while such administrative or judicial review is pursued. Ecology shall not be required to participate in such dispute resolution. If all Parties subsequently agree to modify this Settlement Agreement to conform to the inconsistent provision, the Disputing Party or Parties shall withdraw or dismiss any administrative or judicial action, or recommend such withdrawal or dismissal, as appropriate.

4.6.2.7 Unless this Settlement Agreement is terminated pursuant to Section 7.3, if the final 401 Certification or CZMA Consistency Decision contains a Material Modification after a final and non-appealable administrative or judicial decision, this Settlement Agreement shall be deemed modified to conform to that decision.

4.7 New License

4.7.1 New License that Does Not Materially Modify the Settlement Agreement

4.7.1.1 The Parties have entered into this Settlement Agreement with the express expectation that FERC shall issue a New License that incorporates, without Material Modification, the Proposed License Articles. If FERC does so, no Party will seek rehearing of the New License as to the Proposed License Articles, or support any such request for rehearing by a non-Party to this Settlement Agreement. Parties may only seek rehearing on issues not addressed by the Settlement Agreement. Any Party seeking rehearing on any issue shall provide Notice to the Parties as soon as practicable before filing a rehearing request.

4.7.2 New License Containing a Material Modification

4.7.2.1 Except as provided in Section 4.8.3 for omissions based on jurisdiction, if FERC issues a New License that contains a Material Modification,

this Settlement Agreement shall be deemed amended to conform to the FERC order unless a Party objects to the Material Modification and provides Notice of dispute initiating the dispute resolution process under Section 6 within thirty (30) days of the FERC order.

4.7.2.2 A Party disputing a Material Modification may also petition FERC for rehearing and/or seek judicial review of any License Article, or omission of any Proposed License Article, that constitutes a Material Modification. To the maximum extent practicable, the Parties shall follow the dispute resolution process under Section 6 prior to seeking any such rehearing, appeal or request for stay or extension. Any Disputing Party may ask FERC or the court to defer action on the merits of any rehearing request or appeal while dispute resolution is pursued. If all Parties subsequently agree to modify this Settlement Agreement to conform to the Material Modification, the Disputing Party(s) shall withdraw or dismiss any administrative or judicial action, or recommend such withdrawal or dismissal, as appropriate.

4.7.3 Omission Based on Jurisdiction

4.7.3.1 If the New License does not contain an element of a Proposed License Article solely because FERC expressly determines that it does not have jurisdiction to adopt or enforce the omitted element, this Settlement Agreement shall not be deemed modified to conform to such omission. Within 10 days of issuance of the New License, Licensee shall notify the Parties as to any omission based on jurisdiction and the Parties shall meet to discuss the issue and determine an appropriate response. Any Party may seek rehearing and/or judicial review of such omission. In any event, Licensee shall implement the omitted element(s) unless this Settlement Agreement terminates or unless it would cause Licensee to otherwise violate the New License. Notwithstanding any other provision of this Settlement Agreement, Parties retain any available cause of action for specific performance of obligations omitted based on jurisdiction.

4.7.4 New License Term

4.7.4.1 The Parties support a 50-year term for the New License. The Federal and State Agencies and Tribes will document this affirmative support in the Joint Explanatory Statement.

4.8 Requests for Stay or Extension of Implementation

4.8.1 General. If the New License is challenged, a Party may at its discretion request from FERC or a court a stay or extension of any obligation in the Proposed License Articles for the duration of the administrative or judicial review process. Any other Party may oppose the request for stay or extension. The

requesting Party shall contact the other Parties in advance of seeking a stay or extension and make reasonable efforts to discuss the scope of any request. Any Party that opposes a request for stay or extension shall contact the other Parties and make reasonable efforts to discuss the scope and extent of its opposition, prior to making any filing in opposition to FERC or the court.

4.8.2 Fish Passage. If rehearing or appeal of the New License (or a subsequent FERC order pertaining to the implementation of the New License) is solely due to a license article containing a Material Modification to the Skagit Fish Passage Program described in Appendices FA LA-01 and 5 occurs, no Party will seek a stay or extension for the duration of the administrative or judicial review process of any obligation in the New License other than fish passage-related obligations.

4.9 Responsibility for Implementation

Licensee shall implement its obligations under this Settlement Agreement and the New License. Licensee shall not be excused from this obligation due to a failure by any other Party, entity or person to provide funding or carry out a duty, obligation, or responsibility it may have with respect to the Project pursuant to other laws or agreements. Notwithstanding, Licensee shall have no obligation to reimburse or otherwise pay any other Party for its assistance, participation, or cooperation in any activities pursuant to this Settlement Agreement or the New License unless expressly agreed to by Licensee or as required by law. In the event of rehearing or judicial review, Parties shall bear their own costs and attorneys' fees, unless otherwise provided by applicable law.

4.10 Permits

4.10.1 Licensee shall apply for and use active and diligent efforts to obtain in a timely manner and in final form all Permits needed to implement the New License. Active and diligent efforts include, but are not limited to, seeking administrative review of adverse permitting decisions and reapplying as necessary. Permit applications shall be consistent with this Settlement Agreement. Licensee shall pay all fees required by law related to such Permits. Licensee shall not be held in breach of this Settlement Agreement if it cannot legally implement an action because all applicable Permits required for that action have been timely applied for but are not yet obtained, or because a necessary Permit has been denied despite good-faith efforts to obtain approval or a necessary Permit includes a Material Modification. If a Party determines that a Permit results in a Material Modification, this Settlement Agreement shall be deemed modified to conform to the provisions of the Permit, unless a Party provides Notice of dispute and initiates the dispute resolution process under Section 6 within thirty (30) days after issuance of the Permit. Dispute resolution will consider modifications to the Settlement Agreement, not the disputed Permit. A Party may withdraw from this Settlement Agreement based on a Material Modification after complying with the dispute resolution process under Section 6.

4.10.2 If an entity challenges a Permit, Licensee shall be under no obligation to implement the actions subject to the Permit until such proceeding is completed. If any Permit is denied, challenged, includes a Material Modification, or is not obtained in a timely manner, the Parties shall confer to evaluate the effect of such event on implementation of this Settlement Agreement and the New License and to seek to develop agreed actions to respond to that event.

4.10.3 A Permit delay or denial, or a Permit that constitutes a Material Modification, in itself does not alleviate Licensee's responsibility to comply with the New License but may be the basis for requesting FERC to amend the New License. If the Parties do not agree on actions to respond to a Permit delay or denial or Material Modification any Party may initiate dispute resolution process under Section 6. In the event that the Parties do not agree on a response to a Permit delay or denial or Material Modification, then the Permit delay or denial or Material Modifications may constitute a basis for withdrawal pursuant to Section 7.1.

4.10.4 Nothing in this section shall be construed to limit Licensee's right to apply for a Permit before issuance of the New License, provided that any such applications shall not contain a Material Modification.

4.11 Amendment of New License

4.11.1 Reopener by a Party Other than Licensee

4.11.1.1 A Party other than Licensee may request FERC to reopen the New License, based on material new information including a substantial error or if required to fulfill statutory, regulatory, or court-ordered responsibilities. Each Party reserves all rights under applicable law to challenge any exercise of reserved authority at the time the agency exercises that authority, including any rights provided under Sections 4(e), 18, and 33 of the FPA, and CWA Section 401, if the action would constitute a Material Modification.

4.11.2 Amendments that Do Not Contain a Material Modification

4.11.2.1 Licensee may seek amendments of its New License for operational improvements or efficiencies, routine amendments, or similar Project modifications that do not contain a Material Modification. Each Party reserves all rights under applicable law and this Settlement Agreement to challenge or comment on any application for a license amendment.

4.11.3 Amendments that Contain a Material Modification

4.11.3.1 Licensee reserves the right to fully and timely comply with any FERC directive pertaining to dam safety, flood flows, Project security, or any similar public health and safety requirement, including but not limited to any license amendment involving a Material Modification that is

necessary to implement such FERC directive.

4.11.3.2 Additionally, Licensee may seek an amendment of the New License that would contain a Material Modification in response to: (i) material new information; (ii) another Party's proposal to reopen under Section 4.11.1; (iii) a non-Party's proposal to reopen the New License that would contain a Material Modification; or (iv) a Biological Opinion that would result in a Material Modification issued after the time period for appeal of the New License has passed. Other Parties may comment, oppose Licensee's proposed amendment, or propose other amendments.

4.11.3.3 Each Party reserves all rights under applicable law and this Settlement Agreement to challenge or comment on any application for an amendment of the New License that contains a Material Modification.

4.11.4 Notice and Consultation Requirement for License Amendment

4.11.4.1 Prior to seeking an amendment of the New License, a Party shall provide the proposed amendment to the other Parties for review and comment at least ninety (90) days before initiating the amendment process with FERC, and shall confer with the Parties starting at least sixty (60) days before initiating the amendment process with FERC regarding the need for and purpose of the amendment. A Party shall not be required to comply with this 90-day Notice and comment process if it reasonably believes an emergency situation exists or the Parties otherwise agree; and *provided further*, that the Party shall comply with any statutory or regulatory requirements for notice or consultation. If a Party believes that a proposed amendment contains a Material Modification, such Party shall invoke the dispute resolution process under Section 6 during the 90-day Notice period or waive its dispute.

4.12 Cooperation in Implementation

4.12.1 The Parties shall cooperate in the implementation of this Settlement Agreement and the New License. Upon the request of Licensee, the Parties may provide written communications (or orally, in the event written communication is impossible to obtain due to reasons outside a Party's control) of support in any administrative approval process that may be required for implementation of this Settlement Agreement or related obligation of the New License, subject to available agency resources and agency authority. The preceding sentence shall not apply to a federal or state agency exercising administrative approval authority or to a federal or state agency not participating in the subject proceeding. All Parties are encouraged to intervene in the relicensing proceedings before FERC and support this Settlement Agreement.

5 Off-License Commitments

5.1 Early Implementation Actions

5.1.1 Prior to issuance of a New License, a Party shall carry out the measures stated in Appendix 4 consistent with the applicable schedule stated therein.

5.2 Skagit Fish Passage Program Funding

5.2.1 Licensee shall contribute up to a maximum of Nine Hundred and Seventy Nine Million Dollars ($979,000,000) (2025) for the capital costs for the Skagit Fish Passage Program over the term of the New License. This financial contribution includes all aspects of the project design, planning, development, construction, and reconfiguration of the facilities in the Skagit Fish Passage Program (including means of access for such facilities at Ross). Licensee shall fund separately the operation, maintenance, and monitoring elements of the Skagit Fish Passage Program.[1]

5.2.2 Before and after license issuance, Licensee and Tribes (and other Settlement Parties to the extent allowed by applicable law) agree to support and seek federal, state, and other sources of funding for the Skagit Fish Passage Program. If the total cost of the program exceeds $979,000,000 (2025), other (non-Licensee) funding will be applied to that excess to limit Licensee's financial contribution to $979,000,000 (2025).

5.2.3 Licensee shall contribute a minimum of five hundred and five million dollars ($505,000,000) (2025) for the Skagit Fish Passage Program over the term of the New License. In the event that this minimum amount is not spent on capital costs for the Skagit Fish Passage Program, during the term of the New License, Licensee, Federal and State Agency Parties and Tribes may agree to reallocate any remaining funds from this minimum amount to be spent on other components of the fish programs. This is a funding obligation, not a set-aside fund, and is not dependent upon an annual funding contribution. This minimum funding obligation will continue through the term of the New License. If this minimum funding obligation is not spent during the term of the New License, Licensee will be under no obligation to spend the remaining funds at the end of the term of the New License.

5.2.4 Licensee shall fund implementation of the study and evaluation programs determined necessary by the Tribes and federal/state agencies at an amount not to exceed ten million dollars ($10,000,000) (2025). This funding shall not be counted towards the maximum contribution to the capital cost of the Skagit Fish Passage Program (Section 5.2.1) or the minimum contribution to the capital cost of the Skagit Fish Passage Program (Section 5.2.3). If the cost of study and evaluation program exceeds ten million dollars ($10,000,000), such cost shall

[1] Attachment C to the Settlement Agreement describes the joint commitments on the NPS Funding for NPS Compliance Reviews of the Skagit Fish Passage Program.

be counted against the maximum and minimum contribution described in Section 5.2.1 and Section 5.2.3.

5.2.5 In consultation with the Services WDFW, and Tribes, Licensee shall manage the contracting, design, permitting, construction of facilities needed to implement the Skagit Fish Passage Program. These administrative costs shall be considered part of the Licensee's financial contribution and the Licensee will provide transparent accounting for these activities.

6 Dispute Resolution

6.1 General Requirements

6.1.1 The Parties agree to use the following alternative dispute resolution process to resolve disputes related to this Settlement Agreement and the Proposed License Articles, unless otherwise specifically provided in this Settlement Agreement or precluded by statute or agency regulation.

6.1.2 The Party initiating dispute resolution under this Section 6 shall notify FERC when dispute resolution proceedings are initiated relevant to a proceeding before FERC related to the Proposed License Articles or New License.

6.1.3 The Parties shall devote such time and attention to dispute resolution as necessary and reasonable to attempt to resolve the dispute at the earliest time possible; and each Party shall cooperate in good faith promptly to schedule, attend, and participate in dispute resolution. Each Party shall promptly implement all final agreements reached, consistent with its applicable statutory and regulatory responsibilities.

6.1.4 The procedures stated in this Section 6 shall not apply to Ecology insofar as Ecology is exercising its statutory authority to enforce the requirements of a 401 Certification, a CZMA Consistency Decision, applicable water quality requirements, or other appropriate requirements of state law. However, Ecology, in its sole discretion, may choose upon specific request to participate in a dispute resolution process in such circumstances.

6.2 Procedures

6.2.1 Dispute Initiation Notice

A Disputing Party shall provide timely Notice to the other Parties, describing the matter(s) in dispute and any proposed relief or resolution. For disputes arising under Sections 4.2, 4.3.1, 4.5.1.5, 4.6.2.5, 4.7.2.1, and 4.10.1, the specified time for Notice shall apply. Each Party that wishes to participate in dispute resolution shall provide written Notice to the other Parties within twenty (20) days of receiving the dispute initiation Notice.

6.2.2 Informal Meetings

The Disputing Parties shall hold at least two (2) informal meetings to resolve the dispute, unless agreed otherwise, commencing within thirty (30) days after receipt of the dispute initiation Notice and concluding within sixty (60) days after receipt of the dispute initiation Notice. If the Parties are unable to resolve the dispute, at least one (1) meeting shall be held at the management level to seek resolution. The 60-day period may be extended upon mutual agreement of the Disputing Parties. If these meetings fail to resolve the dispute, the Disputing Parties may, by unanimous consent, agree to mediation. The Party claiming the dispute shall be responsible for coordinating all meetings under this section and shall make good faith efforts to coordinate a meeting time and location satisfactory to all Disputing Parties.

6.2.2.1 Mediation

If the Disputing Parties agree to mediation, they shall undertake to choose a mediator within thirty (30) days of the conclusion of the informal meetings. Mediation shall not occur if the Disputing Parties cannot unanimously agree on the allocation of costs or choice of mediator. The mediation process shall be concluded not later than sixty (60) days after the mediator is selected. The above time periods may be shortened or lengthened upon mutual agreement of the Disputing Parties.

6.2.3 Dispute Resolution Notice

The Party that initiated dispute shall provide Notice to all Parties of the result of the dispute resolution process.

6.2.4 FERC Filings after Dispute Resolution

If Licensee is required to make a FERC filing relating to an issue that was not successfully resolved through dispute resolution, such filing shall include Licensee's reasons, based on Project-specific information, for not adopting a Party's recommendation or for seeking FERC approval without obtaining agency approval. Any other Party may oppose or seek modification of Licensee's filing.

6.2.5 Effect of Dispute Resolution on Other Proceedings

The dispute resolution process under Section 6 does not preclude any Party from timely filing and pursuing an action for administrative or judicial relief of any FERC order, compliance matter, or other regulatory action related to the New License as permitted under this Settlement Agreement; *provided* that any such Party shall initiate the dispute resolution process under Section 6 as soon as practicable prior to or concurrently therewith.

7 Withdrawal from Settlement Agreement

7.1 Withdrawal of a Party

7.1.1 A Party whose interests are adversely affected by a Material Modification or another Party's action that materially violates the terms of this Settlement

Agreement, may withdraw from this Settlement Agreement. A Party may withdraw under this section only after the Parties comply with the dispute resolution process under Section 6. Following unsuccessful completion of the dispute resolution process, the Disputing Party may provide Notice of withdrawal pursuant to Section 8.8.

7.1.2 If Licensee is required to make a FERC filing addressing an issue(s) not successfully resolved through dispute resolution process under Section 6, no Party may withdraw from this Settlement Agreement until FERC issues an order or otherwise acts on Licensee's filing. Any Disputing Party that believes that the FERC order as it relates to the disputed matter is a Material Modification may then withdraw pursuant to this Section 7.1, seek rehearing before FERC, or exercise any other remedy available under applicable law and this Settlement Agreement. For issues that do not require a FERC filing, the Disputing Party or Parties may withdraw from this Settlement Agreement following completion of the dispute resolution process under Section 6.

7.2 Effective Date of Withdrawal

If dispute resolution is unsuccessful and the aggrieved Party provides Notice of withdrawal, the withdrawal shall become effective ten (10) calendar days after such Notice.

7.3 Termination of Settlement Agreement

In the event of termination or revocation of the New License, or upon withdrawal from this Settlement Agreement by Licensee, this Settlement Agreement shall terminate as to all Parties and have no force or effect, except that all Parties shall continue to be bound by Sections 2.2 and 2.3, which shall survive termination. The withdrawal of any Party other than Licensee does not automatically terminate this Settlement Agreement for the remaining Parties. However, the remaining Parties shall meet within ten (10) days to determine the effect of the withdrawal and whether they will continue to operate under the Settlement Agreement. A Party may withdraw based on the withdrawal of another Party and shall not be bound by any term contained in this Settlement Agreement, except Sections 2.2 and 2.3.

8 Other Terms

8.1 Relationship of the Parties

Except as otherwise expressly set forth herein, nothing contained in this Settlement Agreement is intended or shall be construed to create an association, Federal advisory committee, trust, partnership or joint venture, or impose any trust or partnership duty, obligation or liability on any Party, or create an agency relationship between or among the Parties or between any Party and any employee of any other Party.

8.2 Responsibility for Costs

Unless otherwise provided in this Settlement Agreement, each Party shall bear its own costs

of implementing this Settlement Agreement.

8.3 Amendment

This Settlement Agreement may be amended at any time from the Effective Date throughout its term, by written unanimous agreement of all Parties still in existence, including any successors.

8.4 Successors and Transferees

This Settlement Agreement shall apply to, be binding on, and inure to the benefit of the Parties and their successors, and any transferee of the New License, unless otherwise specified in this Settlement Agreement. Voluntary assignments of this Settlement Agreement are not permitted.

8.4.1 Succession

In the event of succession by any Party, whether by statute, executive order or operation of law or contract, or any other means, the successor shall become a Party to and be bound by the terms of this Settlement Agreement, to the extent permitted by law. In the event of succession of a Federal or State Agency Party, whether by statute, executive order, or operation of law, the successor agency will become a Party to and be bound by the terms of this Agreement to the extent permitted by law.

8.4.2 Continuation of Certain Obligations

Upon completion of a succession, the initial Party shall no longer be a Party to this Settlement Agreement. It shall continue to be bound by Sections 2.2 and 2.3. Except as provided in Sections 3 and 4, the initial Party shall not take any action inconsistent with this Settlement Agreement or the portions of the New License that incorporate the Proposed License Articles or Management Plans.

No change in ownership of the Project or transfer of the New License by Licensee shall in any way modify or otherwise affect any other Party's interests, rights, responsibilities or obligations under this Settlement Agreement. Unless prohibited by applicable law, Licensee shall provide in any transaction for a change in ownership of its Project or transfer of its FERC license, that such new owner shall be bound by, and shall assume the rights and obligations of Licensee under this Settlement Agreement upon completion of the change of ownership and approval by FERC of the license transfer.

8.4.3 Notice

Licensee proposing a transfer of the New License pursuant to Section 8.4.2 shall provide Notice to the other Parties at least thirty (30) days prior to the proposed effective date of such transfer or assignment.

8.5 Waiver

The failure of any Party to insist, on any occasion, upon strict performance of any provision of this Settlement Agreement shall not be considered a waiver of any obligation, right or duty of, or imposed upon, such Party.

8.6 Remedies

8.6.1 Governing Law

The New License shall be governed, construed, and enforced in accordance with federal law and regulation.

8.6.2 Nature of Remedies

The Parties reserve all remedies for material breach of this Settlement Agreement and for the Licensee's material non-compliance with the New License, including seeking an amendment of the New License or other appropriate relief from FERC.

8.6.3 No Third-Party Beneficiaries

This Settlement Agreement shall not create any right or interest in any member of the public as a third-party beneficiary and shall not authorize any non-Party to maintain a suit at law or equity pursuant to this Settlement Agreement. The duties, obligations and responsibilities of the Parties with respect to third parties shall remain as imposed under applicable law.

8.7 Elected Officials, Employees and Agents Not to Benefit

No elected officials, employees or agents thereof shall be entitled to any share or part of this Settlement Agreement or to any benefit that may arise from it.

8.8 Notice

Any Notice required by this Settlement Agreement shall be written. If practicable, Notice shall be provided by e-mail to all Parties. Notice shall also be sent to all Parties by first-class mail or comparable method of distribution, and as applicable shall be filed with FERC. For the purposes of this Settlement Agreement, and unless otherwise specified, a Notice, including Notice via e-mail, shall be effective upon receipt, but if provided only by U.S. Mail, seven (7) days after the date on which it is mailed. When this Settlement Agreement requires Notice in fewer than seven (7) days, Notice shall be provided by e-mail and shall be effective when provided.

For the purpose of Notice, the list of authorized representatives of the Parties as of the Effective Date is attached as Appendix 2. The Parties shall provide Notice of any change in the authorized representatives designated in Appendix 2, and Licensee shall maintain the current distribution list of such representatives. The Parties acknowledge their responsibility to keep the other Parties informed of their current address, telephone, and e-

mail information. Notice obligations under this section are in addition to any notice provisions required by applicable law.

8.9 Section Titles for Convenience Only

Section titles in this Settlement Agreement are used only for convenience of reference and organization, and shall not be used to modify, explain, or interpret any Settlement Agreement provisions or the Parties' intentions. To the extent there is any inconsistency between the heading of a section of this Settlement Agreement and the text of the section, the text shall govern.

8.10 Relationship to Other Agreements

The Parties recognize that certain Parties to this Settlement Agreement may also be parties to related agreements addressing non-license terms and conditions, and that Proposed License Articles included in this Settlement Agreement may partially satisfy certain provisions of these other agreements. The Parties' obligations under this Settlement Agreement shall be interpreted independent of those other agreements, and nothing in this Settlement Agreement is intended or shall be construed to bind any Party to any other agreement.

8.11 Severability of Terms of Settlement Agreement

This Settlement Agreement is made on the understanding that each term is in consideration and support of every other term, and each term is a necessary part of the entire Settlement Agreement. Notwithstanding, if a tribunal with jurisdiction rules that any provision in this Settlement Agreement is invalid, the Parties agree to meet and confer regarding the continued viability of this Settlement Agreement.

8.12 Entire Agreement

Except for Attachments A-B, this Settlement Agreement and all Appendices attached hereto constitutes the complete and exclusive agreement among the Parties with respect to the subject matter thereof, and supersedes all discussions, negotiations, representations, warranties, commitments, offers, contracts, agreements in principle, and other writings prior to the Effective Date, with respect to its subject matter.

8.13 Interpretation of the Words "Shall" and "Will"

In this Settlement Agreement, the words "shall" and "will" mean the same thing and can be used interchangeably. Both indicate a required action or future event. Using either "shall" or "will" creates a binding obligation for the relevant Party or Parties to act or comply as stated. To avoid confusion, the interchangeable use of "shall" and "will" does not change the meaning or enforceability of any part of this Agreement. This rule applies to all forms of "shall" and "will," such as "shall not," "will not," "shall have," and "will have." There is no difference in meaning, obligation, or enforceability between provisions using "shall" and those using "will." The choice between "shall" and "will" is for style only and does not affect the legal meaning of the provision.

9 Execution of Settlement Agreement

9.1 Signatory Authority

Each signatory to this Settlement Agreement certifies that he or she is authorized to execute this Settlement Agreement and to legally bind the Party he or she represents, and that such Party shall be fully bound by the terms hereof upon such signature without any further act, approval, or authorization by such Party.

9.2 Signing in Counterparts

This Settlement Agreement may be executed in any number of counterparts, and each executed counterpart shall have the same force and effect as if all signatory Parties had signed the same instrument. The signature pages of counterparts of this Settlement Agreement may be compiled without impairing the legal effect of any signatures thereon.

IN WITNESS THEREOF,

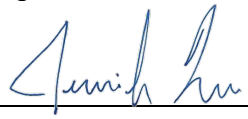
the Parties, through their duly authorized representatives, have caused this Settlement Agreement to be executed as of the date set forth in this Settlement Agreement.

City of Seattle by and through its City Light Department,

_____ Date: _____

By: _____

United States Department of Commerce, National Marine Fisheries Service,



Date: 2/10/2026

Jennifer Quan
Regional Administrator
By: NOAA Fisheries West Coast Region

United States Department of Agriculture, Forest Service,

JACQUELINE BUCHANAN Digitally signed by JACQUELINE BUCHANAN Date: 2026.02.19 16:03:33 -08'00'

Date: _____

By: Jacqueline A. Buchanan
Regional Forester

United States Department of the Interior, Fish and Wildlife Service,

Digitally signed by BRIDGET FAHEY
Date: 2026.02.11 08:09:02 -08'00'

Date: February 11, 2026

Bridget Fahey
Acting Regional Director
By: Pacific Region

United States Department of the Interior, National Park Service,

Date: 2.24.2026

Randy Lavasseur
Regional Director (Acting)
By: Regions 8, 9, 10, 12

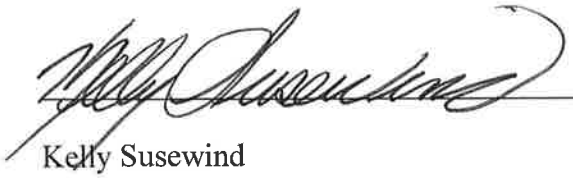
United States Department of the Interior, Bureau of Indian Affairs,

KURT FREDENBERG Digitally signed by KURT FREDENBERG
Date: 2026.02.20 16:08:48 -08'00'

Date: _____

Kurt Fredenberg
By: Acting Regional Director

Washington Department of Fish and Wildlife,



Date: 02/10/2026

By: Kelly Susewind
Director

Washington Department of Ecology,

Date: 2/9/26

Casey D. Sixkiller
By: Director

Sauk-Suiattle Indian Tribe,

Date: 2·12·2026

By: NINO MALTOS II, chairman

Swinomish Indian Tribal Community,

Steve Edwards Date: 2/9/26

Steve Edwards
By: Chairman

Upper Skagit Indian Tribe,

Sheldon Scott Schuyler X Date: 2/11/26

His Mark

Sheldon Scott Schuyler
By: Director of Natural Resources Policy

Skagit County,

_____ Date: _____

By: Ron Wesen
Chair

_____ Date: _____

By: Peter Browning
Commissioner

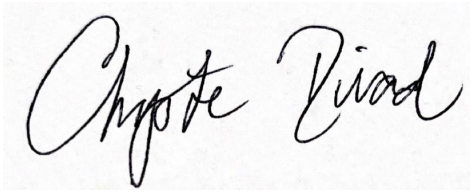
_____ Date: _____

By: Joe Burns
Commissioner

Skagit County Dike and Drainage Flood Control Partnership,

_____ Date: _____

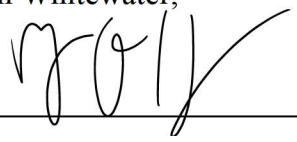
Daryl Hamburg
By: Chairman _____

Trout Unlimited, 

Date: 02-11-2026

By: Chrysten Rivard
Vice President, Pacific Region

American Whitewater,



Date: 13 FEB 2026

Thomas O'Keefe
By: Director of Policy and Science

North Cascades Institute,

Bec Detrich Date: 2/25/2026

Bec Detrich
By: Executive Director

Skagit Fisheries Enhancement Group,

Date: 2/9/2026

Alison Studley
By: Executive Director

Settlement Agreement Appendix 1

Proposed License Articles

Proposed License Article Number and Name
SLIC LA-01: Skagit License Implementation Committee
AESTHETICS LA-01: Lighting Management Plan
AM LA-01: Skagit River Ecosystem Monitoring and Adaptive Management Program
BOTANICAL LA-01: Vegetation Management Plan
BOTANICAL LA-02: Invasive Plants Management Plan
BOTANICAL LA-03: Wetland Enhancement Measures
CULTURAL LA-01: Implementation of Approved Programmatic Agreement and Historic Properties Management Plan
FA LA-01: Skagit Fish Passage Program
FA LA-02: Skagit Riverscape Ecosystem Plan
FA LA-03: Skagit River Mainstem Habitat Enhancement Funding Obligation
FA LA-04: Skagit Estuary Habitat Enhancement Program
FA LA-05: Reservoir Fisheries Management Plan
FA LA-06: Aquatic Invasive Species Management Plan
FA LA-07: Skagit River Limiting Factors Habitat Enhancement Program
FA LA-08: North Cascades Resource Enhancement Funding Obligation
FA LA-09: Ecological Use of Reservoir Wood Management Plan
GEO LA-01: Reservoir Erosion Management and Monitoring Plan
GEO LA-02: Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan
OPS LA-01: Ross Lake Flood Risk Management Operations
OPS LA-02: Ross Lake Summer Variable Reservoir Operations Zone
OPS LA-03: Minimum Instream Flows for the Gorge Reach
OPS LA-04: Annual CPI Adjustment
REC LA-01: Recreation Resource Management Plan
Water LA-01: Water Quality Monitoring and Data Management Plan
Wildlife LA-01: Wildlife Protection and Enhancement Plan
Wildlife LA-02: Avian Species Management Plan
Wildlife LA-03: Fish and Wildlife Mitigation Lands Management Plan

SLIC LA-01 SKAGIT LICENSE IMPLEMENTATION COMMITTEE

The Licensee shall implement the Governance Document for the Skagit License Implementation Committee (SLIC) and Work Groups attached as Appendix 3 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement (Settlement Agreement). The purpose of the SLIC is to facilitate efficient implementation of the license consistent with the Settlement Agreement.

AESTHETICS LA-01 LIGHTING MANAGEMENT PLAN

The Licensee shall implement the Lighting Management Plan attached as Appendix 6 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the Lighting Management Plan shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the Lighting Management Plan are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised Lighting Management Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Lighting Management Plan. Upon Commission approval, the revised Lighting Management Plan becomes a requirement of the License, and the Licensee shall implement the revised Lighting Management Plan, including any changes required by the Commission.

AM LA-01 SKAGIT RIVER ECOSYSTEM MONITORING AND ADAPTIVE MANAGEMENT PROGRAM

1. Within one (1) year of License issuance, the Licensee shall file with the Commission, for approval, a Skagit River Ecosystem Monitoring and Adaptive Management Plan (EMAMP). This EMAMP, at a minimum, shall document how the Licensee shall: (1) identify a suite of physical, aquatic, wildlife, and botanical ecosystem indicators, along with baseline measures and endpoint or trend targets, that shall be used to determine if requirements under the License are contributing to the improvement of ecosystem health; (2) identify and implement additional ecosystem health monitoring and/or studies beyond the scope of the FERC approved Management Plans and other monitoring commitments needed to monitor ecosystem outcome effectiveness and to investigate large-scale changes, such as climate change, new technologies, and other factors; and (3) address the process for evaluating and adaptively managing within the constraints of the specific License Articles. The scope of EMAMP shall be focused on potential Project-related impacts from Ross Reservoir to the Estuary (see FA LA-04 for definition of Estuary). The Licensee shall develop the EMAMP in consultation with the Skagit License Implementation Committee (SLIC) and subject to approval by the National Park Service (NPS) for locations on or affecting NPS land and waters.

2. The EMAMP shall include the following components:

    2.1. Compliance and Performance Monitoring: The EMAMP shall summarize the compliance and performance monitoring conducted pursuant to the other License Articles, as applicable.

    2.2. Ecosystem Outcome Effectiveness Monitoring: The EMAMP shall describe how the results of compliance, performance, and effectiveness monitoring (in combination with the results of research conducted by others) shall be used to advance the scientific understanding of overall ecosystem health and the effectiveness of the protection, mitigation and enhancement (PME) programs under the License. Appendix 19 to the Settlement Agreement includes examples of monitoring related to fish and aquatic ecosystem health that could be developed. In addition, Appendix 20 to the Settlement Agreement includes agreed-upon terms related to the Temperature Action Plan to be developed as part of the EMAMP. The EMAMP shall build upon these examples using a Science-based Decision-Making Framework to identify a framework for monitoring and evaluation of License requirements and additional hypotheses.

    2.3. Resource Goals and Objectives: The EMAMP shall identify indicators established in consultation with the SLIC, along with baseline measures and endpoint or trend targets, that shall be used to determine if License measures are contributing to ecosystem health improvements. The SLIC shall revise these indicators, baseline measures, and endpoint or trend targets, having consulted with other experts or stakeholders, as appropriate, if new information warrants modification of these factors.

3. Ecosystem Monitoring and Research Funding: As described in the EMAMP the Licensee shall provide Ecosystem Monitoring and Research (EMR) Funding, which is an annual funding obligation up to but not to exceed $750,000 (2025) per year for the term of the License and any subsequent annual licenses to: (1) support additional ecosystem health monitoring and/or studies beyond the scope of the other Management Plans; and (2) be used to fund other monitoring commitments to investigate large-scale ecosystem changes, such as climate change, new technologies, and other factors. The Licensee shall annually allocate up to $125,000 (2025) of this EMR Funding to fund wildlife and other terrestrial resource research projects identified in consultation with the SLIC. The Licensee shall bear its own costs for all administrative, legal, and overhead costs associated with management of the EMR Funding and shall not assess any such costs against the funding required to be made available. The Licensee shall provide the SLIC with annual accounting of implementation of its funding obligation to demonstrate that funding is expended consistent with this License Article.

4. The Commission reserves the authority to require changes to the EMAMP. Implementation of the plan shall not begin until the plan is approved by the Commission. Upon Commission approval, the Licensee shall implement the EMAMP, including any changes required by the Commission.

5. The Licensee shall file with the Commission, within five (5) years of License issuance and every five (5) years thereafter, a Five-Year Ecosystem Plan Report. The Five-Year Ecosystem Plan Reports shall: (1) describe the results of EMAMP implementation over the previous five years; (2) assess whether requirements under the License are contributing to the improvement of ecosystem health; and (3) identify any recommended feasible and cost-effective changes to Project operations, requirements, or facilities, including changes to protection, mitigation, and enhancement measures that may be needed to support aquatic ecosystem health improvements. If changes to the EMAMP are recommended, the Licensee shall consult with the SLIC to develop a plan to implement the changes recommended by the SLIC. Amendments to the EMAMP are subject to the approval of the NPS for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service. If changes to Project operations or PME measures are recommended in a Five-Year Ecosystem Plan Report to improve ecosystem health, the Licensee shall consult with the SLIC to develop a plan to implement the changes, subject to approval of the NPS for locations on or affecting NPS lands or waters, and the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service for changes that may affect species and/or habitat protected under the Endangered Species Act.

6. In developing the Five-Year Ecosystem Plan Reports, the Licensee shall use a Science-based Decision-Making Framework that shall include: (1) consultation with the SLIC; (2) identification of ecosystem resource goals and fundamental objectives as well as an evaluation of whether these goals and objectives have been achieved; (3) identification and assessment of metrics needed to evaluate long-term trends and to inform the need to revise FERC-approved management plans; and (4) monitoring and evaluation of ecosystem-based outcomes.

BOTANICAL LA-01 VEGETATION MANAGEMENT PLAN

The Licensee shall implement the Vegetation Management Plan attached as Appendix 7 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the Vegetation Management Plan shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the Vegetation Management Plan are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised Vegetation Management Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Vegetation Management Plan. Upon Commission approval, the revised Vegetation Management Plan becomes a requirement of the License, and the Licensee shall implement the revised Vegetation Management Plan, including any changes required by the Commission.

BOTANICAL LA-02 INVASIVE PLANTS MANAGEMENT PLAN

The Licensee shall implement the Invasive Plants Management Plan attached as Appendix 8 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the Invasive Plants Management Plan shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the Invasive Plants Management Plan are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised Invasive Plants Management Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Invasive Plants Management Plan. Upon Commission approval, the revised Invasive Plants Management Plan becomes a requirement of the License, and the Licensee shall implement the revised Invasive Plants Management Plan, including any changes required by the Commission.

BOTANICAL LA-03 WETLAND ENHANCEMENT MEASURES

No later than twelve (12) years after issuance of the New License, the Licensee shall identify the location and complete the planning to enhance two (2) sites in Gorge Lake, one (1) site in Diablo Lake, and three (3) sites along the Ross Lake shoreline, subject to the identification of appropriate sites, and propose enhancements to wetland habitats at these sites that are consistent with woody debris management efforts for the Project, for Commission approval. These enhancement measures will include consideration of opportunities to improve habitat conditions for amphibians, native littoral and wetland plants, and other priorities identified by the Skagit License Implementation Committee (SLIC).

The Licensee will evaluate locations and develop a plan for wetland enhancements in Gorge Lake, Diablo Lake, and Ross Lake for the potential to provide the suggested resource benefits, in consultation with the SLIC and subject to approval by the National Park Service prior to filing with the Commission. Upon approval, the Licensee will implement the wetland enhancement measures. Implementation of wetland enhancement measures may be phased to facilitate an adaptive development of enhancement measures with the goal of completing the enhancement measures in Diablo Lake within 12 years, completing the enhancement measures in Gorge Lake concurrent with proposed dredging, and the remaining enhancement measures in this License Article twenty (20) years after issuance of the New License.

CULTURAL LA-01 IMPLEMENTATION OF APPROVED PROGRAMMATIC AGREEMENT AND HISTORIC PROPERTIES MANAGEMENT PLAN

The Licensee shall implement the "Programmatic Agreement Between the Federal Energy Regulatory Commission and the Washington State Historic Preservation Officer for Managing Historic Properties that May be Affected by Issuing a New License to Seattle City Light for the Continued Operation and Maintenance of the Skagit River Hydroelectric Project Located in Whatcom, Skagit, and Snohomish Counties, Washington" (Programmatic Agreement), executed on <Date>, and including but not limited to the Historic Properties Management Plan (HPMP) for the Project, filed on <Date>.

The Commission reserves the authority to require changes to the HPMP at any time during the term of the License. Amendments to the HPMP are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or water. Implementation of the amended HPMP by the Licensee shall not begin until it is approved by the Commission. Upon Commission approval, the amended HPMP becomes a requirement of the License, and the Licensee shall implement the amended plan, including any changes required by the Commission.

FA LA-01 SKAGIT FISH PASSAGE PROGRAM

The Licensee shall design, construct, operate and maintain facilities that provide safe, timely, and effective fish passage, both upstream and downstream, at the Gorge, Diablo, and Ross developments ("Skagit Fish Passage Program"). The Licensee shall implement and adaptively manage this program using the best available science and as required by the Fish Passage Implementation Plan ("FPIP"). The Licensee shall complete construction of all such facilities, and the facilities shall be operational within 24 years of License issuance and meeting performance standards within 30 years of License issuance.

1. **Program Goals**. The goals of the Skagit Fish Passage Program are to:

   (a) Contribute to recovery of Endangered Species Act and Washington Priority-listed species in the Skagit River Basin;

   (b) Increase and provide sustainable harvest opportunity to support Tribal Treaty rights;

   (c) Support diverse life history strategies;

   (d) Provide connectivity between all Project reservoirs and the upper and lower Skagit River, eliminating fragmented habitat to improve ecosystem resilience to changing climatic and other conditions and episodic events affecting the Skagit River ecosystem; and

   (e) Avoid or minimize negative impacts to native fish populations, to the extent practicable. In this License Article, "negative impacts" means impacts not addressed in the New License that, taking into account new information, may occur as a result of implementation of the Skagit Fish Passage Program.

2. **Fish Passage Implementation Plan**. The Licensee shall implement the FPIP dated [date of most recent version that SCL has submitted to FERC during relicensing proceeding, after approval by Services].

   (a) The Licensee shall comply with the FPIP's schedules for design, construction, and operation of the fish passage facilities; performance standards for safe, timely, and effective fish passage; and procedures for consultation with the SLIC, as well as dispute resolution related to Implementation Decisions.

   (b) The Licensee shall implement the FPIP pursuant to the following Feasibility Criteria as defined by the Settlement Agreement: (i) the Skagit Fish Passage Program will advance and be consistent with the Program Goals; (ii) the Skagit Fish Passage Program will include a suitable means of access, which may be the SR 20 Access Road or other appropriate means of access, for construction and long-term operation of passage facilities at the Ross Development; and (iii) the Licensee's maximum financial contribution to the Skagit Fish Passage Program (including design, planning, development, construction, and reconfiguration of facilities) will be limited to Nine Hundred and Seventy Nine Million ($979,000,000) (2025) over the term of the New License.

   (c) This License Article does not resolve questions whether: (i) future implementation of the FPIP, and specifically, the Implementation Decisions specified below, would be consistent with the Feasibility Criteria; or (ii) the Feasibility Criteria as applied to such

Implementation Decisions would potentially conflict with each other or with Applicable Law. As provided in the FPIP, each Implementation Report will include an Implementation Decision. The Implementation Decision is defined to mean the Licensee's finding as to whether the Skagit Fish Passage Program implementation conflicts with the Feasibility Criteria. Disputes about Implementation Decisions shall be addressed pursuant to the dispute resolution procedures in Section 3 below.

(d) When proposing to modify the FPIP, the Licensee shall consult with the SLIC Fish Passage Work Group, and the Licensee shall seek the approval of the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and National Park Service, before filing such proposed modification with the Commission for approval. If the Licensee does not obtain the required approvals prior to filing any proposed modification with the Commission, and after following the procedures outlined in the Settlement Agreement and Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3), the Licensee shall include the Licensee's reasons for proceeding with the filing based upon Project-specific information.

(e) The Commission reserves its authority to require changes to the FPIP or the Skagit Fish Passage Program as a whole.

3. **Dispute Resolution Procedures for Implementation Decisions.** The Licensee shall seek to resolve a dispute related to an Implementation Decision through the dispute resolution procedure stated in Settlement Agreement Section 6. If that procedure does not resolve the dispute, the Licensee or any other SLIC Fish Passage Work Group member may request a settlement conference pursuant to 18 CFR § 385.601 et seq. The Licensee may also request, or respond to a request by another SLIC Fish Passage Work Group member, a hearing pursuant to 18 CFR § 385.501 et seq. In such a hearing, the Presiding Officer shall make findings of fact and offer a proposed resolution of the dispute. The Licensee, or Federal or State agency or Tribe, may file exceptions to the Initial Decision as provided by 18 CFR § 385.711 to be resolved by the Commission. The Commission's resolution of a disputed Implementation Decision shall be final action subject to rehearing and judicial review under 16 U.S.C. § 825. No parties waive or limit any of their authority to exercise any reserved authorities by participating in these procedures.

FA LA-02 SKAGIT RIVERSCAPE ECOSYSTEM PLAN

The Licensee shall implement the Skagit Riverscape Ecosystem Plan (REP) attached as Appendix 9 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the REP shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the REP that may require an amendment to the Section 401 Water Quality Certification or impact the Licensee's ability to comply with conditions of the Section 401 Water Quality Certificate are subject to approval by the Washington State Department of Ecology before filing with the Commission. Similarly, any amendments to the REP are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised REP by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised REP. Upon Commission approval, the revised REP becomes a requirement of the License, and the Licensee shall implement the revised REP, including any changes required by the Commission.

FA LA-03 SKAGIT RIVER MAINSTEM HABITAT ENHANCEMENT FUNDING OBLIGATION

1. The Licensee shall provide seventy-five million dollars ($75,000,000) (2025) through the establishment and use of the Skagit River Mainstem Habitat Funding Obligation (MH Funding Obligation) to support the purposes described in Section 4.2 of the Skagit Riverscape Ecosystem Plan (REP) (FA LA-02). The Licensee's acquisition of fee title, conservation easement(s), or other legal rights to implement projects identified in Section 4.5 of the REP shall be solely through voluntary transactions with willing sellers. The $75,000,000 shall be obligated in two phases:

    1.1. Phase 1: Upon license issuance, the Licensee will dedicate forty million dollars ($40,000,000) to be used to support the purposes described in Section 4.2 of the REP.

    1.2. Phase 2: Upon the earlier of (1) the fifteenth anniversary of the License issuance, or (2) the initial $40,000,000 described in Section 1.1 above being obligated pursuant to REP Section 4.2, the Licensee will dedicate an additional thirty-five million dollars ($35,000,000) to continue to support the purposes described in Section 4.2 of the REP.

2. The $75,000,000 is a funding obligation over the License term, not a set-aside fund, and is not dependent upon an annual funding contribution requirement. Licensee shall acknowledge in its financial planning that it will spend $75,000,000 over the License term (consistent with the phases described in Section 1) and account for any expenditures and adjustments according to License Article OPS LA-04 Annual CPI Adjustment. The funds shall not be unreasonably withheld and shall be made fully available for implementation of the REP Section 4.2, or to address emerging issues or new priority aquatic species in a manner consistent with the scope and purpose of the REP Section 4.2, subject to notice provided to the Licensee by March 30th prior to the year the expenses will be incurred for annual expenditures above $4,000,000.

3. Licensee shall provide the Skagit License Implementation Committee (SLIC) with annual accounting of implementation of its funding obligation.

4. If at License Year 30 the $75,000,000 is not fully spent, the Licensee shall consult with the SLIC to assess whether changes to the use of the MH Funding Obligation are necessary to meet the purposes of the REP and to determine whether the remaining funds to benefit Estuary restoration (see FA LA-04 for definition of Estuary), or resource enhancement on federal land upstream of Gorge Powerhouse if funds from the North Cascades Resource Enhancement Funding Obligation (FA LA-08) are depleted.

5. Licensee shall be responsible for implementation of the actions described in this License Article. Depending upon the measure being funded, the entity implementing the measure may be Licensee, a SLIC member, or other appropriate third-party entity.

FA LA-04 SKAGIT ESTUARY HABITAT ENHANCEMENT PROGRAM

The Licensee shall provide seventy-five million dollars ($75,000,000) (2025) dedicated to Skagit River Estuary acquisition and restoration as set forth in this License Article, through the establishment of a Skagit Estuary Habitat Enhancement Funding Obligation (Estuary Funding Obligation).

Within six months of license issuance, the Licensee shall file with the Commission, for approval, a Skagit Estuary Habitat Enhancement Plan (Estuary Plan) to: (1) provide procedures and guidance for implementation of the Licensee's $75,000,000 Estuary Funding Obligation for acquisition and restoration activities in the Estuary and (2) to define the Licensee's monitoring and adaptive management obligation within the Estuary. The Licensee shall develop and implement the Estuary Plan in consultation with the Skagit License Implementation Committee (SLIC). Upon Commission approval, the Licensee shall implement the Estuary Plan. As used in this License Article, the term "Estuary" shall refer to the tidally influenced portion of the Skagit River including Skagit Bay (extending to Camano Island), the Swinomish Channel, and the southern portion of Padilla Bay that is adjacent to the Swinomish Channel.

1. **Estuary Enhancement Goals**. The goal is to have the Licensee's financial contributions to property acquisition through voluntary transactions and habitat restoration in the Estuary (in combination with funding from other entities, as available) result in achieving 1,300 acres of Estuary habitat restoration within fifteen (15) years of Commission approval of the Estuary Plan (with the following interim, minimum targets: (a) 200 acres by Year four (4); (b) 600 acres by Year seven (7); (c) 1,000 acres by Year ten (10); and (d) 1,300 acres by Year fifteen (15)).

2. **Estuary Funding Obligation**.

    2.1. The Estuary Funding Obligation shall be used to fund the following measures:

        2.1.1. Acquisition of fee title, conservation easement(s), or other legal rights solely through voluntary transactions with willing sellers as necessary to complete and maintain restoration on properties that are suitable for potential Estuary habitat restoration;

        2.1.2. Restoration and maintenance activities on acquired property; and/or

        2.1.3. Other restoration, improvements, and maintenance measures designed to improve habitat for the use of salmonids, particularly juvenile salmon, on lands controlled by other parties contingent upon a legal commitment by the third party to maintain such lands in an environmentally protected status.

    2.2. The $75,000,000 is a funding obligation over the License term, not a set-aside fund, and is not dependent upon an annual funding contribution requirement. Licensee shall acknowledge in its financial planning that it will spend $75,000,000 over the License term and account for any expenditures and adjustments according to License Article OPS LA-04 Annual CPI Adjustment. The funds shall not be unreasonably withheld and

shall be made fully available for implementation of this License Article, subject to notice provided to the Licensee by March 30th prior to the year the expenses will be incurred for annual expenditures above $7,500,000.

2.3. The Estuary Funding Obligation shall continue through the term of the License until the $75,000,000 is fully spent. If the $75,000,000 is not fully spent during the License term, the Licensee shall consult with the SLIC to determine how to spend the remaining funds to benefit Estuary restoration.

2.4. The Licensee shall fund acquisition and restoration measures that are designed to contribute toward achieving the goals of this License Article, are consistent with the requirements in Section 2.1, and reflect the recommendations of the SLIC. Depending upon the measure being funded, the entity implementing the measure may be the Licensee, a SLIC member, or other appropriate third-party entity. However, any measures funded through this License Article will be limited to measures that do not result in an expansion of the Project Boundary. It is intended that the Licensee will transfer acquired and/or restored lands to a SLIC member or third-party entity with appropriate restrictions to ensure long-term conservation benefit.

2.5. Within fifteen (15) years after Commission approval of the Estuary Plan, if the SLIC agrees that full achievement of the Estuary Enhancement Goals is not feasible, Licensee shall consult with the SLIC to determine how to: (1) complete as much of the Estuary restoration as feasible with the Estuary Funding Obligation; or (2) implement alternative habitat improvement measures for juvenile salmon rearing, such that the measures can be completed in the shortest practical time, by spending the remaining funds dedicated to the Licensee's Estuary Funding Obligation, with the goal of contributing to at least as much total ecological benefit to juvenile salmon rearing as achievement of the Estuary Enhancement Goals.

3. **The Estuary Plan**. The Estuary Plan shall consist of implementation procedures for the following actions:

3.1. Periodic accounting of implementation of its funding obligation to SLIC.

3.2. Seeking SLIC guidance for funding decisions pertaining to acquisition and restoration measures.

3.3. Annual reports to the Commission on Licensee's implementation of the Estuary Plan during the previous calendar year, including a list of planned projects being funded for the current calendar year and progress made toward achievement of the goals of the Estuary Plan. If the goals are not being achieved, the report must identify why the targets have not been met.

3.4. The Estuary Monitoring Program:

3.4.1. The Estuary Plan shall include an Estuary Monitoring Program, consisting of ecosystem outcome monitoring, compliance monitoring, performance monitoring, and adaptive management measures, as outlined in this section and consistent with

the License Article AM LA-01 Skagit River Ecosystem Monitoring and Adaptive Management Program.

3.4.2. As an independent obligation from Licensee's $75,000,000 Estuary Funding Obligation and Licensee's monitoring obligation for other License Articles, Licensee shall implement (or fund the implementation of) compliance and performance monitoring for all projects funded in whole or in part by the Estuary Funding Obligation. Estuary ecosystem outcome monitoring shall be funded as part of the License Article AM LA-01 Skagit River Ecosystem Monitoring and Adaptive Management Program.

3.4.3. The Estuary Monitoring Program shall, to the greatest extent possible, follow and build upon the scientific methods for data collection already being used for the Estuary, including the Skagit Estuary Intensively Monitored Watershed Program.

3.4.4. The Estuary Monitoring Program shall include measures related to collection of metrics such as, but not limited to, the following:

3.4.4.1. Annual juvenile Chinook Salmon abundance and other salmonid densities using a before-after-control-impact design, or similar study designs, for new restoration projects;

3.4.4.2. Annual juvenile Chinook Salmon abundances and other salmonid densities in long-term monitoring delta reference sites;

3.4.4.3. Annual juvenile salmonid densities adjacent to nearshore habitats of the Skagit delta;

3.4.4.4. Smolt abundances of all salmonids entering the Skagit delta from upstream habitats;

3.4.4.5. Capture, mark, and recapture studies of emigrating salmonids from upstream habitats, Skagit delta, and nearshore Estuary habitats;

3.4.4.6. Restoration site specific evaluation of channel areas, vegetation, water quality and site inundation (water surface elevations) and other appropriate physical habitat metrics (including water quality) to ensure both habitat quality and quantity are restored to a degree that boosts both productivity and capacity; and

3.4.4.7. Habitat status and trends evaluation of tidal channel areas and vegetation that tracks changes in Estuary habitat quantity and quality.

FA LA-05 RESERVOIR FISHERIES MANAGEMENT PLAN

The Licensee shall implement the Reservoir Fisheries Management Plan (RFMP) attached as Appendix 10 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the RFMP shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the RFMP are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised RFMP by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised RFMP. Upon Commission approval, the revised RFMP becomes a requirement of the License, and the Licensee shall implement the revised RFMP, including any changes required by the Commission.

FA LA-06 AQUATIC INVASIVE SPECIES MANAGEMENT PLAN

The Licensee shall implement the Aquatic Invasive Species Management Plan (AISMP) attached as Appendix 11 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the AISMP shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the AISMP are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised AISMP by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised AISMP. Upon Commission approval, the revised AISMP becomes a requirement of the License, and the Licensee shall implement the revised AISMP, including any changes required by the Commission.

FA LA-07 SKAGIT RIVER LIMITING FACTORS HABITAT ENHANCEMENT PROGRAM

Within six (6) months of the Commission's approval of the construction of the downstream fish passage facility at Ross Dam (FA LA-01 Skagit Fish Passage Program), the Licensee shall file with the Commission, for approval, a Skagit River Limiting Factors Habitat Program (Limiting Factors Program). The Licensee shall develop and implement the Limiting Factors Program in consultation with the Skagit License Implementation Committee (SLIC) through a Science-based Decision-Making Framework. Upon Commission approval, the Licensee shall implement the Limiting Factors Program.

1. This Limiting Factors Program shall include the following:

    1.1. Liming Factors Assessment: An assessment as to whether additional habitat enhancement measures, beyond those already being implemented through the Skagit Riverscape Ecosystem Plan (REP) (as described in FA LA-02) with funding obligations in the Skagit River Mainstem Habitat Enhancement Funding Obligation (FA LA-03) and the Skagit Estuary Habitat Enhancement Program (FA LA-04), below the Project, or aquatic habitat enhancement measures upstream of Gorge Powerhouse (as described in North Cascades Resource Enhancement Funding Obligation [FA LA-08]) would contribute to increased anadromous fish production from implementation of the Skagit Fish Passage Program (FA LA-01).

    1.2. Limiting Factors Plan: If the assessment determines that additional habitat enhancement measures would contribute to increased anadromous fish production, the Licensee shall develop a plan to identify additional habitat enhancement measures, and a schedule for implementation of such measures, in consultation with the SLIC.

    1.3. Limiting Factors Program Funding: The Limiting Factors Program shall include an obligation on the Licensee to provide funding up to but not to exceed forty million dollars ($40,000,000) (2025) over the remaining term of the License to fund additional habitat enhancement measures identified in the plan.

        1.3.1. The funding obligation shall commence upon: (1) the Commission's approval of construction of the Ross downstream collector; and (2) the funding obligations in the Skagit River Mainstem Habitat Enhancement Funding Obligation (FA LA-03), the Skagit Estuary Habitat Enhancement Program (FA LA-04), and the North Cascades Resource Enhancement Funding Obligation (FA LA-08) all being fully obligated.

        1.3.2. The implementation of the Limiting Factors Program enhancement measures is a commitment in addition to the measures described in Phase 1 and Phase 2 of the Aquatic Habitat Program (FA LA-02 with funding obligations in FA LA-03), the measures developed via funding obligation from the Skagit Estuary Habitat Enhancement Program (FA LA-04), and the measures developed via funding from the North Cascades Resource Enhancement Program (FA LA-08).

1.3.3. If the Commission and the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the National Park Service conclude that the Ross downstream collector should not be constructed, the Limiting Factors Program funding obligation may be used to address factors limiting harvest or endangered species recovery as identified through a Science-based Decision-Making Framework or other process based on the Ecosystem Monitoring and Adaptive Management Plan (AM LA-01) and best available science after the above-mentioned funding obligations in the Skagit River Mainstem Habitat Enhancement Funding Obligation (FA LA-03) being fully obligated and/or the Skagit Estuary Habitat Enhancement Program (FA LA-04) being fully obligated.

1.3.4. The $40,000,000 is a funding obligation over the License term, not a set-aside fund, and is not dependent upon an annual funding contribution requirement. Licensee shall acknowledge in its financial planning that it will spend $40,000,000 over the License term and account for any expenditures and adjustments according to License Article OPS LA-04 Annual CPI Adjustment. The funds shall not be unreasonably withheld and shall be made fully available for implementation of this License Article, subject to notice provided to the Licensee by March 30th prior to the year the expenses will be incurred for annual expenditures above $4,000,000.

1.3.5. The Licensee shall bear its own costs for all administrative, legal, and overhead costs associated with management of the Limiting Factors Program Funding and shall not assess any costs against the funding required to be made available.

1.3.6. The Licensee shall provide the SLIC with periodic accounting of implementation of its funding obligation.

FA LA-08 NORTH CASCADES RESOURCE ENHANCEMENT FUNDING OBLIGATION

1. The North Cascades Resource Enhancement Funding Obligation

1.1. The Licensee shall allocate ten million dollars ($10,000,000) (2025) through the establishment of the North Cascades Resource Enhancement Funding Obligation (NC Funding Obligation) to be used to fund aquatic or terrestrial measures on federal lands upstream of Gorge Powerhouse administered by the National Park Service (NPS). If the NC Funding Obligation is depleted, the use of available funds from other license funding obligations may be made available for aquatic or terrestrial measures on federal lands upstream of Gorge Powerhouse administered by the NPS through the processes set forth in those license articles.

1.2. The $10,000,000 is a funding obligation over the License term, not a set-aside fund, and is not dependent upon an annual funding contribution requirement. Licensee shall acknowledge in its financial planning that it will spend $10,000,000 over the term of the License and account for any expenditures and adjustments according to License Article OPS LA-04 Annual CPI Adjustment. The funds shall not be unreasonably withheld and shall be made fully available for implementation of this License Article, subject to notice provided to the Licensee by March 30th prior to the year the expenses will be incurred for annual expenditures above $2,500,000.

1.3. The $10,000,000 funding obligation will continue through the term of the License. If the $10,000,000 is not fully spent during the License term, the Licensee shall consult with the Skagit License Implementation Committee (SLIC) to determine how to spend the remaining funds to benefit aquatic or terrestrial resources.

1.4. In consultation with the SLIC, the Licensee shall only use the NC Funding Obligation to fund the implementation of aquatic or terrestrial measures identified and approved by the NPS. For each measure, the Licensee shall, as appropriate, file with the Commission for approval an implementation plan detailing scope, schedule, and budget of the measure. No land-disturbing or land-clearing activities pertaining to such measure shall begin until the Licensee is notified by the Commission that the plan is approved. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

1.5. Measures funded by the NC Funding Obligation shall not interfere with Project operations. Depending upon the measure being funded, the entity implementing the measure may be Licensee, a SLIC member, or other appropriate third-party entity.

1.6. Licensee shall provide SLIC with a periodic accounting of implementation of its funding obligation.

FA LA-09 ECOLOGICAL USE OF RESERVOIR WOOD MANAGEMENT PLAN

Within one year of License issuance, the Licensee shall file with the Commission an Ecological Use of Reservoir Wood Management Plan (Reservoir Wood Plan). The Licensee shall develop the Plan in consultation with the Skagit License Implementation Committee (SLIC) and subject to approval by National Park Service (NPS), the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. Upon Commission approval, the Licensee shall implement the Reservoir Wood Plan.

The Licensee shall continue to manage the handling, storage, and disposal of woody debris accumulated in the reservoirs to minimize impacts to resources in the reservoirs and Project operations and in compliance with its dam safety obligations. This License Article shall not impede Licensee's management of woody debris.

1. Provisions of the Reservoir Wood Plan will consist of implementation procedures for the following actions:

    a. The annual movement of large woody debris (LWD) from the reservoirs to the lower Skagit River to support aquatic habitat, to the extent practical;

    b. The use of suitable wood for restoration efforts, including potentially anchoring (LWD) at strategic locations along the reservoirs to support fish habitat and reduce shoreline erosion, to the extent practical and subject to the approval of NPS;

    c. Temporary storage of woody debris accumulated on the reservoirs; and

    d. Periodic assessment of patterns of accumulation and reservoir operations which guide the amount, timing, size, and duration of woody debris storage and relocation to meet geomorphic and biological objectives.

2. Annual Reservoir Wood Plan implementation activities, if not previously approved by NPS in the Reservoir Wood Plan (including the specific location, timing and scope of the activities), are subject to the review and approval of the NPS if within the boundaries of the North Cascades National Park.

3. Upon completion of road access to Ross Reservoir (if road access is implemented in support of the Skagit Fish Passage Program [FA LA-01]), the Licensee shall update the Reservoir Wood Plan's sections on the annual movement of LWD from Ross Lake to account for the road access and to re-assess the amount, timing, size, and duration of woody debris movement to meet geomorphic and biological objectives.

4. The Licensee shall review and update the Reservoir Wood Plan every 10-years following issuance of the New License, in consultation with the SLIC. Any amendments to the Reservoir Wood Plan following this review and update shall be made in consultation with the SLIC before filing with the Commission. Amendments to the Reservoir Wood Plan are subject to the approval of the NPS for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their

habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

5. Implementation of the revised Reservoir Wood Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Reservoir Wood Plan. Upon Commission approval, the revised Reservoir Wood Plan becomes a requirement of the License, and the Licensee shall implement the revised Reservoir Wood Plan, including any changes required by the Commission.

GEO LA-01 RESERVOIR EROSION MANAGEMENT AND MONITORING PLAN

The Licensee shall implement the Reservoir Erosion Management and Monitoring Plan attached as Appendix 12 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the Reservoir Erosion Management and Monitoring Plan shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the Reservoir Erosion Management and Monitoring Plan are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised Reservoir Erosion Management and Monitoring Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Reservoir Erosion Management and Monitoring Plan. Upon Commission approval, the revised Reservoir Erosion Management and Monitoring Plan becomes a requirement of the License, and the Licensee shall implement the revised Reservoir Erosion Management and Monitoring Plan, including any changes required by the Commission.

GEO LA-02 ROADS, TRAILS, AND TRANSMISSION LINE RIGHT-OF-WAY EROSION MANAGEMENT PLAN

The Licensee shall implement the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan attached as Appendix 13 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

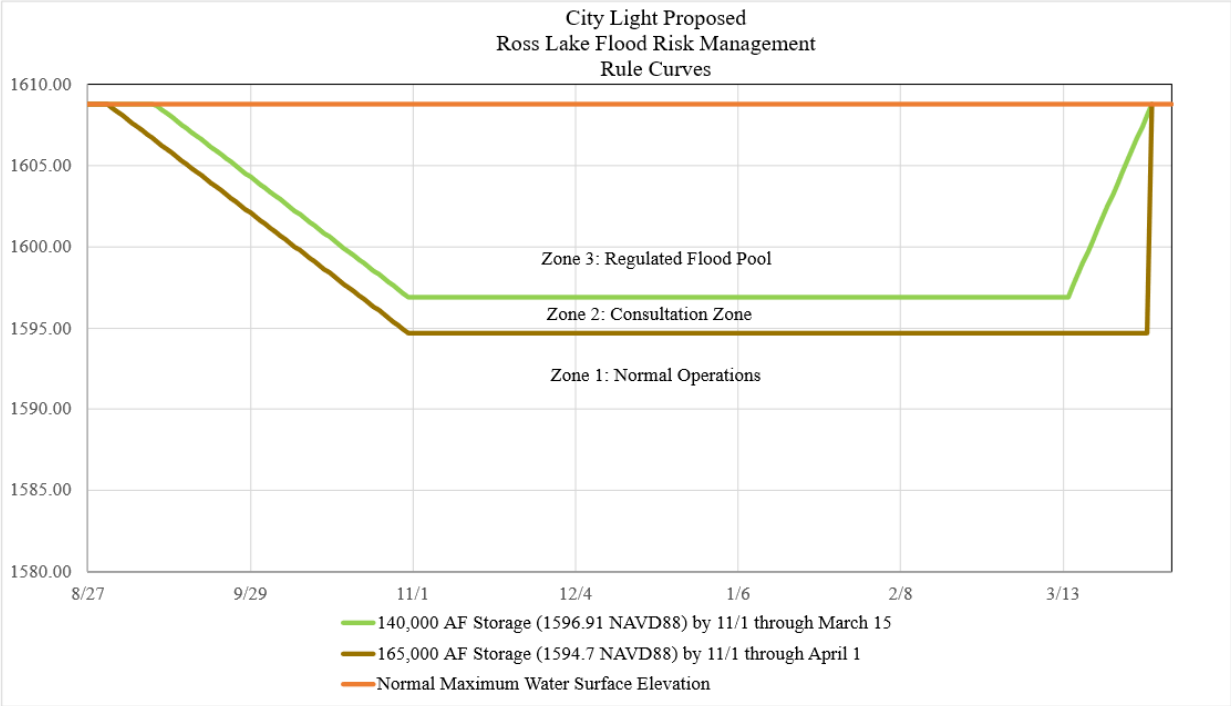
Any amendments to the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan. Upon Commission approval, the revised Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan becomes a requirement of the License, and the Licensee shall implement the revised Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan, including any changes required by the Commission.

OPS LA-01 ROSS LAKE FLOOD RISK MANAGEMENT OPERATIONS

The Licensee shall operate the Project consistent with the Ross Lake Flood Risk Management (FRM) Rule Curves as shown in Figure 1 and described below. The purpose of the FRM Rule Curves is to allow the Licensee to balance flood risk management objectives with the protection, mitigation and enhancement of fish and aquatic resources, recreational opportunities, and hydropower generation.

Figure 1: Ross Lake Flood Risk Management Rule Curves.



Zone 3: Regulated Flood Pool – The Licensee shall reserve 140,000 acre-feet of storage space in Ross Lake for flood risk management during the period of November 1 through, and to include, March 15. The required storage space, if not previously obtained through power withdrawals or other reservoir management purposes, shall be provided by drawing down Ross Lake at a rate equaling or exceeding a uniform drawdown rate from zero on September 10 to a rate that provides 140,000 acre-feet of storage by November 1. The Licensee will reserve 140,000 acre-feet of storage through March 15, after which the required flood risk management storage space will be reduced at a uniform rate to zero required storage space by April 1. Should Ross Lake water surface elevations rise into Zone 3: Regulated Flood Pool as depicted in Figure 1 above, the Licensee shall comply with requests for operational changes at Ross Dam (specified outflows) as directed by the U.S. Army Corps of Engineers (USACE) with the objective of managing flood risk.

Zone 2: Consultation Zone – The Licensee shall target providing 165,000 acre-feet of storage space in Ross Lake for flood risk management during the period of November 1 through, and to include April 1. The targeted storage space, if not previously obtained through power withdrawals or other reservoir management purposes, shall be provided by drawing down Ross Lake at a rate

equaling or exceeding a uniform drawdown rate from zero on September 1 to a rate that provides 165,000 acre-feet by November 1 and through April 1. Should Ross Lake water surface elevations rise into Zone 2: Consultation Zone as depicted in Figure 1 above, the Licensee, in consultation with the Skagit License Implementation Committee (SLIC), in coordination with USACE, and after seeking timely input from Skagit County and the Skagit County Dike and Drainage Flood Control Partnership, shall implement measures to lower Ross Lake to Zone 1 in a manner that balances expeditiously meeting Zone 1 storage objectives while providing: (1) salmon and steelhead protection and enhancement; (2) recreational opportunities; and (3) hydropower generation.

Zone 1: Normal Operations – When Ross Lake water surface elevations are within Zone 1: Normal Operations as depicted in Figure 1 above, the Licensee shall operate the Project consistent with the normal operational objectives and other FERC License requirements.

USACE Directed Operations – In a situation when the National Weather Service, Northwest River Forecast Center forecasts that the natural flow at the gaging station near Concrete, Washington will equal or exceed 90,000 cubic feet per second (cfs) in 8 hours on a rising stage of a flood, the Licensee shall comply with requests for operational changes at Ross Dam (specified outflows) as directed by the USACE. During the flood period (defined above) through which the USACE directs operations of the Project, the Licensee retains the right to discharge up to 5,000 cfs from Ross (plus or minus 20 percent allowances for operational latitude) if the Licensee determines such flows are necessary for downstream resource protection (such as minimum flows for aquatic resources) and/or generation.

Surcharge Storage – If the Ross Lake water surface elevation should reach the elevation of 1,608.76 feet North American Vertical Datum of 1988 (NAVD 88) (1,602.5 feet City of Seattle Datum [CoSD]) before the flood recession occurs, the gates shall be operated to produce maximum surcharge storage to gain the maximum reduction of discharge downstream. If surcharge storage is produced, it shall be maintained as long as possible or until flood recession occurs.

OPS LA-02 ROSS LAKE SUMMER VARIABLE RESERVOIR OPERATIONS ZONE

The Licensee shall maintain Ross Lake within a Summer Variable Reservoir Operations Zone, i.e., within a targeted water surface elevation (WSE) range between 1,600.76 and 1,608.76 feet North American Vertical Datum of 1988 (NAVD 88) (1,594.5 and 1,602.5 feet) City of Seattle Datum [CoSD]) as measured at Ross Dam from July 31 through the Tuesday after Labor Day, upon which Ross Lake shall be drawn down consistent with Ross Lake Flood Risk Management Operations (OPS LA-01).

Subject to the availability of adequate runoff to refill Ross Lake and meet firm power generation needs, targeted WSEs within this zone will be informed by annual flow planning (described in the Skagit Riverscape Ecosystem Plan) and identified in consultation with the Skagit License Implementation Committee to adaptively manage the competing resource objectives listed below:

- Provide fish protection flows downstream of the Project, including process flows;
- Provide recreational access to Ross Lake facilities;
- Reduce reservoir fish stranding and trapping;
- Promote reservoir fish tributary access;
- Promote littoral habitat and native vegetation development;
- Reduce erosion and impacts to sensitive (cultural) resources;
- Protect water quality and minimizing spill; and
- Promote safe, timely, and effective fish passage as described in the Skagit Fish Passage Program.

OPS LA-03 MINIMUM INSTREAM FLOWS FOR THE GORGE REACH

The Licensee shall install and operate a minimum flow control structure at Gorge Dam and, upon installation, release water from such structure to maintain minimum flows in the Gorge Reach (Project River Mile [PRM] 97.2 – 94.7) according to this License Article. The Licensee shall also install and operate a minimum flow turbine generator unit and appurtenant works ("minimum flow unit") to generate electricity with the water provided as a minimum flow into Gorge Reach. The purpose of this License Article is to protect and enhance aquatic, cultural, and other resources in the Gorge Reach between Gorge Dam and Gorge Powerhouse.

1. Minimum Flow Control Structure, Minimum Flow Unit, and Instream Flow Gage

1.1. Within six (6) months after issuance of the New License, the Licensee shall file with the Commission, for approval, a plan to install, operate, and maintain: (1) a minimum flow control structure at Gorge Dam; (2) minimum flow unit, and (3) a gage in the Gorge Reach between Gorge Powerhouse and Dam. The plan shall include, but not be limited to: (1) functional design drawings of the Licensee's proposed structure and minimum flow unit; (2) quantification of the structure's and minimum flow unit's flow range and capacity; (3) a preliminary operation and maintenance plan; (4) a schedule for installing the structure and the minimum flow unit; and (5) construction schedule and anticipated dates for completion of the structure, the minimum flow unit and the gage's installation. Upon Commission approval of this plan, the Licensee shall implement this plan.

2. Gorge Reach Minimum Flows

2.1. Upon completion of the minimum flow control structure's installation, the Licensee shall release water from Gorge Dam into the Gorge Reach to maintain an instantaneous minimum flow of 250 cubic feet per second (cfs) as measured in the Gorge Reach at a gage to be established upstream of the Gorge Powerhouse.

2.2. During the course of a water year, if necessary, the Licensee, in consultation with the Skagit License Implementation Committee (SLIC), shall develop a modified flow release schedule for minimum flow in Gorge Reach when the release schedule described in this License Article requires interim modification to manage water supply, consistent with the Flow Insufficiency requirements of the License Article FA LA-02 Riverscape Ecosystem Plan (Section 3.2). Unless disapproved by Ecology, the Licensee shall notify the Commission and shall implement the modified release schedule within seven (7) days of providing such notice, unless otherwise directed by the Commission.

2.3. For compliance purposes and to account for monitoring imprecision and release equipment variability, the Licensee is allowed temporary fluctuations of up to ten percent of the scheduled flow release as measured in the Gorge Reach at a gage to be established upstream of the Gorge Powerhouse, subject to any relevant Clean Water Act Section 401 Water Quality Certification conditions.

OPS LA-04 ANNUAL CPI ADJUSTMENT

This OPS LA-04 License Article governs Consumer Price Index (CPI) adjustments to all dollar amounts in funding obligations under the New License and Management Plans incorporated therein.

1. Unless otherwise indicated, all dollar amounts in the New License and Management Plans shall be stated as of May 1, 2025, and licensee shall adjust such amounts according to the following formula:

   $\text{Dollar Amount}_{adjusted} = D \times (\text{CPI-U West}_{CURRENT})/(\text{CPI-U West}_{BASE})$

   Where:

   $\text{Dollar Amount}_{adjusted}$ represents the adjusted dollar value of the dollar amount stated in the New License or Management Plan or adjusted dollar value of the remaining principal balance of the dollar amount stated in the New License or Management Plan.

   D = the dollar value of the unadjusted funding obligation or the dollar value of the remaining principal balance of the funding obligation.

   $\text{CPI-U West}_{CURRENT}$ = the CPI for the All Urban Consumer in the West Region (CPI-U West) for the month and year of the new period to which the obligation is being inflated (or deflated). The $\text{Dollar Amount}_{adjusted}$ will be in the dollars for this period after the CPI adjustment. This is the newer time period. The CPI-U West used for these adjustments is from the CPI-U series ID: CUUS0400SA0.

   CPI-U West_{BASE} = the CPI-U West for the time period from which D is being inflated. This is the price for the earlier or "old" time period.

2. The dollar amount stated in the New License and Management Plans will be based on prices on May 1, 2025. The dollar amount will be inflated (or deflated) using the formula in Section 1 of this License Article to adjust the dollar amount to the effective date of the New License.

   2.1. $\text{CPI-U West}_{CURRENT}$ will be the CPI-U for the month and year of the effective date of the New License. (For example, if the New License is effective in September 2026, the $\text{CPI-U West}_{CURRENT}$ will be the index value for September 2026).

   2.2. CPI-U West_{BASE} will be the index value for May 2025. $\text{Dollar Amount}_{adjusted}$ will be adjusted to the nearest whole dollar and is the adjusted dollar amount.

3. The remaining principal balance of the adjusted dollar amount shall be adjusted by CPI annually on the anniversary of the effective date of the New License during the License term (and any subsequent annual licenses).

   3.1. $\text{CPI-U WEST}_{CURRENT}$ will be the CPI-U for the month of the anniversary in the new year.

3.2. CPI-U $West_{BASE}$ will be the CPI for the previous year, on the month of the anniversary.

3.3. Dollar $Amount_{adjusted}$ will be adjusted to the nearest whole dollar and will be the adjusted remaining principal balance of the dollar amount.

4. If publication of the CPI-U West, series CUUS0400SA0 is discontinued, the License, in consultation with the Skagit License Implementation Committee, shall select a comparable index to determine the adjustment using the formula above.

REC LA-01 RECREATION RESOURCE MANAGEMENT PLAN

The Licensee shall implement the Recreation Resource Management Plan (RRMP) attached as Appendix 14 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the RRMP shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the RRMP are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised RRMP by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised RRMP. Upon Commission approval, the revised RRMP becomes a requirement of the License, and the Licensee shall implement the revised RRMP, including any changes required by the Commission.

WATER LA-01 WATER QUALITY MONITORING AND DATA MANAGEMENT PLAN

The Licensee shall implement the Water Quality Monitoring and Data Management Plan attached as Appendix 15 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the Water Quality Monitoring and Data Management Plan shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the Water Quality Monitoring and Data Management Plan that may require an amendment to the Section 401 Water Quality Certification or impact the Licensee's ability to comply with conditions of the Section 401 Water Quality Certificate are subject to approval by Washington State Department of Ecology before filing with the Commission. Similarly, any amendments to the Water Quality Monitoring and Data Management Plan are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised Water Quality Monitoring and Data Management Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Water Quality Monitoring and Data Management Plan. Upon Commission approval, the revised Water Quality Monitoring and Data Management Plan becomes a requirement of the License, and the Licensee shall implement the revised Water Quality Monitoring and Data Management Plan, including any changes required by the Commission.

WILDLIFE LA-01 WILDLIFE PROTECTION AND ENHANCEMENT PLAN

The Licensee shall implement the Wildlife Protection and Enhancement Plan attached as Appendix 16 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the Wildlife Protection and Enhancement Plan shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the Wildlife Protection and Enhancement Plan are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised Wildlife Protection and Enhancement Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Wildlife Protection and Enhancement Plan. Upon Commission approval, the revised Wildlife Protection and Enhancement Plan becomes a requirement of the License, and the Licensee shall implement the revised Wildlife Protection and Enhancement Plan, including any changes required by the Commission.

WILDLIFE LA-02 AVIAN SPECIES MANAGEMENT PLAN

The Licensee shall implement the Avian Species Management Plan attached as Appendix 17 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the Avian Species Management Plan shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the Avian Species Management Plan are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised Avian Species Management Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Avian Species Management Plan. Upon Commission approval, the revised Avian Species Management Plan becomes a requirement of the License, and the Licensee shall implement the revised Avian Species Management Plan, including any changes required by the Commission.

WILDLIFE LA-03 FISH AND WILDLIFE MITIGATION LANDS MANAGEMENT PLAN

The Licensee shall implement the Fish and Wildlife Mitigation Lands Management Plan attached as Appendix 18 to the Skagit River Hydroelectric Project Relicensing Settlement Agreement.

Any amendments to the Fish and Wildlife Mitigation Lands Management Plan shall be made in consultation with the Skagit License Implementation Committee before filing with the Commission. Amendments to the Fish and Wildlife Mitigation Lands Management Plan are subject to the approval of the National Park Service (NPS) for locations on or affecting NPS lands or waters, and any amendments affecting species and/or their habitats listed under the Endangered Species Act are subject to approval by the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Implementation of the revised Fish and Wildlife Mitigation Lands Management Plan by the Licensee shall not begin until it is approved by the Commission. The Commission reserves the authority to require changes to the revised Fish and Wildlife Mitigation Lands Management Plan. Upon Commission approval, the revised Fish and Wildlife Mitigation Lands Management Plan becomes a requirement of the License, and the Licensee shall implement the revised Fish and Wildlife Mitigation Lands Management Plan, including any changes required by the Commission.

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 2

AUTHORIZED REPRESENTATIVES OF THE PARTIES

For City of Seattle by and through its City Light Department:

For United States Department of Commerce, National Marine Fisheries Service:

For United States Department of Agriculture, Forest Service:

For United States Department of the Interior, Fish and Wildlife Service:

For United States Department of the Interior, National Park Service:

For United States Department of the Interior, Bureau of Indian Affairs:

For Washington Department of Fish and Wildlife:

For Washington Department of Ecology:

For Sauk-Suiattle Indian Tribe:

For Swinomish Indian Tribal Community:

For Upper Skagit Indian Tribe:

For Skagit County:

For Skagit County Dike and Drainage Flood Control Partnership:

For Trout Unlimited:

For American Whitewater:

For North Cascades Institute:

For Skagit Fisheries Enhancement Group:

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 3

GOVERNANCE DOCUMENT FOR THE SKAGIT LICENSE IMPLEMENTATION COMMITTEE AND WORK GROUPS

Settlement Agreement Appendix 3

Governance Document for the Skagit License Implementation Committee and Work Groups

This *Governance Document for the Skagit License Implementation Committee and Work Groups* "Governance Document" establishes the procedures for governance of the Skagit License Implementation Committee (SLIC) and associated Work Groups. Requirements for consultation between the Licensee and the SLIC and/or Work Groups and for Mandatory Conditioning Agency's (MCA) Approvals are established in individual License Articles and/or Management Plans.

1 Definitions

The following definitions apply in this Governance Document only. The definitions in the Settlement Agreement also apply where relevant, but in the event of a discrepancy, the definitions herein control.

Advisor means an entity that participates in the SLIC and/or a Work Group in an advisory capacity, as provided in Section 2.4 below.

Approval means, when used in the context of a MCA, the MCA's determination that a given implementation action proposed by the Licensee is consistent with the MCA's mandatory prescription and/or condition and other applicable law.

Consent or consensus means that, after consultation no Member opposes the proposal.

Consult or consultation means that the Licensee meets and confers with other Members according to the process described in this Governance Document and makes good-faith best efforts to obtain agreement from all Members. As used herein, consultation does not mean consultation under the Endangered Species Act, National Historic Preservation Act, government-to-government consultation with tribes, or other federal or state laws or policies requiring consultation.

FERC means Federal Energy Regulatory Commission.

Final Work Product means a Work Product that has been completed and submitted to FERC for approval.

License means the new license issued by FERC to City of Seattle, Washington, through its City Light Department (Licensee) for the continued operation and maintenance of the Project pursuant to Section 15 of the Federal Power Act (FPA), 16 United States Code (USC) § 808, including any subsequent annual licenses, replacing the current license issued in 1994. As used herein, "License" includes all requirements of each License Article and associated Management Plans.

License Articles means the articles of the License setting forth the Licensee's obligations under the New License.

Management Plans means plans approved by FERC providing more detailed information and requirements (including schedule) for implementation of specific License Articles. This definition includes Appendices 5-18 of the Settlement Agreement regardless of whether they are approved by FERC.

Mandatory Conditioning Agency, or MCA, means National Marine Fisheries Service and U.S. Fish and Wildlife Service when exercising their Section 18 authority, National Park Service and U.S. Forest Service when exercising their Section 4(e) authority, and Washington State Department of Ecology when exercising its Clean Water Act Section 401 authority.

Meeting Protocols means the protocols adopted by the SLIC or Work Group, as applicable, under Section 5.

Meeting Summary(ies) means written documentation of issues discussed, status of pending or new action items, and decisions reached in a meeting.

Member(s) means the entities identified in Section 3.2. The obligations of Members apply to their designated Representatives.

Notice means a written communication from a Member to other Members providing a notice pursuant to this Governance Document. The written communication shall clearly state that the written communication is a Notice in the subject header, the purpose of the notice, the action upon which the notice is requesting, and the basis for that request.

Offer of Settlement means the Licensee's filing of the Settlement Agreement with FERC pursuant to 18 Code of Federal Regulations (CFR) 385.602.

Project means the Skagit River Hydroelectric Project, FERC No. 553.

Report means a report that the License requires the Licensee to periodically prepare and submit to FERC with respect to implementation of a given License Article or Management Plan.

Representative(s) means individuals designated by a Member or Advisor to participate in the SLIC or a Work Group, including any alternates.

Settlement Agreement means the entirety of the Settlement Agreement for Relicensing the Skagit River Hydroelectric Project (FERC Project No. 553), including Attachments and Appendices. The Settlement Agreement shall include Attachments, which are related agreements addressing non-license terms and conditions, attached for informational purposes only.

SLIC means the Skagit License Implementation Committee.

Work Group means the Work Groups established under Section 4.

Work Product(s) means a written document that is required by the License and is prepared pursuant to this Governance Document.

2 Roles, Responsibilities, and Reservations of Authority

2.1 All Members and Advisors. All Members and Advisors shall abide by the terms of this Governance Document. They shall make good-faith efforts to attend meetings and timely complete tasks. Members and Advisors shall be guided by the Principles set forth in Section 7 herein. Each Member and Advisor shall bear its own costs of meeting attendance and completion of tasks, except as otherwise agreed with the Licensee.

2.2 Licensee. The Licensee shall, at its own expense: (1) arrange and facilitate all meetings of the SLIC and Work Groups, including procuring an independent facilitator, if requested as provided herein; (2) maintain a roster of Members, Advisors, and Representatives; (3) consult with the SLIC and Work Groups as provided in the License; (4) draft, distribute, and finalize Work Products; (5) when MCA approval is required under the License, make best efforts to prepare a Work Product that both achieves consensus and that the MCA can approve; and (6) undertake other actions needed for efficient implementation of the License in coordination with the Members and input of Advisors.

2.3 Mandatory Conditioning Agencies. When MCA approval is required under the License, the MCA shall make best efforts to assist the Licensee in developing an approvable Work Product.

2.4 Advisor(s). Any Advisor shall comply with all applicable terms herein. An Advisor shall not have authority to consent or object to consensus. If an Advisor disagrees with a consensus decision, the Advisor may record that disagreement and its basis in writing, and the Licensee will include the written disagreement and any response thereto with any related submittal to FERC.

2.5 Reservations of Authority

2.5.1 General. While the goal of consultation and dispute resolution is consensus, nothing in this Governance Document is intended or authorized to transfer or delegate decision-making authority from any Member to any other Member.

2.5.2 No Waiver of Authority. No Member or Advisor waives or relinquishes any of its rights or authority under the Federal Power Act or other applicable law as a result of its participation in the SLIC or any Work Group. No Member or Advisor waives the ability to comment to FERC as a result of its participation in the SLIC or any Work Group.

2.5.3 MCA Approvals. Where MCA approval is required under the License, the other Members or Advisors may provide their views to the MCA individually, but shall not provide consensus advice to the MCA. The Members' or Advisors' views shall not affect the MCA's decision-making authority or constitute consensus advice to the MCA.

2.5.4 Licensee's Compliance. The Licensee does not waive or relinquish any of its authority to submit Work Products or take actions that it deems necessary for compliance with the License or other applicable law.

3 Skagit License Implementation Committee

3.1 Formation. Within sixty (60) days after the Effective Date of the Settlement Agreement, the Licensee shall convene the Initial Meeting of the SLIC.

3.2 Membership. The SLIC shall be comprised of the following entities: Licensee, Sauk-Suiattle Indian Tribe, Swinomish Indian Tribal Community, Upper Skagit Indian Tribe, National Marine Fisheries Service (NMFS), National Park Service (NPS), U.S. Bureau of Indian Affairs (BIA), U.S. Fish and Wildlife Service (FWS), U.S. Forest Service (USFS), Washington State Department of Ecology (Ecology), and Washington State Department of Fish and Wildlife (WDFW).

3.3 Representatives. Each Member entity shall designate one Representative for the SLIC and may designate one or more alternates, via Notice to the Licensee. Initial designations shall be made prior to the Initial Meeting. A Member may change its Representatives at any time by the same means.

3.4 Functions. The SLIC shall: (1) be the venue where Licensee and other Members consult regarding the sufficiency of the Reports and proposed amendments to Management Plans, as required under the License; (2) coordinate work between Work Groups and establish additional Work Groups as needed; (3) carry out the dispute resolution procedure in Section 7.5; and (4) take other appropriate actions conducive to efficient implementation of the License consistent with the Settlement Agreement.

3.5 Meetings

3.5.1 Initial Meeting. At this meeting, the SLIC shall adopt written Meeting Protocols, supplementing or amending the procedures stated in Section 5, and conduct such other business as may be mutually agreeable.

3.5.2 Annual Meetings. After the Initial Meeting, the SLIC shall meet at least annually. At the Annual Meeting, the SLIC shall finalize Reports as needed and any proposed amendments to Management Plans, before submission to FERC and MCA(s) for approval if required; and conduct such other business as may be mutually agreeable.

3.5.3 Special Meetings. Special meetings shall be convened as needed, including by consensus or upon request of a majority of Members.

4 Work Groups

4.1 Formation. Within sixty (60) calendar days after the Effective Date of the Settlement Agreement, the Licensee shall convene each of the Work Groups described in Section 4.3.

4.2 Purpose and Functions. Consultation under the License and decision-making under this Governance Document shall be focused at the Work Group level, to provide for technical input by Members with relevant policy and legal authority. Each Work Group shall: (1) be the venue for consultation between the Licensee and other Members as required under the License; (2) develop, in consultation with the Licensee, Reports to FERC within their scope; (3) develop and recommend amendments to Management Plans within their scope; (4) designate subgroups, coordinate with other Work Groups, and reallocate assignments between Work Groups; and (5) take other appropriate actions conducive to efficient implementation of the License.

4.3 Membership and Scope. The initial Work Groups, scope of responsibilities, and list of Members and Advisors for each Work Group are stated below. Each Member may participate in each Work Group. Advisors may be added or removed based upon a consensus decision of the Members. Work Groups may invite outside participants for a given meeting or meetings when deemed appropriate. The attached matrix (Attachment A) includes a list of each Member and Advisor for each Work Group.

4.3.1 Fish and Aquatics (FA) Work Group. The FA Work Group is responsible for overseeing the implementation of: FA LA-02 Skagit Riverscape Ecosystem Plan; FA LA-03 Skagit River Mainstem Habitat Enhancement Funding Obligation; FA LA-05 Reservoir Fisheries Management Plan; FA LA-06 Aquatic Invasive Species Management Plan; FA LA-07 Skagit River Limiting Factors Habitat Enhancement Program; FA LA-08 North Cascades Resource Enhancement Funding Obligation; FA LA-09 Ecological Use of Reservoir Wood Management Plan; OPS LA-01 Ross Lake Flood Risk Management Operations; OPS LA-02 Ross Lake Summer Variable Reservoir Operations; OPS LA-03 Minimum Instream Flows for the Gorge Reach; Water LA-01 Water Quality Monitoring and Data Management Plan.

4.3.2 Fish Passage Work Group. The Fish Passage Work Group is responsible for overseeing the implementation of the Fish Passage Program as described in the Settlement Agreement and New License.

4.3.3 Estuary Work Group. The Estuary Work Group is responsible for overseeing the implementation of FA LA-04 Skagit Estuary Habitat Enhancement Program.

4.3.4 Terrestrial Work Group. The Terrestrial Work Group is responsible for overseeing the implementation of: Botanical LA-01 Vegetation Management Plan; Botanical LA-02 Invasive Plants Management Plan; Botanical LA-03 Wetland Enhancement Measures; GEO LA-01 Reservoir Erosion Management and Monitoring Plan; GEO LA-02 Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan; Wildlife LA-01 Wildlife Protection and Enhancement Plan; Wildlife LA-02: Avian Species Management Plan; Wildlife LA-03 Fish and Wildlife Mitigation Lands Management Plan.

4.3.5 Recreation Work Group. This Work Group is responsible for overseeing the implementation of: Aesthetics LA-01 Lighting Management Plan; and REC LA-01 Recreation Resources Management Plan.

4.3.6 Other Work Groups. As subsequently established by the SLIC.

4.4 Representatives. Each Member or Advisor shall designate its Representative for a Work Group, and may designate one or more alternates, via Notice to the Licensee. Initial designations shall be made prior to the Initial Meeting. A Member may change its Representatives at any time by the same means.

4.5 Meetings

4.5.1 Initial Meeting. At this meeting, each Work Group shall adopt written Meeting Protocols, supplementing or amending the procedures stated in Section 5, as necessary; and conduct such other business as may be mutually agreeable.

4.5.2 Annual Meetings. After the Initial Meeting, each Work Group shall meet at least annually. At the Annual Meeting, the Work Group shall review the Licensee's Reports and any proposed amendments to Management Plans, identifying any matters that may benefit from or require elevation to the SLIC; and conduct such other business as may be mutually agreeable.

4.5.3 Special Meetings. Special meetings shall be convened as needed, including by consensus or upon request of a majority of Members.

5 Meeting Procedures

5.1 Facilitation. The Licensee shall facilitate all SLIC and Work Group meetings unless the SLIC or Work Group consents to a different Member's facilitation. Upon request of a majority of Members of the SLIC or Work Group, as applicable, the Licensee shall procure an independent meeting facilitator, in which case the Licensee shall consult with the SLIC or Work Group in selecting a facilitator. The role of Facilitator does not provide any decision-making or other authority beyond the procedural responsibilities described herein.

5.2 Meeting Agenda. The Facilitator shall be responsible for developing a meeting agenda, in consultation with the Members and Advisors. Any Member or Advisor may request the addition of an item to the agenda.

5.3 Meeting Notice. The Licensee shall provide Notice of Initial and Annual Meetings at least thirty (30) calendar days in advance, and Notice of Special Meetings at least fifteen (15) calendar days in advance, unless a different period is agreed to by the Members or otherwise appropriate under the circumstances.

5.4 Meeting Summaries. Not more than ten (10) business days after a meeting, the Facilitator shall draft and distribute a Meeting Summary documenting the issues discussed, status of action items, and decisions reached. Members shall have an opportunity to review the summary and provide edits, and, if revisions are requested, the Facilitator shall circulate a revised Meeting Summary. The final Meeting Summary shall be subject to approval by the SLIC or Work Group, as applicable, at the subsequent meeting.

5.5 Scheduling Annual Meetings. The Annual Meetings of the SLIC and Work Groups shall be scheduled to timely complete consultation on Reports and any proposed amendments to the Management Plans.

6 Work Products

6.1 Reports. Licensee shall prepare Reports as required by the License.

6.1.1 Process. Licensee shall provide a draft Report to the applicable Work Group, at least ten (10) business days before the Annual Meeting. Work Group Members and Advisors shall submit any written comments and recommendations to Licensee at or before the Annual Meeting and may provide verbal comments at the meeting. Applicable Reports will be subject to review at the Annual Meeting. The final Reports are a Final Work Product that shall be filed with FERC by the Licensee within ninety (90) calendar days after the Annual Meeting or as otherwise required under the License.

6.1.2 Contents. Licensee shall include the following information in each Report:

6.1.2.1 A work plan documenting the implementation of measures in the preceding calendar year, a description of the specific actions that Licensee plans to implement for the current calendar year and a summary of actions proposed in the following calendar year;

6.1.2.2 Summaries of results of any monitoring or studies conducted during the preceding calendar year, conclusions that the Work Group draws from the results, and any proposed changes to the FERC License based on the results;

6.1.2.3 A discussion of any differences between the implementation schedule in the License and the schedule for the actions Licensee plans to implement during the year, including an explanation for the differences;

6.1.2.4 Documentation of consultations with the SLIC and/or Work Group(s);

6.1.2.5 Documentation of approvals from MCAs in the previous year;

6.1.2.6 Documentation of any Management Plan amendments considered or submitted to FERC during the previous 12-months; and

6.1.2.7 Identification of any issues that would benefit from continuing consultation with a Work Group or SLIC, as applicable.

6.2 Management Plans Amendment Process. Licensee shall be responsible for drafting amendments to Management Plans as needed, subject to consultation with the relevant Work Group. Licensee shall timely obtain all necessary MCA approvals and submit the final proposed amended Management Plan to FERC for its review and approval.

6.3 Schedule. When the License requires consultation on a Work Product, Licensee shall provide the draft Work Product to other Members and Advisors and allow a period of at least twenty (20) business days for review and comment, unless the Members agree to a shorter time period. If requested prior to the conclusion of the review period, the Licensee shall convene at least one meeting of the relevant Work Group to discuss the draft Work Product and attempt to reach consensus with Members as required under the License.

6.4 Requirements for Filing. When the Licensee files a Work Product with FERC, it shall document all consultations with the SLIC and any MCA approval. It shall attach all written comments and responses as requested by any Member and shall document the outcome of any dispute resolution procedure.

7 Decision-making

7.1 Principles. Members and Advisors shall follow these principles in the work of the SLIC and each Work Group:

7.1.1 Focus consultation and decision-making at the Work Group level.

7.1.2 Rely on the best scientific and technical information available relevant to the matter under consideration.

7.1.3 Provide input and expertise commensurate with the Member's or Advisor's scope of authority, rights, or interests and give weight to the opinions of

others with expertise in and/or jurisdiction by law over the matter under consideration.

7.1.4 Where alternate methods are potentially available to meet an objective, and each alternative is consistent with the best available science, consider comparative cost-effectiveness and efficiency.

7.1.5 Use a precautionary approach when accounting for uncertainty to protect, mitigate, and enhance natural resources affected by the Project to the maximum extent practicable.

7.1.6 Commit to prompt resolution of issues to promote timely implementation of license requirements.

7.1.7 Acknowledge that each Member and Advisor speaks for themselves; do not make representations or characterizations about another Member's views either in or outside of meetings.

7.1.8 Be respectful of all Members and Advisors, be prepared to effectively discuss all meeting topics, and make good-faith efforts to address the interests of other Members and reach mutually agreeable resolutions.

7.2 Science-based Decision-Making Framework. The Settlement Parties recognize that implementation of the License may necessitate a significant investment of time and resources. A Science-based Decision-Making Framework (Framework) is identified within certain License Articles and Management Plans in order to facilitate successful post-license implementation of the New License's comprehensive ecosystem approach for certain complex decisions. The Licensee, in consultation with the SLIC, will develop a Framework after the Comprehensive Settlement Agreement is signed that is efficient and timely. This Framework will be used by the SLIC to inform a consensus-based license implementation decision when appropriate given the complexity and timeframe of the decision and available Party resources. In consultation with the SLIC, the Licensee will provide funding to settlement federal agency parties to engage a contractor (which may include another federal agency) that will be jointly selected by settlement federal agency parties and the Licensee to implement the Framework, provided that, if the settlement federal agency parties are not able to contract with the jointly selected contractor, the Licensee may engage the contractor directly.

7.3 Consensus. The SLIC and each Work Group shall strive to make decisions by Consensus. The purpose of Consensus is to implement the License in a manner that meets, or at least does not impair, the interests of each Member.

7.3.1 Achieving Consensus. Each Member of the SLIC or Work Group, as applicable, shall be entitled to consent, abstain, or object to consensus. Consensus is achieved when all participating Members affirmatively agree with a proposal, state a neutral position, or abstain.

7.3.2 Notice to Non-Present Members. Unless otherwise provided in the License, when any attempt to achieve consensus occurs at a meeting, Licensee shall provide Notice of the results to and seek the position of any non-present Members within three (3) business days. The Notice shall request that the non-present Member inform Licensee and other Members of their position via Notice within ten (10) business days or they shall be deemed to have abstained from the decision. The non-present Member shall be entitled to request a reasonable extension of the time to provide their position if needed, and the Members shall vote accordingly. Deemed abstentions shall be documented in the Meeting Minutes.

7.3.3 Mandatory Conditioning Agency Authority. Consistent with Section 2.5.3 herein, when the Licensee attempts to achieve consensus from the non-MCA Members on a matter ultimately subject to MCA approval, the Licensee's efforts at consensus shall not affect the MCA's decision-making authority, or constitute consensus advice to the MCA.

7.4 Separate and Independent Review and Approvals of Conditioning Agency. When the License or applicable law requires approval by an MCA, such approval is separate and independent from the SLIC and Work Group process. In the Licensee's submittal to the MCA of any proposal subject to consultation with a Work Group, Licensee shall document the results of the consultation.

7.5 Dispute Resolution. These Dispute Resolution procedures apply to issues originating within the SLIC or Work Groups and are separate and distinct from the Dispute Resolution procedures set forth in Section 6 of the Settlement Agreement. A Work Product that a Work Group or SLIC does not reach consensus on is subject to this dispute resolution procedure.

7.5.1 Voluntary Participation. Participation in Dispute Resolution is optional. If a Member does not want to participate in Dispute Resolution, it will provide Notice to the other Members.

7.5.2 Dispute Resolution Process. Any Member (and only a Member) may invoke dispute resolution where there has been a good faith attempt to reach consensus and consensus is not reached. A dispute originating at the Work Group shall be elevated to the SLIC. Where the SLIC is unable to resolve a dispute and reach consensus, the Licensee shall provide documentation of the dispute resolution process to FERC as described in Section 7.5.5.

7.5.3 Notice of Dispute. A Member disputing a matter shall, within twenty (20) business days of identifying a dispute, provide Notice of Dispute to all Members and Advisors, if any, of the SLIC or relevant Work Group. The Notice of Dispute shall include the reason for the dispute and a proposal for resolving the dispute with supporting documentation and rationale.

7.5.4 SLIC Dispute Resolution Meeting. Following a timely Notice of Dispute, the Licensee shall convene a meeting of the SLIC within thirty (30) business days to discuss the dispute. All Members may participate in the dispute resolution meeting and are encouraged to submit recommendations on the decision prior to the meeting.

At the dispute resolution meeting, the SLIC shall seek to achieve consensus on the Licensee's proposal, the disputing Member's proposal, or any other proposals supported by two or more Members. At the request of a majority of Members, the Licensee will convene an additional meeting to try to resolve the dispute with an additional round of voting. All documentation provided on the disputed issue shall be attached to the dispute resolution Meeting Summary(ies).

7.5.5 Dispute or Lack of Dispute Resolution at the SLIC. If the SLIC fails to resolve the dispute by achieving consensus on the disputed matter, the Licensee shall prepare a Dispute Report documenting the dispute resolution process, including the dispute resolution Meeting Summary(ies), written submissions, and options discussed. The Licensee will provide the other dispute-resolution participants reasonable notice and opportunity to prepare additional written comments or summaries, which the Licensee will include in the Dispute Report. The Licensee will submit the final Dispute Report to FERC and/or the MCA as relevant, along with the submittal of the disputed Work Product.

7.5.6 License Compliance. Licensee shall file Work Products with FERC, and otherwise implement the License, and Settlement Agreement. Disputes or proceedings under Section 7.4 are not a basis for delay in compliance.

7.5.7 Reservation of Rights. Consistent with the Settlement Agreement, the Licensee and each other Member reserves all rights to seek remedies under the License, FPA, or other applicable law with respect to a matter subject to this procedure.

7.5.8 Mandatory Conditioning Agency. The Dispute Resolution procedure does not apply to and is not binding on an MCA for the purpose of its approval of a Work Product as required by the License or applicable law.

8 Withdrawal

Any Member or Advisor may withdraw from participating in the SLIC or a Work Group by providing Notice to the other Members and Advisors; and any Member and Advisor may recommence their participation by the same means. Any Member or Advisor that withdraws from the Settlement Agreement per the procedures set forth therein shall simultaneously be deemed to have withdrawn from the SLIC and its Work Groups.

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 3 - ATTACHMENT A

SKAGIT LICENSE IMPLEMENTATION COMMITTEE WORK GROUPS' LICENSE ARTICLE OVERSIGHT, MEMBERS, AND ADVISORS

Skagit License Implementation Committee (SLIC) Work Groups' License Article Oversight, Members, and Advisors

Work Group[1]	License Articles	Members	Advisors
Estuary	• FA LA-04 Skagit Estuary Habitat Enhancement Program	All Members as defined in Section 3.2 of the SLIC Governance Document, except USFS and NPS	[INSERT]
Fish Passage	• Skagit Fish Passage Program as described in the Settlement Agreement and New License	All Members as defined in Section 3.2 of the SLIC Governance Document	[INSERT]
Fish and Aquatic	• FA LA-02 Skagit Riverscape Ecosystem Plan • FA LA-03 Skagit River Mainstem Habitat Enhancement Funding Obligation • FA LA-05 Reservoir Fisheries Management Plan • FA LA-06: Aquatic Invasive Species Management Plan • FA LA-07 Skagit River Limiting Factors Habitat Enhancement Program • FA LA-08 North Cascades Resource Enhancement Funding Obligation • FA LA-09 Ecological Use of Reservoir Wood Management Plan • OPS LA-01 Ross Lake Flood Risk Management Operations • OPS LA-02 Ross Lake Summer Variable Reservoir Operations • OPS LA-03 Minimum Instream Flows for the Gorge Reach • Water LA-01: Water Quality Monitoring and Data Management Plan	All Members as defined in Section 3.2 of the SLIC Governance Document	[INSERT]
Recreation	• Aesthetics LA-01 Lighting Management Plan	All Members as defined in Section 3.2 of the SLIC Governance Document, except BIA and USFWS	[INSERT]

[1] Work Groups are identified in Section 4.3 of the SLIC Governance Document. The Governance Document provides that other Work Groups may be subsequently established by the SLIC. In addition, the Historic Properties Management Plan (HPMP) establishes a Cultural Resources Work Group. The Cultural Resource License Article requires the Licensee's implementation of the HPMP including cultural resource consultations.

Work Group[1]	License Articles	Members	Advisors
	• REC LA-01 Recreation Resources Management Plan		
Terrestrial	• Botanical LA-01 Vegetation Management Plan • Botanical LA-02 Invasive Plants Management Plan • Botanical LA-03 Wetland Enhancement Measures • GEO LA-01 Reservoir Erosion Management and Monitoring Plan • GEO LA-02 Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan • Wildlife LA-01 Wildlife Protection and Enhancement Plan • Wildlife LA-02: Avian Species Management Plan • Wildlife LA-03 Fish and Wildlife Mitigation Lands Management Plan	All Members as defined in Section 3.2 of the SLIC Governance Document	[INSERT]

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 4

EARLY IMPLEMENTATION ACTIONS

Settlement Agreement Appendix 4

Early Implementation Actions

The Licensee and other Settlement Parties, as specified below, will conduct the Early Implementation Actions as described below and consistent with the definition of "Early Implementation Actions," in Section 1.2.2 of the Settlement Agreement (SA). The Licensee, and other Settlement Parties, will initiate and/or complete these actions prior to the issuance of the New License, as appropriate.

Section 1 describes the Early Implementation Actions for all proposed license articles and settlement commitments other than the Skagit Fish Passage Program License Article (Fish and Aquatic (FA) License Article (LA) 01).

Section 2 describes the Early Implementation Actions for the Skagit Fish Passage Program as described in the Settlement Agreement.

1. Early Implementation Action for all Proposed License Articles and Settlement Commitments

1.1. **SLIC LA-01: The Skagit License Implementation Committee:** Within sixty (60) days after the Effective Date of the SA, the Licensee will convene the Initial Meeting of the Skagit License Implementation Committee (SLIC), as described in Appendix 3 of the SA.

1.2. **AM LA-01: Skagit River Ecosystem Monitoring and Adaptive Management Program**: The Licensee will begin development of the Skagit River Ecosystem Monitoring and Adaptive Management Plan, in consultation with the SLIC, prior to issuance of the New License, as described in Appendix 1 of the SA.

1.3. **CULTURAL LA-01: Implementation of Approved Programmatic Agreement and Historic Properties Management Plan:** The Licensee will complete the Historic Properties Management Plan prior to issuance of the New License. The Section 106 consulting parties are currently working on revisions to the draft HPMP and City Light will file an updated HPMP with FERC with the Amended FLA in Q1-2026. City Light will obtain NPS approval prior to filing the final HPMP with FERC. The HPMP addresses the treatment of historic properties by providing guidelines for evaluation, monitoring, management and avoidance of potential adverse effects. It also includes a mechanism for identifying and developing specific actions to address effects on known or yet to be discovered sites. With these elements, the HPMP will provide protection for cultural resources throughout the New License term.

1.4. **FA LA-02: Skagit Riverscape Ecosystem Plan**

1.4.1. The Licensee, in consultation with the SLIC, will initiate studies related potential modifications of flow management measures in the Riverscape

Ecosystem Plan (REP) related to juvenile rearing habitat, prior to issuance of the New License and as described in Section 3 of Appendix 9 of the SA.

1.4.2. The Licensee will initiate additional investigations into the population-level effects of ramping on designated aquatic life uses, with a specific emphasis on salmonids, particularly fry and juvenile life stages, most vulnerable to stranding and displacement during Project operations, in consultation with the SLIC, and subject to approval by Ecology, as described in Section 3 of Appendix 9 of the SA.

1.4.3. Following the initiation of the SLIC and Work Groups, Licensee will begin consultation with the SLIC to develop the Process Flows Adaptive Management Plan (AMP), as described in Section 3 of Appendix 9 of the SA.

1.4.4. The Licensee, in consultation with the SLIC, will review and refine the Draft Skagit River Gravel Augmentation Pilot Study prior to License issuance, as described in Section 4 of Appendix 9 of the SA.

1.4.5. Licensee will develop the Reservoir and Flow Plan Meeting Framework in consultation with the SLIC prior to License issuance, as described in Section 3.4 of Appendix 9 of the SA.

1.5. **FA LA-04: Skagit Estuary Habitat Enhancement Program**: As described in Appendix 1 of the SA, following the initiation of the SLIC and Work Groups, Licensee will begin preparation of the Skagit Estuary Habitat Enhancement Plan (Estuary Plan) in consultation with the SLIC. Licensee will submit the Estuary Plan to the Commission for approval within two years of the Effective Date of the SA. Licensee may opportunistically assist in early acquisition and restoration opportunities prior to issuance of the New License.

1.6. **FA LA-05: Reservoir Fisheries Management Plan**: Within two years of the Effective Date of the SA, Licensee will develop, in consultation with the SLIC and Fish and Aquatics Work Group, a Reservoir Fisheries Monitoring Study Plan, as described in Section 4 of Appendix 10 of the SA.

1.7. **OPS LA-03: Minimum Instream Flows for the Gorge Reach**: Licensee to begin planning and design for the minimum flow control structure in the Gorge Reach.

1.8. **WATER LA-01: Water Quality Monitoring and Data Management Plan**: City Light will collect turbidity information and consult with Ecology in refinement of the Draft TDG Attainment Plan and Compliance Schedule prior to License issuance, as described in Appendix 15 of the SA.

1.9. **Temperature Action Plan**: As described in Appendix 20 of the SA, City Light will continue collecting temperature data in the Project reservoirs and Skagit River consistent with the current monitoring regime, and within one year of the Effective Date of the SA, begin collecting temperature data consistent with the Water Quality

Monitoring and Data Management Plan. City Light will also consult with the SLIC in development of the Temperature Action Plan.

2. **Skagit Fish Passage Program Early Action Due Diligence and Development of the Fish Passage Implementation Plan**: This section describes early implementation actions that are stated in the Fish Passage Program Plan (Appendix 5 of the SA). The Licensee will report quarterly to FERC on implementation of the following actions.

2.1. Early Action Studies: Within one year of the Effective Date of the SA, the Licensee, in consultation with the SLIC Fish Passage Work Group, will be responsible for study design, implementation, funding, and synthesis of results as described in Section 5a of Appendix 5 of the SA.

2.2. Passage Program Cost and Schedule Report: As described in Section 5b of Appendix 5 of the SA, the Licensee will engage (or in Licensee's discretion fund another Party to engage) a qualified consultant/contractor to develop a Passage Program Cost and Schedule Report; provided that this engagement, to extent possible under applicable law, policies, and procedures, shall be structured to assure that the Contractor is not disqualified from design-build or other procurement process related to implementation of the Fish Passage Program. Within six months after the Effective Date of the SA, the contractor will complete the report per the scope described in Attachment 2 of Appendix 5.

2.3. Ross Access Report: Within one year of the Effective Date of the SA, the NPS, or alternate entity, shall prepare a report on the means of access, including 30 percent road design and associated costs, for construction and operation of the fish passage facilities at Ross Reservoir, as described in Section 5c of Appendix 5 of the SA.

2.4. Stock Selection and Management Plan: As described in Section 5d of Appendix 5 of the SA, within one year of the Effective Date of the SA, the Co-Managers (Upper Skagit Indian Tribe, Swinomish Indian Tribal Community, Sauk-Suiattle Indian Tribe, and Washington State Department of Fish and Wildlife), in coordination with the Services, will develop a Stock Selection and Management Plan. The Stock Selection and Management Plan will identify the Co-Managers' initial stock selection choices and a process by which to update those choices as appropriate. The Stock Selection and Management Plan will inform the Fish Passage Implementation Plan (FPIP) but constitutes an independent document.

2.5. Fish Passage Implementation Plan: As described in Section 5e of Appendix 5 of the SA, within two years of the Effective Date of the SA, the Licensee will develop a FPIP, in consultation with the SLIC Fish Passage Work Group. The FPIP will detail how the Licensee will implement the Passage Program Plan.

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 5

SKAGIT FISH PASSAGE PROGRAM PLAN

Settlement Agreement Appendix 5

Skagit Fish Passage Program Plan

Skagit River Hydroelectric Project, FERC Project No. 553

As provided in the Settlement Agreement, the Licensee, in collaboration with the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and National Park Service (NPS) (collectively, Services), the Upper Skagit Indian Tribe (USIT), Sauk-Suiattle Indian Tribe (SSIT), and Swinomish Indian Tribal Community (SITC) (collectively, Tribes), the Bureau of Indian Affairs (BIA), and the Washington Department of Fish and Wildlife (WDFW), will implement a Skagit Fish Passage Program in accordance with their agreement as described in the "Fish Passage – Key Terms to Close Settlement Negotiations (December 19, 2024)" (Fish Passage Term Sheet) (Attachment 1), and per the Settlement Agreement and New License.

The primary purpose of this document is to memorialize the Parties' intent with respect to key components of the Skagit Fish Passage Program that will be incorporated into a Fish Passage Implementation Plan (FPIP) developed by the Licensee following the signing of the Settlement Agreement. The Settlement Parties shall request that the FPIP be incorporated by the Commission as a Management Plan under the New License.

1. Summary

The Licensee shall design, construct, and operate facilities that provide safe, timely, and effective fish passage at the three dams comprising the Skagit River Hydroelectric Project (Project), including upstream passage at Gorge Powerhouse, Diablo Dam and Ross Dam; downstream passage at Ross, Diablo, and Gorge dams; acclimation facilities above and below each dam; and a tailrace barrier at the Gorge Reach as described in this Skagit Fish Passage Program Plan (FP3) (3 up/3 down).

This FP3 will inform the development of the FPIP, which will be submitted to the Commission with the request that the FPIP be incorporated as a Management Plan under the New License. The components of the Skagit Fish Passage Program will be defined in the FPIP and be based on the information described in Section 4 (Early Action Due Diligence and Development of the FPIP) and the best available scientific, technological, and other information. The Early Action Due Diligence described in Section 4, and the assessments described in Section 5.a, will guide how (and not if) fish passage is implemented consistent with the Feasibility Criteria in Section 6.

The Skagit Fish Passage Program established under the Settlement Agreement is intended to accomplish full connectivity between all Project reservoirs and the upper and lower Skagit River, eliminate fragmented habitat, and improve ecosystem resilience to changing climatic and other conditions affecting the Skagit River ecosystem. The Program is intended to be implemented consistent with the Feasibility Criteria in Section 6. An overview map of the Project facilities, displaying the Project Boundary in proximity to generation facilities, township/range/section, state, county, river, and river mile are provided in Figure 1 below.

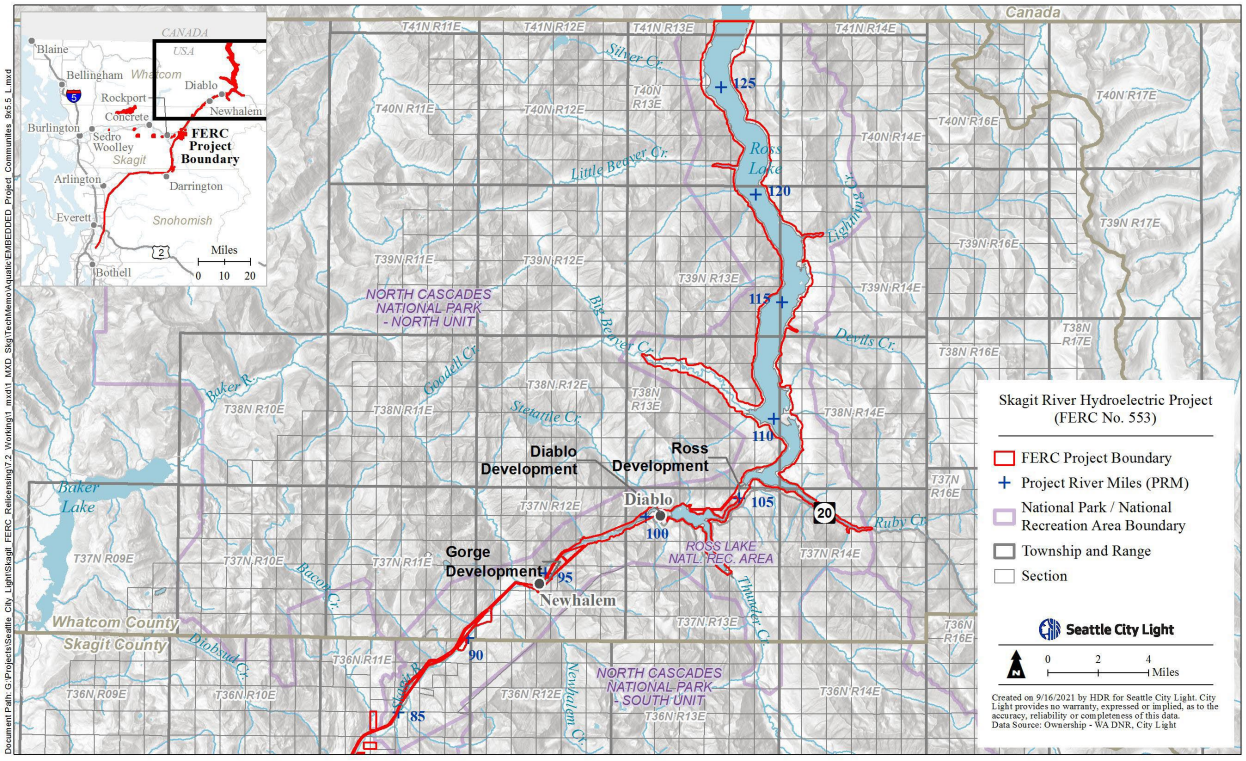


Figure 1. Skagit River Project and surrounding communities near Project generation facilities.

This FP3 includes:

- Construction Schedule and Priorities (Section 2);
- Skagit Fish Passage Program Goals (Section 3);
- Guiding Principles (Section 4);
- Early Action Due Diligence and Development of the FPIP (Section 5);
- Feasibility Criteria (Section 6);
- Preliminary details for the construction of Passage Facilities constituting 3 up/3 down, full connectivity (Sections 7-9); and
- Preliminary survival metrics, standards, and process for post-construction performance expectations of downstream passage measures (Sections 10-11).

2. Construction Schedule and Priorities

Consistent with the Feasibility Criteria described in Section 6, the FPIP will include a schedule for construction and operation of upstream and downstream facilities at all three Project dams. Through the Passage Program Cost and Schedule Report and other Early Action Due Diligence described in Section 5, the Settlement Parties will consider whether efficiencies in mobilization, labor, and procurement could support concurrent development of facilities as necessary to achieve the Skagit Fish Passage Program Goals in Section 3. The Settlement Parties will agree on durations and sequencing requirements that emphasize expeditious implementation of the Program while taking into consideration the Licensee's ability to meet the schedule (*i.e.*, schedule must be achievable and respect and comply with public budgeting, procurement, and contracting laws and requirements). The construction schedule in the New License and FPIP shall be on a schedule designed to meet the following milestones.[1]

- By Year 6 after License Issuance: Complete construction and begin operation of the Gorge Upstream Collector and Gorge Powerhouse barrier facility. Construction will commence by Year 4 after License Issuance and is anticipated to conclude within two years.
- By Year 8 after License Issuance: Complete construction on access to Ross Lake for construction and operation of the Ross downstream collector. Construction will commence by Year 6 after License Issuance and is anticipated to conclude within two years.
- By Year 11 after License Issuance: Complete construction and begin operation of the Ross downstream collector. Construction will commence by Year 8 after License Issuance and is anticipated to conclude within three years.
- By Year 24 after License Issuance: Complete construction of all such facilities, and the facilities shall be operational.
- Year 30 after License Issuance: Performance standards are met at all fish passage facilities.

Based on information acquired during the Early Action Due Diligence, these milestones may be adjusted pursuant to agreement amongst the Parties, and subject to approval by the Services and FERC. The Licensee, in collaboration with the Skagit License Implementation Committee (SLIC) Fish Passage Work Group, will optimize construction schedules and schedule tasks concurrently to the extent feasible to advance the implementation of the Skagit Fish Passage Program.

3. Skagit Fish Passage Program Goals

The Skagit Fish Passage Program goals are to implement and adaptively manage the Program using best available science and consistent with Treaty rights to:

a. Contribute to recovery of Endangered Species Act and Washington State Priority-listed fish species in the Skagit River Basin;

b. Increase and provide sustainable harvest opportunity to support Tribal Treaty rights;

[1] Subject to Section 4.10 of the Settlement Agreement.

c. Support diverse life history strategies;

d. Provide connectivity between all Project reservoirs and the upper and lower Skagit River, eliminating fragmented habitat to improve ecosystem resilience to changing climate and other conditions and episodic events affecting the Skagit River ecosystem; and

e. Avoid or minimize negative impacts to native fish populations, to the extent practicable. In this document, "negative impacts" means impacts not addressed in the New License that, taking into account new information, may occur as a result of implementation of the Skagit Fish Passage Program.

4. Guiding Principles

a. Fish passage measures shall be designed to meet the Skagit Fish Passage Program goals in Section 3.

b. The Tribes and WDFW (collectively, Co-Managers) shall be responsible for completing a Stock Selection and Management Plan (Plan) as an early action measure prior to the License Issuance as provided in Section 5.e. The Co-Managers shall complete the Plan through a consensus process. This Plan will inform the development and implementation of the FPIP.

c. Fish passage measures shall be consistent with the Feasibility Criteria in Section 6.

d. Fish passage measures will be based on the best available science.

e. Fish passage measures will be implemented giving due consideration to tribal cultural concerns.

f. The Settlement Parties understand the importance of collaborating to assure fiscal prudence and adherence to agreed-upon budgets. The Licensee will implement the Skagit Fish Passage Program consistent with the agreed-upon budgets.

g. Certain federal agencies may have interests that relate to the Skagit Fish Passage Program for reasons, including but not limited to: 1) the Federal Government's Treaty and Trust Responsibilities to Tribes, 2) Ross Lake Reservoir being the primary flood storage facility for the Skagit Watershed, and 3) the Ross Forebay Access Road being used for multiple purposes.

h. To the extent practical and compatible with the Skagit Fish Passage Program Goals, the Settlement Parties commit to minimizing impacts to Project facilities and operations (including flood risk management, power generation (including load following and ancillary services), and recreation/education).

5. Early Action Due Diligence and Development of the FPIP

The Licensee and other Parties as specified will begin implementing certain activities immediately following the Effective Date of the Settlement Agreement, including studies and planning to inform the design, feasibility, and completion schedule of fish passage facilities.

The Parties intend that these Early Action Due Diligence measures be completed prior to the Commission's issuance of the Ready for Environmental Assessment (REA) notice to allow this information to inform the Services' Federal Power Act (FPA) § 4(e) and § 18 conditions and prescriptions. The Early Action Due Diligence shall also inform the Licensee's development of

the FPIP required under Section 5.d, which will be carried out in collaboration with the SLIC Fish Passage Work Group. The Licensee will report quarterly to the Commission on implementation progress for the Early Action Due Diligence measures.

a. Early Action Studies

The Services, BIA, and Co-Managers have identified an initial suite of studies to inform development of the FPIP and the Services' fishway prescriptions and conditions. These studies will be based on protocols used by the Services and will reflect the Skagit Fish Passage Program goals of Section 3. Unless otherwise noted below, the Licensee will be responsible for study design, implementation, funding, and synthesis of results. The study plan and design will be developed in consultation with the SLIC Fish Passage Work Group and as determined by the Services.

Except as otherwise noted, the early action studies are intended to be completed within one year of the Effective Date of the Settlement Agreement. Modifications to these studies, or additional studies, may be proposed by the Licensee, a Service, BIA, a Tribe, or WDFW and implemented by the Licensee, in consultation with the SLIC Fish Passage Work Group and as determined by the Services.[2]

Field studies will be carried out in compliance with applicable law and will not commence until any necessary permits or approvals are obtained.

The initial studies are described below.

Physical and Hydraulic Studies

- *Acquisition of Additional Bathymetric Survey Data for Ross Reservoir*. This is a prerequisite for Fluid Dynamics Modeling.
- *Baseline and Design Concept Physical and Computational Fluid Dynamics modeling for Ross Reservoir*. This is a prerequisite for Reservoir Transit Effectiveness Studies.
- *Ross Reservoir Forebay Temperature Modeling*. This is a prerequisite for Reservoir Transit Effectiveness Studies.
- *Field Evaluations of Reservoir Transit Effectiveness, Entrainment, and Congregation and Movement of Fish near Intake Facilities within Ross Reservoir*. These studies, which are needed to inform the design of fish passage facilities, may require two years to observe fish behavior and movement throughout the reservoir.

[2] The Licensee, Co-Managers, BIA, and Services intend to collaborate on all studies used to inform development of the Skagit Fish Passage Program and FPIP. If any of these entities finds it necessary to undertake independent studies, that entity shall timely apprise the other entities of the reasons for doing so and the nature and purpose of the studies and be transparent in sharing study design, data acquired, methods, and results. Ultimately, the Services are responsible for relying on the best available scientific information for their decision-making under FPA §§ 4(e) and 18.

Biological and Ecological Studies

The biological and ecological studies below shall be initiated as desktop evaluations. Depending on the research questions and specific data needs of the studies, field and/or laboratory evaluations may be conducted and may occur during the Early Action Due Diligence period or after License Issuance. Accordingly, some of these studies may require more than one year to complete.

- *Co-Manager Stock Assessment Evaluations*. This evaluation shall include an initial assessment of candidate species and source stocks for the Skagit Fish Passage Program and a framework for incorporating study results and new information over time.
- *Assessment of Genetic Effects*.
- *Evaluation of spawning and rearing habitat for candidate species in Gorge, Diablo, and Ross lakes, Canadian Skagit River, and associated tributaries*.
- *Completion of growth and productivity evaluations for candidate species via food web and bioenergetics studies in Gorge, Diablo, and Ross lakes, Canadian Skagit River, and associated tributaries.*
- *Assessment of effects to and interactions with existing species above Gorge Dam.*
- *Assessment of marine-derived nutrients on productivity in Project reservoirs.*
- *Assessment of residualization risk in Project reservoirs.*
- *Assessment of disease risk.*
- *Synthesis document that summarizes the cultural significance of fish passage connectivity to the Tribes (Refer to CR-02 Cultural Resources Survey, CR-04 Inventory of Historic Properties with Traditional Cultural Significance Study).*
- *Synthesis Document that summarizes results from all studies and suggests how these studies inform the FPIP and Stock Assessment Evaluations. This Synthesis Document will describe how fish passage may affect the abundance, growth rate, spatial structure, and population diversity of the stocks considered for fish passage. Consideration will be given to the population, sub-population, and individual level.*

b. Passage Program Cost and Schedule Report

USIT shall engage, with funding from Licensee, a qualified consultant/contractor to develop a Passage Program Cost and Schedule Report; provided that this engagement, to the extent possible under applicable law, policies, and procedures, shall be structured to assure that the contractor is not disqualified from design-build or other procurement process related to implementation of the Skagit Fish Passage Program. Within six months after the Effective Date of the Settlement Agreement, the contractor shall complete the report per the scope described in Attachment 2. Relying upon existing information, the report shall provide detailed cost and schedule estimates, by facility, reflecting the Parties' intention to implement the Program. The Passage Program Cost and Schedule Report shall include an option(s) for phased implementation, beginning with upstream passage at Gorge Powerhouse and downstream passage at Ross Dam.

c. Ross Access Report

Within one year of the Effective Date of the Settlement Agreement, the NPS, or alternate entity, shall prepare a report on the means of access, including 30 percent road design and associated costs, for construction and operation of the fish passage facilities at Ross Reservoir. The report shall consider Stantec's report, Skagit River Fish Passage – Third Party Review of Access Requirements (May 2024) (Attachment 3). Results of the Ross Access Report shall be necessary to inform access design and schedule in the FPIP. If NPS is unable to undertake the Ross Access Report, it shall promptly notify the Licensee. The Licensee shall fund the NPS or hire an independent consultant to complete the Ross Access Report, with costs deducted from the $10 million fish passage study and evaluation fund identified in Section 5.2.4 of the Settlement Agreement.

d. Stock Selection and Management Plan

Within one year of the Effective Date of the Settlement Agreement, the Co-Managers, in collaboration with the Services, will develop a Stock Selection and Management Plan. The Stock Selection and Management Plan will identify the Co-Managers' initial stock selection choices and a process by which to update those choices as appropriate. The Stock Selection and Management Plan will inform the FPIP but constitutes an independent document.

e. Fish Passage Implementation Plan

Within two years of the Effective Date of the Settlement Agreement, the Licensee shall develop the FPIP, in consultation with the SLIC Fish Passage Work Group and subject to approval by the Services. The FPIP shall detail how the Licensee will implement the Skagit Fish Passage Program. The FPIP shall be consistent with and, when approved by the Services, supersede the requirements in this FP3. The FPIP shall consider the results of the early action studies, Passage Program Cost and Schedule Report, Ross Access Report, the Stock Selection and Management Plan, and any other relevant Early Action Due Diligence.

The Licensee, Services, and Co-Managers intend that the FPIP will form the basis of the Services' Mandatory Terms and Conditions.

The FPIP shall include:

- Performance standards established by the Services for what constitutes "safe, timely, and effective" fish passage;
- Numeric performance criteria for Ross, Diablo and Gorge downstream passage facilities, and a process to ensure that the standards are met by Year 30 of the New License;
- A detailed schedule for construction and operation of upstream and downstream facilities at all three Project dams, consistent with the milestones described in Section 2 and the facilities outlined in Sections 7-9;
- A process for selecting contractor(s) to carry out construction, including a description of potential procurement processes to support the implementation of the Skagit Fish Passage

Program consistent with the program milestones, including an approach to initiate this procurement process for multiple fish passage facilities at the Project in a concurrent fashion, as applicable;

- An initial agreed-upon budget (which may be a range) for the design and construction of the Skagit Fish Passage Program facilities as a whole as well as individual facilities;
- Accounting mechanisms to track Licensee's financial contribution to the design and construction of the Program facilities;
- A process for the Licensee, Co-Managers, Services, and BIA to consider modifications to correct any shortfalls relative to performance standards; the cost of any reconfigurations being within the Licensee's financial contribution as identified in Section 6;
- A process for the Licensee, Co-Managers, Services, and BIA to consider modifications to the FPIP that will allow the design and construction costs to stay within the amount of the Licensee's financial contribution, as identified in Section 6, in the event that the Licensee determines those costs are likely to exceed the Licensee's financial contribution;
- A requirement that the Licensee, Co-Managers, Services, and BIA make best efforts to address any potential inconsistency between the FPIP and the Feasibility Criteria in Section 6.

In addition, the FPIP will require that the Licensee periodically prepare an Implementation Report, which will update the analysis provided in the Passage Program Cost and Schedule Report prepared under Section 5.b as design and construction work advances. No later than Year 4 (i.e. 2 years prior to initiation of construction of access), Year 6 (i.e. 2 years prior to initiation of construction on Ross downstream collector) and Year 9 (i.e., 2 years prior to completion of construction and beginning operation of the Ross downstream collector.) of License Issuance, and as needed thereafter in response to proposed major modifications or reconfigurations of the Program through the term of the New License, the Licensee will file with the Commission such a report. The Parties anticipate that the Implementation Report will be developed and submitted in parallel with a design report for the several facilities as required by Sections 7-9.

The FPIP will require that each Implementation Report concisely evaluate consistency of the Skagit Fish Passage Program with regard to the Feasibility Criteria (recognizing that the cost Feasibility Criteria does not include operations and maintenance). Before filing the report with the Commission, the Licensee will consult with the SLIC Fish Passage Work Group, and will include documentation of consultation in the report, including whether consensus was reached by the SLIC Fish Passage Work Group, copies of comments and recommendations for modifications to FPIP to maintain consistency with the Feasibility Criteria, and specific descriptions of how comments and recommendations from the SLIC Fish Passage Work Group are accommodated by the report. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons based upon Project-specific information.

Each such Implementation Report will include an Implementation Decision. The Implementation Decision is defined to mean the Licensee's finding as to whether the Skagit Fish Passage Program implementation conflicts with the Feasibility Criteria.

Within ninety (90) days of the Licensee's filing of an Implementation Report, the Licensee, a Co-Manager, a Service, or BIA may invoke the procedures within the New License to resolve disputes concerning conflicts with a Feasibility Criteria.

6. Feasibility Criteria

The Feasibility Criteria under FP3 include: 1) the Program shall advance and be consistent with the Program goals, 2) the Program shall include a suitable means of access (i.e. SR 20 Access Road or other appropriate means of access) for construction and long-term operation of passage facilities at Ross Dam, and 3) Licensee's maximum financial contribution to the Program (including the project design, planning, development, construction and reconfiguration of facilities) shall be limited to $979,000,000 (2025).

As defined in the Settlement Agreement, the Licensee's financial contribution will include all aspects of the project design, planning, development, construction, and reconfiguration of the facilities in the Skagit Fish Passage Program (including means of access for such facilities at Ross). The Licensee will fund separately the operation, maintenance, and monitoring elements of the Skagit Fish Passage Program.

7. Upstream Fish Passage at Gorge Powerhouse

Consistent with the milestones established in Section 2, the Licensee shall design, construct, operate, and maintain a hands-free adult fish collection facility and tailrace barrier at the Gorge Powerhouse to trap and transport fish (Figure 2). The Licensee shall design fish passage facilities according to the National Oceanic and Atmospheric Administration (NOAA) Fisheries West Coast Region Anadromous Salmonid Passage Design Manual (NMFS 2022 or latest version thereof) and USFWS Region 1 Passage Guidelines for Select Native Pacific Northwest Fish (USFWS 2024 or latest version thereof). The Licensee shall:

a. Design, construct, operate, and maintain the facility to collect fish in a manner that minimizes handling of fish and design the facility to provide for safe, timely, and effective fish passage.[3]

b. Design, construct, operate, and maintain the facility to maximize fish attraction to the trap and haul facility, including refinement of the location of the entrance to maximize attraction of fish into the entrance.

c. Study and address attraction to the powerhouse, including a study to determine the extent of draft tube injury and/or mortality associated with false attraction to Gorge Powerhouse. If studies indicate false attraction or injury of upstream migrants, the Licensee shall design and construct a facility to address the issue, at the direction and approval of the Services.

d. Provide the SLIC Fish Passage Work Group a minimum of 20 business days for each review period; reviews shall be provided at the 30, 60, and 90 percent design stage. The 90 percent

[3] Potential species include spring chinook, summer chinook, fall chinook, rainbow trout, sockeye, residential coastal cutthroat, summer steelhead, winter steelhead, kokanee, coho, pink, fall chum, bull trout, and Pacific lamprey over Gorge Dam, Diablo Dam or Ross Dam, as determined through consultation with the Co-Managers and subject to the approval of the Services.

design is subject to the approval of the Services. The Licensee shall document the review comments and approvals, and provide the final draft design, with documentation of the review and approvals, to the Commission for approval. Upon Commission approval, the Licensee shall construct as approved by the Commission.

e. Conduct hydraulic and biological evaluations to verify that the Gorge Powerhouse trap and haul facility functions as designed. Within 12 months of the Gorge Powerhouse trap and haul facility being operational, the Licensee, in collaboration with the SLIC Fish Passage Work Group and subject to approval by the Services, shall prepare and file with the Commission a plan (Upstream Fish Passage at Gorge Powerhouse Evaluation Plan) to conduct hydraulic and biological evaluation of the Gorge Powerhouse trap and haul facility. The Upstream Fish Passage at Gorge Powerhouse Evaluation Plan shall include at least two years of biological and hydraulic analysis for passage effectiveness. The Licensee shall begin implementation of the Upstream Fish Passage at Gorge Powerhouse Evaluation Plan as soon as practicable but no later than one year after Commission approval. The Licensee shall, in consultation with the SLIC Fish Passage Work Group, prepare annual reports which shall be provided to the SLIC Fish Passage Work Group by December 31 of each year summarizing that year's data. A Final Upstream Fish Passage at Gorge Powerhouse Evaluation Report shall be developed within six months of the end of the final evaluation year and, upon approval by the Services, be submitted to the Commission for approval.

f. Within 12 months after the Licensee’s completion of the Final Upstream Fish Passage at Gorge Powerhouse Evaluation Report, the Licensee, in collaboration with the SLIC Fish Passage Work Group and subject to approval by the Services, shall file with the Commission a Fish Passage at Gorge Powerhouse Operations and Maintenance Plan to provide for operation and maintenance of the trap and haul facility. The Licensee shall base the Operations and Maintenance Plan on the NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual (NMFS 2022 or latest version thereof), and the results of the Final Upstream Fish Passage at Gorge Powerhouse Evaluation Report. Upon Commission approval, the Licensee shall operate and maintain the trap and haul facility in accordance with the Upstream Fish Passage at Gorge Powerhouse Operations and Maintenance Plan for the New License term.

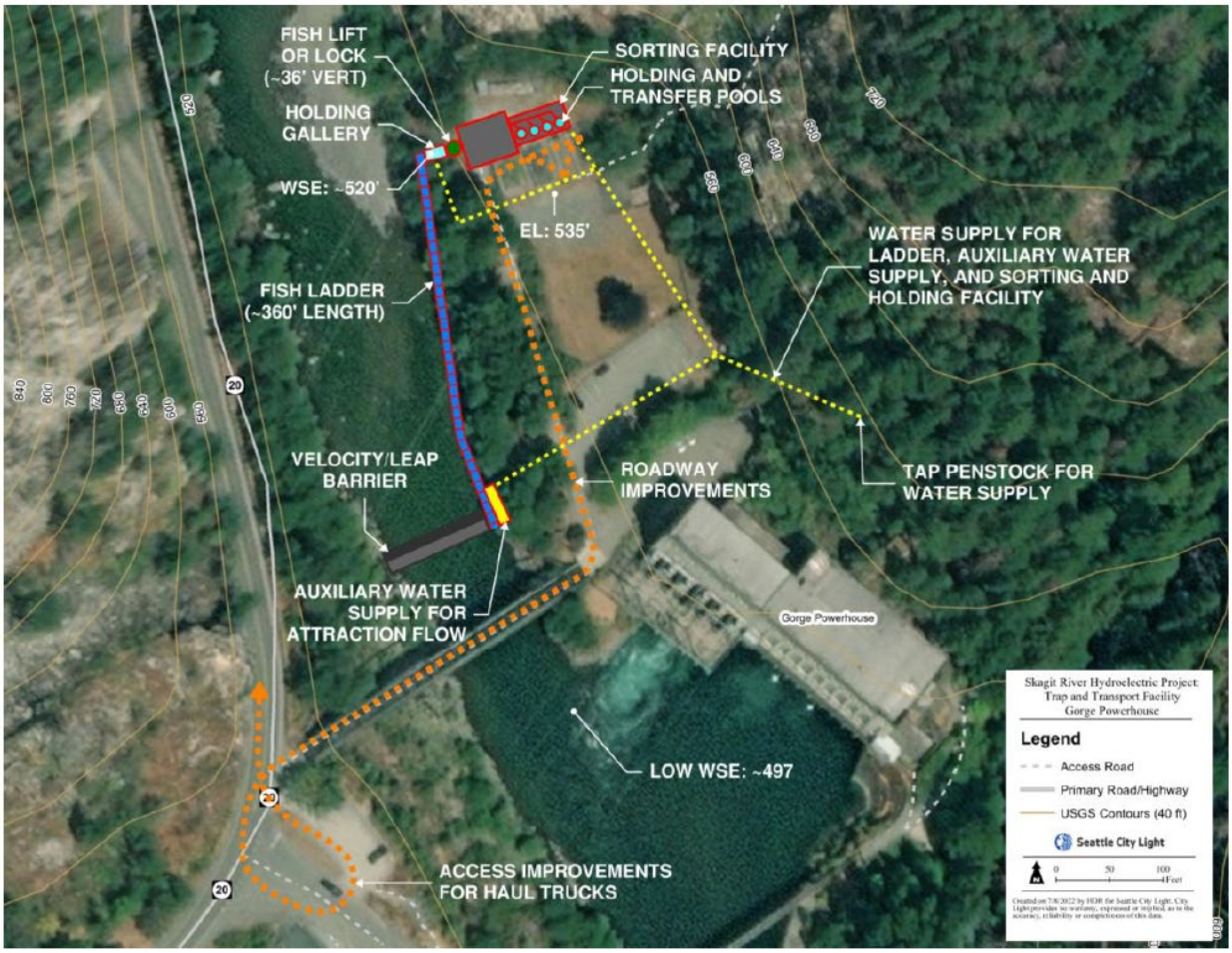


Figure 2. Aerial view of the concept design for the Gorge Powerhouse trap and haul facility (taken from FA-04 Fish Passage Technical Studies Program). Potential facilities that address false attraction at Gorge Powerhouse are not shown.

8. Downstream Passage from Ross Dam to Below Gorge Powerhouse

Consistent with the milestones established in Section 2, the Licensee shall design, construct, operate, and maintain a downstream fish passage facility at Ross Dam. The Licensee shall design the Ross Dam to Below Gorge Powerhouse downstream fish passage facilities according to the NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual (NMFS 2022 or latest version thereof) and USFWS Region 1 Passage Guidelines for Select Native Pacific Northwest Fish (USFWS 2024 or latest version thereof). The Licensee shall:

a. Design, construct, operate, and maintain the facility to collect fish in a manner that minimizes handling of downstream migrating fish and design the facility to provide for safe, timely, and effective fish passage.[4]

b. Design, construct, operate, and maintain the facility to maximize likelihood of meeting the survival standards.

c. Provide the SLIC Fish Passage Work Group a minimum of 20 business days for each review period; reviews shall be provided at the 30, 60, and 90 percent design stage. The 90 percent design is subject to the approval of the Services. The Licensee shall document the review comments and approvals, and provide the final draft design, with documentation of the review and approvals, to the Commission for approval. Upon Commission approval, the Licensee shall construct as approved by the Commission.

d. Shall conduct hydraulic and biological evaluations to verify that the Ross Dam to below Gorge Powerhouse downstream passage facility functions as designed. Within 12 months after the Ross Dam to below Gorge Powerhouse downstream passage facility is operationally complete, the Licensee, in collaboration with the SLIC Fish Passage Work Group and subject to approval by the Services, shall prepare and file with the Commission a plan to conduct hydraulic and biological evaluations of the Ross Dam to below Gorge Powerhouse downstream passage facility. The Ross Dam to below Gorge Powerhouse Downstream Passage Evaluation Plan shall include at least two years of biological and hydraulic analysis for passage effectiveness. The Licensee shall begin implementation of the Ross Dam to below Gorge Powerhouse Downstream Passage Evaluation Plan as soon as practicable but no later than one year after Commission approval. The Licensee shall, in consultation with the SLIC Fish Passage Work Group, prepare annual reports which shall be provided to the SLIC Fish Passage Work Group by December 31 of each year summarizing that year's data. A Final Ross Dam to below Gorge Powerhouse Downstream Passage Evaluation Report shall be developed within six months of the final evaluation year and, upon approval by the Services, be submitted to the Commission for approval.

e. Within 12 months after the Licensee’s completion of the Final Ross Dam to below Gorge Powerhouse Downstream Passage Evaluation Report, the Licensee, in collaboration with the SLIC Fish Passage Work Group and subject to approval by the Services, shall file with the Commission a Ross Dam to below Gorge Powerhouse Downstream Passage Operations and Maintenance Plan to provide for operation and maintenance of the facility. The Licensee shall base the Operations and Maintenance Plan on the NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual (NMFS 2022 or latest version thereof), and the results of the Final Ross Dam to below Gorge Powerhouse Downstream Passage Evaluation Report. Upon Commission approval, the Licensee shall operate and maintain the facility in

[4] Potential species include spring chinook, summer chinook, fall chinook, rainbow trout, sockeye, residential coastal cutthroat, summer steelhead, winter steelhead, kokanee, coho, pink, fall chum, bull trout, and Pacific lamprey over Gorge Dam, Diablo Dam or Ross Dam, as determined through consultation with the Co-Managers and subject to the approval of the Services.

accordance with the Ross Dam to below Gorge Powerhouse Downstream Passage Operations and Maintenance Plan for the New License term.

9. Other Facilities: Upstream Passage at Diablo and Ross, Downstream Passage at Gorge and Diablo

Within 24 years of License Issuance, the Licensee shall design, construct, operate, and maintain a hands free adult fish collection system and tailrace barrier for upstream passage at Diablo, a hands free adult fish collection system and tailrace barrier for upstream passage at Ross, a fish screen and collection and transport system for downstream passage at Gorge, and a fish screen and collection and transport system for downstream passage at Diablo (collectively, Intermediate Facilities). The Licensee shall design passage at the Intermediate Facilities according to the NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual (NMFS 2022 or latest version thereof) and USFWS Region 1 Passage Guidelines for Select Native Pacific Northwest Fish (USFWS 2024 or latest version thereof). The Licensee shall:

a. Design, construct, operate, and maintain the facility to collect fish in a manner that minimizes handling of fish and design the facility to provide for safe, timely, and effective[5] fish passage.[6]

b. Design, construct, operate, and maintain the facility to maximize likelihood of meeting the survival standards.

c. Provide the SLIC Fish Passage Work Group a minimum of 20 business days for each review period; reviews shall be provided at the 30, 60, and 90 percent design stage. The 90 percent design is subject to the approval of the Services. The Licensee shall document the review comments and approvals, and provide the final draft design, with documentation of the review and approvals, to the Commission for approval within 12 years of License Issuance. Upon Commission approval, the Licensee shall construct as approved by the Commission.

d. Conduct hydraulic and biological evaluations to verify that passage at the Intermediate Facilities function as designed. Within 12 months after each of the Intermediate Facilities is operationally complete, the Licensee, in collaboration with the SLIC Fish Passage Work Group and subject to approval by the Services, shall prepare and file with the Commission a plan to conduct hydraulic and biological evaluations at each of the Intermediate Facilities. Evaluation plans for each Intermediate Facility shall each include at least two years of biological and hydraulic analysis for passage effectiveness. The Licensee shall begin implementation of the Evaluation Plan at each Intermediate Facility as soon as practicable but no later than one year after Commission approval. The Licensee shall, in consultation with the SLIC Fish Passage Work Group, prepare annual reports which shall be provided to the SLIC Fish Passage Work Group by December 31 of each year summarizing that year's data. A final evaluation report for each facility covered under this section shall be developed within six months of the end of

[5] Passage Numeric Performance Standards are defined in this document.

[6] Potential species include spring chinook, summer chinook, fall chinook, rainbow trout, sockeye, residential coastal cutthroat, summer steelhead, winter steelhead, kokanee, coho, pink, fall chum, bull trout, and Pacific lamprey over Gorge Dam, Diablo Dam or Ross Dam, as determined through consultation with the Co-Managers and subject to the approval of the Services.

the final evaluation year and, upon approval by the Services, be submitted to the Commission for approval.

e. Within 12 months after the Licensee's completion of the final evaluation report of each Intermediate Facility, the Licensee, in collaboration with the SLIC Fish Passage Work Group and subject to approval by the Services, shall file with the Commission an Operations and Maintenance Plan for each facility covered under this section to provide for operation and maintenance at that facility. The Licensee shall base the Operations and Maintenance Plan on the NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual (NMFS 2022 or latest version thereof), and the results of the final evaluation report for the specific Intermediate Facility. Upon Commission approval, the Licensee shall operate and maintain the Intermediate Facilities in accordance with each Intermediate Facility's specific Operations and Maintenance Plan for the New License term.

10. Preliminary Fish Passage Narrative Standards

The Licensee shall design, construct, operate, and maintain, the fish passage facilities; that provide safe, timely, and effective passage without serious injury or mortality for migrating salmonids.

11. Development and Implementation of Numeric Performance Standards for Ross, Diablo, and Gorge Downstream Passage

The Licensee, in collaboration with the SLIC Fish Passage Work Group and subject to approval by the Services, shall develop performance standards and requirements to monitor and ensure compliance with those standards (Table 1). The performance standards will address reservoir survival potential, collection efficiency, and survival within the fish passage facilities. Several key items will need to be addressed to establish the standards. For purposes of clarity, we include the following key definitions:

Collection Efficiency Definition: The number of juvenile migrants collected by the floating surface collector divided by the total number of fish released.

Definition of the fish release and measurement zone. The zone of measurement could be defined as fish released at the head of reservoir (Ross, Diablo, and Gorge individually) and measured through the collector.

Ross, Diablo, and Gorge Survival (use of a total Project survival versus assignment individual projects): Residual mortality and injury of fish passing consecutively through Project dams should be managed such that passage survival through the individual developments (Ross, Diablo and Gorge) of fish released is defined at somewhere between 75 percent and 97 percent as required at other projects in the region. The Project survival should be assumed as a per-project and not system survival in this case and is comprised of three metrics; 1) survival in the collection system, 2) collection efficiency of fish from the measurement zone, and 3) reservoir survival. As demonstrated through review of Commission license documentation for these facilities, the expectation by the resource agencies indicates that reservoir passage efficiencies must fall within a range of 75 to

85 percent, collection efficiencies must be as high as 95 percent, and survival of smolt through the passage facilities must be between 98 and 99.5 percent.

Table 1. Example downstream fish passage facilities performance standards.

Facility Name and Location	First year of Operation	Reservoir Passage (R)	Collection (C)	Survival (S)	Overall Survival (RxCxS)
Baker River – Baker Lake, WA	2008	80%	95%	98%	75%
Baker River – Lake Shannon, WA	2013	80%	95%	98%	75%
Cushman Project – Lake Cushman, WA	2014	Unspecified	95%	Unspecified	95% target 75% min
Clackamas River Project – North Fork Reservoir, OR	2015	Unspecified	Unspecified	Unspecified	97%
Clackamas River Project (River Mill) – Estacada Lake, OR	2012	Unspecified	Unspecified	Unspecified	97%
Cowlitz Falls Dam – Lake Scanewa, WA	2017	Unspecified	Unspecified	Unspecified	95% target 75% min all species
Pelton Round Butte Project – Lake Billy Chinook, OR	2009	50% temp facility 75% permanent facility	Unspecified	93% temp facility 96% permanent facility	Unspecified
Lewis River Project – Swift Reservoir, WA	2012	Unspecified (Calculated as 85-86%)	95%	95% fry 99.5% smolt	80%

Note: See the Summary of Performance Standards and Evaluation attached to this document for a full list of table citations and references.

From this, the most unknown piece of the calculation is reservoir survival, which no information exists on this issue. In terms of survival NMFS uses positive exclusion barrier screens as the basis of performance for fish. As is detailed in Table C-1, Appendix C of the NMFS guidelines (Table 2 below):

Table 2. Performance standards for conventional (i.e., positive-exclusion) fish screen systems designed and built to the guidelines and criteria described in Chapter 8 of the Manual. New experimental technologies would need to meet these standards to be approved.

Smolt Mortality	Smolt Injury	Fry Mortality
Design performance objective <0.5%	Design performance objective <2%	Design performance objective <2%
Actual mortality >0.5%, but <2% requires additional work to lessen mortality	Actual injury >2%, but <4% requires additional work to lessen injuries	Actual mortality >2%, but <4% requires additional work to lessen mortality
Actual mortality >2% requires major operational or structural changes	Actual injury >4% requires major operational or structural changes	Actual mortality >4% requires major operational or structural changes

The surface flow outlets envisioned in FA-04 Fish Passage Technical Studies Program require a behavioral response and acceptance by fish and may need post construction modifications, in order to meet the standards. Table 3 below demonstrates, in a generic way, the expectation of the magnitude of change that typically is seen with these structures or operation. This can be useful to customize so that there is an understanding of the expectation.

Table 3. Illustrative adaptive management based on measured Project Survival

Fish Collection Efficiency	Actions defined; include both improvements and monitoring
Project Survival met	Objective met. No further actions required.
Actual guidance Project Survival standard missed by up to 10 percent	Minor changes: Structural changes that can be made within existing design. Operational changes to the FSC that can be made within design specifications. Changes in dam and reservoir operations that can be completed within existing rule curve and downstream flow requirements.
Project Survival standard missed by 11- 30 percent	Structural additions or more operational changes.
Project Survival standard missed by more than 30 percent	Adjustments as defined above, and then modification(s). Likely structural, including additional facilities.

12. Modification

This FP3 may be modified in consultation with the SLIC Fish Passage Work Group and subject to approval by the Services.

13. References

ISAB (Independent Scientific Advisory Board). 2014. Review of NOAA Fisheries' Viable Salmonid Population (VSP) Modeling of the Willamette River Spring Chinook Populations (June 2014 draft) ISAB 2014.4.

NMFS (National Marine Fisheries Service). 2022. NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual, NMFS, WCR, Portland, Oregon.

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SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 5 – ATTACHMENT 1

FISH PASSAGE TERM SHEET

Skagit River Hydro Project
Fish Passage - Key Terms to Close Settlement Negotiations

December 19, 2024

1. Licensee will design, construct, and operate facilities that provide safe, timely, and effective fish passage at the three dams comprising the Skagit River Hydroelectric Project (FERC Project No. 553) as will be described in the Fish Passage Program Plan (Passage Program Plan) (3 up/3 down). The due diligence described within Paragraph 6 and the assessments described within the Passage Program Plan are intended to guide how (and not if) fish passage will be implemented in a manner consistent with the Feasibility Criteria stated in Paragraph 5(d).

2. **Fish Passage Program Goals**. The Program Goals are to implement and adaptively manage the Fish Passage Program using best available science and consistent with Treaty rights to:
   - contribute to recovery of ESA and WA Priority-listed species in Skagit River Basin [NOTE: Target Species to be identified];
   - increase and provide sustainable harvest opportunity;
   - support diverse life history strategies;
   - provide connectivity between all project reservoirs and the upper and lower Skagit River, eliminating fragmented habitat to improve ecosystem resilience to changing climatic and other conditions and episodic events affecting the Skagit River ecosystem;
   - avoid or minimize to the extent possible negative impacts to native fish populations and/or the Skagit River ecosystem. [NOTE: Agencies to confirm goals]

3. **Guiding Principles**.
   a. Fish passage measures will be designed to meet the agreed upon Program Goals.
   b. Washington State Department of Fish and Wildlife; Upper Skagit Indian Tribe, Swinomish Indian Tribal Community, and Sauk-Suiattle Indian Tribe (Tribes) (Co-Managers) will be responsible for completing a Stock Selection and Management Plan as an early action measure prior to the new license issuance as provided in Paragraph 6.d. This plan will inform the implementation of the Passage Program Plan.
   c. The National Park Service will be responsible for funding and completing a Ross Access Report as an early action measure as provided in Paragraph 6.b below. This design report will inform the implementation of the Passage Program Plan.
   d. Fish passage measures will be feasible to construct, operate, and reconfigure consistent with the Feasibility Criteria stated in Paragraph 5.d.
   e. Fish passage measures will be based on the best-available science.
   f. Fish passage measures will be implemented giving due consideration to tribal cultural concerns.
   g. The Settlement Parties understand the importance of collaborating to assure fiscal prudence and adherence to agreed-upon budgets. Licensee will implement the Fish Passage Program consistent with the agreed-upon budgets.

h. Certain federal agencies may have interests that relate to the Fish Passage Program for reasons, including but not limited to: 1) the Federal Government's Trust Obligations to Tribes, 2) Ross Lake Reservoir being the primary flood storage facility for the Skagit Watershed, and 3) the Ross Forebay Access Road will be used for multiple purposes.
i. To the extent practical and compatible with Program Goals, the Settlement Parties will commit to minimize impacts to Skagit River Project facilities and operations (including flood risk management, power generation, including load following and ancillary services, and recreation/education).

4. **The Funding**. Licensee will contribute up to a maximum of Nine Hundred and Seventy Nine Million Dollars ($979,000,000) (2025) for the capital costs for the Fish Passage Program over the term of the new license. The Settlement Agreement will define Licensee's financial contribution to include all aspects of the project design, planning, development, construction, and reconfiguration of the facilities in the Fish Passage Program (including means of access for such facilities at Ross). [Note: The Current Version of the Draft Settlement Agreement for the Relicensing of the Skagit River Hydroelectric Project is August 2, 2023 Draft (Draft Settlement). This Document needs to be finalized.] Licensee will fund separately the operation, maintenance, and monitoring elements of the Fish Passage Program.
    a. The Settlement Agreement will establish a Fish Passage Program Workgroup (Passage Program Workgroup) under the SLIC. This workgroup will consist of: Licensee, NMFS, FWS, NPS, [DOE], and BIA (Agencies); Washington State Department of Fish and Wildlife; Upper Skagit Indian Tribe, Swinomish Indian Tribal Community, and Sauk-Suiattle Indian Tribe (Tribes). Other Settlement Parties will participate in the workgroup's work, as provided in [SLIC document].
    b. Before license issuance, the Passage Program Workgroup's primary scope will be to oversee the development and timely completion of the Program Cost and Schedule Report, preliminary Ross Access report, and other Early Action Due Diligence specified in Paragraph 6.
    c. Before and after license issuance, the Licensee and Tribes (and other Settlement Parties to the extent allowed by applicable law) agree to support and seek federal, state, and other sources of funding for the Fish Passage Program. If the total cost of the program exceeds $979,000,000 (2025), other (non-Licensee) funding will be applied to that excess to limit the Licensee's financial contribution to $979,000,000 (2025).
    d. The Licensee will contribute a minimum of five hundred and five million dollars ($505,000,000) (2025) for the Fish Passage Program over the term of the new license. In the event that this minimum amount is not spent on capital costs for the Fish Passage Program, during the term of the license, the Licensee, Federal and State Agencies and Tribes may agree to reallocate any remaining funds from this minimum amount to be spent on other components of the fish programs. This is a funding obligation, not a set-aside fund, and is not dependent upon an annual funding contribution. This minimum funding obligation will continue through the term of the new license. If this minimum funding obligation is not spent during the term of the new license, the Licensee will be

under no obligation to spend the remaining funds at the end of the term of the New License.

5. **Fish Passage Program Plan**: The Proposed License Articles will be set forth in Settlement Agreement Appendix 1 and will include an agreed upon Passage Program Plan as set forth in Attachment 8 thereto [replacing the 8/19]. The Passage Program Plan will include the following:

    a. **Scheduling Priorities:** The Passage Program Plan will ultimately include construction and operation of upstream and downstream facilities at all three Project dams. Through the Passage Program Cost and Schedule Report and other Early Action Due Diligence, the Settlement Parties will consider whether efficiencies in mobilization, labor, and procurement could support concurrent development of facilities as necessary to achieve the Program Goals.
    b. **Science**: Tribes and federal and state agencies will determine studies (Phase 1 and Phase 2 studies including early action studies) required for Licensee's implementation. These studies will be based on protocols used by the NMFS, FWS, and NPS (the Services) and reflect the Program Goals stated above. Per Paragraph 9(b), Licensee will cover the cost of these studies.
    c. **Schedule**: Construction of passage facilities will be on a schedule established under the new license. The Settlement Parties will agree on durations and sequencing requirements that emphasize expeditious implementation of the Fish Passage Program while taking into consideration Licensee's ability to meet the schedule (i.e. schedule must be achievable and must respect and comply with public budgeting, procurement, and contracting laws and requirements).
    d. **Feasibility Criteria**: The Feasibility Criteria under the Passage Program Plan will include 1) the program will advance and be consistent with the Program Goals, 2) the program will include a suitable means of access (i.e. SR 20 Access Road or other appropriate means of access) for construction and long-term operation of passage facilities at Ross Dam, and 3) Licensee's maximum financial contribution to the Fish Passage Program (including the project design, planning, development, construction and reconfiguration of facilities) will be limited to the amount agreed to by the parties and described in Paragraph 4 ($979,000,000 (2025 dollars)). If, during implementation, the Feasibility Criteria are potentially in conflict with each other, or with Applicable Law as reserved under [draft] Settlement Agreement section 3.2, the Settlement Parties will follow the procedures stated in Paragraph 8.d to resolve or avoid the conflict.

6. **Early Action Due Diligence**. Within one year of the effective date of the Settlement Agreement, the Licensee will complete the following steps to confirm the design, feasibility, and completion schedule of these facilities. This due diligence will be done in collaboration with the Passage Program Workgroup. The Licensee will also report quarterly to FERC on implementation progress for the following Early Action Due Diligence measures.

a. **Passage Program Cost and Schedule Report**: After execution of the Settlement, Licensee will engage (or in Licensee's discretion fund another Settlement Party to engage) a qualified consultant/contractor to develop a Passage Program Cost and Schedule Report; provided that this engagement to extent possible under applicable law, policies, and procedures will be structured to assure that the Contractor is not disqualified from design-build or other procurement process related to implementation of the Passage Program. Within six months after the effective date of the Settlement Agreement, the contractor will complete the report per the scope attached as Attachment 1. Relying upon existing information, the report will provide detailed cost and schedule estimates, by facility, reflecting the Settlement Parties' intention to implement the Passage Program. The Passage Program Cost and Schedule Report will include an option(s) for phased implementation, beginning with upstream passage at Gorge Powerhouse and downstream passage at Ross Dam.
b. **Ross Access Report**. Within six months of effective date of the Settlement Agreement, the NPS will prepare a report on the means of access, including 30% road design and associated costs, for construction and operation of the fish passage facilities at Ross Reservoir. The Settlement Agreement will attach, and NPS will consider, Stantec's report, *Skagit River Fish Passage – Third Party Review of Access Requirements* (May 2024).
c. **Fish Passage Implementation Plan**. Within one year of effective date of the Settlement, Licensee will develop a Fish Passage Implementation Plan (which details how the Licensee will implement the Passage Program Plan), in collaboration with the Passage Program Workgroup, and subject to approval by the Services. The plan will take into account the recommendations and conclusion of the Passage Program Cost and Schedule Report, as well as the Ross Access Report. It will include performance metrics established by NMFS and FWS for what constitutes "safe and effective" fish passage, effective by Year 30 of the new license. The Licensee will submit this plan to the Services for approval and then for FERC's approval as a condition of the new license.
d. **Stock Selection and Management Plan**. Within one year of Settlement, Co-Managers in coordination with the Services will develop a Stock Selection and Management Plan. Phase 1 and other study results (as described in the technical attachment) will be incorporated into amendments thereto as applicable. The plan will be submitted for review and approval as appropriate.
e. **Procurement.** Licensee shall begin the procurement process to engage design-build contractor and/or other contractors within six months of the execution of the Settlement Agreement. Licensee may phase the procurement process by facility or other appropriate manner consistent with applicable law that facilitates expeditious implementation of the Fish Passage Program. Licensee will target having a 100% design within [months] of the effective date of the FERC order issuing new license. [NOTE: City Light to review/revise for consistency with procurement policy/ordinance.]

7. **Fish Passage Term Sheet Commitments and Implementation in Connection with License Issuance**. Consistent with the Draft Settlement Section 2, the Settlement Agreement will state that each Party concludes that the Fish Passage Plan (Attachment 8), if approved by FERC without Material Modification (as defined by the Settlement Agreement), will satisfy applicable

statutory and regulatory requirements for a new license. The Parties acknowledge that the Feasibility Criteria and Section 8.d provisions below are material to the Parties' interests. However, the draft Settlement Section 3.2 acknowledges nothing in the Settlement is intended or should be construed as a pre-decisional determination by any Federal and State agency party. Draft Settlement Section 4 (Settlement Agreement Commitments and Implementation) will be applicable to the Fish Passage Plan (Attachment 8) as a Proposed License Article, except as provided in Paragraph 8.b.

a. The Settlement Parties will work to complete the relicensing process in a timely manner. In the submittal of the Settlement Agreement to FERC, Settlement Parties will attach an Explanatory Statement for the Proposed License Articles. In that submittal, they will propose that FERC: 1) solicit and consider public comments on the Settlement (including Explanatory Statement) pursuant to 18 C.F.R. 385.602, 2) make additional information requests to the Licensee as appropriate, 3) accommodate the work by Licensee and other Settlement Parties to complete the Early Action Due Diligence stated above, and 4) consider the quarterly progress reports. In that submittal, the Settlement Parties will explain the advantages of materially advancing the record relevant to FERC's environmental analysis.
b. If FERC issues its Ready for Environmental Analysis (REA) notice after the completion of the Passage Program Cost and Schedule Report, the Services will submit mandatory conditions and prescriptions in response.
c. If FERC issues its REA notice prior to the completion of the Passage Program Cost and Schedule Report, the agencies will submit preliminary conditions and prescriptions consistent with their statutory and regulatory authority (FPA section 18 and 4(e)).
d. If the Passage Program Cost and Schedule Report shows that the Fish Passage Program cannot be implemented in a manner consistent with the Feasibility Criteria, then Licensee or any other Settlement Party may initiate the dispute resolution process stated in [draft] Settlement Agreement section 5.

8. Management of Feasibility Criteria Through the License Term

a. The Settlement Parties will work collaboratively to implement the Fish Passage Implementation Plan in accordance with this Term Sheet, the Settlement Agreement and New License to achieve the Program Goals consistent with the Guiding Principles and Feasibility Criteria to the maximum extent practicable.
b. In consultation with the Passage Program Workgroup, Licensee will monitor the cost of implementation of the Passage Program through the term of the license and provide periodic accounting. Implementation of the Fish Passage Program will be based on agreed upon budgets for specific measures within the Program.
c. If the Licensee determines the cost of the Fish Passage Program is likely to exceed the Licensee's financial contribution (as determined under Paragraph 4), the Settlement Parties will determine if modifications to the Fish Passage Program will allow the cost of the program to stay within the amount of Licensee's financial contribution.
d. The Licensee, Federal and State Agencies, and Tribes agree the license articles will include a sequence of procedures to resolve disputes related to when an

Implementation Decision (as defined in the Passage Program Plan) may conflict with the Feasibility Criteria stated in Paragraph 5(d). Specifically, the Licensee, Federal and State Agencies, and Tribes will follow this sequence of procedures to resolve the conflict:

i. These Parties will follow the Regional Dispute Resolution Procedures stated in [draft] Settlement Agreement Section 5. [INCLUDE AS DEFINED TERM]

ii. If dispute is unresolved, any of these Parties may request a settlement conference and as needed a hearing before an Administrative Law Judge of the Commission's Office of Administrative Litigation. The Administrative Law Judge will make finding of fact and offer a proposed resolution of the dispute.

iii. If dispute is still unresolved, any of these Parties may file exceptions to an ALJ decision with FERC as provided by 18 CFR 385.711. Any subsequent final FERC order is a final action subject to judicial review under FPA section 313(l). This agreement in no way modifies the applicable standards for review in any subsequent appeal.

e. The Parties agree that the license will include a provision that Implementation Decisions are subject to hearing under 18 CFR 385.501 et seq.

f. By participating in this process, the Agencies do not waive or limit their authority to exercise any reserved authorities.

NOTES: 1) Implementation Decision is a defined term that identifies the implementation measures in the Fish Passage Plan that are subject to this dispute resolution provision.

9. The Settlement Parties will agree that if a Party seeks rehearing or appeals the New License (or a subsequent FERC Order pertaining to the implementation of the New License) solely due to a license article containing a Material Modification to a fish passage provision in the Settlement (including the Fish Passage Plan), No Party will seek a stay or extension for the duration of the administrative or judicial review process of any obligation in the New License other than fish passage-related obligations. The Settlement Parties will revise Settlement Agreement Section 4.7 to reflect this commitment. **[revise early action commitment to address similar issue]**

10. License Term. The Settlement Agreement will include a commitment by the Federal and State Agencies and Tribes to affirmatively support a request by the Licensee to FERC for the issuance of a new license with a fifty (50) year license term. The Federal and State Agency and Tribes will document this affirmative support through a agreed upon written statement filed with FERC within thirty (30) day of the filing of the Settlement Agreement with FERC. [Richard will revise]

11. Other Items.

a. All dollar amounts in the above proposals are based upon 2025 dollars and will be subject to the industry standard index (e.g., Cost Performance Index, Cost of Construction Index, Building Construction Price Index, National Highway Construction Cost Index, etc.).

b. Licensee will fund implementation of the study and evaluation programs determined necessary by the Tribes and federal/state agencies at an amount not to exceed <<$x>>.

c. Schedule and sequencing standards will be agreed on in the Settlement.

d. In consultation with the Services and Tribes, the Licensee will manage the implementation process including contracting, design, permitting, and construction.

These costs shall be considered part of Seattle's financial contribution and Seattle will provide transparent accounting for these activities.

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 5 – ATTACHMENT 2

PASSAGE PROGRAM COST AND SCHEDULE REPORT
SCOPE OF WORK

January 13, 2025

Skagit Hydro Project – Fish Passage Technical Work Group
Via: electronic submittal

Subject: Seattle City Light, Skagit River Hydroelectric Project (FERC Project No. 553)
Proposal for Preparing High-Level Fish Passage Cost Estimates and Schedule

Dear Fish Passage Technical Work Group:

McMillen, Inc. (McMillen) is pleased to submit the enclosed letter proposal to provide cost estimating and scheduling analysis for the Skagit River Hydroelectric Project's proposed fish passage facilities (Project). Our proposal presents a summary of our understanding and approach to the Project, followed by the proposed work tasks, budget, and schedule. We have prepared our proposal in response to the Technical Work Group's document entitled "High-Level Passage Concepts for Skagit Costs" (Nov. 4, 2024), which is included as Attachment A of our proposal, as well as Joint Understanding Document for Settlement Agreement, Skagit River Hydroelectric Project (FERC Project No. 553), December 23, 2024.

INTRODUCTION

PROJECT UNDERSTANDING

The Skagit River Hydroelectric Project, FERC Project No. 553, is owned and operated by the City of Seattle through its City Light Department (City Light). The Project is in northern Washington State east of Mount Vernon, Washington. The Project consists of three hydropower developments: Ross, Diablo, and Gorge.

As part of the Federal Energy Regulatory Commission (FERC) relicensing process, City Light is evaluating the feasibility of constructing and operating fish passage facilities at the Project. This study is summarized in the FA-04 Fish Passage Technical Studies Program, Fish Passage Facilities Alternatives Assessment – Concept Development Report Final (FA-04), prepared August 2022. The Fish Passage Facilities Alternatives Assessment prepared by City Light included the development and study of fish passage options including conceptual level option

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descriptions, construction cost estimates, operation and maintenance (O&M) cost estimates, and life cycle analysis.

City Light is working with the federal agencies and tribes (Settlement Group) to develop a Relicensing Settlement Agreement. We understand that the parties are seeking to reach agreement on key terms related to fish passage by early 2025. The Settlement Group has determined that further analysis of the probable costs and implementation schedule is critical path to finalize these terms for the purpose of the Settlement Agreement. The workplan presented herein will provide an independent estimate of construction costs and implementation schedule, assuming the conceptual design outlined in FA-04 and the directions provided by the Technical Work Group.

PROJECT APPROACH

McMillen developed a workplan based on discussion with the Skagit Hydro Fish Passage Technical Work Group. From these discussions, the guidelines for the fish passage facilities associated with the three up and three down options were defined by the Technical Work Group (see Attachment A of this proposal). McMillen will utilize these guidelines as the foundation for developing the cost estimates, construction schedule, and implementation schedule. As outlined in our workplan, we will follow a sequential approach to the work execution as follows:

1. Collect and review available data relevant to the fish passage alternatives and assessments completed to date, including FA-04 and various documents prepared by NMFS/FWS.
2. Collect and review data for existing constructed upstream and downstream fish passage projects located elsewhere with features relevant to the identified fish passage facilities.
3. Attend a field site visit and kickoff meeting to gain site-specific familiarity with the Skagit River hydropower developments critical to understanding site access, construction challenges, and fish passage facility siting.
4. Develop a construction schedule specific to each fish passage facility that reflects the site-specific constraints, anticipated environmental challenges and constraints, construction access, and anticipated construction durations.
5. Develop general construction conditions for each fish passage facility that reflect the anticipated project management, equipment, and overhead requirements.
6. Develop unit costs for major construction site work, including excavation, concrete, rock placement, pipeline construction, electrical, access methods (if construction may be

necessary), and general site work that can be applied to specific work quantities developed for the fish passage facility sites.

7. Assemble cost information from other constructed fish passage projects that are relevant to the Skagit-proposed facilities. These analogous costs will be used where applicable to provide relevant cost information for specific facility features such as pumps, fish transport tanks, guide nets, and associated facilities.
8. Prepare unit labor, equipment, and material costs for the operations and maintenance (O&M) cost analysis. These standard units will be applied to anticipated quantities to develop O&M costs for each fish passage facility.
9. Review the proposed conceptual fish passage facility designs and develop cost estimates using the cost information assembled. A combination of quantity-based costs for site related work and lump sum values for procurement equipment will be used to prepare the initial cost estimates.
10. Prepare a draft report that summarizes the analysis, assumptions, and data used to develop the cost estimates, schedule, and overall implementation schedule for the proposed fish passage facilities at the Skagit River hydropower developments.

A more detailed description of the workplan tasks and activities is presented in the following paragraphs.

WORKPLAN

General Assumptions

The workplan was developed to provide an efficient and timely development of an independent cost estimate and schedule for the identified fish passage system at the Skagit Hydroelectric Project outlined by the Technical Work Group. In developing our workplan, McMillen made the following general assumptions:

- Fish passage facilities will follow the High-Level Passage for Skagit for Costs as outlined by the Technical Work Group (see Attachment A).
- The conceptual design as presented in the FA-04 Fish Passage Technical Studies Program, Fish Passage Facilities Alternatives Assessment – Concept Development Report, Final, August 2022, will be used as the basis for the cost estimates. McMillen will not develop new design layouts or details for the proposed fish passage facilities.
- Assumptions related to the conceptual designs will be made by McMillen, where required, to facilitate development of the cost estimates and schedule.

- Information from existing fish passage facilities will be used, where applicable, to fill gaps within the existing conceptual fish passage designs.
- Cost estimate will be considered Class 5 estimates as defined by the American Association of Cost Engineers (AACE) International.
- Cost estimate will be prepared using Heavy Bid Cost Estimating software package using available information on materials, quantities, equipment, and past project cost information.
- Construction schedule will be prepared using the Primavera P6 scheduling program.
- McMillen will develop an independent cost estimate and schedule using the existing conceptual design. A comparison against the FA-04 Conceptual Design Study will be completed to provide a high-level analysis of areas where the cost estimates and schedule may vary.

Work Tasks

Task 1: Data Collection and Review

As a first step, the McMillen team will collect and review the available and applicable data sources related to the Skagit River hydropower developments and the specific proposed fish passage facilities. McMillen will obtain the support documentation from City Light and the Technical Work Group, where applicable, as well as additional engineering and science materials which we believe will be beneficial to the Project. We anticipate these materials will include the work completed by HDR, as-constructed drawings of the hydropower development, and constructed relevant fish passage projects. A bibliography will be prepared that lists the collected data sources and identifies potential gaps with an approach or assumptions to fill the identified data gaps. McMillen will rely on existing information related to the fish passage facilities design and operation. McMillen will not develop new design details as part of our analysis. Where insufficient information is available, we will request additional guidance or confirmation of our assumptions from the Project team to support our cost estimating work effort.

Deliverables

- Bibliography of the data sources used to support the cost estimating work effort.
- Brief memorandum identifying potential data gaps and the approach or assumptions used to fill specific data gaps.

TASK 2: CONSTRUCTION COST ESTIMATES AND SCHEDULE

McMillen will prepare a construction cost estimate for the upstream and downstream fish passage facilities proposed at the Ross, Diablo, and Gorge hydropower developments. The cost estimate will be based on the high-level passage concepts developed by the Technical Work Group which will serve as the basis for the analysis (see Attachment A). The cost estimate will utilize the schematic design packages developed by HDR with the revisions proposed by the Technical Work Group. Quantity takeoffs will be developed, where applicable, for major work activities including site clearing and grubbing, demolition, earthwork, cofferdam and dewatering, concrete placement, mechanical, electrical, and equipment procurement and installation. Budgetary quotes will be obtained where feasible for equipment and other construction materials required for construction. The cost estimate template will mirror the work completed by City Light to provide a direct comparison between the McMillen and City Light estimates. The cost estimate will be developed using the Heavy Bid Cost Estimating software that is a standard estimating package used in the Heavy Civil Construction Industry. The cost estimate will provide a breakdown of the anticipated labor, materials, equipment, and consumables required to construct the fish passage projects. General conditions will be estimated based on the anticipated construction period for each facility to provide a more detailed evaluation of management and indirect costs associated with the fish passage facility construction.

As a recommended practice of the American Association of Cost Engineers (AACE) International, the Cost Estimate Classification System provides guidelines for applying the general principles of estimate classification to project cost estimates. This system maps the phases and stages of project cost estimating together with a generic project scope definition maturity and quality matrix, which can applied across a wide variety of industries and scope content. A Class 5 cost estimate will be prepared for the fish passage facilities. Class 5 estimates are prepared based on a very limited information, and subsequently, have a wide accuracy range with typical ranges of -20% to -30% on the low side and +30% to +50% on the high side, depending on the complexity of the project. The goal of this cost estimate effort is to confirm the estimates completed within FA-04 and improve the confidence interval associated with each fish passage facility. The cost estimates prepared within this analysis will be utilized to support development of the Settlement Agreement.

Construction schedules will be prepared for the Project using Primavera P6 scheduling software. The construction schedule will be organized based on the specific work activities and by work area to define the work activities, durations, and overall anticipated construction schedule anticipated for each fish passage facility. The individual fish passage facility schedule will represent total construction duration without being tied to a specific year. With all individual schedules complete, a master schedule will be prepared which integrates all

projects into an overall program implementation schedule. Within the master schedule, estimated durations for planning, engineering, permitting, and regulatory approvals will be added. The main purpose of the construction schedule is to develop realistic construction durations that consider weather, environmental, and anticipated regulatory requirements.

The work will be executed as three distinct subtasks as follows:

- Subtask 2.1 Ross Development
- Subtask 2.2 Diablo Development
- Subtask 2.3 Gorge Development

Deliverables:

- Cost estimates and construction schedules for the upstream and downstream fish passage facilities presented in modular form (by development).
- Documentation of the data used and assumptions made in developing the schedule and cost estimates.
- Description of the schedule and cost estimates included in Task 5, Report.

TASK 3: OPERATION AND MAINTENANCE (O&M) COST ESTIMATES

Task 3 consists of preparing O&M costs for the fish passage facilities proposed for each hydropower development. The cost estimate will be developed to present labor, equipment, and materials associated with the fish passage facility operation and maintenance. Labor categories will be defined to represent the O&M staff required to effectively operate and maintain the facilities. Standard labor rates for appropriate worker classification, equipment rates, and indirect costs will be obtained from City Light. Staffing will be reviewed and assigned based on anticipated operation and maintenance activities and durations. The O&M cost associated with each fish passage facility will be reviewed individually, then as a system to determine the overall staffing and associated O&M cost for the Skagit Hydro fish passage system.

This work effort is organized in three subtasks as follows:

- Subtask 3.1 Ross Development
- Subtask 3.2 Diablo Development
- Subtask 3.3 Gorge Development

Deliverables

- O&M cost estimates for the upstream and downstream fish passage facilities identified in Attachment A.
- Documentation of the data used and assumptions made in developing the O&M cost estimates.
- Description of the O&M cost estimates included in Task 5, Report.

TASK 4: FISH PASSAGE OPTIONS ANALYSIS

Within this task, two fish passage options will be evaluated:

- Option 1: Three up and three down with upstream and downstream fish passage facilities at each of the three hydropower developments.
- Option 2: Upstream passage from the Gorge Powerhouse to Ross Dam and Downstream Passage from Ross to release below Gorge.

The cost estimates associated with Option 1 are related to Task 2 and 3 cost estimates where three up and three down fish passage facilities will be evaluated. For Option 2, the downstream fish passage facilities at Ross Dam will be coupled with the upstream fish passage facilities at Gorge Dam. For the purpose of cost estimating, it is assumed the fish passage facilities associated with Option 2 will remain the same as in Option 1. Minor revisions of O&M costs or construction cost to reflect the specific facilities required for Option 2, such as acclimation facilities, will be incorporated into the Option 2 analysis.

Task 4 will assemble representative construction and O&M costs for Options 1 and 2. Planning, engineering, permitting and regulatory, and construction supervision costs will be incorporated as a percentage of the construction costs to provide a total project cost for each option.

Deliverables

- Cost estimates and schedule for Option 1 and Option 2.
- Description of the data and analysis presented in Task 5, Report.

TASK 5: REPORT

The cost estimate and schedule prepared for each hydropower development and related facilities will be summarized and presented in a report. The report will be organized to present an overview of the data collected to support the analysis, the assumptions, and the final cost

estimates. The report will include recommendations that support value-engineering in the post-Settlement Agreement design of the fish passage facilities.

This task will be initiated with the development of a detailed report outline for the Project team review. A draft report will then be prepared and submitted to the Project team for review and comment. Comments on the draft report will be incorporated, then the final report will be issued. The budget estimate was developed based on the following three subtasks:

- Subtask 5.1 Report Outline
- Subtask 5.2 Draft Report
- Subtask 5.3 Final Report

Deliverables

- Draft report outline for review and comment.
- Draft report for review and comment.
- Final report which incorporates comments on the draft report.
- Written response to the draft report comments.
- Draft report review meeting (8 hours; budget carried in Task 6).

TASK 6: MEETINGS

A key to success of any project effort is effective communication throughout the project execution. To ensure communication between McMillen and the Project team, we anticipate a range of meetings will be required. These meetings will be primarily web-based meetings with limited face-to-face meetings. Table 1 outlines the proposed meetings.

Table 1. Proposed Project Meetings

Meeting Type	Overview
Kickoff Meeting and Site Visit	McMillen will attend a kickoff meeting and site visit at the Skagit Project. The meeting will be organized to provide the McMillen team members with the maximum information possible on the existing hydropower developments to support preparation of the cost estimates for the fish passage facilities.
Coordination Meetings	These calls would occur on a minimum of a bi-weekly basis and include the McMillen and Project team members. These meetings are intended to be approximately 1 hour in length and used to allow McMillen to present preliminary information, ask clarifying questions, and coordinate the ongoing work activities. Brief meeting minutes from the coordination calls will be prepared and distributed by the McMillen team.
Monthly Progress Meeting	The progress meetings will be attended by our Project Manager and will be designed to update the Settlement Group on the Project status including budget, schedule, and coordination items.
Cost Estimate Progress Review Meeting	We anticipate progress review meetings to present the preliminary cost estimate, work progress, assumptions, and general progress of the work. The focus of these meetings is to present preliminary information to the Technical Work Group and Settlement Group to ensure full alignment between the McMillen work effort and the Project team to ensure the final work product meets expectations. Three meetings 4 hours in length are assumed. Meeting minutes will be prepared from each meeting.
Draft Report Review Meeting	A review meeting will be held to present and discuss the draft report. The draft report will be issued in advance of the meeting allowing the Technical Work Group and Settlement Group to provide responses in advance of the meeting. McMillen will review these comments, develop written responses, then tailor the meeting agenda to focus on the highest priority comments. This meeting was assumed to be 8 hours in length and will be a face-to-face meeting.
Project Closeout Meeting	A project closeout meeting will be held with the Technical Work Group to review the scope of work and work products and confirm that all work deliverables have been provided and the contract can be closed. This meeting will be attended by the McMillen Project Manager.

TASK 7: PROJECT MANAGEMENT AND ADMINISTRATION

Mort McMillen will serve as the Project Manager and will be responsible for the overall work direction and will serve as the primary contact for the McMillen team. Mr. McMillen will coordinate directly with the Technical Work Group to manage the Project. As a first step, Mort will develop a simplified Project Management Plan (PMP) that outlines the project management activities required to execute our workplan. The PMP will identify the staffing plan and individual budget allocation, communication protocol, documentation protocols and directories, and our QA/QC plan. On a monthly basis, Mort will attend a progress review meeting with the Settlement Group to review the work progress, coordinate work tasks, and discuss the schedule and budget status. This work task includes the work effort required to set up the project budget and schedule, develop and manage the QA/QC program and track the overall work effort. For the purpose of preparing the budget, we have assumed a total project duration of 6 months allowing several months for follow-up questions and coordination on the final report's questions and comments.

Deliverables:

- Abbreviated PMP to support the internal management of the work effort.
- Monthly progress reports and invoices.
- Written documentation and certification of completed QA/QC on the cost estimates and final report.

SCHEDULE

The proposed project milestone schedule is presented in Table 2. The schedule was developed to expedite execution of the work activities as much as possible, while also ensuring a high-quality work product.

Table 2. Project Milestone Schedule

Task No.	Description	Milestone Date based on NTP Date	
		Start	End
	Notice to Proceed (NTP)	1/13/2025	1/13/2025
1	Data Collection and Review	1/13/2025	1/31/2025
2	Construction Cost Estimates and Schedule		
2.1	Ross Development	1/13/2025	3/21/2025
2.2	Diablo Development	1/13/2025	3/21/2025

Task No.	Description	Milestone Date based on NTP Date	
		Start	End
2.3	Gorge Development	1/13/2025	3/21/2025
3	O&M Cost Estimates		
3.1	Ross Development	3/10/2025	3/31/2025
3.2	Diablo Development	3/10/2025	3/31/2025
3.3	Gorge Development	3/10/2025	3/31/2025
4	Fish Passage Options Analysis	3/1/2025	3/31/2025
5	Report		
5.1	Report Outline	1/27/2025	2/7/2025
5.2	Draft Report	3/24/2025	4/4/2025
5.3	Final Report	4/19/2025	5/15/2025
6	Meetings		
6.1	Bi-weekly Coordination Meetings	Bi-weekly	Bi-weekly
6.2	Monthly Progress Meetings	Monthly	Monthly
6.3	Cost Estimate Progress Meeting 1	1/31/2025	1/31/2025
6.4	Cost Estimate Progress Meeting 2	3/14/2025	3/14/2025
6.5	Draft Report Review Meeting	4/18/2025	4/18/2025
6.6	Project Closeout Meeting	6/27/2025	6/27/2025
7	Project Management and Administration		
7.1	Project Management Plan	1/13/2025	1/24/2025
7.2	Progress Reports and Invoice	Monthly	Monthly
7.3	QA/QC	3/31/2025	4/3/2025

KEY MCMILLEN STAFF

McMillen has assembled a team with the specific experience required to efficiently execute the work tasks. Our key staff members and their roles and responsibilities are presented in Table 3.

Table 3. Key McMillen Staff Members and Responsibilities

Staff Member	Project Role	Responsibility
Mort McMillen	Principal Fisheries Engineer	Overall responsibility for the project technical execution, cost estimate and schedule development, and report preparation.
Kevin Jensen	Senior Civil Engineer	Review of the fish passage facilities and support to the cost estimating team on the civil engineering aspects of the facilities.
Curtis Neibaur	Lead Cost Estimator	Plan and prepare the Heavy Bid construction cost estimate.
Laura Wishart	Civil Engineer	Engineering support to develop project quantities and equipment quotes.
James Whitney	Electrical Cost Estimator	Plan and develop electrical cost estimates.
Jeff Heindel	Senior Fisheries Biologist and Operations Lead	Develop O&M costs based on experience as fish passage and hatchery manager for Idaho Fish and Game.

BUDGET

The budget estimate to execute the scope of work outlined within this letter proposal is summarized in Table 4. A detailed breakdown by labor category, hours, and direct costs for each task is presented as Attachment B. Our budget estimate includes the following assumptions:

- McMillen staff will perform all the work activities outlined within this proposal. We do not intend to use any subconsultants.
- One site visit attended by our key staff members is included.
- Markup on direct costs is 5%.
- Total project duration is 6 months, which provides additional time beyond the delivery of the final report to address follow-up questions from the Project team.
- No additional design work will be completed by the McMillen team. We will utilize the existing sketches, descriptions, and information developed by HDR, as well as information from similar constructed facilities located on the west coast, if appliable.

Table 4. Project Budget Estimate

Task No.	Description	Budget Estimate ($)
1	Data Collection and Review	27,730
2	Construction Cost Estimates and Schedule	238,510
3	O&M Cost Estimates	37,920
4	Fish Passage Options Analysis	42,140
5	Report	51,625
6	Meetings	66,980
7	Project Management and Administration	3.900
	TOTAL BUDGET	**$468,805**

SUMMARY

McMillen is looking forward to working with the Project team on the Skagit Hydropower Development Project. If you have any questions or need additional information, please contact me at (208) 830-1390.

Sincerely,

Morton D. McMillen

Morton D. McMillen, P.E.
Executive Vice-President

cc: Mara McMillen, President
Marcus Emmons, Engineering Operations Manager
Kevin Jensen, Senior Project Manager

Enclosures: Attachment A: Skagit Hydro Fish Passage Technical Work Group, High-Level Passage Concepts for Cost
Attachment B: McMillen Detailed Budget Estimate

Attachment A. Skagit Hydro Fish Passage Technical Work Group, High-Level Passage Concepts for Cost

Skagit Hydro Project – Fish Passage Technical Work Group

McMillen

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ATTACHMENT A

High Level Passage Concepts for Skagit for Costs (the 3 up- 3 down strawperson)

Ross Development

- Hands free upstream passage via trap and transport at Ross Powerhouse for bull trout (with future considerations for O. mykiss and lamprey), with means to hold/manage any other fish, including adult salmonids and other native fishes such as suckers;
- Downstream passage via floating surface collector (FSC) (*NEW design capacity at 20% of powerhouse capacity*) with forebay guidance net at the Ross Dam intake. This concept includes off-FSC holding and management facilities and includes transport program for downstream migrants.
- FSC-associated facilities also include separation facilities to prevent in-trap predation.
- FSC-associated facilities also include tagging, marking, or otherwise sampling station(s).
- Downstream passage should facilitate all species (except invasive species). Species planned for transport to acclimation facilities below Gorge Powerhouse should include: O. mykiss (juveniles {fry, 1+, 2+, 3+} and kelts), Chinook salmon (fry and 1+), coho (fry, 1+ and 2+), and sockeye (1+ and 2+). Species planned for transport from Ross Reservoir to Diablo Reservoir include: Bull Trout, O. mykiss, lamprey, and all other native fishes).

Diablo Development

- Hands free Upstream passage via trap and transport at Diablo Dam, with means to hold/manage other species (at least bull trout, rainbow and lamprey), but are likely to include some other native species.
- Species planned for capture and transport from Diablo Dam into Diablo Reservoir include: Bull Trout, lamprey, O. mykiss. Additional accommodations for moving adult salmonids, including Coho and Chinook salmon (summer, fall and spring runs), and O. mykiss should not be excluded from planning efforts at this design effort. All other native species should be transported into Diablo Reservoir unless otherwise determined by the Co-managers and Services (e.g., Peamouth, suckers, etc).
- Upstream passage of Bull Trout, lamprey, O. mykiss from Diablo Dam into Diablo Reservoir should include annual accommodations for 1,000 fish plus accommodations for an additional 2,000 adult salmonids, and other native fishes.
- Downstream passage via FSC at the Diablo Dam intake (*NEW design capacity at 20% of powerhouse capacity*), with forebay guidance net. This concept includes off FSC holding and management facilities and includes transport program for downstream migrants.
- Downstream passage via the FSC should facilitate all species (except invasive species). Species planned for transport to acclimation facilities below Gorge Powerhouse should include: O. mykiss (juveniles {fry, 1+, 2+, 3+} and kelts), Chinook salmon (fry and 1+), coho (fry, 1+ and 2+). Species planned for transport from Diablo Reservoir to Gorge Reservoir include: Bull Trout, O. mykiss, lamprey, and all other native fishes).

Gorge Development

- Hands Free Upstream trap and transport at Gorge Powerhouse.
- Facilities should include sampling, monitoring, and tagging a subset of adults captured.
- Species planned for capture and transport from Gorge Powerhouse into Ross Reservoir include: Chinook salmon (summer, fall, and spring runs), coho, O. mykiss, sockeye, Bull Trout, lamprey. All other native species should be transported into Gorge Reservoir unless otherwise determined by the Co-managers and Services (e.g., Peamouth, suckers, etc).
- Adult capture and transport of adult salmonids at Gorge Powerhouse should plan for 35,000 fish with considerations for bonanza years where upwards of 100,000 fish or more could be caught and transported annually. Daily maximum planning targets should include 3,500 adult salmonids.
- Powerhouse draft tube barrier (physical is likely option or hydraulic as appropriate).
- Temporal barrier at the downstream end of the bypass.
- Downstream passage via FSC at the Gorge Dam with forebay guidance net (*NEW design capacity at 20% of powerhouse capacity*). This concept includes off FSC holding and management facilities and includes transport program for downstream migrants.
- Downstream passage via the FSC should facilitate all species (except invasive species). Species planned for transport to acclimation facilities below Gorge Powerhouse (or possibly immediately below Gorge Dam) should include: O. mykiss (juveniles {fry, 1+, 2+, 3+} and kelts), Chinook salmon (fry and 1+), coho (fry, 1+ and 2+), bull trout (all sizes and age classes), O. mykiss, lamprey, and all other native fishes.

Acclimation

- Acclimation facilities for all migrants after transport (multiple locations).

Adaptive means for meeting the survival standard

- The list for adaptive means to meet the survival standards has not been developed. This is a necessary task before 30% design.

Line items

- This exercise is for construction costs and other items should list separately for exec discussions.

Bull Trout

- Ultimate decisions considering where bull trout will be placed will be based on management plans developed by the USFWS.

Fish size

- Fish size considerations should be acquired at the WDFW smolt trap, Baker smolt trap, and Marblemount hatchery

Periodicity

- Run timing of adult and juvenile salmonids can be obtained via WDFW's smolt trap, the Baker adult and smolt trap, Marblemount hatchery, comanager and SCL spawning surveys. Delays in run timing from periodicity tables up to 2 weeks should be anticipated for smolt emigration from Ross Reservoir.

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 5 – ATTACHMENT 3

THIRD PARTY REVIEW OF ACCESS REQUIREMENTS

Stantec

SKAGIT RIVER FISH PASSAGE
3RD PARTY REVIEW OF ACCESS REQUIREMENTS
FINAL MEMO REPORT

May 20, 2024

Prepared for:
Lead Parties

Prepared by:
Stantec

Project Number:
224202828

3rd Party Review of Access Requirements

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
0	Draft	A. Corzine, D. Whitbeck, J. McClure, J. Wright	5/15	H. Wahto	5/15	M. Manwaring	5/15
1	Final	B. Corzine, D. Whitbeck, J. McClure, J. Wright	5/20	H. Wahto	5/20	M. Manwaring	5/20

3rd Party Review of Access Requirements

The conclusions in the Memo Report titled “Skagit River Fish Passages 3rd Party Review of Access Requirements” are Stantec’s professional opinion, as of the time of the Memo Report, and concerning the scope described in the Memo Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Memo Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Memo Report was prepared. The Memo Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient’s own risk.

Stantec has assumed all information received from Lead Parties (the “Client”) and third parties in the preparation of the Memo Report to be correct and accurate. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Memo Report is intended solely for use by the Client in accordance with Stantec’s contract with the HDR. While the Memo Report may be provided by the Client to other parties in connection with the project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

3rd Party Review of Access Requirements

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3rd Party Review of Access Requirements

1 Introduction and Background

Stantec Consulting Services, Inc. (Stantec) was asked to support Seattle City Light's (SCL) Skagit Hydro Project Relicensing by conducting a 3rd Party Review of Access Requirements for a fish collection and passage concept at Ross Dam. Based on initial discussions with the Lead Parties (LPs) and our review of the February 26th, 2024 Scope of Work Document (Scope Document) provided to Stantec, the objectives for the 3rd Party Review (Review) are to assess previously prepared reports, information, and documents intended to evaluate the construction access, long-term maintenance, and operational needs for the implementation of a floating surface collector (FSC) in the Ross Dam Reservoir (the Project). This Memo Report represents Stantec's review, technical assessment, and general commentary of the information provided and as the result of collaborative meetings with the LPs.

1.1 Information Provided for Review

A kick-off meeting was conducted on April 1st, 2024 with the Lead Parties including SCL, Upper Skagit Indian Tribe (USIT), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and National Park Service (NPS) that served to reiterate the collective goals and milestones for Stantec's review, included discussion of pertinent information pertaining to the Fish Passage Technical Studies Program, and initiated the plan and details for the upcoming site visit. Prior to the meeting, existing information identified in the Scope Document was shared by HDR Engineering (HDR) with Stantec for data review and was uploaded to a SharePoint site for collaboration. Previously prepared reports and documents supporting the development of the Project and reviewed by Stantec were as follows:

- HDR FA-04 Fish Passage Technical Studies Program (March 2023)
- Memorandum: Summary of Access and Infrastructure Requirements for Construction of a FSC at Ross Lake (January 2024)
- LiDAR Data Processing and Management Memo (April 2020) and Topobathymetric Lidar Technical Data Report (July 2022)
- SCL Final License Application (April 2023) and Additional Information Requests/Responses (December 2023)
- SCL Fish Passage Proposal Gantt Chart (November 2023)
- NMFS and USFWS Fish Passage Program Proposal (November 2023)
- NMFS and USFWS terms and conditions schedule (November 2023)
- McMillen Engineering (McMillen) Gantt Chart (June 2023)
- NPS Value Analysis Methodology Protocols (2023)
- NMFS West Coast Region Anadromous Salmonid Passage Design Manual (2022)

3rd Party Review of Access Requirements

During the subsequent site visit on April 15th, 2024 with the following parties present – SCL, HDR, USIT, USFWS, and NPS, Stantec visually assessed existing conditions and potential access opportunities from a constructability and long-term operations and maintenance perspective. With the data review and site visit complete, Stantec independently evaluated the access requirements needed for the construction, long-term maintenance, and operations for the implementation of a FSC in the Ross Dam Reservoir.

1.2 Intent and Goals for Memo Report

The objectives for the Review were confirmed by the Lead Parties at the project kick-off meeting. Jointly, the Lead Parties stated the overall objectives are to 1) identify a viable method (in terms of access and construction) for downstream fish passage at Ross Dam and 2) assess a practical schedule for implementation of the Project. Stantec's assessment considers the following objectives and factors mindful of the Lead Parties' interests for the Project:

- Evaluate a 1,000 cfs attraction flow surface collector and requirements for construction of a downstream collector (including evaluation of a single, smaller module design concept that would allow for different access methodologies)
- Verify constructability assumptions and viable access considerations, including staging need
- Identify the size and scale of the materials, modules, and equipment necessary to build the downstream collector
- Evaluate up to three transport options (e.g. incline lift, airlift of components, etc.) for construction materials, equipment, and workforce needs
- Provide information on the size of workforce regarding number of workers for construction and operation of the Project
- Provide an opinion on (i) HDR's Project implementation timeline, including site access and the floating surface collector facilities; (ii) SCL's Fish Passage Proposal Gantt Chart, and (iii) opportunities for full construction build-out that would realize an expedited development timeline while continuing to meet the overall project goals

Assessment of the Project includes the transport, construction, operation and maintenance of the FSC, including construction equipment, materials and deliveries, construction workforce requirements, and long-term maintenance requirements (materials and workforce) with diligent prioritization of the Lead Parties' requests and of the NPS Value Analysis Methodology process to the fullest extent possible given the time constraints. Stantec bases its review on observations made at the site visit, the existing materials and discussions provided, and professional judgement from analogous projects.

2 Fish Passage for the Project

As part of the FA-04 Fish Passage Technical Studies Program, HDR conducted an assessment of fish passage facilities of different types. The assessment ultimately resulted in an evaluation of potential for

success for each type (upstream or downstream) based on a feasibility score. The technical development of each alternative was at a feasibility or pre-feasibility level. In this section, fish passage requirements for the projects are reviewed including upstream and downstream passage schemes that appear to have been carried forward as preferred. Specifically, the focus of this discussion is the FSC in Ross Dam forebay including the size, materials, and equipment required for the FSC construction and operation.

2.1 Fish Passage Criteria and Requirements

The 2011 NMFS West Coast Region Anadromous Salmonid Passage Design Manual was utilized in the Final Fish Passage Conceptual Design Criteria Document (DCD) prepared by HDR for the development of the fish passage facilities proposed for the Project. Numerous additional guidelines and criteria used in the design of the facilities were also listed. The design criteria from the 2011 NMFS manual for fish screens, bypasses, fishways (with specific considerations to Lamprey), debris racks, and the trapping and holding of fish were summarized by HDR in Section 4.0 of the DCD Final Draft – Attachment H of the FA-04 Fish Passage Technical Studies Program (HDR 2023). NMFS updated the Anadromous Salmonid Passage Design Manual in 2022; however, the 2022 Design Manual provides similar guidance and criteria for fish passage facilities as the referenced 2011 Design Manual.

The DCD is general in nature, providing summaries of the physical and biological settings, fish passage criteria from the NMFS Design Criteria, and performance criteria including typical at this stage. From our review the information, the criteria identified are typical at this stage of preliminary design not specific enough to provide specific commentary on how constraining particular criteria may ultimately be in the final implementation of the Project. Even the 1,000 cfs attraction flow for the FSC is not based on data specific to the Project but is based on similar successful facilities of this type. The ability to achieve the desired passage efficiencies should be confirmed by studies in future phases of development. Stantec does recommend, however, that a 1,000 cfs attraction flow downstream surface collector in the Ross Dam forebay is an appropriate strategy for downstream collection and is likely to be as successful as other options considered such as the head-of-reservoir floating collection or in-tributary collection options.

2.2 Summary of Proposed Upstream and Downstream Passage Schemes

Two conceptual trap and transport facilities for the upstream passage of fish were proposed in the Final Fish Passage Concept Development Report (CDR) prepared by HDR – Attachment I of the FA-04 Fish Passage Technical Studies Program. The first potential location of the facility is located at the Gorge Powerhouse and includes a velocity/leap barrier, approximately 360 ft of fish ladder, holding gallery, fish lift or lock, sorting station, holding pools, transfer bays, and transport vehicles. The second potential location of the facility is located at Gorge Dam and includes approximately 800 ft of fish ladder, holding gallery, fish lift or lock, overhead transport flume, sorting station, holding pools, transfer bays, and transport vehicles. Both locations of the upstream passage facility are said to require road improvements such as road widening, resurfacing, and additional turn radii for the upstream transport vehicle (HDR 2023). Per the Fish Passage Facilities Feasibility Assessment (Feasibility Assessment) – Attachment K of the FA-04 Fish Passage Technical Studies Program, the Gorge Powerhouse upstream passage facility had a high-level feasibility score of 86 percent and the Gorge Dam upstream passage facility had a

moderate-level feasibility score of 78 percent. The facility at Gorge Dam had decreased ability to meet engineering, constructability, and operational constraints (Factor 1) and to operate in conjunction with existing uses (Factor 2).

Correspondingly in the CDR, HDR proposed the Ross Dam forebay as a potential release location for the upstream transport from the facilities. It was estimated at either upstream facility location the transport duration would be 2 hours requiring fish to be transported via truck on State Route 20 (SR 20) to Diablo Lake, via barge on Diablo Lake, and lastly via truck on the Ross Haul Road to the Ross Dam forebay (HDR 2023).

For downstream passage, the conceptual downstream passage FSC in the Ross Dam forebay was proposed by HDR within the CDR of the FA-04 Fish Passage Technical Studies Program. The proposed FSC facility utilizes pumped flow and consists of a net transition structure, a floating fish collection barge, primary and secondary dewatering screens, fish handling and transfer systems, transport vehicles, and a new road providing improved access to and from SR 20 through the Ross Haul Road for fish transport operations. Moreover, HDR proposed potential transport sequences for the downstream transport from the FSC facility with a SR 20 connection to the Gorge bypass reach or Gorge Powerhouse. Either potential downstream release location will have a transport duration of 3 hours and require the following transport sequence: transport pod guide system, crane/lift/hoist, truck, barge, and truck (HDR 2023). The Feasibility Assessment of the FA-04 Fish Passage Technical Studies Program compared the total feasibility score of the FSC in the Ross Dam forebay with the new connection to SR 20 and without connection to SR 20. The total score of the FSC with connection to SR 20 is 56 percent, and the score without connection to SR 20 is 35 percent due to the significant decreased ability to meet engineering, constructability, and operational constraints (Factor 1), meet usual and customary fish passage performance standards (Factor 3), and adapt to changing environmental and operational conditions (Factor 4) (HDR 2023).

2.3 FSC Size, Materials, and Equipment

From the FA-04 Concept Development Report, the FSC in Ross Lake is proposed to be located in the forebay and designed as a permanent fixture with the ability to be relocated within the reservoir for maintenance or extreme low water level. A specific general shape and size of FSC is not indicated; however, it is assumed to be a rectangular prism barge structure similar to other FSCs in the region and likely ranging from 170’ to 230’ in length by 60’ to 80’ in width by 28’ to 36’ in height. For reference, the Lower Baker FSC is 130’ x 60’ and 24’-6” in height. The Lower Baker project is located approximately 45 miles further downstream from Ross Dam on a tributary of the Skagit River. The facility is also designed for 1,000 cfs through flow; however, the Lower Baker project would likely need to be longer than 130 feet if built today to meet current NMFS fish screening criteria.

As discussed by HDR/Art Anderson the Summary of Access and Infrastructure Requirements for Construction of a FSC at Ross Lake memo, FSC’s are typically fabricated using modular construction so that the modules can be fabricated and initially tested off site. The rectangular modules are then shipped to site for final assembly. Larger modules result in a lighter and smaller FSC structure; however, it is feasible to design and construct modules that would fit constraints of varying proposed access methods. Constraints for the modules could include fitting within the existing haul road tunnel or limiting the total

3rd Party Review of Access Requirements

module weight to accommodate deliveries by helicopter, incline lift, or gondola. The tradeoff with module size is that smaller modules would mean additional time for fabrication and deliveries. An increased number of smaller modules would also cause the FSC to ultimately weight more and will result in a larger and slightly more expensive overall structure. Finally, the increase in number of modules could extend the construction duration for the FSC if the delivery method is limiting (such as if they need to be barged through Ross Lake up to Winnebago flats), though our view is this is not likely to be a limiting constraint in the overall program.

For materials, the modules for the hull of an FSC barge are typically fabricated from carbon steel and finish painted. It may be possible to use alternative materials or barge configurations that would reduce the overall weight. We recommend that the Lead Parties could pursue this at a later phase; however, at this level of development it is not possible to confirm the feasibility of this due to lack of project definition.

For construction, the FSC will require a significant amount of large material deliveries to the final assembly location, whether it be a drydock facility near Ross Dam or the Winnebago Flats location near Hozomeen, BC. The belly tanks, pontoon tanks, and other hull components will represent the largest items, but there will be a significant amount of metal fabrications (such as fish screens), large pumps, other large mechanical and electrical equipment, building components, and other items that need to be brought to site. For equipment, Lowboy trailers or semi-trailers would typically be used to bring in the large equipment. Due to large load size or weight, it is anticipated that some deliveries may have restricted delivery times due to road restrictions. Material and equipment barged from Diablo will also need to consider equipment on the existing haul road that can be used for transfer from the barge. A crane will be required in the FSC assembly area to lift the modules and other large equipment into place. Depending on the construction method, we recommend this is likely to be a boom truck or mobile crane. A tower crane could also be used for this purpose and, if positioned strategically, may offer the ability to assist with deliveries and equipment staging as well as the FSC construction effort. At this time, there is insufficient project detail to confirm all equipment necessary and in many cases this will be the choice of the general contractor.

3 Access Requirements for FSC

Final Liscense Agreement (FLA) Settlement Discussions with Lead Parties prompted SCL to develop a draft Fish Passage Program Proposal in December 2023 with an associated draft Fish Passage Program Execution Timeline including the planning, design, and construction of the FSC (SCL 2023). To support the planning, design, and construction of the FSC explained in the Fish Passage Program, HDR and Art Anderson Associates (Art Anderson) prepared a memorandum on the subject matter of *The Summary of Access and Infrastructure Requirements for Construction of a FSC at Ross Lake* (Memo). It analyzes “general infrastructure, access improvements, utilities, staging areas, fabrication areas, and launch facilities, as well as the heavy machinery, fabrication equipment, office space, and hotel service requirements necessary for the construction and installation of an FSC at the Ross Lake Dam forebay area” (HDR 2024). The Memo discusses three potential FSC construction options described as constructing/launching the FSC 1) at Ross Lake Dam forebay via Dry Dock, 2) at Winnebago Flats via Slipway with Construction Access through Canada, and 3) at Winnebago Flats via Slipway with Construction Access via Ross Lake and a SR 20-to-Ross Dam Connecting Road. The following

3rd Party Review of Access Requirements

infrastructure and site-improvement requirements are listed in the Memo as being common to all methods for construction and production of the FSC:

- Site access near powerhouse intake at the south end of the dam,
- Replacement of the bridge located between the dam and powerhouse intake structure,
- Construction and improvements to permanent infrastructure – construction of a SR 20 access road and road improvements to Ross Haul Road and along the lakefront (HDR 2024).

The Memo expresses heavy reliance on the construction of the SR 20 access road for all three FSC construction options, alluding to what is conveyed in the FA-04 Fish Passage Technical Studies Program addressing the FSC facility in the Ross Dam forebay. In this section, Stantec further assesses the access requirements necessary for the construction and operation of the FSC in the Ross Dam forebay and additional transport options for construction materials, equipment and workforce needs are identified.

3.1 Potential Access Methods

Refer to the attached Table 2: FSC Access Methods for Construction and Operation for a breakdown of access methods reviewed by Stantec as a part of this effort. At a high level, access is required at two critical locations (Ross Dam forebay and Winnebago Flats) for the construction, operation, and maintenance of a FSC in the Ross Dam forebay.

This section will broadly describe the access methods reviewed as well as the construction, maintenance, and potential impacts required for each. Strategies which utilize these access methods are described in the following sections.

3.1.1 ROSS DAM FOREBAY

Continuous and convenient year-round access to the Ross Dam forebay will be critical for long-term efficient operation and maintenance of the FSC. The FSC facility is anticipated to be in continuous operation at all times throughout the year regardless of weather conditions and access to the FSC facility should be either maintainable year-round or have redundancy.

3.1.1.1 SR 20 to Ross Dam – Roadway Connection

A direct roadway connection from SR 20 to the Ross Dam provides the Project the greatest amount of convenient access and flexibility throughout the extended life of the Project during all phases of construction, operation, and maintenance. With properly designed roadway connectivity, all phases of the Project can be supported including the construction, operation, and maintenance of the FSC with minimal future constraints placed on the operations by access considerations.

Based on our site visit and the data provided to our team, roadway connectivity is possible between SR 20 and the Ross Dam, however further study is warranted to determine a viable route given the many topographical and environmental constraints in the area. It is recommended that additional detailed survey of the area be performed in a phased approach as a part of any future route study starting with high-definition aerial topography to facilitate the generation of viable options and followed by a detailed

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ground study along potential routes to validate and then refine the final alignment. A measured approach is recommended for roadway design in this location due to the sensitivity of the area. It is anticipated that approximately 18 months would be required for the design and permitting of an acceptable route in this location.

Construction of this roadway is anticipated to be seasonal based upon weather conditions in the area and will likely span two seasons with establishment of an upper laydown/staging area near the existing parking lot (0.5 to 1.0 acres), pioneering of the road alignment, and cutting grade to the proposed width anticipated to take up the first season, with the second season finalizing grade, paving, and securing uphill and downhill slope cuts/fills taking the majority of the second season. If this route is selected as the sole access method for construction materials, construction of the FSC would be delayed pending construction of this access. The roadway itself could disturb as little as 5 to 10 acres or as much as 30 to 35 acres depending on alignment and slope criteria utilized in the design/construction.

Over the long term a roadway will require snow removal and periodic maintenance to maintain efficient operation. One advantage of a roadway is that maintenance activities would not be anticipated to take the access out of service for extended periods of time.

3.1.1.2 Ross Haul Road Upgrades

Improvements to the Ross Haul Road, primarily safety improvements, support a wide range of options for the construction, operation, and maintenance of the proposed FSC. The haul road is currently utilized by SCL for the operation and maintenance of the Ross Dam and Powerhouse infrastructure and is accessed by boat and barge from the Diablo Dam region. Improvements to this roadway could help facilitate long term safe transport of people and supplies throughout the life of the FSC.

Based on our site visit and the data provided to our team the existing haul road, while steep with tight turns, is sufficient (pending geotechnical confirmation, and tunnel constraint resolution) to support the loads and vehicles necessary to transport construction, operations, and maintenance equipment. It should be noted that the largest loads and modular FSC components will likely require specialized equipment to navigate the haul road and the corners including vehicles with high tractive capabilities and trailers with multiple independently steerable axles to navigate the tight corners.

While the road appears to be in sufficient condition for these activities, given the level of use anticipated throughout the life of the Project including construction and operation, we would recommend that the roadway be improved to increase safety for the long term (50+ years) operations. Initial safety improvements recommended include the addition of guard railing, ensuring a minimum roadway width sufficient for two-direction travel, exploring the ability to widen tight corners, maintaining a stable surface, and addressing the tunnel constraints near the lower docks (see sub-sections below).

Design and permitting of these improvements is anticipated to take approximately 18 months depending on regulatory requirements for permitting but should also be coordinated with the construction contractor to ensure the route meets the requirements of the equipment needed for construction of the FSC. Overall construction of improvements should be assumed to take roughly one season due to limited workspace, the need to mobilize all equipment and personnel by barge and maintaining the ongoing operations of the Ross Dam and Powerhouse.

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Additional disturbance to the area is assumed to be minimal, some widening of the roadway could be mitigated with gabion walls and existing clearings could be utilized for staging activities, primary disturbances may come via methods to enhance or bypass the tunnel restriction.

3.1.1.3 Tunnel Constraint – Ross Haul Road

The primary constraint on the Ross Haul Road is an existing tunnel just south of the barge landings, currently all vehicles and equipment need to pass through the Haul Road tunnel, the dimensions of which are a significant constraint on what can be transported through this route. Through our study we have identified several possible options of various feasibility that could be utilized to mitigate this constraint.

New Barge Dock South of the Tunnel – There is an existing landing south of the tunnel utilized by both the NPS and Ferry service to the Dam that could be improved. Construction of a new barge landing at this location would likely displace the Ferry Landing and/or NPS docks but allow for large loads to completely bypass the tunnel restrictions altogether. Some improvements would be required on this section of roadway to accommodate the larger vehicles, and existing services would need to be accommodated elsewhere. It is anticipated construction of these improvements would take two months, could be constructed with other improvements, but also help facilitate other construction activities by allowing the transport and use of larger construction equipment in the area if needed.

Expanding Tunnel Dimensions – The size of the tunnel could be increased; this would require a detailed evaluation by a geological tunnel specialist to determine the appropriate methods and reinforcement for the expanded tunnel. It is possible that this expansion could require lining the inside of the tunnel for reinforcement but should also be noted that the power line pole directly above the tunnel could cause some concerns with this operation. The tunnel in its existing size does not appear adequate to safely accommodate the full range of equipment needed for construction. It is anticipated tunnel improvements would require 4 months, would take the tunnel out of service for other operations, and may impact the start of other activities.

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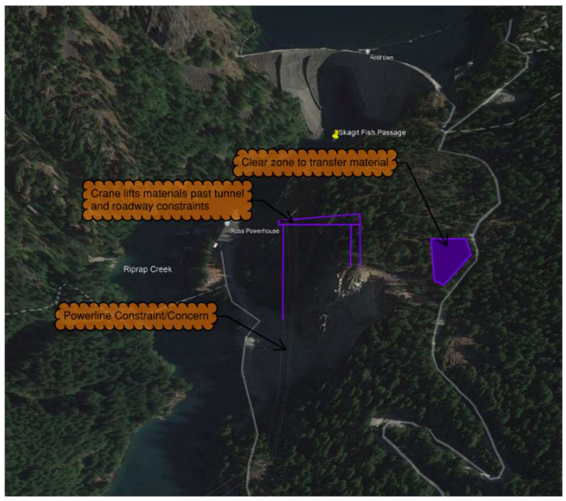

Tower Cranes – Our team explored the possibility that tower cranes in the area of the tunnel could be utilized to avoid both the tunnel as well as the tighter switchbacks ascending the Ross Haul Road. Tower crane(s) would be set up in the approximate area of the rockslide and be used to elevate equipment and material past the tunnel, switchbacks, and steepest gradients. The geology of the rock in the area to support a crane would need to be investigated, power lines in the area would need to be safely navigated, and the logistics of transporting and installing the crane determined. It would require several months to set up the cranes. Note that while somewhat viable, there are significant safety concerns based on the historic rockslide, wind speeds, and proximity to power lines which may make a solution of this kind unworkable.

3.1.1.4 Barging – Existing Access

Barging is currently the methtod utilized to bring people and equipment to the Ross Dam and Powerhouse for all necessary operations. This method is tried and true and has been in operation since the commissioning of the Dam facilities.

Barges are loaded in the area of the Diablo Dam and then transported upriver to the barge landings south of the Ross Dam Powerhouse where they are unloaded and utilize the Ross Haul Road for deliveries.

It is anticipated that this service will be an integral part of any construction strategy and the long-term operation and maintenance of the FSC, including serving as a secondary or redundant method of transportation to other selected options when necessary. There are no additional disturbances or impacts identified beyond what is noted above and the possibility of additional barging capabilities to support operation (size or number).

3.1.1.5 Non-Traditional Access (Incline Lift/Gondola)

These two options are grouped together as their use cases and capacities for the Project share a similar profile. From SR 20 to the Ross Dam an incline lift could be sited (greater impacts) or a gondola system (lesser impacts) which would be feasible for the transport of equipment, personnel, and ultimately fish from the FSC to SR 20 for further transport.

It should be noted that while either may be able to be designed such as to accommodate initial construction loads (30-40 ton FSC components), although it is likely this would ultimately significantly increase upfront costs as well as long term maintenance requirements throughout the life of the facilities. Alternatively, a more modest configuration suitable for the transport of fish as well as personnel, supplies, and maintenance equipment would be beneficial and better balance costs and long-term availability.

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Each option has associated pros and cons as detailed in Table 2, but at a high level a gondola is likely to be impacted by higher winds whereas an incline lift could be more susceptible to interruptions due to winter maintenance (snow on the tracks requiring clearing). The gondola requires clearing around any towers needed for the overhead lines whereas an incline lift requires a straight run to be cleared of vegetation and graded to a relatively consistent grade.

As these are specialty products, as the Project progresses our team recommends that the design team engaging with manufactures of each to determine opportunities and constraints for their use, and how they might fit into the overall Program being developed.

3.1.1.6 Helicopter Access

Helicopter access and delivery of components has been discussed throughout the life of the Project for the delivery of construction equipment as well as other phases of the Project. It is unknown at this time what exactly what fleet could be available but should be noted that their capacity is far less than what is capable of being transported by roadway. Helicopters would also be impacted by wind speed in the canyon.

The largest military grade helicopters have a capacity of roughly 18 tons (far less than the 30-40 ton modules anticipated in the Art Anderson study), while their civilian counterparts often have capacities between 3 tons at the higher end, though Columbia Helicopters has a 12 ton capacity aircraft for specialty operations.

While the Memo discusses the limitations of heavy lift helicopters for initial construction, helicopters should not be discounted for other material deliveries outside of the FSC itself; tower crane components, piles for FSC construction, and other long awkward components may be ideally transported by helicopter for this Project. Helicopters could also prove to be a cost and time saving option for critical supplies when barging capacity is being utilized by other needs.

3.1.1.7 Railway from Diablo

Based on the historical knowledge that the Ross Dam utilized a railway for initial construction, Stantec looked at the possibility of re-establishing the rail line to potentially mitigate some of the impacts of other options. Based on discussions with NPS staff and limited historical records this does not appear to be a viable option to pursue further. The historic rail line ran along the north bank of the river which would still require transport to the south bank, and based on limited evidence of a historic rail bed it is assumed that the old alignment is currently submerged.

We do not believe that further discussion of this option is warranted as no existing alignment exists and the construction of a new alignment is likely to exceed the time, complexity, and impacts of all other options.

3.1.2 WINNEBAGO FLATS

While there are options in the HDR studies that avoid Winnebago Flats for the initial construction of the FSC, and it is understood that there may be US-Canada issues at play outside the expertise of this

analysis, it seems apparent at face value that Winnebago Flats provides the greatest opportunity for the staging, construction, and launching of a new FSC in Ross Lake due to existing land access, and as the only location on the lake with relatively flat ground near the water's edge. To this end access would be required for the initial construction of the FSC but not necessarily beyond.

3.1.2.1 Silver Skagit Road – Existing Access

Based on our current understanding, Silver Skagit Road is capable of handling the traffic required for the haulage of the majority of FSC components in its current state and all necessary components after construction of a temporary bridge to address the notable 30-ton limitation of one bridge along the route. Cross-border transportation issues are outside the scope of this analysis, but it is assumed for this discussion that those issues will be addressed.

Use of Silver Skagit Road would allow for the start of construction on the FSC 'immediately', as in no other access options need to be completed before the contractor can start the process of establishing construction sites, staging areas, and work camps. The contractor would be able to begin building support facilities on day one while any constraints to the delivery of the FSC components are being addressed.

We recommend the use of a temporary bridge to bypass the existing weight restricted bridge and thus allow for the efficient transfer of materials to the construction site. The road itself should be maintained in its current condition (this would likely require a crew monitoring and addressing erosion and sedimentation) and not upgraded to a paved road unless required to by the BC government. Additional restrictions may be imposed and we recommend the parties begin a dialogue with BC/Canada to facilitate these discussions and obtain an understanding of what is possible.

Based on our review, while not the only option, it is our belief that use of Silver Skagit Road is the most viable link for efficient construction of the FSC, all other options are likely to significantly increase construction time, complexity, and logistical burdens on all parties.

3.1.2.2 Barging – Improved Access

Refer to section 3.1.1.4 for a description of existing barging along Diablo Lake. A similar link in the supply chain could be constructed for Ross Lake to facilitate the barging of materials between the Ross Dam and Winnebago Flats to the transport of materials.

Disturbances will be required at both ends of the Ross Haul Road for the construction of new ferry docks which will need to be designed to accommodate the fluctuating water levels in the Ross Lake, staging would also be recommended so that material could be stockpiled to maintain continuous barge service as 'on time delivery' is likely to be a schedule constraint during construction. Due to the difference in barging distance below and above the Ross Dam, it is possible multiple barges may need to be employed on Ross Lake to facilitate efficient delivery of supplies and materials.

3.1.2.3 Helicopter Access

Refer to Section 3.1.1.6 for discussion related to the availability and limitations of helicopter use for access to the Winnebago Flats area. As stated above it is assumed that helicopters could be utilized for

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time sensitive material delivery when other options are over utilized, or for delivery of components that are long or awkward to transport by land.

3.2 Transport Considerations

There are multiple access options available to support field studies, construction, operations and long-term maintenance requirements. Since the reality of a program to restore a viable fish population and migration process is going to span several decades, it is logical to assume that any proposed transportation methods might become less or more meaningful over time. Given the mountainous location it is appropriate to look at multiple transportation options that could be utilized in whole or in part, as potential multiple options for any or all access requirements. During construction phases, there will be an almost daily need for access of labor personnel, equipment, permanent and non-permanent materials, and supplies. In this dynamic, it is appropriate to utilize multiple transportation options, including helicopter airlift, possibly an inclined lift, new access from SR 20 to Ross Dam, potential improvement and limited access via Ross Haul Road and potentially access via Canada to the Northern upper end of Ross Lake. Once on site, the contractor will likely use (tower, maybe) cranes, boats and barges, trucks, trailers, RT Loaders and crawler excavators to accomplish the construction tasks.

Helicopter airlift is restricted by weight and weather. However, by eliminating the need for complex rigging systems, helicopters reduce the risks associated with lifting heavy materials and equipment. In addition, aerial transportation reduces the likelihood of accidents caused by ground vehicles, such as collisions and overturning. Helicopters can easily lift loads in the range of 3,000-6,000 lbs, up to loads of 25,000 lbs. (Sikorsky S-64E & S-64F Skycranes), or more.

Another transportation option that merits consideration and field study is the incline lift option, specifically at Ross Dam. Conceptually, this incline lift apparatus would be situated between SR 20 and an appropriate location/elevation near the Ross Dam site. A positive for the construction of the incline lift is that its footprint is in the range of 1-3 acres at most. It would be capable of operating in times of high winds and weather more so than a helicopter service and cost to operate over time would be considerably less than other options. The incline lift option could be versatile enough to transport workforce, materials, and even smaller pieces of equipment and supplies. Track systems are available that can be curved and/or straight-line orientations.

In general, it should be anticipated that multiple options would be ideal for the construction of the FSC as well as the operation and maintenance over the life of the Project, some options are suited for initial construction, but not ongoing operations, while others will ideally support the operations of the FSC, but not address the requirements of the FSC’s initial construction. The next section discusses possible combinations of strategies that could be utilized throughout the life cycle of the Project but will need to be better defined as the ultimate program evolves.

3.3 Concept Access Strategies

It is both unlikely and impractical for a single access strategy to meet the ultimate requirements for construction, operation, and maintenance of a new FSC alone. The usage and load profiles required between initial construction and O&M functions vary significantly such that a solution for construction may

far exceed that needed for long term O&M leading to higher maintenance needs long term, while a solution for O&M may not meet the requirements of initial construction. Additionally, all access strategies require ongoing maintenance and upkeep which can take them out of service during which time a secondary redundant access route may be desirable.

For example, in the case of an incline lift or gondola; upsizing to meet the load capacities required for initial construction would represent a significant additional investment upfront and increased long term O&M costs during an operations period when that additional capacity is no longer required. Additionally, the lift or gondola will require periods of more extensive maintenance during which time it would be out of service requiring a secondary route to maintain FSC operations.

The following examples are intended to illustrate potential combinations of options which may be employed to accommodate the life cycle of the FSC. Depending on the unique factors of the Project, many of which may be discovered/encountered as the Project progresses, additional options or combinations are likely to exist as well, this is only a few examples to assist the parties in long term discussions. Table 1 gives an estimate of cost rankings for potential access methods.

3.3.1 EXAMPLE 1 – ALL LAND ACCESS

All Land Access for the construction, operation and maintenance of the FSC could be accomplished by use of existing land access from the North and South of Ross Dam as well as the construction of the new roadway from SR 20 to the Ross Dam. It would seem to be plausible to improve the existing southern land access to the Ross Dam area via the Ross Haul Road as a secondary form of access, and likely initial access for construction activities prior to the completion of the new upper access roadway. The new upper access roadway would serve as the primary access route for construction activities at the Ross Dam as well as the operations of the new FSC. At the southern end of the Ross Haul Road, the ferry dock on Diablo Lake could be upgraded (as needed) to allow for the loading/unloading and barging of materials, personnel, and fish transport containers south to a similar loading/unloading landing at Diablo Dam as a secondary route in the event that the upper access road is closed due to weather or maintenance. From either point, the cargo would be placed on a truck that could then access SR 20. This process could be reversed for transport up-river. At the northern most reach of the Ross Haul Road a similar docking facility could be constructed that would allow for barge access to the FSC for construction, operation and maintenance. This would serve as added redundancy for FSC access. It is important to note that upgrades would need to be studied to enhance both safety and drivability of the Ross Haul Road. Time studies and handling logistics would also need to be analyzed for pre-determined windows available for fish transport.

Along with the utilization of the Ross Haul Road for barge access, it would need to be coupled with access from Canada via Silver Skagit Road to Winnebago Flats as discussed in Section 3.1.2. This access would serve primarily as a staging area for construction of the FSC and be a workcamp location for contractors and oversight personnel. As noted previously, the Silver Skagit road would require a temporary bridge to be constructed to allow for transport of oversize/overweight loads and other miscellaneous materials and supplies.

This combination utilizing the Silver Skagit Road for initial construction, the Ross Haul Road for deliveries during construction prior to upper access construction, and eventually the upper access road for

deliveries and long-term operations provides the team with a great deal of long-term flexibility with the notable impacts caused by the construction of the upper access roadway.

3.3.2 EXAMPLE 2 – ALL-IN: LAND, AIR, AND RIVER

The All-In approach is a comprehensive approach designed to circumvent the need for a direct SR 20 to Ross Dam upper access roadway and mitigate some of the disadvantages of the low impact approach described in the next section.

Construction of the FSC would be accomplished by use of Silver Skagit Road as described above for the majority of construction equipment and materials. The Ross Haul Road would be improved along with the ferry dock to facilitate the transport of more common materials as well as personnel, and ultimately serve as a secondary form of access through the life of the Project.

Finally, an incline lift or gondola would be constructed from SR 20 to the top of Ross Dam while the FSC is under construction, if completed during construction this could facilitate some construction deliveries but would primarily be intended to facilitate the operation, maintenance, and fish transport activities of the FSC through the life of the Project, allowing supplies, components, and fish to be transported in a timely manner directly to SR 20 avoiding the Ross Haul Road and delays barging could create.

The primary draw of this is to avoid the connection to SR 20 via roadway and replace that alternative with a variety of solutions to ensure efficient long-term operation of the FSC.

3.3.3 EXAMPLE 3 – LOW IMPACT

The low impact option is intended to produce the minimal impact to the current area to achieve the construction and operation of a new FSC. In this scenario the existing Ross Haul Road is improved as well as the ferry dock at the lower end, materials are available to be delivered from this area for O&M and as a secondary delivery point during initial construction.

With this access route constructed, Silver Skagit Road would still be utilized for the primary construction of the FSC, setup of the construction camp, and delivery of critical components. The river and barge route from the south could be utilized to transport personnel as well as smaller construction components.

Operation of the FSC would be through the barging infrastructure in existence and improvements to the ferry landings. This would likely result in more complicated operation and maintenance as well as fish transport similar to the conditions currently experienced by the Ross Powerplant and Dam but would avoid additional disturbances from incline lift or gondola construction. No direct access from SR 20 to the Ross Dam would be constructed.

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Table 1. Cost Ranking of Access Methods

Access Method	Cost Ranking (Least to Most expensive)	Relative Costs
Helicopter (Construction of helipads/facilities only)	1	$-$$
Access through Canada to Winnebago Flats	2	$$
Improvements to Docks and Ross Haul Road	3	$$-$$$
Access Road from SR 20 to Ross Dam	4	$$$ (w/ blasting)
Incline Lift	5	$$$-$$$$ (w/ blasting)
Cabled Gondola	6	$$$$-$$$$$

4 FSC Construction and Operation

The concept development of the FSC at Ross Dam within the CDR prepared by HDR outlines key constructability components of the FSC in Ross Reservoir and installation in the Ross Dam forebay. The worker safety concerns identified include the Project being in a remote location resulting in worker safety, delays, and cost risks. Requirements for laydown and staging include the requirements related to the three FSC construction options discussed in the Memo by HDR/Art Anderson. Existing infrastructure interference identified include improvements to existing access routes, utility considerations, and reconstruction of roads. As a result, these components may allow for geotechnical or geologic restraints in the development of the FSC. Overall, the constructability components of the FSC outlined in the CDR reflect those discussed in the Memo. The Memo states the following construction and operation requirements common to the three potential FSC construction options proposed by HDR/Art Anderson:

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- Modular construction of the FSC
- Staging area near powerhouse intake at the south end of the dam
- Building accommodations for workers
- Cranes for placing the FSC modules
- Power to support construction
- Installation of mooring infrastructure, debris booms, and net systems
- Improvements on the shore for a facility (including boat launch) to transfer fish from FSC to transport vehicle at Ross
- Construction and improvements to permanent infrastructure – construction of a SR 20 access road and road improvements to Ross Haul Road and along the lakefront – to support fish facility construction and operation

In addition, the CDR discusses the operation and maintenance needs for the FSC in more detail than as discussed in the Memo. Such discussion in the CDR includes the need for the facility to be fully manned and staffed year-round, with additional staff required for larger efforts including increased fish passage, inspections, and maintenance, as the FSC would be designed to operate year-round. Maintenance needs are summarized as regular, annual, and infrequent. Regular maintenance includes inspection, cleaning, and/or lubricating of equipment, remove debris from the boom, holding gallery, and transport pods, inspect debris screens, clean debris off access roads and walkways, test ballast system, monitor the freeboard of the facility, and vehicle maintenance. Annual maintenance includes the activities which help to ensure the components of the facility are functioning as they should to prolong the life of the FSC, and infrequent maintenance include activities which are conducted on an as-needed basis. Stantec further evaluates constructability assumptions, viable access considerations (including staging needs), and information on the size of workforce regarding number of workers for construction and operation of the Project throughout this section.

4.1 Staging and Laydown Considerations

The FA-04 Concept Design Report recommended two potential construction options for the FSC in Ross Lake:

- Building the FSC on the north end of Ross Lake and floating it into place in the final location in the Ross Dam forebay, or
- Constructing a large floating drydock near the Ross Dam from a mobile modular barge system to then build and launch the FSC.

In all cases, a dedicated staging and laydown area will be required to receive store deliveries and staging of construction activities at the Ross Dam. The staging area is ideally at the same or located within a very

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short distance of the actual construction area, likely situated approximately at the high-water elevation for the lake with a ramp to (and into) the lake as well as provisions for barging operations.

For drydock construction at the Ross Dam HDR recommended an approximate one-acre area will be required for the assembly of the FSC adjacent to the lake, similar to a small shipyard. It may be possible to combine staging and laydown with the construction activities building the FSC within that acreage, but it is also likely that a separate staging area (possibly the already cleared area uphill of the dam) will be needed to receive land deliveries to reduce the requirements on the shoreline facilities, particularly if an offshore constructed method such as a drydock is used for FSC construction. Some limited staging at the area near the powerhouse intake at the south end of the dam is also discussed as an option.

For staging and laydown, HDR noted that there is adequate area for staging/construction activities at Winnebago Flats and laydown area near Happy Creek. This assumes some combination of deliveries through Canada via the Silver Skagit Road or barging of equipment and materials through the Ross Reservoir. It is assumed this staging area could be constructed within the area surrounding Winnebago Flats either by clearing additional land or use of coffer dams (or a combination thereof).

We recommend that a 0.5-1 acre staging area of relatively flat surface will be required for the Project at the Ross Dam waterfront regardless of where the FSC is constructed (figure below). For interim deliveries near Ross Dam, we also recommend that the existing spoil area along the lower haul road between the existing boat landing and Ross Dam could also be considered for development as a staging and laydown area (photo next page).

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4.2 Workforce Considerations

The LPs requested a review of the workforce requirements for construction and operation of the Project. There are three distinct needs for workforce, each considered separately below: (1) workforce during FSC construction, (2) day-to-day operational workforce, and (3) periodic workforce needs for long-term maintenance and improvements.

4.2.1 CONSTRUCTION

For the sake of this discussion construction costs for passage facilities only are taken to be $400-$425 million, based on HDR OPCC data from June 2022. For reference, the approximate costs for Diablo and Gorge are taken as $370-$390 million and $220-$240 million respectively. The Ross Lake upstream and downstream construction would likely be with a workforce of 30-40 personnel (craft and management) working between both locations on Ross Lake depending on the scheduling of work. In addition to the on-site craft and management there would be material and supplier personnel and equipment coming and going on an almost daily basis. The anticipated construction and commissioning of the FSC system would have a duration of approximately 3.5 years, which would translate into 3 plus construction seasons. This would mean an average billing of $16-$20 million per active month of construction at Ross Lake/Dam. During construction season, work would likely be scheduled on a six-day week / 10 hours per day minimum.

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For the construction phase, it is important to stress the importance of staging, laydown and fabrication areas. These advance logistics decisions will be critical to the timing of work progress. As much information and suggestions for options and potential locations that can be vetted by program designers and planners will facilitate a clear path to successful logistical support for the Contractor. In addition, it is recommended that consideration of alternative construction delivery methods should be studied and discussed as a means of providing the best quality, on time delivery, and overall cost of a very complex and important project.

4.2.2 OPERATION

Based on the fish periodicity provided in FA-04 Fish Passage Assessment Gorge Bypass Reach, the FSC will require nearly continuous year-round operation. SCL will need to maintain a dedicated staff to operate and service the facility. Operational staff will likely access the FSC daily (minimum 3-4 days per week during slower periods). To support this, a crew of 3-5 FTEs will be needed for the FSC operations, with temporary or seasonal workers employed on an as-needed basis during large fish migration windows or at times where substantial identification or enumeration needs are presented. SCL will also need a dedicated maintenance staff, 2-3 FTEs, to support regular servicing and repairs for the life of the Project. Access for maintenance staff may not be daily, but likely average 2-3 times per week per FTE. Finally, SCL will need to employ drivers for haul trucks. We estimate 2-3 drivers and accompanying vehicles will be needed to support the operations. There may be opportunities to subcontract with a trucking or transportation firm to provide drivers.

4.2.3 MAINTENANCE

In addition to regular maintenance for operations, the downstream collection system will require periodic improvements and upgrades to replace wearable large infrastructure such as guide nets, replacing larger mechanical equipment that has reached its useful life, or facility updates based on changing technology or operational best practices. For these purposes, access for occasional larger work crews and equipment needs to be accommodated. We anticipate maintenance access for large vehicles and equipment at these approximate intervals:

- Annual or biannual maintenance requiring a construction crew of 3-4 individuals for periods of 1-3 weeks, accompanied by limited equipment and material deliveries. Work likely performed by SCL or preferred subcontractors.
- Less frequent (3-5 year) upgrades requiring similar size construction crews (3-4 individuals) but with greater work periods (1-2 months) and requiring larger material deliveries and coordination. Work likely performed by a specialized contractor.
- Longer term upgrades (5-10 years) requiring larger construction crews (6-8 individuals) and with greater work periods (3-6 months), requiring significant material deliveries and coordination. Work performed by a general contractor with multiple craft labor components.

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4.3 Construction Cost Review

Construction cost estimate for a workcamp scenario associated with providing northern access to Ross Lake (via Canada road infrastructure) would have an initial staging and operational setup cost of ~$500,000 to ~$750,000. On site staging costs for laydown and storage, temporary docking and boat launch facilities, granular roads (new and improved) and parking areas and other support facilities would cost in the ~$250,000 to ~$450,000 range. Operational costs, including fabricated building and equipment (including consumables) would cost ~$85,000 to~$110,000 per month during months of construction activity (6-8 months per calendar year). During months of shutdown, costs would lower to a range of ~$35,000 to ~$50,000. These projected costs would accommodate a working crew of 40 to 50 individuals including craft, supervision, management, and necessary support. The workcamp personnel would also be getting additional compensation for travel and other “out of town” expenses that would be determined by the eventual Contractor. These additional compensations would be accounted for as General Project (Overhead) costs and spread across construction activity costs determined by the scope of work required by design. Providing access to the north end of Ross Lake would also require costs for maintaining and restoring damage to existing roadway surfaces along with temporary bridge structure. This cost over a two to three period would be in the range of ~$1.5 million to ~$2.0 million. If it is desired to have a major access road upgrade for planned major access, perhaps in lieu of a SR 20 connection to Ross Dam, then the Silver Skagit Road upgrade costs for the 25–30-mile stretch could be as much as $25 – $50 million. There are several access options discussed in other sections of this report and summarized in Table 2. Additional study and discussion will be necessary to accurately determine the viability and constructability of any proposed access options. However, it should be suggested that a prudent approach to access for construction and operational phases might be best served with a combination of more than a singular method or point of access. Even with a compressed schedule, the durability of selected access methods, and their annual projected O&M costs will be important considerations in selecting the proper method.

A high-level review of the various Opinion of Probable Construction Costs (OPCC) was conducted for the various potential fish passage facility alternatives (FA-04, Study Report, 1 of 3, Attachment I, Fish Passage Facilities Alternatives Assessment-Concept Development Report Final, 4.0 Anticipated Costs for Fish Passage Facility Operation and Construction, Section 4.1 of the CDR). The basic elements used to develop these OPCC estimates were stated to be cost accuracy, direct costs, and indirect costs. These elements are discussed in OPCC Sections 4.1.1.1, 4.1.1.2 and 4.1.1.3. Major assumptions are presented for Ross, Diablo and Gorge Developments (OPCC Tables 4.1-1, 4.1-2 and 4.1-3).

The descriptions of elements that typically make up the OPCC estimate generally appear to be both reasonable and proper. However, the discussion of Indirect Costs (4.1.1.3) does not seem to include major General Condition elements that we typically find included in cost estimates. These would include Project Management-personnel and vehicles, Field Engineering-personnel and vehicles, Surveying-Crews, supplies, vehicles, Safety-personnel, vehicles, supplies, medical exams, testing, etc., Onsite Administration personnel and vehicles, Administration Costs-office supplies, trailers, office furniture, copy machines, electrical service, trash service, sanitary service, etc., and Equipment Support Costs-personnel and vehicles, misc. support equipment such as welders, compressors, power washers, lube trucks, light plants, storage containers, etc. Given these considerations, the cost for General Project Conditions could be more accurately expressed, as a percentage, based on the cost range of the individual OPCC (Class 4-5). As an example, $100 million or less is usually in the range of 20-25% and $100 million to $250

million in the range of 15-20%. This very general simplification has relevancy only for projects where there is a significant Labor (craft) resource requirement, and a matching Equipment and Materials resource component.

5 Project Timeline Evaluation

McMillen – in collaboration with USFWS, NMFS, and USIT – reviewed FLA documents submitted by SCL, which included the Fish Passage Program Execution Timeline. McMillen prepared a preliminary document (McMillen Gantt Chart) in June 2023 consisting of a schedule and attendant task notes. The McMillen Gantt Chart entails general tasks including forming a fish committee, conducting studies, initiating and developing study plans, compiling baseline formation and reporting, the design, permitting, and construction of juvenile and adult facilities, the design, permitting, and construction of access road improvements between Ross Dam and reservoir, and developing and implementing a master monitoring plan. The attendant task notes briefly detail the major items on the schedule and what the tasks consist of. In Stantec's request for additional information on April 19th, 2024, McMillen provided a marked-up copy of SCL's Fish Passage Program Execution Timeline Rev4.1 dated August 2023. This document assisted Stantec with background information on how the top task durations of McMillen's timeline were determined. The McMillen Gantt Chart includes fish passage developments at Gorge, Diablo, and Ross Dams and is a schedule that renders the completion of the Project in approximately 17 years.

Prior to the December 2023 Settlement Discussions regarding the FLA, NMFS and USFWS drafted a Fish Passage Program Proposal (Proposal) with a terms and conditions schedule (NMFS 2023). As stated by NMFS and USFWS, the outcome goal for fish passage is to "achieve viable, self-sustaining, naturally reproducing, harvestable populations above Gorge Dam" (NMFS 2023). This goal is achieved through the development of the fish passage program as described in Section 2 of the Proposal, the effective and timely design, construction, and operation, including the obtainment of required permits, of passage facilities at each facility for upstream and downstream collection and transport of fish outlined in Section 3, and the effective development of fish passage monitoring, adaptive management, and reporting detailed in Section 4 of the Proposal.

In response to the settlement discussions, SCL developed the draft Fish Passage Program Proposal with an associated draft Fish Passage Program Execution Timeline Rev7.0 dated November 2023 (SCL Gantt Chart), which included the planning, design, and construction of the FSC (SCL 2023). The most recent revision was completed in April 2024 to include predecessor relationships between different tasks as requested by Stantec on April 19th. The SCL Gantt Chart includes five comprehensive tasks – Phase 1 Fish Passage Program Development, Phase 2 Pilot Program, Phase 3 Construction and Operation of Ross Downstream and Gorge Upstream Fish Passage Facilities, Phase 4 Construction and Operation of Other Fish Passage Facilities, and Annual Reporting – that have subtasks detailed within each. This timeline includes fish passage developments at Gorge and Ross Dams, and it is a schedule that renders the completion of Phase 4 in 47 years.

This section presents Stantec's evaluation of the two Gantt Charts provided in terms of McMillen's and SCL's construction timelines, including the Ross Dam site access and FSC facility, and assessment of opportunities for an expedited construction timeline that meets the goals for the Project.

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5.1 Construction

The SCL Gantt Chart is an all-inclusive list of all tasks that may or may not be necessary to successfully execute, to completion, the establishment of sustainable fish passage operations. This timeline is generally a linear timeline that is not necessarily in the most opportunistic sequence. In an initial review of the durations listed for various tasks, they appear to be mostly reasonable assumptions of time required. We further noted that there appear to be multiple opportunities for shortening the overall timeline, utilizing concurrent activity and early start processes. The concurrent and optimal sequencing of tasks should, with proactive discussions and collaboration among stakeholders, result in significant decrease in the overall Program timeline.

The McMillen Gantt Chart contains multiple simultaneous tasks to shorten the overall Program duration. The durations for a majority of the "key tasks" seem to be in line with the SCL durations. The most obvious difference between the timescales is the apparent lack of recognition for a "pilot program" in the McMillen schedule, as in the pilot program facilities are permanent. The Phase 2 Pilot Program is basically a 10-year task in the SCL Gantt Chart. Durations for other components of the SCL and McMillen, such as SR 20 Access Road, Design & Construction of Ross Downstream facilities and Upstream Gorge facilities, and Habitat and Passage Studies, are basically the same. Aside from the absence of a Phase 2 Pilot Program the additional compression of the McMillen Gantt Chart timeline results primarily from assumption of six months of early start activities prior to issuance of the License, concurrent construction activities, and early start of construction during design by use of partial design components issued as complete for construction.

Based on observations made, it is reasonable pending a more detailed scheduling analysis that an overall Program schedule, inclusive of a pilot program of 7-10 years, could produce a 30-to-35-year duration for the implementation of overall Program. This would include Studies, Design, Construction, Testing and Commissioning. A reduction of overall Program duration could be realized by devising an accelerated plan to construct pilot program facilities that incorporates a "risk/reward" scheme to reduce schedule delays or incentivize an accelerated construction activity. In our opinion, a pilot program has the potential to be highly consequential for the success of the overall Program and along with critical pre-construction analysis and sequencing.

McClure and Others, in an April 2018 NOAA Technical Memorandum, stated that the "apparent uncertainty of established best practices for the introduction of salmonid populations suggests that additional study and meaningful pilot programs are necessary". With this being case, the Pilot Program infrastructure should be designed, constructed, and operated in a manner that would facilitate it being incorporated into the permanent facilities.

5.2 Permitting & Regulatory Approvals

Agency and FERC reviews and approvals are appropriately built into the schedule to occur at the major milestones/decision points: pilot project results, license amendment(s), and on the design of the access and FSC. Permitting and regulatory approvals involving the government of BC or Canada was discussed between the Lead Parties and Stantec at only a high level to acknowledge that governmental coordination will be needed not only for construction permitting (e.g. site access, temporary bridge, laydown area) but

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also to approve or facilitate the movement of materials, equipment, and workforce during construction. Long term operation and maintenance of the FSC is not anticipated to involve access through Canada.

Construction-related permits and associated durations is assumed to place similar (relative) requirements on the Project and impacts to schedule, regardless of the access alternative or combination of alternatives.

Schedule impacts for construction permitting under each access alternative is noted in Table 2. However, in all alternatives schedule impacts would be minimal relative to the overall duration indicating this parameter is not significant to comparing the various access alternatives or evaluating schedules, i.e. permitting is not a long duration item relative to other issues.

6 Next Steps

To advance the understanding of the options presented above, the following is recommended over the next 12 months to narrow the range of variables with respect to costs, schedule, and constructability, and potentially select preferred project alternative.

6.1 Concept Feasibility Study (Design, Costs, Schedule, and Constructability)

Stantec recommends a Concept Feasibility Study be performed that focuses on evaluating the two routing options (US and Canadian access) to determine a preferred alternative, specifically related to project costs, schedule, construction challenges, risks, and access limitations.

From a cost and schedule estimate perspective, Stantec recommends:

- Retain a consultant to perform a Concept Feasibility Study to advance up to two routing conditions for (i) primary construction access and (ii) long-term operation and maintenance (O&M) access.
    - Primary Construction assessment would focus on elements related to the development of a conceptual cost estimate and logic-sequenced schedule to facilitate construction of a FSC, including the engineering design, permitting, construction, pilot program, and long-term operations, considering:
        - Access to Ross Reservoir though Canada
        - Access to Ross Reservoir from US locations
    - Long-Term Operations & Maintenance assessment would focus on the development of a conceptual cost estimate and logic-sequenced schedule to perform O&M activities to sustain long term efficient project operation, assuming:
        - Access to Project through a US approach point

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- Development of a Design Concept Report (DCR) that includes routing design alternatives, FSC criteria (installation, modularity, assembly), special cross-border design requirements, and other construction-related assumptions. This activity includes:
    - Engagement by a construction contractor to develop indicative construction costs and a logic-sequenced schedule for major construction elements.
    - Engagement with a gondola manufacturer to determine if this alternative is a viable option, including providing an indicative cost estimate.
    - Engagement with an incline lift manufacturer to determine if this alternative is a viable option, including providing an indicative cost estimate.
    - Engagement with an FSC contractor to determine if this can be constructed in a manner that meets access and construction constraints, including providing an indicative cost estimate.
    - Working with Lead Parties to develop a draft “Pilot Passage Program”, including a milestone schedule and measures of success.

6.2 Permitting, Regulatory Approvals, and Other Schedule Considerations

To address overall permitting schedule challenges, Stantec would recommend a subgroup of representatives be convened to:

- Identify and refine the major regulatory and permitting schedule requirements to determine realistic (and opportunistic) timeframes to streamline permit approvals.
- Identify what actions are required to address permitting schedule unknowns (i.e., study results, additional data collection, advanced design elements).
- Note it is anticipated this element would also identify the time requirements for obtaining approvals for any work being performed or authorized in Canada.

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Table 2. FSC Access Methods for Construction and Operation.

Access Method	Assumptions	FSC Construction Access					FSC Operations Access			
		Supported FSC Construction Methods	Advantages	Disadvantages	Time to Construct	Disturbed Area	Advantages	Disadvantages	Time to Transport	Disturbed Area & Aesthetics
No. 1 Access at Ross Dam Forebay via New paved Road Connection from SR 20 [1,2]	• New asphalt/concrete road between SR-20 and connection with existing haul road, suitable for snowplow access and complete with vehicular guardrail where needed. • Maximum slope 10%. • Suitable route to be identified in coordination with NPS. • Construction methods still TBD, but may require rock blasting, retaining walls, and/or other slope stabilization methods.	• Floating Drydock in the Ross Lake Dam Forebay (HDR Option 1) [1]. • Construction Access at Winnebago Flats via water transit across Ross Lake (HDR Option 3) [1]. • Provides greatly improved access to forebay for installation of Guide Nets, FSC Mooring Systems, and other shore-side facilities for FSC.	• Supports daily, all-season access for construction and will very likely expedite construction timelines. • Allows for large and/or heavy loads to be readily delivered to the Ross Dam Forebay area. • Ability to mobilize vehicles and vessels for transport of materials and equipment to Ross Dam vicinity without transit through Canada via Silver Skagit Rd. • Ability to mobilize vehicles and vessels for transport of materials and equipment to Ross Dam vicinity without tunnel restrictions on existing Ross Haul Rd. • Supports access for construction crews from US-based locations.	• Routes will need to be carefully considered due to steep terrain and potentially unstable subsurface material. • Safety concerns for vehicle operations during winter months.	• Design & Permitting: 18 Months • Const. Duration: 2 Seasons • Overall Construct: 2 Seasons	• Upper staging area 0.5 - 1.0 acre. • Roadway Disturbance: 5 to 10 acres (minimum); Laid back: 30 to 35 acres.	• Supports daily, all-season operational access by personnel, vehicles, and equipment. • Allows for large and heavy loads to be readily delivered to the FSC shore-side area in support of maintenance activities. • Supports minimizing haul times for fish transport operations.	• Routes will need to be carefully considered due to steep terrain and potentially unstable subsurface material. • Road may be subject to rock fall, landslides, tree falls, or other natural causes that will require periodic maintenance and reconstruction efforts. • Creates disturbance to natural environment in vicinity of the road including noise, air pollution, and potential for habitat disruption. • High maintenance costs for clearing, plowing, and ice management during winter months. • Safety concerns for vehicle operations during winter months.	• Estimated total fish transport time <1 hour between shore offload from FSC and release location.	• Creates a minimum 5-10 acres disturbed area for the road, up to 30-35 acres depending on construction method. • Road will be visible at turnout from SR 20, but otherwise likely obscured in the trees.
No. 2 Access to Ross Dam Forebay via Diablo Barge/Boat, improved Ross Haul Rd [2]	• Haul road is improved to support construction and eventual daily, all-season access. Road is assumed to remain in current location. • Future operational access for FSC would remain similar to current operations, which personnel arriving by jet boat from Diablo. • Option could be combined with other options to bring heavy material around the tunnel restriction on Ross Haul Rd.	• Floating Drydock in the Ross Lake Dam Forebay (HDR Option 1) [1]. • Provides greatly improved access to forebay for installation of Guide Nets, FSC Mooring Systems, and other shore-side facilities for FSC. • Provides somewhat improved access to forebay for installation of Guide Nets, FSC Mooring Systems, and other shore-side facilities for FSC, but still limited by tunnel and haul road grade.	• Improved haul road would support better personnel and equipment access during construction. • Minimizes new road requirements.	• Capacity limitations due to barge capacity, load/unload time, and tunnel limitations. • Assuming 5 FSC modules moved per week, thereby approximating 5 months to move all FSC modules to construction site. • Ross Haul Rd is too steep, making the drive weather dependent. • Limitations of the tunnel could necessitate smaller FSC modules and add cost and time to the build. • Additional daily time for construction crews to transit from Diablo every day.	• Design & Permitting: 18 Months • Const. Duration: 1 Seasons • Tunnel Improves: 4 Months • Overall Construct: 1 Season	• Lower staging area uses existing. • Roadway disturbance: minimal (upgrading).	• This is the current mode for access to Ross Dam. SCL has existing transport vessels and equipment suitable for this method.	• Ross Haul Rd is too steep, making the drive weather dependent. • Haul road and tunnel restrictions will restrict the ability to perform larger scale long-term maintenance.	• Total fish transport time between 1-3 hours. Requires use of haul road, jet boat to Diablo, and reloading onto a truck road for final transport to release location.	• Minimal additional disturbed area – roadway widened and improved for safety. • Existing haul road visible in locations – same as current.
No. 2a Avoid Ross Haul Rd tunnel by use of Ross Lake Ferry landing location [2]	• Use the existing ferry landing and NPS docks to allow large loads to avoid the tunnel without improvements. • Ferry access will still be required during construction.	• Floating Drydock in the Ross Lake Dam Forebay (HDR Option 1) [1]. • Construction Access at Winnebago Flats via water transit across Ross Lake (HDR Option 3) [1].	• Tunnel improvements not required to facilitate the delivery of larger FSC components. • Utilizes existing access to the water.	• Requires construction of a new barge landing likely in place of the existing Ross Lake Ferry Landing and relocation of the Ferry Landing. • Drive to ferry landing and first 'hairpin turn' may require widening.	• Design & Permitting: Part of other options. • Const. Duration: 2 Months	• Minimal additional disturbance to widen road and turns.	• Augments option No. 2 by bypassing the existing tunnel allowing for the delivery of larger sized loads.	• Ross Haul Rd is too steep, making the drive weather dependent – a concern for long term FSC operations. • May permanently displace Ferry Landing and NPS docks.	• Total fish transport time between 1-3 hours. Requires use of haul road, jet boat to Diablo, and reloading onto a truck road for final transport to	• Minimal additional disturbed area – roadway widened and improved for safety. • Existing haul road visible in locations –

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									release location.	same as current.
No. 3 Construction Access at Winnebago Flats via Canada Silver Skagit Rd (HDR Option 2) [1,2]	• FSC is assumed to be constructed by bringing materials and equipment through Canada for construction and launch from Winnebago Flats. • Following completion, FSC to be launched and towed into place using one or more tugboats. • Long term operations would continue to utilize barge/boat access from Diablo and the existing Ross Haul Rd.	• FSC Construction at Winnebago Flats. • Slipway for FSC launch at Winnebago Flats (HDR Option 2 and Option 3) [1].	• Existing relatively flat area for construction, staging and accommodation areas may lessen the level of effort for additional earthwork preparations. • There is an existing dock and boat ramp that could be improved upon for construction use, and then retained and reused for public recreational opportunities once the project is complete. • Sewer and power system improvements can be retained for public recreational opportunities once the project is completed. • Improvements to Silver Skagit Road will create easier access to the public after completion of the project. • Improved road access will enable almost any anticipated shipping requirement to reach the site. • May be able to begin construction of staging areas and FSC in first season with minimal access improvements required.	• Road improvements will require extensive coordination with Canadian authorities, thereby adding the potential for delays. • Additional time for each delivery due to route through British Columbia. • Potential Canadian customs limitations for materials and equipment. • Potential Canadian customs restrictions for certain employees with police records. • Increased costs due to approximately 37 miles of road improvements required.	• Design & Permitting: Unknown • Const. Duration: Not Critical Path • Temporary Bridge for larger loads: 3 months • Overall Construct: Start Immediately	• Minimal upgrades required for Silver Skagit Rd; 0.5 acres for upgraded bridge. • New ferry dock at Winnebago Flats. • Approx. 5 acres – includes staging, production, and crew accom. [1].	• Upgraded access to Winnebago Flats could be utilized for larger scale long-term maintenance such as replacing guide nets. A barge may be necessary.	• Construction at Winnebago flats does not significantly address challenges of fish transport and personnel access from the FSC, which could reduce success of the overall program.	• Total fish transport time between 1-3 hours. Requires use of haul road, jet boat to Diablo, and reloading onto a truck road for final transport to release location.	• Minimal additional disturbed area; Winnebago Flats restored to original after construction. • Existing haul road visible in locations – same as current.
No. 4 Construction Access at Winnebago Flats via water transit across Ross Lake (HDR Option 3) [1,2]	• FSC is assumed to be constructed by barging materials and equipment through Ross Lake. • Following completion, FSC to be launched and towed into place using one or more tugboats. • Long term operations would continue to utilize barge/boat access from Diablo and existing Ross Haul Rd.	• FSC Construction at Winnebago Flats. • Slipway for FSC launch at Winnebago Flats (HDR Option 2 and Option 3) [1].	• Minimizes new road requirements for FSC initial build. • Existing relatively flat area for construction, staging and accommodation areas may lessen the level of effort for additional earthwork preparations. • There is an existing dock and boat ramp that could be improved upon for construction use, and then retained and reused for public recreational opportunities once the project is complete. • Does not require the extra coordination and costs incurred with improving Silver Skagit Road. • No customs issued incurred during transportation of materials and supplies. • No access restrictions for work personnel.	• Slower travel time for shipping equipment, materials, and modules to the production site over Option 1. • Increased safety concerns for people being transported over the lake. • Site access will be susceptible to inclement weather (high winds, fog, heavy rain, etc.). • Shipments to the site are limited to the capacity of the barge and boat and how frequently they can make the round trip. • Fabrication of additional barges for shipping equipment is required, thereby increasing costs. • Increased fuel and maintenance costs due to regular operation of numerous watercrafts. • Need a new ferry dock at North Ross Dam to reload	• Design & Permitting: 18 Months • Const. Duration: 1 Season • Tunnel Improves: 4 Months • New North Ferry Docks: 3 Months • Overall Construct: 1 Season	• Lower staging area uses existing. • Roadway disturbance: minimal (upgrading Haul Rd). • New ferry dock north of Ross Dam and at Winnebago Flats. • Approx. 5 acres – includes staging, production, and crew accom. [1].	• Operations could use existing access to access the FSC via jet boat from Diablo and Ross Haul Rd.	• Construction at Winnebago flats does not significantly address challenges of fish transport and personnel access from the FSC, which could reduce success of the overall program.	• Total fish transport time between 1-3 hours. Requires use of haul road, jet boat to Diablo, and reloading onto a truck road for final transport to release location.	• Minimal additional disturbed area; Winnebago Flats restored to original after construction. • Existing haul road visible in locations – same as current.

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			• Minimal additional infrastructure improvements due to proximity between the loading area and the required improvements to reach Ross Dam (less than 0.5 miles).	equipment onto new barge, needs to fluctuate with water levels.						
No. 5 Construction Access at Ross Dam Forebay via Restored Railways [1,2]	• Original grade for railway is re-established for a temporary rail line to support FSC Construction. Rail is assumed to be extended to the base of Ross Dam by the powerhouse. • Material transported by rail would be offloaded to a truck using a crane and then transported to Ross Dam forebay using existing Ross Haul Rd. • Long term operations would continue to utilize barge/boat access from Diablo and existing Ross Haul Rd.	• Floating Drydock in the Ross Lake Dam Forebay (HDR Option 1) [1]. • Construction Access at Winnebago Flats via water transit across Ross Lake (HDR Option 3) [1].	• Restoring the railway is a highly unlikely viable option due to the layout of the historic railway. If it were feasible, rail would be suitable for all-season transport large materials and equipment up to the base of the dam. • Minimizes new road requirements for FSC initial build.	• Additional improvements required to offload equipment and materials from the rail terminal to the FSC. • Substantial effort required to rebuild railways. May delay project due to permitting timelines. • Access for rail development may be challenging and may require temporary roads and use of techniques such as rock blasting to create rail grades meeting modern design criteria. • Rail development may create aesthetic impacts within the Ross Lake National Recreation Area. • Existing historic rail line does not extend from Diablo to Ross. • Would need to supplant existing Diablo local roadways. • Still requires upgrades to Ross Haul Rd.	• Design & Permitting: 24-30 Months • Const. Duration: 2 Seasons • Restore Incline Lift: 1 Season • New Tunnels: Possible, Unknown • Overall Construct: 2-3 Seasons	• Minimal staging area 1 - 2 acres. • 10 - 20 acres disturbance for railway development	• Rail could support reduced transit times for fish transport tanks offloaded from the FSC.	• Railways do not significantly address challenges of personnel access to/from the FSC.	• Total fish transport time between 1-3 hours. Requires use of haul road, rail transit, and finally reloading onto a truck road for final transport to release location.	• 10-20 acres disturbance for railway development. • Rail will be visible from SR 20 and other locations and will require regular maintenance to maintain tracks.
No. 6 Construction Access at Ross Dam Forebay via *High/Low-Capacity* Helicopters [1,2]	• Construction of FSC would be accomplished by air dropping material from helicopters into a staging area in the Ross Dam Forebay.	• Floating Drydock in the Ross Lake Dam Forebay (HDR Option 1) [1].	• Minimizes new heavy road requirements for FSC initial build.	• Increased number of FSC modules to reduce individual module weight, thereby increasing the amount of steel to build entire FSC. • Likely to be prohibitively expensive relative to other options. • Supplemental option for material transport, not all materials cannot utilize. • Limited by wind in gorge. • Helicopter capacity limited vs. ground transportation (20 tons vs 40 tons). • May still need to improve Ross Haul Rd. for safety.	• Design & Permitting: 18 Months (Ross Haul Road) • Const. Duration: (Ross Haul Road), Staging Areas	• Minimal staging area >1.0 acre.	N/A	• Helicopters do not significantly address challenges of fish transport and personnel access from the FSC.	• Total fish transport time between 1-3 hours. Requires use of haul road, jet boat to Diablo, and reloading onto a truck road for final transport to release location.	• Minimal additional disturbed area. • Existing haul road visible in locations same as current.
No. 7 Access at Ross Dam Forebay via Tower Cranes [1,2]	• Two tower cranes would be installed to provide lift access from SR 20 down to Ross Lake. • First Tower crane located in area around Ross Dam Trailhead. Second crane near the haul road by the left abutment.	• Floating Drydock in the Ross Lake Dam Forebay (HDR Option 1) [1]. • Access to forebay for installation of Guide Nets, FSC Mooring Systems, and other shore-side facilities for FSC. • Construction Access at	• Minimizes new road requirements for FSC initial build. • Capable of lifting heavy loads and steep terrain. • Cranes are readily available in construction industry. • Supports access for construction crews from US-based locations.	• Establishing an accessible, efficient location for using crane and landing pad for construction. • Requires the use of at least 2 tower cranes, which is logistically difficult. • Powerhouse intake could interfere with operation of crane. • Regular high winds and wind gusts in the area will be a safety hazard and	• Design & Permitting: 18 Months • Crane Const. Duration: 3-4 Months • Haul Road Const.	• Minimal staging area 0.5 - 1.0 acre. • Minimal crane area of 1.0 - 1.5 acres.	• Tower cranes are thought to be unlikely to be allowed to be retained post initial construction; therefore, operations will use existing access to access the FSC via jet boat from Diablo and Ross Haul Rd.	• Tower cranes do not significantly address challenges of fish transport and personnel access from the FSC.	• Total fish transport time between 1-3 hours. Requires use of haul road, jet boat to Diablo, and reloading onto a truck road for final transport to	• Minimal additional disturbance assuming tower cranes are removed post construction. • Existing haul road visible in locations

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	• Materials and equipment would be offloaded from trucks in Ross Dam Trailhead parking lot and dropped onto landing pad midway down slope. Second pick required to bring material down to FSC or shore-side area.	Winnebago Flats via water transit across Ross Lake (HDR Option 3) [1].		deterrent to transport with a tall crane. • Aesthetically displeasing in natural environment. • Initial Construction option only. • Required Ross Haul Rd Improvements.	Duration: 1 Season • Tunnel Improves: None				release location.	same as current.
No. 8 Access at Ross Dam Forebay via Ropeway/Gondola from SR 20 [2]	• Ropeway/gondola is assumed to have high-capacity operation. • Supports to be located in coordination with NPS and in area with suitable ground conditions. • Ropeway/gondola would be first used for construction – transport of workers and smaller materials. • Long term operations and maintenance would use the ropeway/gondola for transport of fish and smaller materials for maintenance. • Ropeway/Gondola connects from SR 20 to location on haul road near left abutment.	• Floating Drydock in the Ross Lake Dam Forebay (HDR Option 1) [1]. • Forebay elements (Guide Nets, FSC Mooring Systems, and others) for FSC shore-side facilities. • Construction Access at Winnebago Flats via water transit across Ross Lake (HDR Option 3) [1].	• Ropeway/gondola does not require to be built on a constant slope. • Ropeway/gondola has a long service life and can withstand snow and icy conditions. • Efficient and safe means of transport of workers and materials. • Reduces new road requirements. Some level of temporary or intermittent access may be needed to construct ropeway/gondola supports.	• Ropeway/gondola requires to be built as a straight-line segment. • Requires Ropeway/gondola to have prefabricated steel parts to be brought in by helicopter, • OR requires Ropeway/gondola to have parts small enough to be barged via Diablo and trucked up Ross Haul Rd. • Typical maximum operating windspeed for gondolas transporting materials depend on the design of the gondola, weight of the materials, and safety regulations; Oftentimes, the design limit is around 25-30 mph. At Cat Island, Ross Lake from 5/25/2022–1/19/2024, max wind speeds read up to 22.5 mph (Feb 2023) with max wind gusts of 36 mph (Mar 2023).	• Design & Permitting: 18 Months • Const. Duration: 1 Season • New North Ferry Docks: 3 Months • Upper & Lower Transfer Areas: 3 Months • Overall Construct: 1 Season	• Minimal staging area 0.5 - 1.0 acre. • 1 - 3 acres of disturbance along the path of the ropeway/gondola. Additional may be needed for temporary construction access.	• Efficient and safe means of transport of workers and materials. • Ropeway/Gondola can be utilized for fish transport and workers operating the FSC. • The Doppelmayr 3S, the tri-cable lift at Whistler-Blackcomb, is designed to carry vehicles up to 35 people and safely operate in approximately 62 mph winds. At Cat Island, Ross Lake from 5/25/2022–1/19/2024, max wind speeds read up to 22.5 mph (Feb 2023) with max wind gusts of 36 mph (Mar 2023).	• Likely to require ongoing maintenance to keep brush and tree limbs away from moving equipment.	• Total fish transport time <2 hours between FSC shore offload and release. Fish tank loaded on ropeway, then offloaded to a truck road for final transport to release location.	• 1-3 acres of disturbance along the path of the ropeway/gondola. Ropeway/Gondola path will need to be maintained with low vegetation and will be visible similar to a ski lift.
No. 9 Access at Ross Dam Forebay via Incline Lift/Funicular Railway from SR 20 [2]	• Incline lift/funicular railway would be used for construction – transport of workers and materials to the shore side near the dam. • Long term operations and maintenance would use the incline lift/funicular railway for transport of fish	• Floating Drydock in the Ross Lake Dam Forebay (HDR Option 1) [1]. • Forebay construction elements (Guide Nets, FSC Mooring Systems, and others) for FSC construction at Winnebago Flats. • Construction Access at Winnebago Flats	• Reduced time to deliver major components for FSC construction, potentially shortening construction window and impact. • Depending on design, could be used for both materials and personnel. • Suitable for all-season operation.	• Incline lift/funicular railway required to be built on a constant slope. Locating slope and any inflection points in the path will need to be carefully considered and may still inform a lack of feasibility.	• Design & Permitting: 18 Months • Const. Duration: 2 Seasons • New North Ferry Docks: 3 Months • Upper & Lower Transfer	• Minimal staging area 0.5 - 1.0 acre. • 3-5 acres of disturbance along the path of the incline lift; Additional may be needed for temporary construction access.	• Incline lift/funicular railway can be utilized for fish transport and workers operating the FSC. • Supports potentially reduced fish transport time for upstream/downstream fish movements.	• Ice and snow are likely to be difficult to manage on the railway. • Risk of operational disruption due to limited access to the inclined railway. • Likely to require ongoing maintenance to keep brush and tree limbs away from moving equipment.	• Total fish transport time <2 hours between FSC shore offload and release. Fish tank loaded on incline lift, then offloaded to a truck road for final transport to release location.	• 1-3 acres of disturbance along the incline lift/funicular. • Path for incline lift/funicular will need to be maintained with low vegetation and will be visible similar to a ski lift.

3rd Party Review of Access Requirements

	and smaller materials for maintenance. • Works could potentially use inclined railway or continue to use jet boats from Diablo.	via water transit across Ross Lake (HDR Option 3) [1].			Areas: 3 Months • Overall Construct: 2 Seasons					

Notes: 1) Access Method proposed by HDR & Art Anderson in the Memorandum: *Summary of Access and Infrastructure Requirements for Construction of a FSC at Ross Lake*. Common to the construction and site improvements of the FSC as noted in the Memorandum:

a. Prefabricated modules supplied to FSCs built in remote locations are approximately 60ft in length by 11ft in width x 8ft in height, and the number of modules range from 65-130 modules.
b. To transport a load without a special load-specific transportation permit, the combined trailer and load cannot exceed the envelope of 53’ long by 13.5’ high by 8.5’ wide in accordance with RCW 46.44.
c. When on land, the staging and production areas for an FSC of this size are expected to be on the order of approximately 1.5 acres each (total of up to 3 acres).
d. Cranes capable of placing modules on to the FSC at the construction site.
e. Installation of debris booms and net systems.
f. Mooring infrastructure to secure the FSC in position to ensure the safety of the dam and FSC.
g. Temporary or permanent power suitable to operate multiple welders, compressors, lighting, and other construction equipment at the construction site.
h. Worker accommodations, including office, restroom, and breakroom facilities.
i. Site access to an area at the south end of the dam near the powerhouse intake structure.
j. Bridge replacement between the dam and powerhouse intake structure (HDR 2024).

2) See **Table 2** for potential access method combinations to meet all FSC construction and operations & maintenance needs.

3rd Party Review of Access Requirements

Table 3. Stantec's Summary of Access Methods to achieve Floating Surface Collector (FSC) Critical Needs.

Access Methods[1]	FSC Critical Needs			
	Workers	Constructability	Maintenance	Operation
No. 1 Access at Forebay via New paved Road Connection from SR 20				
No. 2 Access to Forebay via Diablo Barge/Boat, improved Ross Haul Rd				
No. 2a Avoid Ross Haul Rd tunnel by use of Ross Lake Ferry landing location				
No. 3 Construction Access at Winnebago Flats via CA Silver Skagit Road, Barge/Boat to FSC from South				
No. 4 Construction Access at Winnebago Flats via Water Transit across Ross Lake				
No. 5 Construction Access at Ross Dam Forebay via Restored Railways				
No. 6 Construction Access at Ross Dam Forebay via Low-Capacity Helicopters				
No. 7 Access at Ross Dam Forebay via Tower Cranes				
No. 8 Access at Ross Dam Forebay via Ropeway/Gondola from SR 20				
No. 9 Access at Ross Dam Forebay via Incline Lift/Funicular Railway from SR 20				

Notes: 1) Access methods that do not meet all critical needs are thought to be combined with other additional access methods to achieve all critical needs for the FSC.

LIGHTING MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

November 2025

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List of Acronyms and Abbreviations

ADA.....American with Disabilities Act
BMP.....best management practices
CCT.....Correlated Color Temperature
CFL.....compact fluorescent lamp
City Light.....Seattle City Light
FERC.....Federal Energy Regulatory Commission
HID.....high intensity discharge
HPS.....high pressure sodium
IDA.....International Dark-Sky Association
IES.....Illuminating Engineering Society
IESNA.....Illuminating Engineering Society of North America
K.....Kelvin
LC.....North Cascades Outdoor School Learning Center
LED.....light-emitting diode
LPS.....low pressure sodium
NERC.....North American Electric Reliability Corporation
NPS.....National Park Service
NRHP.....National Register of Historic Places
O&M.....operation and maintenance
OSHA.....Occupational Safety and Health Administration
Project.....Skagit River Hydroelectric Project
RLNRA.....Ross Lake National Recreation Area
SR.....State Route
SLIC.....Skagit License Implementation Committee
WISHA.....Washington Industrial Safety and Health Act
WSDOT.....Washington State Department of Transportation

GLOSSARY

These defined key terms are utilized in the Lighting Management Plan (Lighting Plan).

Types of Lighting

There are four basic types of lighting which are utilized to varying degrees at Skagit River Hydroelectric Project facilities covered in this Lighting Plan. The lighting types include incandescent, fluorescent, high-intensity discharge (HID), and light-emitting diode (LED). Each of these is defined below.

Incandescent Lamp consists of a sealed glass bulb with a filament inside. When electricity is passed through the filament, the filament gets hot. Depending on the temperature of the filament, radiation is emitted from the filament. The principle of obtaining light from heat is called 'incandescence." Standard incandescent bulbs are most common and yet are the most inefficient. Larger wattage bulbs have a higher efficiency than smaller wattage bulbs.

Compact Fluorescent Lamp (CFL) are a type of fluorescent lamp that are designed to replace traditional incandescent bulbs. CFLs are very energy efficient, using approximately one quarter of the energy compared to traditional incandescent bulbs. CFLs also have a very long lifespan compared to normal incandescent bulb.

High Intensity Discharge (HID) lamps are similar to fluorescents in that an arc is generated between two electrodes though the arc in an HID source is shorter, yet it generates much more light, heat, and pressure within the arc tube. Below are HID sources, listed in increasing order of efficiency.

- *Mercury Vapor Lamps* are widely used to light both indoor and outdoor areas. Mercury vapor lamps consist of an inner arc discharge tube constructed of quartz surrounded by an outer hard borosilicate glass envelope.
- *Metal Halide Lamps* are similar to mercury vapor lamps but use metal halide additives inside the arc tube along with the mercury and argon. These additives enable the lamp to produce more visible light per watt with improved color rendition. These lamps are sometimes used for general outdoor lighting, such as parking facilities.
- *High-pressure Sodium (HPS) and Low-pressure Sodium (LPS)* are specific types of gas-discharge lights. The principal difference between low- and high-pressure sodium lights is the operating pressure inside the lamp. As indicated by the name, HPS vapor lights operate at a higher internal pressure. The arc tube is made of aluminum oxide and the sodium metal is combined with several other elements like mercury which counterbalances the yellow glow with some white to light blue emissions.

Light-emitting Diodes (LED) pass an electrical current through a microchip, which illuminates the small light sources and results in visible light. Compared with conventional light sources that first convert electrical energy into heat, and then into light, LEDs convert electrical energy directly into light, delivering efficient light generation with little-wasted electricity. LEDs produce light up to 90 percent more efficiently than incandescent light bulbs.

Other Key Terms

Illuminating Engineering Society of North America (IES or IESNA) is a recognized technical and educational authority on illumination. For over 100 years its objective has been to communicate information on all aspects of good lighting practice to its members, to the lighting community, and to consumers through a variety of programs, publications, and services.

*International Dark-Sky Association (IDA)*is a recognized authority on light pollution and one of the leading organizations combating light pollution worldwide. Their mission includes preserving and protecting the nighttime environment and the heritage of dark skies through environmentally responsible outdoor lighting.

Lumen is a unit of measurement for the brightness from a light source.

Luminaire is a complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps, and to connect the lamps to the power supply.

Correlated Color Temperature (CCT) is a measure in Kelvin (K) of light's warmness or coolness. Warm light sources which feature light in the red, orange, and yellow range of the visible spectrum have a lower CCT; cool light sources featuring bluish/whitish colors have a higher CCT. Historical "warm" HPS lighting can have a CCT of around 1,800 K, while first generation "white" LED lighting had 4,000 K – 6,000 K CCT. This Lighting Plan will focus on recommending night lighting with a warmer CCT, i.e., a maximum K of 2,700, which more closely mimics firelight in color and intensity and has no blue in the spectrum.

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Lighting Management Plan (Lighting Plan) for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) No. 553. This Lighting Plan provides guidance for the management of Project facilities with exterior lighting elements within the Project Boundary.

City Light will coordinate the efforts required under this Lighting Plan with other license article requirements and resource management plans included in the new license. Specifically, resources with related guidance measures are designed to work in tandem to meet comprehensive management goals through the implementation of the suite of City Light's proposed resource measures.

1.1 Background

The Skagit River Project is located in a remote area, with steep terrain, approximately 120 miles northeast of Seattle and 60 miles east of Sedro-Woolley along State Route (SR) 20. The Project is unique in that the generation facilities are almost entirely within a national recreation area, the Ross Lake National Recreation Area (RLNRA), which was established in 1968—decades after the initial licensing and development of the Project—and is managed by the National Park Service (NPS) as part of the North Cascades National Park Complex.

The Project includes numerous Project facilities within the Project Boundary that support the operations and maintenance (O&M) of the Project, which include a variety of exterior lighting elements, primarily for safety, security, and efficient operation of the facilities. Project facilities with exterior lighting elements exist at Ross Dam, Diablo Lake, Diablo Dam, Gorge Lake, Gorge Powerhouse, and at the two Project townsites (Diablo and Newhalem). These Project facilities support hydropower operations, as well as public access and recreational uses.

In the broader context, the RLNRA provides numerous and varied non-Project recreation facilities at Ross Lake, Diablo Lake, Gorge Lake, and along the Skagit River downstream of Gorge Powerhouse. While the Project provides recreation facilities located on City Light and federal land managed by either City Light or the NPS, most of the recreation facilities within or adjacent to the Project Boundary are non-Project recreation facilities located on federal land and managed by the NPS as part of the RLNRA. NPS reports annual use for RLNRA ranging from approximately 700,000 to 1,100,000 visitors annually from 2010 to 2022.

1.2 Project Facility Lighting Context

This section describes the existing needs, types, and areas of Project facility lighting within the Project Boundary. Notably, Project transmission lines do not include exterior lighting.

1.2.1 Ross Dam

Project facilities in the Ross Dam area include Ross Dam, Ross Dam Boathouse, Ross Powerhouse, and Ross Powerhouse Boathouse. Ross Dam is located just upstream of Ross Powerhouse and includes a boathouse on the upstream face of the dam. Ross Dam is accessible by boat and trail only; vehicle use of the road atop the dam is not available to the public. The only exterior lighting

on the dam is associated with the boathouse and a single light along a stairwell on the upstream face of the dam. The exterior lighting can be categorized into two types: (1) covered canopy lighting or (2) wall packs (City Light 2023).

In general, these facilities require minimal amounts and levels of ambient light for Project operations and safety and are located in areas with limited development where the natural environment could be affected by small amounts of electric lighting at night. The non-Project Ross Lake Resort is also located in this area upstream of Ross Dam, which includes exterior lighting on the resort administration buildings and cabins.

1.2.2 Diablo Lake

Project facilities in the Diablo Lake area occur along the northwest portion of the reservoir along Diablo Dam Road. The Project facilities include Diablo Dam, Diablo Dam Parking Area, Skagit Tour Dock, West Ferry Landing, Diablo Lake Boathouse, and the North Cascades Outdoor School Learning Center (LC).

Completed in 1930, Diablo Dam is a concrete arch dam with two gravity abutments that have Art Deco/Moderne stylistic features. This architectural style is seen in the concrete detailing, centrally placed concrete arches supporting the roadway on top of the dam, and the low concrete walls along the crest of the dam. It is also seen in the 30 ornamental lighting standards—the tall, tapered metal piers/posts, each having a single glass octagonal luminaire—that are equidistantly spaced along and on each side of the entire roadway. The historic period lighting aesthetics of the dam include the warm color temperature of the incandescent lamps used at the time of the dam's construction, and later, LPS lamps. The earlier luminaire sources have been replaced with 4,000 K LED sources, lack full cut-off shielding, and operate from dusk to dawn (City Light 2023). The adjacent gate house/intake tower has a variety of HID, CFL, and LED wall packs and post top luminaires, only some of which match the Art Deco/Moderne aesthetic of the dam.

The roadway along the top of Diablo Dam is open to the public and provides access to the northern shoreline of Diablo Lake, which includes operational, recreational, and educational facilities accessed via Diablo Dam Road between Diablo Dam and the LC. Most of the facilities on Diablo Dam Road (excluding the LC) do not have functional exterior lighting. LED street lighting (4,000 K and unshielded) is provided intermittently and at intersections, including in the vicinity of Diablo Dam Parking Area, Skagit Tour Dock, and West Ferry Landing (City Light 2023).

The Diablo Boathouse is located between the West Ferry Landing and the LC along Diablo Dam Road. The boathouse is used primarily during daytime hours, but occasional Project O&M requires nighttime use. Most of the exterior lighting at the boathouse can be categorized into three types:

(1) typical post-top light poles; (2) exterior entrance lighting; and (3) covered canopy lighting (City Light 2023). The post-top lighting provides general area lighting in the driveway and parking area and is unshielded. Lighting is also located at the entrance ramp and doorway to the boathouse and is partially recessed under a canopy. The interior and exterior walkway facing out onto Diablo Lake have a combination of covered and uncovered canopy lighting (City Light 2023).

The LC is an educational and residential campus located on the northern shore of Diablo Lake operated by the North Cascades Institute in partnership with City Light and NPS. It was

constructed by City Light as required by the current FERC license. The campus is comprised of 16 buildings including multi-media classrooms, a library, aquatic and terrestrial labs, a dining hall, a recycling and compost center, an amphitheater, outdoor learning shelters and trails, and overnight lodging for up to 92 visitors. Exterior lighting in the LC area can be categorized into three types: (1) pathway/bollard lighting; (2) exterior entrance or porch lighting; and (3) lighting to accentuate the buildings' architecture including some up lighting (City Light 2023). The LC has the highest quantity and density of exterior lighting in the Diablo Lake area. All of the lighting in these three categories is LED and on a timeclock control system that automatically turns the lights off at 11 p.m. when the LC facility is in use. The pathway lighting is used to guide visitors and staff along the trails between buildings on campus and consists of approximately thirty, 24-inch-tall bollards with partial shielding (not full cut-off). The porch lighting on each facility provides general area lighting and visibility at the entrance to each facility. The luminaires are wall-mounted and aimed downward but lack full shielding. There are several architectural feature lights that are roughly 20 feet above the ground that accent building architecture, including utilizing up-lighting without shielding.

Overall, the Project facilities in this area require minimal to moderate levels of ambient light for Project operations, safety, or historical aesthetics and are located in an area with increased development and human activity but still within a natural environment.

1.2.3 Gorge Lake

1.2.3.1 Diablo Townsite

The Diablo townsite is located approximately 6 miles north of the Newhalem townsite and 1 mile off of SR 20. The townsite is divided into two areas, including the Hollywood area, located on City Light-owned lands, and the other area commonly known as Reflector Bar, located on federal lands managed by NPS. The Hollywood area is primarily residential, with 23 houses, nearly all built in the 1950s. The residential portion of the Reflector Bar area previously consisted of 12 residential buildings which were removed in 2022. Most of the exterior lighting in the Diablo townsite can be categorized into three types: (1) typical post-top light poles; (2) residential exterior entrance or porch lighting; and (3) covered canopy lighting (City Light 2023).

Residential porch lighting varies from building to building. Many buildings have a mix of source types and luminaire types, including LED, CFL, and incandescent wall packs and sconces. These luminaires are typically located next to building entrances or over garages/driveways to provide general illumination for visibility and security. Most of these exterior lighting luminaires are unshielded.

Overall, the townsite requires continuous and moderate amounts of ambient light for residential uses, safety and security. In general, nighttime human activity in this area is predominantly residential.

1.2.3.2 Diablo Powerhouse, Switchyard and O&M Buildings

The Diablo Powerhouse and switchyard are located in between the Hollywood and Reflector Bar areas of the Diablo townsite, essentially dividing the townsite into the two separate areas. City Light administration/maintenance buildings are located nearby to the Diablo Powerhouse/switchyard in the Reflector Bar area of the townsite. Most of the exterior lighting at

these facilities can be categorized into two types: (1) typical post-top light poles; (2) wall packs; and (3) covered and uncovered canopy lighting (City Light 2023).

Overall, the Project facilities in this area require continuous and moderate amounts of ambient light for Project operations, safety, and security. In general, nighttime human activity in this area is predominantly City Light staff related to O&M of these Project facilities.

1.2.4 Newhalem

1.2.4.1 Newhalem Townsite

The Newhalem townsite includes 28 houses, two bunkhouses, garages, administrative offices, a meeting hall, dining hall, playground, firehouse, helipad, wastewater treatment plant, general store, information center, parking areas, and public restrooms. The Newhalem townsite, particularly the Main Street area, historically had ornamental light standards that gave the townsite a unique feel that visitors and Project facility operations teams appreciated (NRHP 2011). Much of the exterior lighting found in the Newhalem townsite can be categorized into two types: (1) typical post-top light poles; or (2) residential exterior entrance, or porch lighting (City Light 2023).

Typical post-top light poles have LED sources, an estimated CCT of 4,000 K, and some up light shielding, but many are unshielded (i.e., globes) (City Light 2023). Residential and Project facility porch lighting varies from building to building. Many buildings have a mix of source types and luminaire types, including LED, CFL, and incandescent wall packs and sconces (City Light 2023). These luminaires are typically located next to building entrances and driveways to provide general illumination for visibility and security. Most of the exterior lighting on residential, Project facility entrances, and porches are unshielded (City Light 2023).

Overall, the townsite requires continuous and moderate amounts of ambient light for residential and public uses, safety and security. In general, nighttime human activity in this area is predominantly related to residential use as well as Project O&M.

1.2.4.2 Gorge Powerhouse

Gorge Powerhouse is located on the left bank (facing downstream) of the Skagit River just upstream of the Newhalem townsite and is reached via a vehicular bridge over the river that connects to SR 20. In addition to the vehicular bridge to Gorge Powerhouse, there is a pedestrian bridge from a public parking area that provides access to interpretive signage and the adjacent Ladder Creek Falls Trail and Gardens (see below). Gorge Powerhouse has a variety of exterior luminaires including parking and area lighting, original architectural sconces, adjustable flood lights, and wall packs with a variety of different source types including LED, CFL, and HID (City Light 2023). The CCT of the luminaires around the exterior of the powerhouse range from 2,700 K to 5,000 K.

The Gorge switchyard is located on the eastern portion of the Newhalem townsite and is adjacent to a maintenance yard with warehouses, storage buildings, and workshops. The Gorge switchyard and maintenance yard exterior lighting can be classified as utilitarian and is used only for facility operations within the Gorge switchyard and maintenance yard. The majority of luminaires found in this area are wall packs around exterior building perimeters, flood lights in driveways and work zones, and various types of general area lighting under the canopies of maintenance areas. These

luminaires are primarily LED and CFL sources. Many of these luminaires are in good condition and have been upgraded within the last 10 years. All these luminaires have a CCT of 4,000 K or higher. Many of these luminaires produce intense levels of light, are unshielded, and are operated for extended periods of time.

Overall, the Project facilities in this area require continuous and moderate amounts of ambient light for Project safety and security. Most of the nighttime use in this area is related to Project O&M and visitors to the adjacent Ladder Creek Falls Trail and Garden.

1.2.4.3 Gorge Switchyard and Maintenance Yard

The Gorge Switchyard is located on the eastern portion of the Newhalem townsite and is adjacent to a large maintenance yard with warehouses, storage buildings, shops, and a water tower. The Gorge switchyard and maintenance yard exterior lighting can be classified as utilitarian and is used only for Project facility operations within the Gorge switchyard and maintenance yard. The majority of luminaires found in this area are wall packs around exterior building perimeters, flood lights in driveways and work zones, and various types of general area lighting under the canopies of maintenance areas (City Light 2023). These luminaires are primarily LED and CFL sources, have been upgraded within the last 10 years, and have a CCT of 4,000 K or higher (City Light 2023). Many of these luminaires produce intense levels of light, are unshielded, and are operated for extended periods of time.

Overall, these Project facilities require continuous and moderate to high amounts of ambient light for Project safety and security. The nighttime use in this area is related to Project O&M.

1.2.4.4 Ladder Creek Falls Trail and Garden

Ladder Creek Falls Trail starts next to Gorge Powerhouse and winds alongside the creek through a garden developed on the adjacent hillside. The trail includes interpretive signs and provides access along Ladder Creek Falls, a dramatic series of waterfalls and pools located in a slot canyon and which are illuminated at night with colored lights. This area is a historic contributing resource within the Skagit River and Newhalem Creek Hydroelectric Project historic district. It was planned and established in the 1920s and 1930s by J.D. Ross, superintendent of the City's Lighting Department, as an attraction for visitors to the Project and to garner public support for the Project (NRHP 2011). The original installation of colored lights and speakers that led visitors along the trails to the waterfalls in the slot canyon were attached to tree trunks. Remnants of the original installation can still be seen today hanging from tree branches and tree trunks, weathered by time and the elements.

City Light upgraded and reinstalled the colored lights in the 1970s with CFL luminaires and again in 2009 with color changing LED flood light luminaires aimed at the waterfalls. These color changing LED luminaires are built into the side of the slot canyon and under one of the trail bridges hidden from view. This new system of trail lights and color changing luminaires has a modern control system that can be altered for different events or times of year, as needed. Many of these luminaires are unshielded or provide up lighting (City Light 2023). Post-top lighting is provided intermittently throughout the length of the trail and stairs which included full shielding (City Light 2023).

1.3 Night Skies and Light Pollution

This section introduces the relevant nighttime dark sky resources of interest related to Project facility lighting, including night skies and light pollution.

1.3.1 Night Skies

Per the NPS, the protection of night skies has only recently been recognized as an important cultural and natural resource by the NPS and more broadly in the United States (NPS 2023). The NPS strives to preserve dark sky viewsheds for the enjoyment of park visitors, and the well-being of wildlife and habitat. The NPS also states that an essential management action is to work with neighboring communities to ensure that the protection of natural lightscapes is integrated into park and community planning. Basic principles such as following best management practices (BMP) and tracking progress can protect and even restore natural lightscapes (NPS 2023). This Lighting Plan aims to support these NPS principles through implementation of BMPs and monitoring at Project facilities.

The night sky is a combination of both natural and anthropogenic sources of light. Natural light sources include moonlight, starlight from stars and planets, the zodiacal light (i.e., hazy light in the sky just after evening twilight ends or before twilight begins at dawn), and airglow. The predominant anthropogenic source of light is outdoor electrical lighting.

1.3.2 Light Pollution

Light pollution is the combination of all the adverse or obtrusive effects of electric light that produce artificial sky glow, including (1) unnecessary, unwanted, or wasted light; (2) light that damages or degrades the nighttime environment; and (3) light that negatively impacts humans and other species (e.g. increasing predation rates on juvenile salmonids) (IES 2020). Light pollution includes both direct glare and skyglow (human-caused light scattered through the atmosphere). Sky glow is the brightening of the night sky that results from the scattering and reflection of light from the constituents of the atmosphere (gaseous molecules and aerosols) in the direction of the observer and has two components: natural sky glow and artificial sky glow (IES 2020). Electric lighting increases sky glow above natural background levels through a combination of direct (i.e., light emitted above the horizontal) and reflected light (i.e., light reflected from the ground or vertical surfaces, depending on the ground cover conditions, such as snow or water) (IES 2020).

Light pollution created by an anthropogenic source can be recognized in several forms, including:

- *Glare* – undue brightness of a light source shining horizontally. The luminance produced by the light source is sufficiently greater than the natural luminance to which the eyes are adapted, causing annoyance, discomfort, or loss in visibility.
- *Light clutter* – excessive grouping of light sources.
- *Light trespass* – unwanted lighting of an area. For instance, a floodlight or streetlight spills onto an adjacent property, lighting an area that would otherwise be dark.
- *Over-illumination* – the use of artificial light well beyond what is required for a specific activity, such as streetlights turning on too early or offices in a building not turning off their lights at night.

- *Skyglow* – the increased night sky brightness that is produced by upwardly emitted and reflected electric light being scattered by water, dust, and gas molecules in the atmosphere.

Implementation of this Lighting Plan is anticipated to have a myriad of benefits, including balancing the need for safety and security, conserving energy and resources, minimizing O&M costs, reducing adverse effects on biological species active at nighttime, exploration of recreational opportunities in a nighttime environment, and general public health.

2.0 PURPOSE AND SCOPE OF THE PLAN

This Lighting Plan provides BMPs and procedures to guide City Light's actions related to the management of light pollution and to preserve natural darkness under the new license. The regulation of artificial light use at night will be done in a way that prioritizes the safety of visitors and staff while minimizing the impact of such light on protected outdoor spaces, viewsheds, and wildlife. The Lighting Plan will be effective for the term of the new license and is subject to periodic updates in consultation with the Skagit License Implementation Committee (SLIC).[1]

2.1 Goals and Objectives

The primary goals for the Lighting Plan are to:

- Enhance nighttime dark-sky resources by preventing or minimizing light pollution from existing and future Project facilities;
- Balance attempts to prevent or minimize light pollution against the need for lighting for safety, security, historic values, and other Project purposes; and
- Coordinate lighting conditions with the NPS to ensure a consistent management approach within the RLNRA.

The implementation actions included in this Lighting Plan are designed to meet the following objectives:

- Conduct a site-specific lighting evaluation to develop a road map for implementation of lighting BMPs at Project facilities;
- Periodically inspect Project lighting and provide employee education on lighting BMPs to track compliance with the Lighting Plan; and
- Communicate with the SLIC on a regular interval to provide implementation updates and collaboratively update management strategies.

2.2 Geographic Area

The geographic scope includes the current Project facilities listed below and lands within the Project Boundary. This scope includes external luminaires on Project facilities with lighting which escapes to the night sky. The Project facilities with exterior lighting included in the geographic scope of this Lighting Plan are listed below. Notably, highway lighting along SR 20 is managed by Washington Department of Transportation (WSDOT). Any new facilities that are developed as part of the new license will be included in this geographic scope.

[1] The SLIC includes agency representatives that will collaborate regarding implementation and monitoring of this Lighting Management Plan and contribute to adaptive management decisions.

Ross Dam

- Ross Dam
- Ross Powerhouse
- Ross Dam Boathouse
- Ross Powerhouse Boathouse

Diablo Lake

- Diablo Dam
- Diablo Boathouse
- Diablo Dam Parking Area
- Skagit Tour Dock
- West Ferry Landing
- LC

Gorge Lake

- Diablo Powerhouse
- Diablo Switchyard
- Maintenance/Administrative facilities
- Diablo townsite

Newhalem

- Gorge Powerhouse
- Gorge Switchyard/Maintenance Yard
- Maintenance/Administrative facilities
- Newhalem townsite
- Ladder Creek Falls Trail and Garden

3.0 BEST MANAGEMENT PRACTICES

This section details the BMPs, specific light tasks and appropriate luminaires, exemptions to the BMPs, and other Project-specific lighting considerations.

3.1 Lighting Best Management Practices

City Light will implement the following BMPs at Project facilities to meet the goals and objectives of the Lighting Plan. These BMPs are consistent with NPS sustainable outdoor lighting specifications (NPS 2023).

- No lighting – Initial screening of lighting at Project facilities should determine if the light is needed.
- LEDs in warm colors – Maximum of 2,700 K. Use energy efficient LEDs that have a warm color hue (e.g., yellow or amber) and not blue or white. Notably, the most highly efficient LEDs are not preferable because they have significant amount of blue color, which generates more glare/blind spots, have potential adverse health effects, and are not considered wildlife friendly.
- Recessed and fully shielded – Hockey puck style lights that can be inserted under a soffit or architectural feature are very useful. Avoid globes or diffusers that hang below the light fixture. Use "full cut-off" shielding which allows excess light to be directed downward and not upward.
- No upward facing lights – Outdoor lighting should be designed and installed to be downward facing (e.g., park signs and flags often have upward-facing lighting that can be easily made to point downward). Avoid lights that are directed laterally as well.
- Fixtures that include or can accommodate timers, motion detectors, hue adaptors, and dimmers – These adaptive technologies can increase energy efficiency and reduce impacts to natural and cultural resources substantially. Further, they can enhance visitor health and safety.
- Lowest lumens possible – Lumens are the unit of measurement used to specify the intensity or brightness of LED bulbs. The number of lumens needed to safely light an area is usually much lower than most people think, especially outdoors. LEDs are much brighter and more energy efficient than other types of lighting so it is possible to utilize a much lower wattage LED and still have the same level of brightness. For example, a 250-watt incandescent bulb has the same lumens as a 30-watt LED bulb. Field adjustable wattage selectors may also reduce impacts, increase cost savings, and extend product life.
- Proper installation – Lights should be installed with proper angle and height as designed. Another benefit of using LEDs for outdoor lighting is that LED luminaires allow for very specific control of the beam spread. The size of the lighted area will change depending on the height of the fixture or pole so the beam spread should be accounted for during installation to avoid lighting a greater area than needed. For example, a Type I beam spread is typically used for roads while Type V may be more appropriate for a parking lot. Proper installation and spread angle can also reduce the number of lights needed in general.

In addition to the NPS sustainable outdoor lighting specifications, the IES Lighting Practice document (IES 2020) is a resource for City Light during implementation of BMPs.

3.2 Light Tasks and Appropriate Luminaires

This section highlights typical light tasks and the suitable luminaires based on the type of task/Project facility where lighting is provided. In general, this section is consistent with suggestions from the IDA (2002). There are various practices and placements of outdoor lighting, which require certain luminaires to provide lighting for a specific task. This section highlights some typical examples of light tasks and suitable luminaires and provides BMPs for making these luminaires compliant. This section highlights tasks such as building exteriors, residential lighting, parking area lighting, roadway lighting, pathways, historical lighting, flag lighting, and exterior lighted signs.

3.2.1 Building Exterior

Whether utilizing fixtures for security, landscape or illuminating pathways, exterior lights can transform how the nocturnal environment is perceived and utilized. One major component of exterior lighting is the safety and monitoring of property. However, security lighting where no patrols exist (e.g., remote storage yard, parking areas) is often counterproductive, inviting crime without the opportunity to intercede. A prevalent light source for this task is the wall pack: wall-mounted luminaires with optical elements (e.g., reflectors, refractors) that usually direct a large portion of their light at angles near the horizontal plane. Wall packs are unfortunately commonly used in inappropriate ways, often in attempts to minimize hardware expenses under swiveled luminaires, giving rise to glare and poor lighting. An uncompliant wall pack cannot simply be fixed by installing an “add-on” shield, as these accessories rarely, if ever, provide true full shielding.

3.2.2 Residential Lighting

The majority of lighting fixtures available on the homeowner market are inherently unshielded or swiveled and rarely used pointed straight down, essentially contributing to light trespass to anything in the near vicinity. A productive way to improve lighting used in residential areas is to find which local retailers carry shielded products, such as wall sconces. These fixtures need to abide by the lighting BMPs while illuminating narrow tasks, such as doorways, small walkways, or other point targets.

3.2.3 Parking Lots

Parking lot lighting is provided to allow automobile drivers to see pedestrians and other hazards. Additionally, they provide pedestrians visibility to navigate and avoid any hazards once they exit their automobiles and the ability to find their vehicles when they return. Correctly spaced lighting will create an even distribution of light, providing a clear pathway for pedestrians to navigate without creating glare or potentially dangerous shadows. The use and size of the parking lot will dictate the height, distribution, and pattern of lights required to effectively light the area. After a certain hour, it is suggested to incorporate lighting controls to not waste light and energy if a parking lot is no longer being used.

3.2.4 Roadway Lighting

Although SR 20 runs through RLNRA and affects visitor experience, especially in Newhalem, the lighting management of SR 20 is under WSDOT jurisdiction. City Light operates streetlights in Newhalem and Diablo townsites.

3.2.5 Pathways

Areas that direct visitor navigation and are not nearby parking lots or other existing luminaires can be illuminated by bollards. Not only do bollards help direct the flow of traffic, but they can also be utilized to provide an evenly lit pathway without shining light into the natural lightscape. The placement and utility of bollards should serve the purpose of providing a clearly lit pathway for highly visited or emergency evacuation routes that require additional light that is not provided by the use of personal flashlights. Areas on trails or near facilities that require supplemental visual aids (e.g., stairways) could be lined with reflective tape.

3.2.6 Historical Lighting

Cultural and historic resources will be supported, not degraded, by outdoor lighting. The use of period light fixtures represents a special challenge, as these are generally more decorative and less efficient than their modern equivalents. Successfully preserving the cultural and historic integrity of resources may require additional expense and creative solutions, as well as tolerating lower task area illumination typical of decorative fixtures. Historic unshielded luminaires can be effective and attractive if they are used with very low output lamps (no more than about 300 lumens each) simulating the low output gas flames originally held by such fixtures. For these fixtures, CCT values should be at 2,700 K or lower.

3.2.7 Flag Lighting

Flag lighting is almost always up-directed and driven by the traditional practice that any flag flying at night must be properly illuminated. If flags are not lowered and night lighting is required, replacement lighting at flagpoles will be shielded or down-directed.

3.2.8 Externally Illuminated Signs

Signs should only be lit if they include pertinent emergency information that should be available at any time. Casual information (e.g., programs, building hours, outreach agendas) that can be accessed during the day should not be illuminated after sunset. If the information needs to be accessible, a down-directed fixture is the preferred installation.

3.2.9 Lighting Over Water

At Project facilities with exterior lighting over water surfaces (e.g., Ross and Diablo Lake boathouses, Gorge Powerhouse), City Light will first assess if downward facing lights are necessary for Project operations and safety or have other resource/historic values and modify or remove them as appropriate. Where downward facing lights are deemed necessary, City Light will utilize LEDs in warm colors (preferably red) and, as feasible, fixtures will include adaptive/control measures (e.g., timers, motion detectors, hue adaptors, and/or dimmers) to minimize their use during nighttime hours.

3.2.10 Other Considerations

3.2.10.1 Accessibility Standards

It is a requirement to provide accessible routes which meet standards set by the Americans with Disabilities Act (ADA). However, the ADA does not give guidelines on appropriate lighting levels for accessible routes. Lighting on accessible routes should follow the general guidelines stated in

this Lighting Plan. In order to accommodate people with impaired vision, lighting should maintain a continuous illumination, minimize glare, and not create a spotty effect.

3.2.10.2 Retrofit Existing Lights

Retrofitting or replacing an existing light source with a new one can be an extremely cost-effective option. Existing light poles, electric wiring, and appropriate fixtures can be modified to become dark-sky compliant. For example, parking lot lights can have the lamps replaced, allowing continuous use of standing poles. If a fixture is fully shielded but has the inappropriate color temperature, exchanging the existing lightbulb with a 'warm' colored LED is an option. For the procedure and examples for retrofitting lights, refer to the NPS Outdoor Lighting Retrofits Guide (NPS 2014).

3.2.10.3 Pursue Alternatives

Consider methods for providing safety other than permanent illumination. If the problem is lack of pathway visibility at night, determine if non-illumination solutions are adequate, such as painting curbs or steps, retroreflective markers, luminescent markers, using light colored pavement and surfaces, providing flashlights, trimming vegetation to minimize deep shadows, or smoothing out walkway tripping hazards. Signs and markers may be made visible with retroreflective or photo-luminescent coating. The minimum impact solution that best aligns with NPS guidelines should be chosen.

3.3 Exemptions and Other Considerations

This section includes any areas or uses that qualify for exemptions from the implementation requirements of this Lighting Plan. The following types of outdoor lighting installations shall be allowed and are not subject to the implementation requirements of this Lighting Plan. However, where possible and practical, measures outlined in this Lighting Plan should be taken to exercise best energy practices and shield the light from the surrounding environment.

- Codes – Any existing lighting codes or regulations are not affected by this Lighting Plan and take precedence.
- North American Electric Reliability Corporation (NERC) standards – Where NERC standards require specific lighting at electrical grid facilities, these facilities are considered exempt from the Lighting Plan.
- Occupational Safety and Health Administration (OSHA) / Washington Industrial Safety and Health Act (WISHA) – Where OSHA or WISHA states that specific lighting levels are necessary for work situations these are considered exempt from the Lighting Plan.
- Temporary/Construction Lighting – Allowable installations of outdoor lighting for temporary or construction purposes shall be limited to the minimum number of nights required to complete the task that the lighting illuminates. Staff responsible for such installations will follow these guidelines to the greatest practical extent and will endeavor to limit as much as possible off-site impacts of such lighting.
- Emergency Lighting – Temporary emergency lighting is exempt from these lighting guidelines, with the understanding that any such lights will be turned off or returned to their usual method of control when the emergency has ended (this responsibility will fall to the

onsite incident leader). Typically, emergency lighting is necessary for human safety in emergency or unforeseen circumstances.

- Interpretive Programs – Evening interpretive programs typically start at or after sunset, necessitating some lighting to allow visitors to walk to and from select Project facilities (e.g., Ladder Creek Falls Trail and Garden). Red lighting is recommended for these interpretive programs.
- Traffic Safety – Color spectrum restrictions do not apply to traffic signal lights that may be installed in the park.
- Helipad Lighting – Lighting for any helipads is exempt from this Lighting Plan and will meet requisite standards for this specialized feature.
- Campfires – Campfires are not considered artificial lighting for the purpose of this Lighting Plan and are thus not addressed here.

4.0 PLAN IMPLEMENTATION

Upon approval by FERC, the Lighting Plan will be implemented in consultation with the SLIC. City Light will continue to implement lighting-related measures for routine O&M and new construction and will incorporate additional measures if new data indicates they are necessary.

4.1 Develop Lighting Plan Implementation Guidance Document

City Light will develop a Lighting Plan Implementation Guidance Document (Guidance Document) that will include a site-specific evaluation of exterior lighting types and tasks associated with different types of Project facilities and provide a road map for BMP implementation at each facility using best-available lighting technologies and practices. This document will be informed by a Project-wide facility lighting engineering assessment.

This Guidance Document will enable City Light staff to apply BMPs consistently and efficiently at Project facilities with exterior lighting over the term of the new license. City Light will develop this document in consultation with the SLIC, including the NPS and its dark sky/lighting specialists. Once developed, City Light will apply the BMPs outlined in the Lighting Plan Implementation Guidance Document and make changes to lighting, accordingly. City Light will also consider during peak visitor use season (June 1st -September 1st), that the Diablo Dam lights will be turned off from 11pm to 2am for night sky viewing opportunities for the public and protection of fish and wildlife resources. City Light staff may require the lights on during peak visitor use season for emergency or maintenance operations.

City Light anticipates updating the Guidance Document periodically throughout the license as detailed in Table 4.3-1, primarily in response to emerging lighting technologies.

The Guidance Document will be developed in consultation with the SLIC and subject to approval by the NPS for locations on or affecting NPS lands and waters. The Guidance document BMPs will not conflict with Project operations (including employee safety).

4.2 Employee Education Program

City Light will provide Project facility lighting awareness training to City Light staff to enhance the implementation of lighting BMPs consistently at all Project facilities.

4.3 Implementation Schedule

This section provides a schedule for City Light's implementation of the lighting BMPs outlined in this Lighting Plan, including a timeline for the development of the Guidance Document and the implementation of specific measures identified therein, as well as a schedule for periodic review and monitoring actions. Table 4.3-1 describes City Light's preliminary implementation schedule for the Lighting Plan.

Table 4.3-1. Lighting Plan implementation schedule.

Timeline	Implementation Activity
Annual Activities	Report to and consult with SLIC (consistent with the SLIC Governance Document) on previous year's activities, monitoring, and planned current and upcoming activities (three year Work Plan). Work Plan activities on locations on or affecting NPS lands and waters not otherwise approved by NPS (including the specific location, timing, and scope of the activities) are subject to NPS approval.
Year 1 following license issuance	Complete Project-wide facility lighting engineering assessment, including Diablo Dam historic lighting in consultation with the SLIC.
Year 2 following license issuance	Complete Guidance Document in consultation with the SLIC, subject to approval by the NPS for locations on or affecting NPS lands and waters.
Year 2 through 5 following license issuance	Implement BMPs for all Project facilities with exterior lighting as outlined in the Guidance Document and Work Plan.

5.0 MONITORING AND REPORTING

This section describes the monitoring efforts that will document progress towards Lighting Plan goals and objectives. Monitoring is an extension of City Light's protection and enhancement implementation and will use baseline information from City Light relicensing study efforts. The goals of monitoring are to track long-term compliance with exterior lighting enhancement BMPs, and to inform periodic updates to this Lighting Plan.

5.1 Monitoring Activities

City Light will inspect Project facility lighting at regular intervals during the new license term to assess compliance with the Lighting Plan. City Light will modify non-compliant lighting according to the BMPs and the Guidance Document. City Light will begin these periodic inspections in Year 6 following license issuance following implementation of the Lighting Plan's BMPs at Project facilities (Table 5.1-1).

Table 5.1-1. Timeline of Lighting Plan monitoring activities.

Timeline	Protection Monitoring Activity
Year 1 following license issuance	Develop the inspection scope and methodology and monitoring plan in consultation with the SLIC.
Year 6 following license issuance, then every 5th year of the new license	Project facility lighting inspections.

5.2 Reporting Schedule

City Light will report annually to the SLIC through the annual report on the status of implementing lighting measures and monitoring activities. The annual report and work plan will include a summary of the previous year's work, schedule of current year's work and anticipated work in the following year. Annual work plan activities on locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS (including the specific location, timing and scope of the activities). Every fifth year of the new license starting in Year 6, City Light will file a lighting inspection report with FERC. A component of the report will be to review current BMPs and technologies with the SLIC and make recommendations for potential updates to the Lighting Plan and/or Guidance Document.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS before filing such modification with the Commission for approval.

If, after following the applicable procedures outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for

proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

If City Light and the SLIC collaboratively determine that revisions to this Lighting Plan should be made, City Light will make any revisions in coordination and consultation with the SLIC. Any revisions to this Lighting Plan shall be filed with FERC for approval prior to implementation.

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VEGETATION MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

December 2025

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List of Attachments

Attachment	Description
Attachment A	Target List of RTE Plant Species

List of Acronyms and Abbreviations

BMP .....best management practice
City Light.....Seattle City Light
EPA .....Environmental Protection Agency
ESA .....Endangered Species Act
FERC.....Federal Energy Regulatory Commission
HPMP.....Historic Properties Management Plan
IVM.....Integrated Vegetation Management
LiDAR.....Light Detection and Ranging
MU .....Management Unit
NERC.....North American Electric Reliability Corporation
O&M .....operations and maintenance
PHS .....Priority Habitats and Species
Project .....Skagit River Hydroelectric Project
REP .....Riverscape Ecosystem Plan
RMZ.....riparian management zone
ROW .....right-of-way
SWAP .....State Wildlife Action Plan
SOP .....Standard Operating Procedure
SR.....State Route
SLIC.....Skagit License Implementation Committee
USFS .....U.S. Forest Service
USFWS .....U.S. Fish and Wildlife Service
WMZ.....wetland management zone

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Vegetation Management Plan for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) Project No. 553. This Vegetation Management Plan provides guidance and requirements for the management of vegetation within the Project Boundary. The goal of this Vegetation Management Plan is to minimize direct and indirect impacts from routine Project operations and maintenance (O&M) on native vegetation. Information obtained through the implementation of this Vegetation Management Plan will be used to inform decision-making regarding vegetation management in an adaptive management context.

City Light will coordinate the efforts required under this Vegetation Management Plan with other license article obligations, including other Project resource management plans included in the new license. City Light's other management plans and measures relevant to this Vegetation Management Plan include:

- Avian Species Management Plan;
- Fish and Wildlife Mitigation Lands Management;[1]
- Fish Passage Implementation Plan;
- Historic Properties Management Plan;
- Invasive Plants Management Plan;
- Reservoir Erosion Management and Monitoring Plan;
- Riverscape Ecosystem Plan (REP);
- Roads, Trails, and Transmission Line Right-of-Way (ROW) Erosion Management Plan;
- Wetland Enhancement Measures; and
- Wildlife Protection and Enhancement Plan.

[1] Vegetation management on mitigation lands will be primarily directed by the Fish and Wildlife Mitigation Lands Management Plan, but in areas where the properties intersect the transmission line ROW, elements of this Vegetation Management Plan will be implemented. The mitigation properties that intersect the transmission line ROW include Bacon Creek, Corkindale Creek, Illabot Creek North, and Illabot Creek South.

2.0 PURPOSE AND SCOPE OF THE PLAN

This Vegetation Management Plan provides best management practices (BMPs) and requirements for implementing BMPs for the management of vegetation within the transmission line right-of-way (ROW), and in other areas within the FERC Project Boundary around Project facilities. The goal of this Vegetation Management Plan is to enhance habitat, reduce erosion, protect visitor aesthetic experience, and minimize potential effects from Project operations on vegetation while fully complying with North American Electric Reliability Corporation (NERC) clearance requirements. This Vegetation Management Plan is subject to annual reporting and periodic five (5) year reviews and updates in consultation with the Skagit License Implementation Committee (SLIC).[2]

2.1 Goals and Objectives

This section presents goals and objectives for managing vegetation within the Project Boundary. The primary goals of this Vegetation Management Plan are as follows:

- Reduce the risk of wildfire ignition and potential for spread of wildfire;
- Maintain zones defensible against wildfire around Project facilities and infrastructure, townsites, and ingress/egress routes;
- Maintain safe access along Project roadways, facilities, and infrastructure;
- Minimize conditions that promote the establishment or spread of invasive plants, and minimize potential for erosion;
- Enhance and maintain species diversity and structural complexity of plant communities and fish, wildlife, and pollinator habitat;
- Protect cultural resources and historic properties in coordination with City Light's HPMP, including considerations for historic landscapes at Diablo and Newhalem townsites; and
- Protect visitors' aesthetic experience to the extent possible (e.g., viewshed from key locations on State Route [SR] 20, and Ross, Diablo, and Gorge reservoirs).

2.2 Geographic Area

The geographic scope of this Vegetation Management Plan includes lands within the Project Boundary where vegetation management is performed. This includes:

- Project roads and trails;
- Project facilities and infrastructure;
- Townsites of Newhalem and Diablo;
- The transmission line ROW from Ross Dam to Bothell Substation and other areas where electrical lines are maintained;

[2] The SLIC includes entities that will consult regarding implementation and monitoring of this Vegetation Management Plan and contribute to adaptive management decisions.

- Ross, Diablo, and Gorge reservoirs, shorelines, and littoral zone; and
- Enhancement areas[3] for culturally important resources and avian or non-avian wildlife.

[3] These do not include enhancements associated with the fish and wildlife mitigation lands, which will be managed pursuant to the Fish and Wildlife Mitigation Lands Management Plan.

3.0 PLAN IMPLEMENTATION

Upon approval by FERC, this Vegetation Management Plan will be implemented in consultation with the SLIC. Collaboration with agencies, Indian Tribes and Canadian First Nations, non-governmental organizations, landowners or managers, or other groups will be included for specific efforts, as appropriate.

3.1 General Best Management Practices

Vegetation management will use BMPs to protect sensitive areas and wildlife habitat and prevent the spread of invasive plants. While conducting all vegetation management, O&M, and construction activities, crews will follow these general BMPs as well as task-specific BMPs described in the following sections. Any updates to best available science and BMPs will be made during adaptive management reviews every five (5) years over the life of the new license, or as needed and proposed by the SLIC. City Light will implement the following BMPs:

- Continue to implement City Light's existing Pesticide Reduction Strategy (City Light Undated) for the selection and minimization of herbicide application for invasive plant management and use of rodenticides, spill prevention, and other environmental compliance and management programs that prevent releases of hazardous materials and minimize environmental contamination risks.
- Review potential management methods and implications for habitat (e.g., mowing can simplify plant community structure, reduce diversity, and spread invasives).
- Limit mowing and brush cutting to defined zones near towers and road shoulders or where appropriate for habitat maintenance (e.g., meadow). Consider impact of mowing and brush cutting on flowering and seed-set for native and invasive species. When possible, mowing, brush-cutting, and tree removal will be scheduled outside of the nesting season (March 15 to September 1). However, within critical areas (i.e., within three feet of road surface, 20 feet around tower bases, within critical wire zones, in townsites, in close proximity to dams and powerhouses, or trees deemed hazardous) work may need to occur throughout the year to maintain safety. Work in all other areas will be conducted outside of the nesting season or after a nesting bird assessment or survey is conducted. Any assessment or survey would use WDFW and USFWS approved methodologies. All observed nests will be reported to City Light wildlife biologist prior to commencement of work so protective measures can be implemented.
- Maximize retention of native plants consistent with modified wire-border zone approach, height zonation analysis, and O&M considerations.
- Maximize well-vegetated native plant buffers along rivers, creeks, and wetlands consistent with the Shoreline Management Act, and applicable Critical Areas Ordinances and Shoreline Master Programs.
- Reduce unauthorized motorized vehicle access where feasible, including the installation of gates and other physical impediments. If monitoring indicates a problem, trespassing issues may be addressed through adaptive management.

- Use IVM, modified wire-border zone approach, and height-zonation to replace invasive plants and non-compatible native plants with native plant species compatible with required clearances, to the extent possible, given underlying property ownership. As part of this effort and in conjunction with other license implementation efforts, City Light will:
  - Monitor non-native invasive and non-compatible native species.
  - Use a two-part approach to encourage compatible native species: (1) selectively target non-native invasive species and non-compatible native species, and (2) use IVM to create conditions which allow compatible native species to flourish and reduce dominance of non-native invasives and non-compatible natives.
  - Develop a toolbox, as part of BMPs, that promote IVM and follow City of Seattle and NPS written pesticide policies and guidance documents for lands managed by the NPS.
  - Consider impacts of climate change and use of models (e.g., U.S. Forest Service [USFS] Seedlot Selection Tool) to select plant material of appropriate provenance.
- Incorporate culturally significant plants and plants to support wildlife, avian, and pollinator habitat (e.g., elk forage, deer browse, bird nesting and foraging, species beneficial to native pollinators).
- Maintain wildlife habitat features such as snags, stumps, and woody material, and habitat piles, where possible. This may include topping of trees where practicable.
- Maintain and conserve culturally modified trees.
- Monitor vegetation species composition and structure at managed sites relative to site-specific management objectives and targets. Linkage to City Light's Wildlife Protection and Enhancement Plan and Wetland Enhancement Measures will address wildlife use management sites.
- Implement fire protection measures, including (but not limited to) wildfire fuels management. Future wildfire fuels management rules and regulations may impact habitat management along the transmission line ROW.
- Continue to implement City Light's Invasive Plants Management Plan to prevent or minimize the establishment or spread of invasive plants.
- Follow City Light's Principles of Ecological Vegetation Management for Utility Rights-of-Way (City Light 2018).
- Implement vegetation management, mapping, and transmission line clearance surveillance and monitoring using available technology (including drones and other remote sensing methods), where applicable.

3.2 Fuels and Wildfire

City Light's framework for vegetation management is designed to reduce the risk of wildfire ignition and potential for spread of wildfire. This Vegetation Management Plan is intended specifically for the Skagit River Project for the life of a new license and complements City Light's Wildfire Risk Reduction Strategy (City Light 2023a), which addresses generation and transmission system operations in its service territory (including, but not limited to, the Skagit River Project).

3.2.1 Risk Assessment and Reduction

City Light will assess fuels and other wildfire risk by implementing the following actions:

- Annual transmission line ROW patrols and inspections;
- Routine, cyclical vegetation management to achieve required clearances;
- Danger and hazard tree removal; and
- Quality assurance.

Transmission line crew chiefs monitor vegetation growth, clearances between vegetation and the line, access roads, culverts, bridges, ROW uses, land use/easement encroachments, and vandalism in their daily work to identify areas and prioritize types of vegetation needing control. City Light's transmission line ROW is patrolled once every calendar year in addition to regular vegetation maintenance activities, to capture the following:

- Assess the condition of the transmission line ROW;
- Identify potential encroachments, including new construction that could conflict with the safe operation of the transmission system;
- Identify changes in vegetation and tree conditions along the transmission line ROW and potential fire hazard risk from nests; and
- Identify potential damage to transmission access and roadways.

In addition to the annual patrols on the transmission system, City Light's crews will conduct a four-year work cycle plan that will include maintenance such as managing vegetation, maintaining transmission line ROW infrastructure, and addressing encroachments or ensuring proper access or egress. Most areas are inspected every one to two years but areas with fewer potential issues may only get inspected once in the 4-year cycle. However, the approach and timing of maintenance may be updated.

3.2.2 Fuels Management

Based on risk assessments conducted as part of City Light's Wildfire Risk Reduction Strategy (2023a), City Light will identify specific MUs where vegetation will be managed to reduce the potential for ignition, rapid spread, or intensity of wildfire. Some vegetation communities are known to have high conductivity or burn hotter (i.e., stands of conifers, Scot's broom [*Cytisus scoparius*], or dry grasses), and may be managed to create breaks between adjacent MUs or lands adjacent to the transmission line ROW. Additional considerations for identifying MUs will include risk associated with utility features, topography, or other geographic locations with a heightened level of wildfire risk, adjacent or nearby land uses, such as residential homes and industrial forests. Prescriptions for fuels management may include shifting vegetation community types, identifying and managing danger or hazard trees, piling or removing slash, or pruning, mowing, or brush cutting to reduce conditions for spread or high-intensity fire (e.g., mowing tall grasses to create a fire break) among others. Slash will also be managed to minimize risk, by reducing the size and stratifying the locations of slash piles.

3.3 Vegetation Management Techniques

The following procedures are used to maintain vegetation in the transmission line ROW:

- Selective removal – Cutting down individual trees. This method is the most common approach used by City Light. Trees are generally cut down before they grow within 20 feet of a transmission line. Depending on wire height and topography, this can range from trees less than 5 feet to greater than 100 feet tall;
- Topping – Removing tops of individual trees. This practice is used minimally as it is difficult, can be more dangerous, and kills the tree in the long run. However, it can be useful when screening or some shading from the remaining tree is desired, such as near streams;
- Girdling – Removing a band of cambium from the entire circumference of the tree trunk to kill the tree. This method is only used on conifers when a snag is desired for either aesthetics or habitat value;
- Side trimming – Pruning tree limbs growing in from areas adjacent to the transmission line ROW;
- Herbicide – Herbicides are only selectively applied to fast-growing tree species (e.g., black cottonwood [*Populus trichocarpa*]) and invasive plants such as Scot's broom). The primary selective herbicide application techniques include spot spray, basal bark, EZ-ject, and cut and treat. The City of Seattle adopted a pesticide -reduction program in 1999, which was designed to reduce overall pesticide use, particularly pesticides with higher toxicity;
- Brush cutting – Brush cutting using a tractor-mounted mower to mow down woody vegetation at desired heights is a technique that has greatly increased after adoption of the pesticide reduction program to decrease herbicide use. However, based on independent research and City Light field work, City Light has concluded that annual brush cutting generally facilitates the spread of invasive plant species (e.g., common tansy [*Tanacetum vulgare*], Bohemian knotweed (*Fallopia x bohemica*) and now limits use to immediately along patrol roads/trails (within 3 feet of the roadway) and 20 feet around transmission line towers. Use of a reticulated arm allows vegetation to be cut at different heights. City Light plans to test the efficacy and effects of mowing Scot's broom and some tree species over lower-growing native species (e.g., salal [Gaultheria shallon]) to retain as much native low-growing vegetation as possible. Brush cutting tests will be coordinated with the Skagit River System Cooperative;
- Mowing – Using a tractor-mounted rotary cutter (i.e., field deck) to mow herbaceous and small-diameter woody vegetation. There are several stream crossings (e.g., Montague Creek) where this method was commonly used. This method was used in relatively flat riparian areas below the Sauk crossing. However, this method has resulted in increased reed canarygrass (*Phalaris arundinacea*) and has been largely discontinued to allow appropriate native woody species to grow; and
- Additional Integrated Weed Management techniques may be applied where the reduction of invasive species is desired. This includes seeding and planting native species to improve habitat conditions to the extent possible while adhering to the modified wire-border zone approach. Integrated Weed Management techniques can be found in City Light's Invasive Plants Management Plan.

3.4 Slash Management

The following procedures are used to manage slash[4] in the transmission line ROW:

- Lop and scatter – Cutting slash wood into smaller segments and scattering pieces such that they are spread relatively homogenously and most wood is in contact with the ground. This technique generally promotes faster decomposition of woody debris but can also result in buildup of wildfire fuels;
- Brush pile – Piling slash into small piles to provide habitat for wildlife and reduce contiguity of wildfire fuels consistent with NRCS standards where applicable;
- Leave in place;
- Fly chip to be left in place or used elsewhere for weed suppression and erosion control.
- Removal as whole log for use in historic preservation, trail maintenance, erosion control, habitat stewardship, or other City Light enhancement measures; and
- Invasive plant slash/waste material will be removed and disposed of in a manner that minimizes the spread of invasive plants through viable seeds or vegetative propagules. This approach will be evaluated by species and location and included in City Light's Invasive Plants Management Plan BMPs.

3.5 Hazard and Danger Tree Management

Hazard trees are trees that are structurally unsound and could strike a target, such as a transmission line, when they fall. Danger trees are trees on or off the transmission line ROW that have the potential to come in either direct contact with the transmission line or close enough to cause an electrical arc with the transmission line. City Light will inspect for both danger and hazard trees and trim or remove them to minimize risk from electrical arcs and falling trees to Project operations, structures, City Light staff, or visitors, or Project-related recreation facility or area per City Light's Recreation Resource Management Plan. Danger and hazard trees pose a specific risk to electrical lines, as they may cause operational failure or fire. Components used to identify danger and hazard trees include location of a tree relative to Project resources; the size, health, and age of a tree; the soil type, slope, and stability in which the tree occurs; and other facility factors, such as electric line sag and sway.

Consistent with NERC standards, City Light crews will conduct systematic visual examinations of possible danger and hazard trees near and within the transmission line ROW concurrent with performing vegetation management activities. City Light will manage danger and hazard trees within the Project Boundary and on City Light-owned property. On publicly- or privately-owned land, City Light will work with the appropriate land manager or private owner to address hazard and danger trees outside of the Project Boundary. However, City Light will not be responsible for hazard or danger trees at locations where permission is not granted.

[4] Slash describes the vegetative debris from trimmed or cut vegetation, including branches and trunks.

3.6 Project Roads, Facilities, and Townsites

City Light will manage vegetation near Project facilities and infrastructure, Project roads and trails, and within the townsites of Newhalem and Diablo to maintain wildfire clearance, safe access, dam safety, historic characteristics, and visual aesthetics, where applicable.

City Light will routinely clear vegetation in the immediate vicinity of Project facilities (e.g., powerhouses, dams, or storage areas), Project infrastructure (e.g., transmission towers), and Project recreation facilities. Vegetation clearing will be performed by manual or mechanical means (e.g., mowers, chainsaws, brushcutters, and line trimmers), unless otherwise decided in consultation with the SLIC.

Along Project roadways, vegetation maintenance will be primarily limited to the road prism.[5] City Light will use machine-mounted mechanical equipment (e.g., tractor-mounted field deck or side arm brushcutter) to mow 3 feet from the road edge. At key viewshed locations, primarily along state routes and where safety clearance allows, City Light will maintain screens of taller vegetation to protect visual aesthetics. All vegetation management for trails will be conducted by hand (loppers, pruners), except when larger diameter trees fall and block trail access. For vegetation along townsite roads, City Light will use lawnmowers.

Within the townsites of Newhalem and Diablo, vegetation will be managed to maintain, visitor and staff safety, recreation and interpretive facilities, historic characteristics[6] and visual aesthetics, in addition to wildfire clearance and safe access. The composition of new landscaping plants will mostly be native, with some non-native species, reviewed for their potential to become invasive, to maintain visual aesthetics and historic characteristics of the location. Only native species or species from the western United States, selected for assisted migration will be used in and near natural areas. Assisted migration activities should be reviewed by NPS on case by case basis ahead of any plantings. Cultivated species and seed sources planned for planting should be reviewed as part of the annual work plan. Additional vegetation management may include mulching, mastication, mowing or trimming to create defensible space from wildfire, even in areas not specifically associated with the Project or Project recreation facilities. City Light will consult with the SLIC to develop specific BMPs related to vegetation and landscape management in and around the townsites, powerhouses, dams, and other infrastructure.

Debris from vegetation removal or trimming will be relocated to areas less visible from public roadways or access areas to minimize aesthetic impacts. Slash will be disposed of by chipping, lopping and scattering/piling, masticating, or removal from the site. Branches may be cut into pieces then piled or lopped and scattered away from the site. Tree trunks may either be fallen and limbed to promote soil contact, used for restoration projects, hauled away, or cut into rounds.

[5] See City Light's Roads, Trails, and Transmission Line ROW Erosion Management Plan for additional details regarding vegetation management along roadsides and roadside chemical application BMPs.

[6] Vegetation management activities will follow the protocols and guidelines in City Light's HPMP, which will outline how potential impacts to historic properties, like the historic district comprising Newhalem, will be addressed.

3.7 Transmission Line ROW

The primary goal of vegetation management within the transmission line ROW and other areas where electrical lines are present (e.g., distribution lines) is to reduce the likelihood of having vegetation contact electric lines to minimize the risk of transmission interruption and fire ignition. Other goals in the transmission line ROW are to maintain access to inspect and maintain towers, powerlines, and fiber optic communication lines. City Light will maintain vegetation at safe distances from electric lines while diversifying native plant communities and wildlife habitats and reducing invasive species cover.

City Light will programmatically implement IVM[7] to promote desirable plant communities and replace, to the extent possible, invasive plants or other plants that are not compatible with management goals or regulatory requirements (i.e., transmission line clearance). IVM is the practice of promoting desirable, stable, low-growing plant communities that will resist invasion by tall growing tree species through the use of appropriate, environmentally-sound, and cost-effective control methods (Environmental Protection Agency [EPA] 2022). The choice of control method or methods is based on environmental impact and anticipated effectiveness, along with site characteristics, security, economics, current land use, and other factors (American National Standard 2012).

National NERC clearance requirements provide minimum distances between a conductor (e.g., electric lines) and vegetation. Clearances are designed to prevent trees or tall shrubs from grounding or arcing, which reduces the potential for wildfire ignition. Standard clearances may need to be increased in areas where high wind conditions and maximum conductor sag and sway (conductor-to-ground distance will vary in time depending on air temperature and electrical load) are likely to occur. Vegetation may not need to be trimmed in areas where the terrain provides natural clearances, such as in a valley between transmission towers. Clearances will be maintained by:

- Selective removal of tall-growing species with as little impact as possible to the native low-growing species;
- Removal of deciduous trees in such a manner as to prevent resprouting (e.g., time of year tree is cut, herbicide treatment); and/or
- Stewardship or restoration[8] of vegetation communities by seeding/planting with compatible, native plant species.

Although City Light maintains safety clearances along the entire transmission line ROW, City Light may not be able to implement protections and enhancements beyond safety requirements on land not owned by City Light.

[7] City Light's Integrated Weed Management strategy is outlined in its Invasive Plant Species Management Plan.

[8] City Light recognizes four major categories of activities along the restorative continuum: 1) reduced impacts; 2) remediation; 3) rehabilitation, and; 4) ecological restoration (Nelson et al. 2024). City Light prioritizes and designs management actions to gain the greatest native ecosystem repair or recovery based on continued land-use, geographic location and other constraints.

3.7.1 Modified Wire-Border Zone Approach

As a general O&M practice principle, City Light will implement the modified wire-border zone approach in combination with IVM and height zonation to promote vegetation that requires less active management while enhancing natural resources within and associated with the transmission line ROW.

The modified wire-border zone approach provides for vegetation height variation, with taller vegetation permitted in areas where safety clearance is still met. Areas between parallel transmission lines, or on the outside of the transmission line ROW, may support small trees or shrubs, while vegetation directly under the lines generally consists of shorter vegetation. Within the transmission line ROW, compatible plant communities include native species that meet height zonation guidelines, discourage invasive plants, and support wildlife, avian, and other sensitive habitats. Ideally, once the desired conditions are met, only minimal vegetation management will be necessary to maintain habitats and safety requirements.

Height zonation determines the maximum height of vegetation at all locations within the transmission line ROW to meet safety clearances of the modified wire-border zone approach. Each length of transmission line is mapped in relation to the distance of the lines from the ground; lines much farther from the ground are at towers or over ravines, and lines much closer to the ground are at the lowest curve (catenary) of the lines between towers. The remaining distance after clearance to the ground has been met determines the height of compatible vegetation.

IVM will be used to minimize invasive plants or plants that are incompatible with the site -specific height zonation. Over time, the application of the modified wire-border zone approach, height zonation, and IVM will result in vegetation communities with more compatible native species, thereby reducing effort and cost for vegetation maintenance within the transmission line ROW. The increased cover of plant communities compatible with the modified wire-border zone approach will improve habitat structure for many avian and wildlife species, increase the habitat connectivity with habitats adjacent to the transmission line ROW, reduce adverse edge effects,[9] and reduce invasive plant cover.

Consistent with the modified wire-border zone approach (as described by Ballard et al. 2007), modifications to the wire-border zone may include efforts to:

- Retain small, compatible native trees, where height zonation analysis and O&M considerations allow;
- Maximize well-vegetated buffers with native plant species along rivers, creeks, and wetland consistent with the Shoreline Management Act, and applicable Critical Areas Ordinances and Shoreline Master Programs;
- Replace invasive plants and non-compatible native plants with native plant species compatible with required clearances, based on height zonation and given underlying property ownership;

[9] Abrupt habitat edges along transmission line ROW corridors can result in increased wildlife diversity but can also cause adverse effects of harsh transitions in vegetation structure and composition from habitat fragmentation and increased depredation of birds.

- Enhance or restore to the extent possible and practical, vegetation structure and stratification of vegetation communities based on target habitat metrics developed in City Light's Avian Species Management Plan and Wildlife Protection and Enhancement Plan; and
- Manage higher clearances (e.g., lower trimming) on species with faster anticipated growth to accommodate City Light's routine maintenance schedule.

IVM will rely on planting palettes of native species aligned with general habitat types (e. g., riparian) categorized by height to match height zonation requirements. Height zonation may be mapped in areas outside of and adjacent to the FERC Project Boundary to indicate where City Light may coordinate with landowners (if not City Light-owned land) for permission to manage vegetation in a manner to reduce risk. However, these areas rely on landowner cooperation and City Light is not responsible for vegetation management outside of the FERC Project Boundary where permission is not granted.

3.7.2 Management Units (MUs)

MUs will be used to identify areas of specific management priorities and will be delineated by geographic location to account for underlying and adjacent land ownership,[10] access, uses, or agency management. Within the transmission line ROW, MU prescriptions for IVM may be aligned with culturally significant plants or areas, avian and/or wildlife habitat enhancements, invasive plant management, and/or wildfire fuel load reduction. Methods for treatment within each MU will consider the relative value of sensitive areas (e.g., wetland management zones and riparian management zones [WMZ/RMZ]), protection of other applicable required buffers under the SMA, enhancement opportunities (e.g., creating habitat for elk), threat of invasive species to the ecology of the unit, resource protections (e.g., cultural resources), or other priorities determined by the SLIC. City Light will design MU prescriptions to maintain or enhance existing habitat characteristics for rare, threatened, and endangered (RTE) plants, Priority Habitats and Species (PHS), and Washington State Wildlife Action Plan (SWAP) species.

Initial MUs and treatment methods will consider existing landscape limitations, non-invasive vegetation, and compatibility within the modified wire-border zone approach, and will be heavily influenced by height zonation. Wetland MUs associated with reservoirs may be developed in conjunction with Wetland Enhancement Measures or other wetland or fisheries enhancement measures by enhancing conditions for native plants and amphibians. The majority of MUs will be within the transmission line ROW as the programmatic management of vegetation provides an opportunity for restoration/enhancement of habitats or fuels reduction.

MU objectives and prescriptions will be developed and updated as needed through the life of the license in consultation with the SLIC. Additional MUs may be developed in other areas within the FERC Project Boundary where vegetation is managed.

[10] The degree to which habitat is managed on privately-owned lands within the transmission line ROW may be limited by owner permissions and uses.

3.8 Reservoir Shorelines, Islands, Wetland and Riparian Habitats

3.8.1 Protections

City Light's vegetation management crews will adhere to mapped RMZ/WMZ buffers and other applicable required buffers, which indicate a geographic boundary within which ground disturbance must be minimized and specific BMPs must be implemented. City Light will implement BMPs to minimize the spread of invasive plants into RMZ/WMZ buffers and other applicable required buffers to the extent possible to maintain native plant populations.

BMPs to protect wetland, littoral, and riparian ecosystems and associated fish and wildlife include, but are not limited to, the following:

- Use hand labor for tree trimming or selective removal to limit ground disturbance and soil compaction (i.e., no heavy machinery);
- Maintain well-vegetated riparian or wetland buffers as required by critical areas regulations and applicable Shoreline Master Programs;
- Avoid ground disturbance in Washington Department of Ecology regulated buffers. If disturbance is necessary and allowed under applicable law, use mulch (e.g., wood straw, wood chips), seed, or other erosion control BMPs specified in Washington Department of Ecology's most current stormwater management manual.
- Plant or seed (with certified weed free mixes when available or consult on other alternatives) bare soils in areas of potential erosion; and
- Where possible, address actively eroding areas in accordance with City Light's Reservoir Erosion Management and Monitoring Plan and Roads, Trails, and Transmission Line ROW Erosion Management Plan.

3.8.2 Enhancements

In consultation with the SLIC, City Light will design MU prescriptions to incorporate existing wetland and riparian features. Prescriptions will adhere to protective BMPs within the RMZ/WMZ buffers and will focus on planting or encouraging native plant species. Specific MUs may be designed specifically to enhance riparian wetland complexes with prescriptions designed to shift invasive plant communities to native plant communities. Where possible, specific prescriptions may include:

- Maintain or enhance existing wetland habitat characteristics for RTE plants, and PHS and SWAP species;
- Plant habitat appropriate shrubs and small trees in aquatic buffers to provide shade and wildlife habitat;
- Create snags and tall stumps for wildlife;
- Create downed logs and habitat piles for small mammals; and
- Where possible, address impacted hydrology from road ditches and relief culverts in accordance with City Light's Roads, Trails, and Transmission Line ROW Erosion Management Plan.

Any proposed modifications to wetlands, as well as any in-water work, will be subject to Ecology's review and approval, and may also require additional applicable permits or authorizations, which shall be obtained prior to commencement of any work. Any in-water work shall also require the development of a Water Quality Protection Plan.

3.9 Avian and Other Wildlife Protection and Habitat Management

3.9.1 Protections

When conducting vegetation management actions, City Light crews will follow protection BMPs identified in City Light's Avian Species Management Plan and Wildlife Protection and Enhancement Plan. City Light will implement IVM strategies in select MUs to manage desired habitat for avian and non-avian wildlife. Most active protection and other management opportunities will occur within the transmission line ROW, where vegetation management will be focused on diversifying and stratifying vegetation communities to restore or enhance quality habitat in line with avian habitat goals.

3.9.2 Enhancements

In consultation with the SLIC, City Light will implement IVM strategies in select MUs to increase desired habitat for avian and non-avian wildlife. Most enhancement opportunities will occur within the transmission line ROW, where vegetation management will be focused on creating functional diversity and structural complexity and heterogeneity within vegetation communities, enhancing riparian and wetland buffers, and increasing connectivity with adjacent habitats which will increase habitat value for amphibians, reptiles, birds, small mammals, ungulates, and pollinators. Vegetation enhancement targets will align with habitat enhancement targets outlined in City Light's Avian Species Management Plan and Wildlife Protection and Enhancement Plan. Vegetation goals to meet habitat enhancement targets may incorporate:

- Complexity indices;
- Habitat connectivity within and adjacent to the transmission line ROW;
- Structural complexity and heterogeneity;
- Incidence and cover of invasive plants;
- Occurrence of plant species which support culturally important wildlife;
- Cover and heights of vegetation species; and
- Retention or addition of snags and logs important for target wildlife (e.g., elk and deer forage, riparian and upland birds).

Habitat targets will also incorporate facility or roadway safety requirements. These targets are anticipated to align with the specific land ownership and associated management goals and may be focused on habitats specific to wildlife species of management concern.

Locations for enhancements and the specific targets for vegetation will be determined in consultation with the SLIC and will be included in vegetation management prescriptions implemented under this Vegetation Management Plan. Additional enhancements made through

City Light's other management plans[11] may be maintained over time through the application of this Vegetation Management Plan. Enhancements will be monitored and measured against the specific targets identified for treatment areas. City Light's cultural resources specialists will review such enhancements in accordance with the activity review process outlined in the HPMP.

3.10 Special-status Plants and Native Vegetation Communities

City Light will identify special-status plants and native vegetation communities and manage protections through MU prescriptions. Specific MUs may be designed to minimize threats to known special-status plants or communities from invasive plants, unauthorized access, or other threats. Vegetation management techniques will be selected to minimize impacts including trampling or over trimming and may include manual maintenance of individual plants. Additionally, City Light staff will be provided maps with locations of native vegetation communities to avoid, with particular focus on locations where sensitive plant species occur near regular O&M activities.

Special-status plant species include:

- **Endangered Species Act (ESA) Federally Listed or Proposed Species** – Species that are listed and protected under the ESA of 1973, as endangered or threatened, or proposed for listing.
- **ESA Federal Candidate Species** – Species that U.S. Fish and Wildlife Service (USFWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation has not occurred because of other higher priority listing activities. Candidate species receive no statutory protection under the ESA. However, USFWS encourages the formation of partnerships to conserve these species.
- **ESA Federal Species of Concern** – Species usually thought to be in decline, and which may be considered for federal candidate status in the future.
- **State-Listed Species** – Species listed by the Washington Natural Heritage Program on an advisory basis as Endangered, Threatened, or Sensitive.
- **NPS Management Priority Species** – Species that are categorized as "species that warrant particular management attention as determined by park management staff." Select species from this list are included as species of management concern, as advised in collaboration with NPS staff.
- **USFS Sensitive Species** – Species on the Regional Forester's List of Sensitive Species for the Mt. Baker – Snoqualmie National Forest (USFS 2019) and as may be subsequently amended. The Regional Forester's List does not include species already protected under the ESA.

An initial target list of special-status plants was developed during 2021 and 2022 surveys (as part of the TR-03 Rare, Threatened, and Endangered Plants Study) based on: (1) the species falling into one of the categories above, (2) known RTE plant species occurrences, and (3) potentially suitable

[11] City Light's REP, Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan, and Invasive Plants Management Plan address riparian restoration in the transmission line ROW, minimizing sedimentation to water features from roadways, and revegetation, respectively.

habitats present. This RTE target list is included as Attachment A of this Vegetation Management Plan. One state-sensitive plant species, boreal jewelweed (*Impatiens noli-tangere*), is known to occur in the Project Boundary.

3.11 Culturally Important Resources

3.11.1 Protections

Through collaboration with Indian Tribes and Canadian First Nations, City Light will implement vegetation management techniques and MU prescriptions for culturally important areas, plant communities, or specific culturally significant plants. City Light will minimize Project effects on culturally important areas or plants from invasive plants, unauthorized access, or other threats. Vegetation management techniques will be chosen specific to prescriptions to minimize impacts and respect the intended use of culturally significant plants, plant uses, or important areas (e.g., avoidance of herbicidal application in select locations). City Light's cultural resources specialists will review the development, implementation, evaluation, and potential revision of the vegetation management techniques in accordance with the activity review process outlined in the HPMP.

City Light will continue respectful and confidential communication with Indian Tribes and Canadian First Nations for the purposes of protecting traditional knowledge. Communication regarding culturally important areas and culturally significant plants will be fully coordinated with the protocols and management measures in City Light's HPMP.

3.11.2 Enhancements

Specific MUs may be designed to enhance plants for harvest, support culturally important wildlife habitat, or other uses by Indian Tribes or Canadian First Nations. Populations of culturally significant plants may be enhanced in areas identified for access or reserved for harvest. Enhancements would adhere to site-specific prescriptions and would generally be prioritized to minimize the effects of invasive plants or other incompatible species. City Light's cultural resources specialists will review such enhancements in accordance with the activity review process outlined in the HPMP.

City Light will continue respectful and private communication regarding the identification of plant species and locations for potential enhancement with Indian Tribes and Canadian First Nations for the purposes of protecting traditional knowledge. Communication regarding culturally significant plants will be fully coordinated with the protocols and management measures in City Light's HPMP.

3.12 Visual Aesthetics

City Light will enhance visual aesthetic impacts, to the extent possible, while through implementation of the modified wire-border zone approach. Vegetation management prescriptions will enhance the Project aesthetics by maintaining designated viewsheds and creating natural screening of Project infrastructure (e.g., maintenance areas, switchyards, transmission towers, RV parking, etc.) and by incorporating historic landscapes at Newhalem and Diablo townsites.

3.13 Emergency Situations

Emergency situations are instances where there is imminent risk to human life, including a threat of fire hazard, mechanical failure, or power outage. In the event of an emergency situation, City Light will make efforts to avoid direct effects to natural or cultural resources and will communicate with appropriate agencies within 14 days. Additionally, City Light will coordinate with their Cultural Resource Coordinator as provided in the HPMP.

4.0 IMPLEMENTATION TIMELINE

City Light will implement this Vegetation Management Plan upon license issuance. Locations and management goals will be developed for MUs within the first year of license issuance, while specific prescriptions will continue to be developed for new areas or updated as needed in consultation with the SLIC. MU prescriptions will be implemented on a prioritized schedule, and treatments may be monitored to assess progress toward target vegetation goals. Prescriptions for target vegetation may be associated with avian or wildlife habitat enhancement, culturally significant plants or areas, fuels management, or other measures. A timeline of activities is included in Table 4.0-1.

Table 4.0-1. Timeline of Vegetation Management Plan implementation activities.

Timeline	Activity
Annually	Report to and consult with the SLIC (consistent with the SLIC Governance Document) on previous year's activities and monitoring, and planned current and upcoming activities that are based on the Implementation Work Plan and shared through the Annual Report (three year rolling plan (previous year activities, and two year rolling work plan)). Report-out will include the status of vegetation management activities, progress in reaching target vegetation management goals associated with habitat enhancement, maps if available, and other pertinent issues. Annual work plan activities and monitoring locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS in the Implementation Work Plan (including the specific location, timing and scope of the activities).
	Conduct annual patrols on the transmission line ROW to identify maintenance needs.
	Conduct annual maintenance to complete Project area vegetation management coverage on 4-year cycle.
Every two years	Conduct trainings for employees and contractors on SOPs and BMPs.
Within one (1) year of license issuance	City Light will develop an Implementation Work Plan in consultation with SLIC and with approval from the NPS when actions have the potential to affect NPS lands and waters and from NMFS and/or USFWS for actions that may affect ESA listed species or their habitat. This plan shall include management goals and objectives, priorities, a schedule, and treatments for MUs, including identification of sensitive habitats and at-risk areas.
Within first (3) three years of license issuance	Develop SOPs during implementation to refine hazard tree BMPs.[1]
	Develop an initial list of potential riparian or wetland restoration projects.

1. City Light uses International Society of Arboriculture Tree Risk Assessment (Dunster et al. 2025) for hazard tree assessment.

4.1 Employee Training

City Light will provide employee and contractor training biannually on BMPs and SOPs to minimize potential negative effects of vegetation management activities. City Light will also provide illustrated plant identification references for common species.

5.0 MONITORING AND REPORTING

5.1 Monitoring Schedule

This section describes the monitoring efforts that will document progress towards this Vegetation Management Plan's goals and objectives. The goals of monitoring are to determine the effectiveness of IVM to reduce the presence of invasive plants or non-compatible native plants and to measure progress toward meeting vegetation structure and composition targets in MUs. Although City Light's rotating schedule of inspection and treatment provides built-in monitoring, additional monitoring will be implemented to monitor vegetation response to implementation of the modified wire-border zone, IVM, and management prescriptions in select MUs. Monitoring will include a combination of ground-based plot/transect measurements and use of remote sensing (e.g., Light Detection and Ranging [LiDAR] and drone-based data collection). A generalized timeline of monitoring activities is included in Table 5.0-1.

Table 5.0-1. Timeline of Vegetation Management Plan monitoring activities.

Timeline	Activity
Within first two (2) years	Determine preliminary monitoring metrics and thresholds for priority MU treatments using appropriate sampling approaches appropriate to gather quantitative or semi-quantitative data.
Every five (5) years following license issuance	Monitor vegetation response in selected MUs to assess species composition and structure.

5.2 Adaptive Management and Plan Review

City Light will apply adaptive management through the process of implementing testable management actions, and assessing the need to update management decisions outlined in this Vegetation Management Plan (including the Implementation Work Plan). At five (5) year intervals, or as needed and proposed by the SLIC, City Light will evaluate monitoring information to determine if new best available science, BMPs, updates to IVM strategies, or changes to MU prescriptions would increase the success of the protection and enhancement measures included in this Vegetation Management Plan (including the Implementation Work Plan).

City Light will engage in regular consultation with the SLIC and submittals to FERC. City Light will report annually to the SLIC on the status of vegetation management activities, progress in reaching target vegetation management goals associated with habitat enhancement, the schedule of current year's work, anticipated work in the following year, and other pertinent issues. Every five (5) years, City Light will file a report with FERC describing implementation and any proposed modifications to this Vegetation Management Plan (including the Implementation Work Plan) based upon the results of monitoring and consultation with the SLIC.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects

an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

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VEGETATION MANAGEMENT PLAN

ATTACHMENT A

TARGET LIST OF RTE PLANT SPECIES

Table A-1. Initial target list of RTE plant species developed during 2021 and 2022 surveys as part of the TR-03 Rare, Threatened, and Endangered Plants Study.

Species Name[1]	Common Name[1]	Flowering Times	Last Documented	State Status (Rank) 2021[2]	Habitat Requirements[3]	Elevation Range (feet)	Wetlands, Streams/ Riparian	Wet to Moist Meadow	Upland Meadow	Upland Forest	Rocky Outcrop
Botrychium hesperium	**western moonwort**	May to August	-	S (S2)	Moist open areas in meadows and forests.[4]	2,493-6,300	-	X	-	X	-
Botrychium paradoxum	**two-spiked moonwort**	June to August	Suspected	T (S2)	Late seral western redcedar forests on floodplains, perennial or intermittent stream terraces, wet or dry meadows, compacted old rockbeds, rocky subalpine slopes, and early seral lodgepole pine communities.	2,460-6,560	X	X	X	X	-
Botrychium pedunculosum	**stalked moonwort**	June to August	2010	T (S2)	Moist or dry meadows, springs, stream terraces, coniferous forests, and forest edges.	1,640-4,350	-	X	X	X	-
Carex buxbaumii	**Buxbaum's sedge**	June to August	-	-	Bogs, marshes, wet meadows.	0-2,000[5]	X	X	-	-	-
Carex capillaris	hair sedge	June to August	2010	S (S1)	Streambanks, wet meadows, bogs, and marshy lake lakeshores.	2,790-6,496	X	X	-	-	-
Carex comosa	**bristly sedge**	May to July	-	-	Marshes, lake edges, wet meadows.	30-2,525	X	X	-	-	-
Carex flava	**yellow sedge**	June to August	-	-	Wet meadows, forested wetlands, bogs, shores of streams, and lakes.	1,150-4,265	X	X	-	X	-
Carex macrochaeta	**Alaska long-awn sedge**	June to August	2010	S (S1)	Moist open spaces, including seeps and wet meadows, and around streams, lakes, and waterfalls.	1,195-3,200	X	X	-	-	-
Carex pluriflora	**black bog sedge**	June to July	1988	S (S2)	Wetlands, boggy lake margins, prairies, streambanks, and coastal inland areas.	165-3,165	X	X	-	-	-
Carex rostrata	northern beaked sedge	June to August	2010	S (S2)	Fens, bogs, quaking or floating peat, lake and stream shores, wet meadows; often in shallow water or on floating mats.	3,200-5,120	X	X	-	-	-
Cicuta bulbifera	**bulblet-bearing water-hemlock**	August to September	-	S (S2S3)	Edges of marshes, lakes, bogs, meadows, shallow standing or slow-moving water.[4]	230-3,710	X	X	-	-	-
Coptis asplenifolia	fern-leaf goldthread	April to May	-	S (S2)	Moist, cool, old forests with a well-developed litter layer.	95-3,051	-	-	-	X	-
Dendrolycopodium dendroideum (Lycopodium)	**prickly tree clubmoss/tree ground- pine**	All growing season	-	S (S2)	Rocky outcrops, talus fields, moss, and significant debris layers.[4]	785-3,610	-	-	X	-	X
Eriophorum viridicarinatum	**tassel cottongrass**	June to July	2010	S (S2)	Obligate wetland species of cold, usually calcareous swamps, bogs, fens, ponds, and wet meadows.	1,970-6,560	X	X	-	-	-
Githopsis specularioides	common bluecup	mid-April to mid-June	1970	S (S2S3)	Dry, open places at lower elevations, such as thin soils over bedrock outcrops, grassy balds, talus slopes, and gravelly prairies.	195-2,495	-	-	X	-	-
Hypericum majus	**greater Canadian St. John's-wort**	July to September	-	S (S2)	Along ponds and lakeshores, riparian areas.[4]	195-2,330	X	-	-	-	-
Impatiens aurella	**varied jewelweed**	July to September	-	-	Moist shaded areas at low elevations.	0-4,000[5]	-	X	-	-	-
Leptogium cyanescens	blue vinyl	Growing Season	-	E (S1)	Bark, rotten logs, rocks; moist forests, usually near creeks. Coast to mid-elevations.	0-1,540	X	-	-	X	-
Lycopodiella inundata	**bog clubmoss**	All growing season	2010	S (S2)	Sphagnum bogs, wet sandy places, and wetlands adjacent to lakes, marshes, and swampy grounds.	10-1,885	X	-	-	-	-
Montia diffusa	branching montia	April to July	Suspected	S (S1S2)	Moist forests and open fir woodlands in the lowland and lower montane zones; occasionally in xeric soils or disturbed sites.	1,181-2,890	-	-	X	X	-
Oxytropis campestris var. *gracilis*	slender crazyweed	May to June	Suspected	S (S2)	Montane sites on glacial outwash terraces in sandy loam soil, scree, and alpine tundra.	1,870-7,545	-	-	-	-	X

Species Name[1]	Common Name[1]	Flowering Times	Last Documented	State Status (Rank) 2021[2]	Habitat Requirements[3]	Elevation Range (feet)	Wetlands, Streams/ Riparian	Wet to Moist Meadow	Upland Meadow	Upland Forest	Rocky Outcrop
Platanthera chorisiana	choriso bog orchid	July to August	1991	S (S2)	Wettest regions of sphagnum bogs, streams, seeps, wet meadows, gravel outwashes, and moist areas with fine soils; often just above the water table.	2,540-4,265	X	X	-	-	-
Ramalina thrausta	cartilage lichen	All growing Season	-	T (S2)	Low elevation moist coniferous forests.	50-2,790	-	-	-	X	
Silene seelyi	Seely's silene	late May to August	2000	S (S3)	Shaded crevices in ultramafic, granitic, or basaltic cliffs and rocky outcrops, and occasionally among boulders in talus; restricted to sites with poor nutrient and water availability.	1,115-6,560	-	-	-	-	X
Spiranthes porrifolia	western ladies'-tresses	July to August	-	S (S2)	Meadows, seeps, streams.4	40-6,810	X	X	-	-	-

Source: Bivin and Rochefort (2010) unless otherwise noted.
1 Species names in **bold** are known or likely to occur within the Project vicinity. Source: Bivin (2019a, 2019b).
2 State Status: E=Endangered; S=Sensitive; T=Threatened; State Rank: S1=Critically Imperiled; S2=Imperiled; S3=Vulnerable. For more detail on state status codes, see Washington DNR (2021c).
3 Source: Camp and Gamon (2011) unless otherwise noted.
4 Source: Hitchcock (1971).
5 Source: Wildflower Search (2021).

INVASIVE PLANTS MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

November 2025

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List of Attachments

Attachment	Description
Attachment A	Target List of Invasive Plant Species

List of Acronyms and Abbreviations

BMP .....Best Management Practice
City Light.....Seattle City Light
EDRR.....Early Detection and Rapid Response
ESA.....Endangered Species Act
FERC.....Federal Energy Regulatory Commission
GIS .....Geographic Information System
IWM.....Integrated Weed Management
IVM.....Integrated Vegetation Management
MU .....Management Unit
NOCA .....North Cascades National Park
NPS .....National Park Service
O&M.....Operations and Maintenance
Project .....Skagit River Hydroelectric Project
RCW .....Revised Code of Washington
RMZ.....riparian management zone
SOP .....Standard Operating Procedure
SLIC.....Skagit License Implementation Committee
USDA.....U.S. Department of Agriculture
USFWS .....U. S. Fish and Wildlife Service
USFS.....U.S. Forest Service
WMZ.....wetland management zone

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Invasive Plants Management Plan (Invasive Plants Plan) for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) Project No. 553. This Invasive Plants Plan provides guidance for the management of invasive terrestrial plant species within the Project Boundary. The goal of this Invasive Plants Plan is to minimize the establishment and spread of invasive non-native plant species associated with Project activities and to enhance native plant communities. This Invasive Plants Plan is intended to be implemented in conjunction with City Light's Terrestrial Invasive Plant Species Prevention Best Management Practices (City Light unpublished) and Pesticide Use Reduction Strategy (City Light undated) which address generation and transmission system operations in its service territory (including, but not limited to the Skagit River Project).[1] Information obtained through the implementation of the plan will be used to inform decision-making regarding invasive plants in an adaptive management context.

City Light will coordinate the efforts required under this Invasive Plants Plan with other license obligations, including other Project resource management plans and measures included in the new license. City Light's other management plans and measures relevant to this Invasive Plants Plan include:

- Vegetation Management Plan;
- Avian Species Management Plan;
- Wildlife Protection and Enhancement Plan;
- Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan;
- Reservoir Erosion Management and Monitoring Plan;
- Fish and Wildlife Mitigation Lands Management Plan; and
- Historic Properties Management Plan.

[1] City Light's service territory includes generation facilities at the Skagit River, Boundary, Tolt, and Cedar Falls hydroelectric projects.

2.0 PURPOSE AND SCOPE OF THE PLAN

This Invasive Plants Plan provides best management practices (BMPs) and resource management goals to guide City Light's actions related to minimizing the spread of terrestrial invasive plants within the Project Boundary under the new license. This Invasive Plants Plan is subject to annual reporting and periodic five (5) year review and updates in consultation with the Skagit License Implementation Committee (SLIC).[2]

2.1 Goals and Objectives

The goal of this Invasive Plants Plan is to identify, control, contain, eradicate, and minimize the establishment and spread of invasive plant species associated with Project activities on, near, or downstream of the Project Boundary. This goal supports City Light's corresponding management plans which aim to enhance native habitat for fish and wildlife.[3]

The implementation actions included in this Invasive Plants Plan are designed to meet the following objectives:

- Apply integrated weed management (IWM) methods and strategies to reduce or eradicate existing or new populations of invasive plants;
- Establish, restore,[4] preserve, propagate, and enhance native plant communities to reduce the risk of future invasive plant infestation; and
- Implement adaptive management to accomplish goals through the life of the new license.

2.2 Geographic Area

The geographic scope of this Invasive Plants Plan includes Project facilities, lands, and shorelines within the Project Boundary, including City Light's fish and wildlife mitigation lands, and geographic locations adjacent to and downstream of the Project Boundary to the confluence with the Sauk River where there is a clear pathway and vector for invasive species origin from within the Project Boundary.[5]

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2 The SLIC includes entities that will consult regarding implementation and monitoring of this Invasive Plants Plan and contribute to adaptive management decisions.

3 City Light's management plans with goals to enhance wildlife habitat include the Avian Species Management Plan, Wildlife Protection and Enhancement Plan, and Fish and Wildlife Mitigation Lands Management Plan.

4 City Light recognizes four major categories of activities along the restorative continuum: 1) reduced impacts; 2) remediation; 3) rehabilitation, and; 4) ecological restoration (Nelson et al. 2024). City Light prioritizes and designs management actions to gain the greatest native ecosystem repair or recovery based on continued land-use, geographic location and other constraints.

5 City Light may have limited access or cooperation to treat invasive plants on privately-owned land adjacent to the Project. Likewise, infestations upstream, downstream, or on adjacent lands may prevent City Light from effectively treating invasive plants within the Project Boundary.

3.0 PLAN IMPLEMENTATION

Upon approval by FERC, this Invasive Plants Plan will be implemented in consultation with the SLIC. Collaboration with agencies, Indian Tribes and Canadian First Nations, non-governmental organizations, landowners or managers, or other groups will be included for specific efforts, as appropriate (i.e., treatment of specific invasive plant populations). City Light will implement the following measures to minimize the spread of invasive plants within the Project Boundary:

- **Prevention:** City Light will aim to prevent the introduction and spread of invasive plant species within the Project Boundary using BMPs and early detection and rapid response (EDRR).
- **EDRR:** City Light will use EDRR for identifying and treating new populations of invasive plants to prevent their spread. This will incorporate invasive plant identification, mapping, reporting, assessing, managing, and monitoring of new invasive species or a new location of a known invasive species.
- **Effective Control:** City Light will employ IWM and other strategies to control invasive plant species within the Project Boundary through eradication, containment, and/or reduction of invasive plant population densities and abundance. In addition, City Light will follow IWM guidelines to help determine management prescriptions, such as when to direct seed, install plants, mulch, or apply other methods.
- **Monitoring and Data Management:** City Light will monitor treatment efficacy and use results of monitoring to inform and adapt management.
- **Outreach and Education:** City Light will educate and inform City Light employees and contractors about best practices for preventing introduction and spread of invasive plants.
- **Coordination:** City Light will coordinate regularly with USFS and NPS, and consult with SLIC on invasive vegetation management, control, and monitoring efforts.

3.1 Integrated Weed Management

IWM[6] refers to managing invasive plant species using multiple control tactics. By integrating several approaches into a weed management plan, the control of invasive species can be optimized based on the timing and capabilities of each method employed. Strategizing the use of multiple methods over a period of time can ensure that different biological considerations of targeted species are addressed to eradicate invasive populations. The most suitable control method(s) are those which best achieve management objectives at a particular site. General categories of IWM and associated applications are summarized below.

- **Preventative Control** implements education and outreach to change human behavior that increases the prevalence of invasive species within a specific community. This method facilitates the accurate identification of invasive plant populations, emphasizes BMPs such as cleaning equipment and clothing to stop the spread of invasive species seeds or rhizomatous

[6] IWM follows steps standard for all integrated pest management programs: (1) identify species; (2) determine thresholds for action; (3) monitor invasive plant species; (4) evaluate management options for each species and site; 5) implement management using multiple methods, especially prevention, selective, and cultural methods whenever possible; and (6) monitor management effectiveness.

plant material, and the close monitoring of specific areas to detect early infestations. Preventative control techniques include, but are not limited to the following:

- Education regarding proper invasive plant identification and BMPs through training for employes or through signage or outreach for visitors;
- Monitoring specific areas to detect infestations early;
- Revegetating areas with robust native species after other treatment methods have been employed to reduce invasive reestablishment; and
- Manipulating vegetation communities and structures to create suboptimal growing conditions for invasive plant species.

- **Cultural Control** describes the manipulation of a plant community to control invasive species and give native plants a competitive advantage. A cultural control known as "cover-type conversion" provides a competitive advantage to native plants, allowing them to thrive and eventually out-compete invasive species for sunlight and other essential elements, which will shift vegetation communities over time. Cultural control techniques include, but are not limited to the following:
  - Reintroduction of native species;
  - Mulching with wood chips or similar material;
  - Solarizing using black or clear plastic;
  - Use of weed barriers, such as hardscapes and weed mats;
  - Managed flooding; and
  - Prescribed burning.
- **Manual Control** works best for small, newly introduced populations in areas where chemicals cannot be utilized. Manual methods employ workers with hand-carried tools to control vegetation. Manual techniques can be used on select vegetation but can be inefficient and expensive. Manual control efforts must be persistent and continue throughout the growing season to be successful, or may be paired with other control methods such as chemical controls. Manual control techniques include, but are not limited to the following:
  - Hand pulling or grubbing; and
  - Selective cutting with chain or hand saw.
- **Mechanical Control** is performed with machines. They are often efficient and cost effective, particularly for clearing dense vegetation, and may be used to impede growth or minimize plants that mature and contribute to the seedbank. This method must be persistent and continue throughout the growing season to be successful, or may be paired with other control methods such as chemical controls. Mechanical control techniques include, but are not limited to the following:
  - Mowing with tractor mounted rotary or flail deck, side-mounted brush cutter, or similar device; and
  - Use of heavy equipment to rip out or grade vegetation.

- **Biological Control** refers to the use of disease, fungi, insects, or animals to control invasive populations. This method generally takes several years to show results depending on the specific biological tool used. For example, grazing animals need to be used for multiple, consecutive years, generally during early growth periods, to diminish a population. Biological controls generally include the following:
  - Livestock grazing (e.g., cows, goats, or sheep);
  - Insect grazing (e.g., thistle crown weevil); and
  - Applications of pathogens such as bacteria or nematodes.
- **Chemical Control** utilizes herbicides,[7] either synthetic or naturally derived, to control invasive populations. They can be applied either in a broad application such as spraying large populations, or specifically to individuals using a method such as stem injection or spot-treatment. Use of this method is limited in riparian areas or areas with coarse soils where herbicides may enter the watershed. Selection and timing of the appropriate herbicide is important for chemical controls to be effective. Herbicide selection should consider factors such as the weather (e.g., rain, temperature, wind), which species the herbicide targets (general or selective), and if the herbicide relies on soil or foliar activity to be effective (USDA 2023). Types of chemical control application methods[8] include the following:
  - Spot-spray treats individual plants with hand-held sprayer;
  - Cut-and-treat is the application of herbicide on the cambium of cut stems, generally applied to woody vegetation;
  - Hack-and-squirt or frill-and-treat is the application of herbicide to the cambium which is exposed in a full ring around a trunk of a tree;
  - EZ-ject is a tool that injects a capsule of herbicide into the bark of a tree;
  - Basal bark application involves painting or spraying herbicide to the base of a tree; and
  - Broadcast foliar spray applied with boom-type or similar sprayer.

3.1.1 Surveys and Monitoring

City Light will monitor and review changes in invasive species cover over time by implementing monitoring and performing surveys at select locations (Tables 4.0-1 and 4.0-2). These activities will generally include the following:

- Sites that receive invasive species treatment will be monitored annually for three years following the completion of treatment and will be retreated if deemed necessary to move toward desired future condition;

[7] City Light will review all herbicides prior to use for compliance with City of Seattle Pesticide Strategy policies, follow agency regulations (e.g., National Park Service [NPS], U.S. Forest Service [USFS], U.S. Department of Agriculture [USDA]), and apply tiered criteria (City Light Undated) when selecting the appropriate herbicide.

[8] For more details and photographs of herbicide application methods, visit Herbicides and Forest Vegetation Management at: https://extension.psu.edu/herbicides-and-forest-vegetation-management.

- Every two (2) years areas that have been treated for invasive species or undergone revegetation will be monitored for effectiveness and may include measures of changes in total plant cover, changes in species composition (i.e., native vs. invasive plants), or other site-specific measures;
- Every five (5) years City Light will perform surveys at prioritized areas for target invasive plant species and sensitive plants. Survey information will be used to update invasive and sensitive plant databases and associated Geographic Information System (GIS) maps, and to inform the status, distribution, likely vectors, and limiting factors for target invasive plant species; and
- Every fifteen (15) years, City Light will perform a complete survey to inventory invasive plants within the Project Boundary and the banks of the Skagit River to the confluence with the Sauk River, with a focus on specific treatment areas and identified pathways and vectors. City Light may use a rolling approach to accomplish a complete inventory over the course of each 15-year interval.

City Light may increase the frequency of surveys or monitoring if needed to reach objectives for specific invasive plant populations.

3.1.2 Target Species

Target species describes invasive plants that will be targeted for treatment by City Light. Priorities for treatment of IWM target species on U.S. Forest Service (USFS) land will be determined by the USFS and priorities on land managed by the National Park Service (NPS) will be determined by the NPS. Priorities for treatment of IWM target species on non-federal lands will be determined through consultation with the SLIC and based on proximity to sensitive plant species or habitats, the geographic context, and may be coordinated with avian and wildlife enhancement activities. City Light will consult with the SLIC to develop a prioritization scheme for species on the target list that is Management Unit-based and would include the following criteria:

- Impacts of invasive species;
- Extent/number of populations of each invasive species;
- Available control methods;
- Proximity to sensitive habitats or species;
- Potential to manage pathways and vectors present;
- Proximity to roads; and
- Likelihood of effectiveness based on combined factors.

Prioritization methodology of treatments for target plant species will be based on IWM thresholds,[9] with an emphasis on controlling non-native and invasive plants that require control as listed by designations on noxious weed lists, fast-spreading species (e.g., wind-born seeds), and "ecosystem

[9] Thresholds describe a point at which invasive species populations or environmental conditions indicate that action must be taken.

engineers" (i.e., plants that alter ecosystems[10]). Approach for IWM may range from monitoring to active treatment methods. Prioritization will be conducted for each Management Unit (MU). City Light may additionally apply protocols from Prioritizing Weeds: The Alien Ranking System (Hiebert 2001) or similar systems to refine the target species list on non-USFS lands.

A target list was developed during 2021 and 2022 surveys (as part of the TR-04 Invasive Plants Study [City Light 2023a]) and is included in this Invasive Plants Plan as Attachment A. The initial target list includes plant species that fall into one of the following categories:

- All species listed as Class A or Class B weeds by the County Noxious Weed Boards of Skagit County, Whatcom County, and Snohomish County. The classifications of noxious weeds are defined as follows (Washington State Noxious Weed Control Board 2021; Revised Code of Washington [RCW] 17.10.010):
  - Class A Weeds — Non-native species with a limited distribution in the state. Action toward eradication is required by state law.
  - Class B Weeds — Non-native species established in some regions of Washington but of limited distribution or not present in other regions of the state. Because of differences in distribution, treatment of Class B weeds varies between regions of the state. In regions where a Class B weed is unrecorded or of limited distribution, prevention of seed production is required. In these areas, the weed is a "Class B designate," meaning it is designated for control by state law. In regions where a Class B species is already abundant or widespread, control is a local option. In these areas, the weed is "Class B-selected," with containment, gradual reduction, and prevention of further spread being the chief goals. County noxious weed control boards may also designate Class B weeds for required control.
- Species identified by the NPS as ornamental species that have escaped from historical cultivation in Newhalem, also known as "First Priority Species" (NPS 2011).
- Species identified as target species during the 2019 Study Plan Development Process (i.e., reed canarygrass *[Phalaris arundinacea]*, Japanese knotweed [*Fallopia japonica*], traveler's-joy [*Clematis vitalba*], petty spurge [*Euphorbia peplus*], and sycamore maple [*Acer pseudoplatanus*]).
- Other non-native species recommended, assessed, and agreed to by City Light and/or in consultation with the SLIC.

The initial target list of invasive plant species will be updated prior to monitoring surveys and will be reviewed every five (5) years or sooner if additional invasive species are identified to occur within the Project Boundary.

3.1.3 U.S. Forest Service Lands

City Light will implement vegetation management consistent with USFS practices and regulations.

[10] Examples of ecosystem engineers include cheat grass which has a propensity to alter fire regimes, increasing both frequency, flame length, and fire spread; knotweed which increases riverbank erosion; knapweed which increases soil erosion due to allelopathic root exudates; and Scot's broom which increases soil nitrogen.

3.1.4 Lands Administered by the National Park Service

Invasive plant treatments on lands administered by the NPS will follow practices in the Invasive Non-Native Plant Management Environmental Assessment (NPS 2011) which recommends an integrated pest management approach that includes select use of certain herbicides to implement a well-balanced invasive plant management program. City Light shall conform to all state, local and federal regulatory pesticide requirements, and relevant NPS management plans including the Invasive Non-Native Plant Management Environmental Assessment (NPS 2011) as amended.

Pesticides and herbicides used on NPS lands or in areas affecting NPS lands and waters to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, non-native fish, etc., shall be approved in writing by NPS. Seed mixes and plant material used in revegetation efforts (reestablishing vegetation cover in disturbed areas) on NPS lands or in areas affecting NPS lands and waters shall be approved by NPS.

Annual consultation with the SLIC will include the following information for determination of application subject to NPS approval on locations on or affecting NPS lands and waters:

- A determination as to whether pesticide applications are essential for use on NPS lands;
- Specific locations of use;
- Specific pesticides proposed for use;
- Application rates;
- Safety risk and timeframes for application;
- Target plant species;
- Confirm the herbicide is approved in the NOCA Non-Native Plant Management Plan;
- Record of the environmental compliance conducted as part of the proposed use; and
- Any other pertinent information.

In addition, for new construction projects on NPS lands and waters, the weed-free certifications for fill and erosion control materials shall include an assessment of all NPS priority invasive species in addition to the state listed noxious species.

3.2 General Best Management Practices

City Light will implement BMPs and Standard Operating Procedures (SOPs) to minimize the introduction and spread of invasive plants, reduce erosion, and protect wildlife habitats and sensitive species during all Project activities. These BMPs will be applied to routine operations and maintenance (O&M), new construction projects, emergency work, and all other Project activities. For invasive plant populations that extend beyond the Project Boundary, where pathways and vectors analysis point to clear origin from Project operations and adjacent land ownership allows (e.g., within the Ross Lake National Recreation Area), City Light will collaborate with adjacent landowners to manage populations. BMPs will be prioritized based on the location within the Project boundary and the associated management goals (i.e., land within the transmission line ROW, fish and wildlife management lands, townsites, etc.).

City Light will implement the following BMPs: While conducting all vegetation management, O&M, and construction activities, crews will follow these general BMPs as well as task-specific BMPs described in the following sections. All BMPs will be refined during the first year of license implementation, and any updates to best available science and BMPs will be made during adaptive management reviews every five (5) years over the life of the new license, or as needed in consultation with the SLIC.

- Use integrated vegetation management and modified wire-border zone approach[11] to replace invasive plants and non-compatible native plants with native plant species compatible with required clearances, to the extent possible, given underlying property ownership. As part of this effort and in conjunction with other license implementation efforts, City Light will:
  - Monitor non-native invasive and non-compatible native species;
  - Use a two-part approach to encourage compatible native species: (1) targeting non-native invasive species and non-compatible native species, and (2) using integrated management to create conditions which allow compatible native species to flourish and reduce dominance of non-native invasives and non-compatible natives;
  - Develop site- or activity-specific BMPs which promote integrated management and follow City of Seattle and NPS and USFS written pesticide policies and guidance documents for lands managed by the NPS; and
  - Consider impacts of climate change and use of models (e.g., USFS Seedlot Selection Tool) to select plant material of appropriate provenance.
- Implement City Light's existing Pesticide Reduction Program (City Light Undated) for the selection and minimization of herbicide application.
- Use of native species or non-invasive species when non-native species are desired for landscaping. All non-native species should be evaluated by an ecologist before introducing them to the Project.
- Invasive plant slash/waste material will be removed and disposed of in a manner that minimizes the spread of invasive plants through viable seeds or vegetative propagules, as evaluated by species and location.
- Implement BMPs for cleaning and inspection[12] of vehicles or personal clothing (e.g., shoelaces) when:
  - Moving work locations, especially when moving from areas with known weed populations;
  - Moving vehicles out of a local area of operation;
  - Moving machinery between properties or sites within the same property where invasive species may be present in one area, and not in another;

[11] The wire zone is the section of the transmission line ROW directly under the wires and extending outward a short distance and is managed to promote a low-growing plant community dominated by graminoids, herbs and small shrubs. The border zone is the remainder of the transmission line ROW, managed to establish tall shrubs. "Modification" to the wire-border zone approach includes the addition of underlying topography and wire height.

[12] Refer to City Light's Terrestrial Invasive Plant Species Prevention Best Management Practices for details and illustrations of vehicle cleaning and inspection techniques.

- Using machinery along roadsides, in ditches, and along watercourses;
- Using vehicles on unformed dirt roads, trails, or off-road conditions;
- Using machinery to transport soil and quarry materials; and
- Visiting remote areas where access by vehicles is limited.

City Light may further refine these general BMPs or add to them to address specific activities or site-specific protections.

3.2.1.1 Routine Operations and Maintenance

City Light will implement BMPs specific to normal Project O&M activities including woody debris management on reservoirs, vegetation management throughout the Project Boundary, road and culvert maintenance, and basic maintenance of infrastructure. City Light will comply with SOPs for individual job categories, such as materials management, vegetation management, landscape maintenance, and road maintenance.

3.2.1.2 New Construction

New construction involves substantial work (e.g., relocating a Project tower or section of road, significant construction of shoreline habitat treatments, bridges, or major culvert replacements) that would involve substantial ground disturbance. The City shall assess all new construction projects for regulatory compliance and will follow conditions of permits to avoid or minimize effects. City Light will comply with SOPs for individual job planning or habitat restoration. For each project, the SOPs and BMPs that may be included are:

- Minimize vegetation modification and revegetate areas disturbed by operations using native plant species beneficial to wildlife;
- Incorporate IWM into project planning, budgeting, and implementation;
- Clean tools and equipment;
- Cover and manage stockpiles of gravel or soil;
- Proper disposal or recycling of green waste;
- Use of certified weed-free materials for erosion reduction and for revegetation of disturbed areas;
- Locate staging areas as close to construction sites as practicable to minimize driving distances between staging areas and construction sites;
- Locate staging areas in previously disturbed or graveled areas to minimize soil and vegetation disturbance where practicable; and
- Stabilize disturbance areas by applying a weed-free gravel (if available) top layer to the roadways.
- Conduct annual post-construction surveys for three years following project completion to monitor and treat any new infestation.

3.2.1.3 Emergency Situations

Emergency situations include instances where there is imminent risk to human life, including a threat of fire hazard, mechanical failure, or power outage. In the event of an emergency, City Light will make efforts to avoid the spread of invasive non-native plant species and will communicate with appropriate agencies within 14 days, if these situations arise. In areas where emergency work creates potential opportunities for weed introduction, establishment, or spread, City Light will work to minimize those effects. Areas with ground disturbance from emergency activities will be monitored and treated as needed. Additionally, City Light will coordinate with their Cultural Resource Coordinator as provided in the HPMP.

3.3 Pathways and Vectors

Pathways and vectors may influence the establishment and spread of invasive species within the Project Boundary (pathways are the means that species are introduced to new environments, and vectors are the transfer mechanisms). These are both natural, such as seed dispersal via wind, waterways, or animals, and human-induced, such as spread by humans as they move through areas on foot, by boat, or via other vehicles. City Light's SOPs and BMPs are designed to minimize the introduction and spread of invasive plant species by pathways and vectors.

City Light will identify locations within the Project Boundary where there are Project-related disturbances and associated invasive plant species dispersal, map invasive plant species locations, and monitor changes in these populations. This information will be used to prevent the spread of known sources and provide for EDRR and effective control using IWM.

3.4 Sensitive Plants and Habitats

Sensitive plants include special-status plants as well as those that are culturally significant to Indian Tribes and Canadian First Nations. Sensitive habitats include healthy native communities that support richness of native species and meet functional ecological conditions in areas such as wetland and riparian habitats. City Light will seek to protect sensitive plants and habitats from effects of invasive species and will develop IWM strategies to minimize impacts.

3.4.1 Special-Status Plants

Special-status plants include those that are defined by each entity below and are known or have the potential to occur in the Project Boundary. These include agency identified species (e.g., federal- and state-listed species, Washington priority species and habitats, and those identified by the USFS and the NPS).[13]

3.4.2 Culturally Significant Plants

Culturally significant plants may be considered sensitive in areas identified for enhancement, or in areas reserved for harvest by Indian Tribes. In these areas, populations of culturally significant plants will be prioritized to minimize the effects of invasive plants. City Light will continue respectful and private communication with Indian Tribes and Canadian First Nations for the

[13] More information regarding special-status plant protections is included in City Light's Vegetation Management Plan.

purposes of protecting traditional knowledge. Communication regarding culturally significant plants will be fully coordinated with the protocols and management measures in the HPMP.

3.4.3 Wetland and Riparian Habitats

Wetlands and riparian areas are generally located around a water feature such as ponds or streams and include surrounding vegetation communities. These areas are considered sensitive because of the ecological value and distinct habitat for wildlife, including aquatic and avian species and plants. City Light will adhere to mapped riparian management zone (RMZ)/wetland management zone (WMZ) buffers to protect the ecological functions of wetland and riparian habitats as well as wildlife and plants.

3.5 Revegetation

Revegetation is the process of reestablishing vegetation cover in disturbed areas and is a standard component of construction, erosion control, and site restoration. The main functions of revegetation are to conserve native plant resources, reduce loss of soil to erosion, combat invasive species, mitigate impacts of climate change, and maintain healthy forests and wildlife habitat. City Light will revegetate areas with Project-related ground disturbance measuring 0.25 acres or greater, with minimal vegetative cover (less than 30 percent native species cover) and where stormwater from the site may run into:

- Surface waters of the State, or
- Storm drainage systems that discharge to a surface water(s) of the State.

Revegetation will be focused on establishing native species to prevent available habitat for invasive species, to reduce erosion and sedimentation, and to increase diversity of native plants in the Project Boundary. City Light will use species appropriate to the native habitat to minimize habitat conversion effects and may prioritize specific species to accomplish these goals. Revegetation efforts in the vicinity of Newhalem and Diablo townsites may follow guidance from the Seattle City Light Newhalem and Diablo Landscape Tree Inventory (Bartlett Consulting 2022), which provides recommendations for historic preservation and diversity.

For revegetation at locations on USFS land, land managed by NPS, areas larger than 3 acres, or on steep slopes or within erosional areas, planning will include a site assessment and the development of a revegetation plan, with the following:

- General site conditions, including slope, terrain, soils, land use and access, proximity to water;
- Proximity to invasive plant occurrences;
- Vegetation community specifics, including native species composition, species richness and density and/or percent cover;
- Site complexity, including the variety of landforms or vegetation patches;
- Other location-specific constraints;
- Amount and type of monitoring (to be commensurate with the level of disturbance);
- Quantitative monitoring methods and performance standards;

- Cover or germination criteria and contingency measure(s) for seeding efforts; and
- Maintenance schedule, as necessary.

At sites where compaction may be a problem, topsoil may be removed, and stockpiled and/or loosened and roughened in such a manner as to make it usable for replanting and plant establishment. If it is to be removed and stockpiled longer than one month, the topsoil will be stored in a manner that keeps the soil biota alive, maintains soil microbe health, prevents erosion, and prevents the establishment of invasive plant species. In sites that are being seeded, seeding will take place during the next available seeding window (i.e., March 15 through June 15 and September 1 through October 15). At some sites, amendments, such as compost or biochar may be added to the soil. City Light will try to use seed mixes that contain only plant species native to the North Cascades, Cascades, or Puget Trough Level III Ecoregion. In cases where assisted migration is desired or growing conditions are hot and dry, City Light may use species native to the Willamette Valley and/or Klamath Mountains/California High North Coast Range Level III Ecoregions.

A mixture of seeding techniques may be used and will be detailed in the revegetation plans. Seeding rates will be determined based on pure live seed methods and mixture to improve seeding success. Seeds should be covered not more than three times the thickness of the seed. Sites will be covered with a certified weed-free mulch in conjunction with seeding.

Larger sites will typically be replanted with a mixture of native trees, shrubs, and forbs. Plantings within the transmission line ROW will include species compatible with clearance requirements and avian or wildlife habitat enhancements.

Revegetation will occur as soon as possible after ground-disturbing activities during the appropriate season for seed establishment or planting viability. Restoration and seeding of disturbed areas, including topsoil piles and berms, will be completed within 60 days following completion of construction or ground-disturbing activities, if in the appropriate season or as soon as feasibly possible the next appropriate season.

City Light may pursue revegetation projects in areas where non-Project-related ground disturbance is present in areas 0.25 acres or larger. These disturbances are often visitor-related, and while not authorized, may be ongoing despite preventative measures. In many cases, revegetation may be paired with access minimization (i.e., gates) or structural impediments (i.e., boulders or stone terraces) intended to reduce off-road vehicle use.

3.6 Management Units

MUs will be used to identify areas of specific management priorities and will be delineated by geographic location, which may coincide with land ownership or agency management (e.g., Ross Lake as a geographic location). Within the transmission line ROW, MU prescriptions for IWM may be aligned with avian or wildlife habitat enhancements and coordinated with vegetation management activities and goals.

Methods for treatment within each MU will consider the relative value of sensitive areas (e.g., wetlands), value of enhancement opportunities (e.g., creating habitat for wildlife), the threat of the

invasive species to the ecology of the unit, resource protections (e.g., cultural resources), or other priorities determined through consultation with the SLIC. Initial MUs and treatment methods will consider existing landscape limitations, non-invasive vegetation, and compatibility within the modified "wire-border zone" approach.

City Light will consult with the SLIC to develop a methodology for prioritizing treatment of specific invasive plants within prioritized MUs. Target species will be prioritized within each MU based on the management objectives and site-specific prescriptions. Some invasive species/populations may be actively managed while others may rely on longer-term or more passive approaches (i.e., Integrated Vegetation Management [IVM] and succession).

3.7 Data Collection and Management

City Light will maintain a GIS geodatabase to track changes of treated invasive plants, seeded or planted native plants, plants or plant communities of traditional importance, and sensitive habitats. A database will be maintained, in tandem with GIS maps, showing specific metrics (e.g., percent cover or species richness) measured at intervals (Table 4.0-1), and the details of the planting or treatments, if any. All changes in populations will be compared against target goals for each area to measure success, or to inform adaptive management.

3.8 Education and Training

City Light will provide outreach and education with information on how to limit the introduction or spread of target species in the Project Boundary and how to reduce impacts to sensitive species and habitats. Training will be provided to City Light employees biennially. Training will include the review of BMPs and SOPs, as well as provide basic weed identification references. Outreach and education regarding common vectors and preventative actions will be made available to recreationists at high-use sites within the Project Boundary.

4.0 IMPLEMENTATION TIMELINE

City Light's implementation of the Invasive Plants Plan will follow a rolling schedule to accomplish treatment throughout all prioritized areas. MUs will be treated and monitored in phases, particularly in the transmission line ROW and reservoir shorelines, as these areas are too large to treat at one time. IWM treatments may be synchronized with other vegetation management activities. A generalized timeline of activities is included in Table 4.0-1.

Table 4.0-1. Timeline of Invasive Plants Plan activities.

Timeline	Activity
Annually	Report to and consult with SLIC (consistent with the SLIC Governance Document)on previous year's activities and monitoring, and planned current and upcoming activities that are based on the implementation work plan and shared through the Annual Report (three year rolling plan (previous year activities, and two year rolling workplan)). Annual work plan activities and monitoring locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS in the Implementation Work Plan (including the specific location, timing and scope of the activities.[14] Annual work plan activities and monitoring locations affecting an ESA-listed species and/or its habitat are subject to approval of USFWS and/or NMFS (if not previously approved in the Implementation Work Plan).
	Conduct early detection monitoring for priority areas.
	Implement prevention measures and control priority species.
	Survey prioritized areas for target species and update invasive plant database and associated GIS maps.
Within the first year following license issuance	City Light will develop an Implementation Work Plan in consultation with SLIC and with approval from the NPS when actions have the potential to affect NPS lands and waters and USFWS and/or NMFS for actions affecting an ESA-listed species and/or its habitat. This plan shall include management goals and objectives, priorities, and treatments for MUs, including identification of sensitive habitats and at-risk areas.
	Develop and begin implementing BMPs and SOPs to address EDRR, emergency actions, and other specific tasks.
Every two (2) years following license issuance	Provide training to City Light employees which will include review of BMPs and SOPs, as well as provide basic weed identification references.
Every five (5) years following license issuance	Describe the status, distribution, likely vectors, and limiting factors for target invasive plant species and update maps accordingly.
	Survey for sensitive plants in prioritized areas and update goals or priorities. Update sensitive species database and GIS maps and provide culturally significant plant data to Indian Tribes and Canadian First Nations for review.
	Review and update management goals, priorities, and treatments for MUs, including identification of sensitive habitats and at-risk areas.
Every fifteen (15) years following license issuance	Perform a complete survey to inventory invasive terrestrial plants within the Project Boundary and the banks of the Skagit River to the confluence with the Sauk River, with a focus on specific treatment areas and identified pathways and vectors.

[14] Herbicide use on locations on or affecting NPS lands and waters are always subject to NPS approval.

5.0 MONITORING AND REPORTING

5.1 Monitoring Schedule

Monitoring efforts will be performed to document the progress of meeting the Invasive Plants Plan goals and objectives. Monitoring will be an extension of protection efforts, using baseline information determined through City Light study efforts. The goals of monitoring are to determine the effectiveness of protection measures, and to inform adaptive management updates to this Invasive Plants Plan. A generalized timeline of monitoring activities is included in Table 5.0-1.

In select MUs where invasive species are treated, monitoring may include the following metrics:

- Percent cover of invasive species;
- Number of invasive species present;
- Percent cover by native species;
- Native species diversity (richness and evenness); and
- Heterogeneity/complexity of habitats (vegetation patch richness and evenness).

Table 5.0-1. Timeline of Invasive Plants Plan monitoring activities.

Timeline	Activity
Within the first (1) year following activity	Identify priority populations and appropriate thresholds for monitoring.
Annually for the first three (3) years following activity	Monitor sites that receive invasive species treatment following the completion of treatment. Sites will be retreated if deemed necessary to move toward desired future condition.
	Monitor revegetated areas for establishment and effectiveness (e.g., percent cover native species) until revegetation is established.

5.2 Adaptive Management and Plan Review

City Light will apply adaptive management through the process of implementing testable management actions, and assessing the need to update management decisions outlined in this Invasive Plants Plan (including the Implementation Work Plan). At five (5) year intervals, or as needed and proposed by the SLIC, City Light will evaluate monitoring information to determine if new best available science, BMPs, updates to IWM strategies, or changes to MU prescriptions would increase the success of the protection and enhancement measures included in this Invasive Plants Plan (including the Implementation Work Plan).

City Light will engage in regular consultation with the SLIC and submittals to FERC. City Light will report annually on the status of known invasive plant populations, native plant propagation, and other pertinent issues. Every five (5) years, City Light will file a report with FERC describing implementation and any proposed modifications to this Invasive Plants Plan (including the Implementation Work Plan) based upon the results of monitoring and consultation with the SLIC.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

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INVASIVE PLANTS MANAGEMENT PLAN

ATTACHMENT A

TARGET LIST OF INVASIVE PLANT SPECIES

Table A-1. Initial target list of invasive plant species developed during 2021 and 2022 surveys as part of the TR-04 Invasive Plants Study.

Scientific Name	Common Name	Predicted Occurrence	Known Location	Noxious Weed Classification[1]				Source
				State	Skagit	Whatcom	Snohomish	
Abutilon theophrasti	Velvetleaf	None	-	B	B-designated	B-designated	B-designated	County Lists
Acer ginnala	Amur maple	None	-	-	-	-	-	NPS - 1st Priority
Acer negundo	Box elder	Uncommon	Newhalem, Diablo	-	-	-	-	NPS - 1st Priority
Acer platanoides	Norway maple	None	-	-	-	-	-	NPS - 1st Priority
Acer pseudoplatanus	Sycamore maple	Common	Newhalem, Diablo	-	-	-	-	NPS - 1st Priority / 2019 Study Plan
Acer rubrum	Red maple	None	-	-	-	-	-	NPS - 1st Priority
Aesculus hippocastanum	Horse chestnut	Uncommon	Newhalem, Diablo	-	-	-	-	NPS - 1st Priority
Aegopodium podagraria	Bishop's goutweed	Uncommon	-	-	-	-	-	City Light
Alhagi maurorum	Camelthorn	None	-	B	B-designated	B-designated	B-designated	County Lists
Alliaria petiolata	Garlic mustard	None	-	A	A	A	A	County Lists
Amorpha fruticosa	Indigobush	None	-	B	B-designated	B-designated	B-designated	County Lists
Anchusa arvensis	Bugloss, annual	None	-	B	B-designated	B-designated	B-designated	County Lists
Anchusa officinalis	Bugloss, common	None	-	B	B-designated	B-designated	B-designated	County Lists
Anthriscus sylvestris	Wild chervil	None	-	B	B-designated	B-selected	B-designated	County Lists
Arctium lappa	Greater burdock	Common	Newhalem, Diablo, ROW, Newhalem penstock trail	-	-	-	-	NPS - 1st Priority
Berteroa incana	Hoary alyssum	None	-	B	B-designated	B-designated	B-designated	County Lists
Brachypodium sylvaticum	False brome	None	-	A	A	A	A	County Lists
Bromus tectorum	Cheatgrass	Common	-	-	-	-	-	City Light
Bryonia alba	White bryony	None	-	B	B-designated	B-designated	B-designated	County Lists
Buddleja davidii	Butterfly bush	Common	Riparian gravel bars, isolated locations within transmission line ROW	B	B-no control	B-selected	-	County Lists
Butomus umbellatus	Flowering rush	None	-	A	A	A	A	County Lists
Cabomba caroliniana	Fanwort	None	-	B	B-designated	B-designated	B-designated	County Lists
Campanula rapunculoides	Creeping bellflower	Common	Newhalem, Diablo	-	-	-	-	NPS – 1st Priority
Carduus acanthoides	Thistle, plumeless	None	-	B	B-designated	B-designated	B-designated	County Lists
Carduus nutans	Thistle, musk	None	-	B	B-designated	B-designated	B-designated	County Lists
Carduus pycnocephalus	Thistle, Italian	None	-	A	A	A	A	County Lists
Carduus tenuiflorus	Thistle, slenderflower	None	-	A	A	A	A	County Lists
Cenchrus longispinus	Longspine sandbur	None	-	C	C	-	B-designated	County Lists
Centaurea calcitrapa	Purple starthistle	None	-	A	A	A	A	County Lists
Centaurea diffusa	Knapweed, diffuse	None	-	B	B-designated	B-designated	B-designated	County Lists
Centaurea jacea	Knapweed, brown	None	-	B	B-designated	B-designated	B-designated	County Lists
Centaurea macrocephala	Knapweed, bighead	None	-	A	A	A	A	County Lists
Centaurea melitensis	Malta starthistle	None	-	B	B-designated	B-designated	-	County Lists
Centaurea nigra	Knapweed, black	None	-	B	B-designated	B-designated	B-designated	County Lists
Centaurea nigrescens	Knapweed, Vochin	None	-	A	A	A	A	County Lists
Centaurea solstitialis	yellow starthistle	None	-	B	B-designated	B-designated	B-designated	County Lists
Centaurea stoebe	Knapweed, spotted	Uncommon	Diablo Lake boat ramp, Newhalem	B	B-designated	B-selected	B-designated	County Lists / NPS
Centaurea x moncktonii	Knapweed, meadow	None	-	B	B-designated	B-selected	B-designated	County Lists

Scientific Name	Common Name	Predicted Occurrence	Known Location	Noxious Weed Classification[1]				Source
				State	Skagit	Whatcom	Snohomish	
Chondrilla juncea	Rush skeletonweed	None	-	B	B-designated	B-designated	B-designated	County Lists
Cirsium arvense	Canada thistle	Common	ROW, Newhalem penstock, Diablo, several mitigation land properties	C	-	C-selected	-	County Lists
Cirsium vulgare	Bull thistle	Common	-	C	C	C	-	County Lists
Clematis orientalis	Oriental clematis	None	-	A	A	A	A	County Lists
Clematis vitalba	Traveler's-joy	Common	ROW (scattered locations from Newhalem to Sauk), road to Camp Marion, Taylor spawning channel, bypass reach	-	-	-	-	2019 Study Plan
Conium maculatum	Poison hemlock	Common	ROW	B	B-selected	B-selected	B-designated	County Lists / NPS
Convolvulus arvensis	Field bindweed	Common	Reflector Bar	C	-	-	-	State List
Crataegus monogyna	English hawthorn	Common	Reflector Bar, Newhalem	C	-	C-selected	-	County Lists
Crupina vulgaris	Common crupina	None	-	A	A	A	A	County Lists
Cynoglossum officinale	Houndstongue	None	-	B	B-designated	B-designated	B-designated	County Lists
Cyperus esculentus	Yellow nutsedge	None	-	B	B-selected	B-designated	B-designated	County Lists
Cytisus scoparius	Scot's broom	Common	ROW, Reflector Bar, Newhalem, Taylor spawning channel, Savage Slough mitigation land property	B	B-selected	B-selected	-	County Lists / NPS
Daphne laureola	Spurge laurel	Uncommon	-	B	B-designated	B-designated	B-designated	County Lists
Echium vulgare	Common viper's bugloss	None	-	B	B-designated	B-designated	B-designated	County Lists
Egeria densa	Brazilian elodea	None	-	B	B-designated	B-designated	-	County Lists
Epilobium hirsutum	Hairy willowherb	None	-	B	B-designated	-	B-designated	County Lists
Euphorbia esula	Spurge, leafy	None	-	B	B-designated	B-designated	B-designated	County Lists / NPS
Euphorbia myrsinites	Spurge, myrtle	None	-	B	B-designated	-	B-designated	County Lists
Euphorbia oblongata	Egg-leaf spurge	Uncommon	Near Diablo Dam	A	A	A	A	County Lists
Euphorbia peplus	Petty spurge	Common	Newhalem	-	-	-	-	2019 Study Plan
Fallopia japonica	Knotweed, Japanese	Uncommon	Riparian, ROW (not sure which species), Diablo; McLeod Slough and North Everett Creek (species unknown on mitigation lands)	B	B-selected	B-designated	B-selected	County Lists / NPS / 2019 Study Plan
Fallopia sachalinensis	Knotweed, giant	Uncommon	Riparian, ROW	B	B-designated	B-designated	B-selected	County Lists
Fallopia x bohemica	Knotweed, bohemian	Uncommon	Riparian, ROW	B	B-no control	B-selected	B-selected	County Lists
Ficaria verna	Lesser celandine	None	-	B	B-no control	B-selected	-	County Lists
*Foeniculum vulgare (*except *F. vulgare* var. *azoricum)*	Common fennel (except bulbing fennel)	Uncommon	-	B	B-no control	B-designated	B-designated	County Lists
Galega officinalis	Goatsrue	None	-	A	A	A	A	County Lists
Genista monspessulana	French broom	None	-	A	A	A	A	County Lists
Geranium robertianum	Herb-Robert	Common	Newhalem, Diablo, ROW, some mitigation lands, Newhalem Ponds	B	B-no control	B-selected	-	County Lists / NPS
Geranium lucidum	Shiny geranium	Uncommon	-	B	B-designated	B-designated	B-designated	County Lists / NPS
Glyceria maxima	Reed sweetgrass	None	-	A	A	A	A	County Lists
Hedera helix	English ivy	Common	Copper Cr. pit, Newhalem, Diablo	C	-	C-selected	-	County Lists
Helianthus ciliaris	Texas blueweed	None	-	A	A	A	A	County Lists
Heracleum mantegazzianum	Giant hogweed	None	-	A	A	A	A	County Lists
Hieracium aurantiacum	Hawkweed, orange	Uncommon	near Illabot Creek Road	B	B-designated	B-selected	B-designated	County Lists

Scientific Name	Common Name	Predicted Occurrence	Known Location	Noxious Weed Classification[1]				Source
				State	Skagit	Whatcom	Snohomish	
Hieracium, subgenus Hieracium	Hawkweeds: All non-native species and hybrids of the wall subgenus	Common	Newhalem, ROW	B	B-no control	B-selected	-	County Lists
Hieracium, subgenus *Pilosella*	Hawkweeds: All non-native species and hybrids of the meadow subgenus	None	-	B	B-designated	B-designated	B-designated	County Lists
Hydrilla verticillata	Hydrilla	None	-	A	A	A	A	County Lists
Hypericum perforatum	St. John's-wort	Common	-	C	C	C	-	City Light
Ilex aquifolium	English holly	Common	Newhalem, Diablo, ROW	-	-	-	-	NPS - 1st Priority
Impatiens glandulifera	Policeman's helmet	Uncommon	SR 20 along Gorge Lake, Comm line to Babcock cell tower; Taylor spawning channel	B	B-designated	B-selected	B-designated	County Lists
Impatiens parviflora	Small-flowered Jewelweed	Uncommon	-	A	A	A	-	County Lists
Isatis tinctoria	Dyer's woad	None	-	A	A	A	A	County Lists
Jacobaea vulgaris	Tansy ragwort	-	ROW, Savage Slough mitigation land property	C	B-selected	B-selected	B-designated	County Lists
Juglans nigra	Black walnut	Common	Newhalem, Diablo	-	-	-	-	NPS - 1st Priority
Juglans spp.	Butternut	Common	Newhalem, Diablo	-	-	-	-	NPS - 1st Priority
Kochia scoparia	Kochia	None	-	B	B-designated	B-designated	B-designated	County Lists
Lamiastrum galeobdolon	Yellow archangel	None	-	B	B-designated	B-designated	-	County Lists
Lepidium latifolium	Perennial pepperweed	None	-	B	B-designated	B-designated	B-designated	County Lists
Leucanthemum vulgare	Oxeye daisy	Common	-	C	C	-	-	City Light
Linaria dalmatica ssp. *dalmatica*	Dalmatian toadflax	Uncommon	ROW, Diablo, Newhalem	B	B-designated	B-designated	B-designated	County Lists / NPS
Linaria purpurea	Purple toadflax	Common	Newhalem, ROW	-	-	-	-	NPS - 1st Priority
Linaria vulgaris	Yellow toadflax	Uncommon	ROW	B	C	-	-	County Lists
Ludwigia hexapetala	Water primrose	None	-	B	B-designated	B-designated	B-designated	County Lists
Ludwigia peploides	Floating primrose-willow	None	-	A	A	A	A	County Lists
Lunaria annua	Annual honesty	Common	Newhalem, Diablo	-	-	-	-	NPS - 1st Priority
Lysimachia vulgaris	Loosestrife, garden	Uncommon	-	B	B-designated	B-designated	B-designated	County Lists
Lythrum salicaria	Loosestrife, purple	Common	-	B	B-no control	B-designated	B-selected	County Lists
Lythrum virgatum	Loosestrife, wand	None	-	B	B-no control	(B-designated)	-	County Lists
Mirabilis nyctaginea	Wild four-o'clock	None	-	A	-	A	A	County Lists
Myriophyllum aquaticum	Parrotfeather	None	-	B	B-designated	B-designated	B-designated	County Lists
Myriophyllum heterophyllum	Variable-leaf milfoil	None	-	A	A	A	A	County Lists
Myriophyllum spicatum	Eurasian watermilfoil	None	-	B	B-no control	B-selected	B-selected	County Lists
Nymphoides peltata	Yellow floatingheart	None	-	B	B-designated	B-designated	B-designated	County Lists
Onopordum acanthium	Thistle, Scotch	None	-	B	B-designated	B-designated	B-designated	County Lists
Persicaria wallichii	Knotweed, Himalayan	Uncommon	Riparian, ROW	B	B-designated	B-designated	B	County Lists
Phalaris arundinacea	Reed canarygrass	Common	Ross Lake, Big Beaver, ROW, mitigation lands	C	C	C	-	County Lists / NPS / 2019 Study Plan
Phragmites australis	Common reed (non-native genotypes only)	None	-	B	B-designated	B-designated	B-designated	County Lists
Picris hieracioides	Hawkweed oxtongue	None	-	B	B-designated	B-designated	-	County Lists
Potentilla recta	Sulfur cinquefoil	Uncommon	ROW at Illabot Creek	B	B-designated	B-designated	B	County Lists / NPS
Prunus avium	Sweet cherry	Uncommon	Newhalem, Diablo	-	-	-	-	NPS - 1st Priority

Scientific Name	Common Name	Predicted Occurrence	Known Location	Noxious Weed Classification[1]				Source
				State	Skagit	Whatcom	Snohomish	
Prunus cerasifera	Cherry plum	-	-	-	-	-	-	NPS - 1st Priority
Prunus domestica	Domestic plum	-	ROW	-	-	-	-	NPS - 1st Priority
Prunus laurocerasus	Cherry-laurel	-	Newhalem, Diablo	-	-	-	-	NPS - 1st Priority
Pueraria montana var. *lobata*	Kudzu	None	-	A	A	A	A	County Lists
Rhaponticum repens	Knapweed, Russian	None	-	B	B-designated	B-designated	B-designated	County Lists / NPS
Robinia hispida	Bristly locust	-	Near spray booth, Ladder Creek Garden, and road to top of Incline Lift	-	-	-	-	NPS - 1st Priority
Rubus bifrons	Himalayan blackberry	-	widespread ROW, Reflector Bar, Newhalem Ponds, several mitigation lands	C	-	C-selected	-	County Lists
Saccharum ravennae	Ravenna grass	None	-	B	B-no control	-	-	County Lists
Sagittaria graminea	Grass-leaved arrowhead	None	-	B	B-designated	B-designated	-	County Lists
Salvia aethiopis	Sage, Mediterranean	None	-	A	A	A	A	County Lists
Salvia pratensis	Meadow clary	None	-	A	A	A	A	County Lists
Salvia sclarea	Sage, clary	None	-	A	A	A	A	County Lists
Schoenoplectus mucronatus	Ricefield bulrush	None	-	A	A	A	A	County Lists
Silybum marianum	Thistle, milk	None	-	A	A	A	A	County Lists
Solanum elaeagnifolium	Silverleaf nightshade	None	-	A	A	A	A	County Lists
Solanum rostratum	Buffalobur	None	-	C	C	-	A	County Lists
Sorbus aucuparia	European mountain-ash	-	Newhalem, Diablo	-	-	-	-	NPS - 1st Priority
Sorghum halepense	Johnsongrass	None	-	A	A	A	A	County Lists
Spartina alterniflora	Cordgrass, smooth	None	-	A	A	A	A	County Lists
Spartina anglica	Cordgrass, common	None	-	A	A	A	A	County Lists
Spartina densiflora	Cordgrass, dense-flowered	None	-	A	A	A	A	County Lists
Spartina patens	Cordgrass, saltmeadow	None	-	A	A	A	A	County Lists
Spartium junceum	Spanish broom	None	-	A	A	A	A	County Lists
Taeniatherum caput-medusae	Medusahead	None	-	B	C	C	-	County Lists
Tamarix ramosissima	Saltcedar	None	-	B	B-designated	B-designated	B-designated	County Lists
Tanacetum vulgare	Common tansy	-	widespread ROW, Reflector Bar, several mitigation lands	C	-	C-selected	-	County Lists
Thymelaea passerina	Spurge flax	None	-	B	A	-	A	County Lists
Tribulus terrestris	Punctureviné	None	-	B	B-designated	B-designated	B-designated	County Lists
Tussilago farfara	European coltsfoot	None	Nooksack Mitigation Property-	B	B-designated	B-designated	-	County Lists
Ulex europaeus	Gorse	None	-	B	B-designated	B-designated	B-designated	County Lists
Verbascum thapsus	Flannel mullein	-	Newhalem, Diablo, ROW, several mitigation lands	-	-	-	-	NPS - 1st Priority
Vinca minor	Lesser periwinkle	-	Newhalem, Diablo, Reflector Bar	-	-	-	-	NPS - 1st Priority
Zygophyllum fabago	Syrian beancaper	None	-	A	A	A	A	County Lists

1 A = Class A Noxious Weeds: Non-native species with a limited distribution in the state. Eradication is required by state law.
B = Class B Noxious Weeds: Non-native species established in some regions of Washington, but of limited distribution or not present in other regions of the state. Because of differences in distribution, treatment of Class B weeds varies between regions of the state. In regions where a Class B weed is unrecorded or of limited distribution, prevention of seed production is required. In these areas, the weed is a "Class B designate," meaning it is designated for control by state law. In regions where a Class B species is already abundant or widespread, control is a local option. In these areas, the weed is a "Class B-selected," with containment, gradual reduction, and prevention of further spread being the chief goals. County noxious weed control boards may also designate Class B weeds for required control.
C = Class C Noxious Weeds: Non-native species that are already widely established in Washington or of special interest to the state's agricultural industry. Counties may enforce control if locally desired or choose simply to provide education or technical consultation to county residents.
Non-native status from the Washington State Noxious Weed Control Board (2021). https://www.nwcb.wa.gov/pdfs/2021-State-Weed-List_Scientific_Name-8.5x11.pdf.

RIVERSCAPE ECOSYSTEM PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

December 2025

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List of Acronyms and Abbreviations

°C .....degrees Celsius
AHP.....Aquatic Habitat Program
BACI.....before-after-control-impact
BMP .....best management practice
cfs.....cubic feet per second
City Light.....Seattle City Light
CLOMR .....Condition Letter of Map Revision
CMZ.....Channel Migration Zone
CoSD.....City of Seattle Datum
dbh.....diameter at breast height
EMAMP.....Ecosystem Monitoring and Adaptive Management Program
FEMA .....Federal Emergency Management Agency
FERC.....Federal Energy Regulatory Commission
FLA .....final license application
FLIR.....forward looking infrared
FMP.....Flow Management Program
LiDAR.....light detection and ranging
LY .....License Year
NAVD 88 .....North American Vertical Datum of 1988
NERC.....North American Electric Reliability Corporation
NMFS.....National Marine Fisheries Service
NPS .....National Park Service
PDT .....Pacific Daylight Time
PME .....protection, mitigation and enhancement
PRM .....Project River Mile
Project .....Skagit River Hydroelectric Project
PST.....Pacific Standard Time
REP .....Riverscape Ecosystem Plan
Revised FSA .....Revised Fisheries Settlement Agreement
ROW .....right-of-way
RTK.....real-time kinematic positioning

SLIC .....Skagit License Implementation Committee

SMART .....Specific, Measurable, Achievable, Relevant, and Time-bound

SR.....State Route

SRSC.....Skagit River System Cooperative

STJ .....(salmonid) stream-type juvenile

USFS .....U.S. Forest Service

USFWS .....U.S. Fish and Wildlife Service

USGS .....U.S. Geological Survey

WDFW.....Washington Department of Fish and Wildlife

WSDOT .....Washington State Department of Transportation

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Riverscape Ecosystem Plan (REP) for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) No. 553. The REP consists of two programs: the Flow Management Program (FMP) and the Aquatic Habitat Program (AHP). City Light will implement the flow and aquatic habitat measures described in this REP to (1) minimize the negative effects of Project operations on salmonids, lamprey, and other fishes; (2) enhance mainstem, side channel, Estuary, and off-channel habitat and connectivity downstream of Gorge Powerhouse and at stream crossings along the transmission line right-of-way (ROW); and (3) operate the Project in compliance with Washington State water quality requirements. This REP also describes proposed flow releases designed to promote geomorphic processes (i.e., Process Flows) that maintain aquatic, riparian, and floodplain habitats and increase the connectivity of side channels and off-channel habitats to the main channel.

City Light will integrate the efforts required under this REP with other license article obligations, including the Fish Passage Program, reservoir and flood risk management operations, and other license article obligations included in the new license.

2.0 PURPOSE AND SCOPE OF THE PLAN

City Light will implement the flow and aquatic habitat measures described in this REP to (1) minimize the negative effects of Project operations on salmonids, lamprey, and other fishes; (2) enhance mainstem, side channel, Estuary, and off-channel habitat and connectivity downstream of Gorge Powerhouse and at stream crossings along the transmission line ROW; and (3) operate the Project in compliance with Washington State water quality requirements. The REP consists of two programs: the FMP and the AHP.

2.1 Goals and Objectives

The goal of the REP is to describe the measures and framework for City Light's implementation of the flow and habitat measures developed to (1) minimize the negative effects of Project operations on salmonids, lamprey, and other fishes and (2) enhance mainstem, side channel, Estuary, and off-channel habitat and connectivity downstream of Gorge Powerhouse and at stream crossings along the transmission line ROW.

The purpose of the FMP (integrated as part of this REP) is to describe the measures and framework for City Light's implementation of flow and downramping rate restrictions to minimize the negative effects of Project operations on salmonids, lamprey, and other fishes and to provide the following benefits: (1) salmon spawning and redd protection; (2) salmon fry protection; (3) steelhead spawning and redd protection; (4) steelhead fry protection; (5) salmonid fry outmigration; (6) salmonids and juvenile rearing habitats enhancement, including mainstem margins and floodplain habitat; and (7) salmonid stream-type juvenile (STJ) protection. City Light will also implement the proposed flow releases designed to promote geomorphic processes (e.g., Process Flows) that maintain, improve, and enhance aquatic, riparian, Estuary, and floodplain habitats and increase the connectivity of side channels, floodplain, and off-channel habitats to the main channel to achieve the goals of process flows outlined in the Development Proposal for a Process Flows Adaptive Management Plan (Appendix N).

The FMP builds off the existing Flow Plan of the Revised Fisheries Settlement Agreement (Revised FSA) implemented since 2013 (City Light 2011) by continuing flow management approaches that have been successful while also introducing new and modified measures to benefit salmonids.

The purpose of the AHP (integrated as part of this REP) is to describe the measures and framework for City Light's implementation of the mainstem, riparian, floodplain, side channel, Estuary, and off-channel habitat enhancement measures downstream of Gorge Dam and at stream crossings along the transmission line ROW with the primary purpose of improving the availability of these habitats and enhancing the ecosystem process that create and sustain them. The AHP builds off the existing Anadromous and Resident Fish Non-Flow Plan (City Light 2011) by expanding upon the Habitat Development and Improvement Program while also introducing new measures to benefit aquatic and riparian habitats and ecosystem diversity and resiliency. Additionally, the AHP includes measures to avoid, minimize, and mitigate impacts of Project operations to protect and enhance aquatic habitat at transmission line stream crossings along the transmission line ROW and associated routes. Culvert replacements, wood augmentation, and projects to avoid, minimize, and mitigate interactions resulting from channel migration

interactions with transmission line towers and other City Light infrastructure are included in the AHP.

Terrestrial components of management of the transmission line ROW and associated roads including road maintenance, vegetation management and riparian restoration measures are included in City Light's Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan, and Vegetation Management Plan, respectively.

This REP also lays out a comprehensive monitoring program to evaluate the effectiveness of the measures described within, identify adaptive management opportunities, and support compliance.

2.2 Geographic Area

The geographic scope of this REP is the Skagit River below Gorge Dam, including aquatic habitat areas to be enhanced within the transmission line ROW and within the Skagit River below Gorge Dam.

3.0 FLOW MANAGEMENT PROGRAM

The purpose of the FMP (integrated as part of this REP) is to describe the measures and framework for City Light's implementation of the flow and downramping rate restrictions to minimize the negative effects of Project operations on salmonids, lamprey, and other fishes and to provide the following benefits: (1) salmon spawning and redd protection; (2) salmon fry protection; (3) steelhead spawning and redd protection; (4) steelhead fry protection; (5) salmonid fry outmigration; (6) salmonids and juvenile rearing habitats enhancement, including mainstem margins and floodplain habitat; and (7) salmonid STJ protection. City Light will also implement the proposed flow releases designed to promote geomorphic processes (e.g., Process Flows) that maintain, improve, and enhance aquatic, riparian, Estuary, and floodplain habitats and increase the connectivity of side channels, floodplain, and off-channel habitats to the main channel to achieve the goals of process flows outlined in the Development Proposal for a Process Flows Adaptive Management Plan (Appendix N).

While the FMP flow measures and downramping rate restrictions below the powerhouse are designed to provide year-round protection for all anadromous and resident species, they specifically prioritize protections for the following mainstem spawning species:

- Chinook Salmon (*Oncorhynchus tshawytscha*)
- Pink Salmon *(O. gorbuscha)*
- Chum Salmon *(O. keta)*
- Steelhead *(O. mykiss)*

Flow measures are tailored to be protective for specific life stages of each species:

- *Spawning Flows* are implemented to limit maximum flow levels during the Spawning Period, and thereby minimize redd building in areas along the river margin.
- *Incubation Flows* provide minimum flow levels throughout the Incubation Period so that redds are adequately inundated from the onset of spawning until the fry emerge.
- *Fry Protection* is implemented by providing for minimum flow requirements and restrictions on downramp conditions to minimize the risk of fry stranding during the period when fry are emerging from redds.
- *STJ Protection* exclusively targets STJ life histories of Chinook Salmon, steelhead, and other salmonids (i.e., Bull Trout, Coho Salmon, and resident fishes that inhabit the mainstem) that exhibit prolonged freshwater residence.[1] This measure establishes downramping rates to protect STJ from stranding and to minimize local displacement from foraging habitats.

Table 3.0-1 describes the combined flow protection periods by species and life stage.

[1] The studies conducted prior to and as part of the relicensing of the Project support City Light's conclusion that the downramping rates in the current license provide adequate protection for STJ and the parr life history. City Light is conducting an ongoing study that may result in modifications to the FMP for STJ, in consultation with the SLIC. Any amendments to this FMP as a result of these studies are subject to approval by the Services.

Table 3.0-1. Combined flow protection periods by species and life stage.

Flow Protection Period[1]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Chinook Salmon												
Spawning												
Incubation												
Fry												
STJ												
Flow Protection Period	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Pink Salmon												
Spawning												
Incubation												
Fry												
Flow Protection Period	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Chum Salmon												
Spawning												
Incubation												
Fry												
Flow Protection Period[2]	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Steelhead												
Spawning – March steelhead												
Spawning – April steelhead												
Spawning – May/June steelhead												
Incubation[2] – March steelhead												
Incubation[2] – April steelhead												
Incubation[2] – May/June steelhead												
Fry												
STJ												

1 The Incubation Flow protection period has four components distinguished above by color: the Spawning Period (red), the Incubation Period (black/grey), and the Fry Protection Period (blue), and the STJ Protection Period (green).

2 For the purposes of spawning and Incubation Flows, steelhead are separated into three subperiods based on the month in which they spawn.

Additionally, the Project will comply with the minimum instantaneous[2] flow requirements as described in Table 3.0-2 below as measured at the U.S. Geological Survey (USGS) Newhalem gaging station (12178000).

Table 3.0-2. Minimum Instream Flow Requirements.

Period	Minimum Instantaneous Flow (cfs)
January 1 – April 30	1,700
May 1 – June 30	1,600
July 1 – August 31	1,400
September 1 – November 15	2,000
November 16 – December 31	1,700

3.1 Instream Flow Provisions by Species

3.1.1 Chinook Salmon

3.1.1.1 Spawning Flows

For the purposes of this FMP, the Spawning Period for Chinook Salmon extends from September 1 to October 31. From September 1 to September 11, the maximum Daily Spawning Flow of 4,500 cfs will not be exceeded to help prevent dewatering of redds during subsequent flow conditions. From September 12 to October 31, the spawning period for Chinook and Pink salmon overlap. Pink Salmon spawn during odd years and prefer lower flows compared to Chinook Salmon. As a result, the maximum Daily Spawning Flow of 4,500 cfs will not be exceeded during even years and 4,000 cfs will not be exceeded during odd years to help prevent dewatering of redds during subsequent flow conditions. Two exceptions to this rule may occur: (1) flows may be higher during the Spawning Period if flow forecasts suggest that there will be a sufficient volume of water available to also provide higher flows during the subsequent Incubation Period; and (2) flows may also be higher during the Spawning Period when high flow events result in uncontrollable flow conditions.

3.1.1.2 Incubation Flows

Incubation Flows are intended to provide flow conditions during the Incubation Period so that redds remain adequately inundated until fry emerge. For Chinook Salmon, the Incubation Period begins on September 1, simultaneously with the beginning of the Spawning Period, and extends until April 30. The Incubation Period is further separated into the following three segments during which different instantaneous minimum Incubation Flows are implemented.

- *September 1 – 9*: During the first ten (10) days of the Spawning Period, which also represent the first ten (10) days of the Incubation Period, Incubation Flows will be based on the Planned Spawning Flow. Planned Spawning Flows are the flows targeted for spawning during a given month in City Light's monthly operating plan.
- *September 10 – October 31*: During the remainder of the Spawning Period, Incubation Flows

[2] Instantaneous flow is defined as the incremental flow as measured at the Skagit River at Newhalem, Washington USGS flow gaging station (12178000).

will be based on the average of the ten (10) highest Daily Spawning Flows that have occurred during the Spawning Period up to that day. Daily Spawning Flows are calculated as the actual average daily flow at the Newhalem Gage minus the portion of flow attributed to other sources.[3]

- *November 1 – April 30:* During the remainder of the Incubation Period, Incubation Flows will be based on the Season Spawning Flow which is calculated as the average of the ten (10) highest Daily Spawning Flows at the Newhalem Gage observed during the entire Spawning Period (September 1 – October 31).

Exceptions to these Incubation Flows may occur when higher minimum flows are required for protection of other species and life stages. During such instances, City Light will provide the highest of the competing minimum flow requirements indicated for any particular day. City Light, in consultation with the Skagit License Implementation Committee (SLIC), may determine that basing the Incubation Flows on the ten (10) highest Daily Spawning Flows could result in an Incubation Flow that is higher than desirable. Since the main purpose of Incubation Flows is to keep redds inundated during the Incubation Period, City Light, in consultation with the SLIC, may use an adaptive management approach to evaluate the sensitivity and effectiveness of using the ten (10) highest Daily Spawning Flows versus an alternative approach. Additionally, City Light, in consultation with the SLIC, may apply adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity.

3.1.1.3 Fry Protection

Protection for Chinook Salmon fry is provided by implementing flow requirements and restrictions on downramp conditions to minimize the risk of fry stranding during the period when fry are emerging from redds. For Chinook Salmon, the Fry Protection Period extends from January 1 through May 31. Restrictions on the maximum downramping rates during the Fry Protection Period are based on flows at the Newhalem Gage and are described in Section 3.1.5 below.

To maintain inundation of various fry rearing habitats, the Newhalem Flow will be maintained that is the higher of:

(1) The required monthly minimum flow as described in Table 3.0-2 above; or

(2) The required Incubation Flow.

City Light will endeavor to maintain a Predicted Marblemount Flow of at least 3,000 cfs, but will not be required to release flows exceeding 2,600 cfs (as measured at Newhalem Gage) for the purposes of salmon fry protection. Table 3.0-1 provides a graphical illustration of Chinook salmon flow protection periods by life stage.

3.1.2 Pink Salmon

3.1.2.1 Spawning Flows

For the purposes of the FMP, the Spawning Period for Pink Salmon extends from September 12 to October 31, exclusively during odd-numbered years. During this period, a maximum Daily Spawning Flow of 4,000 cfs will not be exceeded to help prevent dewatering of redds during

[3] I.e., flood risk management, spill, avoiding Firm Load curtailment, high Sidestream Inflow, or Process Flows.

subsequent flow conditions. Two exceptions to this rule may occur: (1) flows may be higher during the Spawning Period if flow forecasts suggest that there will be a sufficient volume of water available to also provide higher flows during the subsequent Incubation Period; and (2) flows may also be higher during the Spawning Period when high flow events result in uncontrollable flow conditions.

3.1.2.2 Incubation Flows

Incubation Flows are intended to provide flow conditions during the Incubation Period so that redds remain adequately inundated until fry emerge. For Pink Salmon, the Incubation Period begins on September 12, simultaneously with the beginning of the Spawning Period, and extends until April 30. The Incubation Period is further separated into the following three segments during which different instantaneous Incubation Flows are implemented.

- *September 12 – 21*: During the first ten (10) days of the Spawning Period, which also represent the first 10 days of the Incubation Period, Incubation Flows will be based on the Planned Spawning Flow. Planned Spawning Flows are the flows targeted for spawning during a given month in City Light's monthly operating plan.
- *September 22 – October 31*: During the remainder of the Spawning Period, Incubation Flows will be based on the average of the ten (10) highest Daily Spawning Flows that have occurred during the Spawning Period up to that day. Daily Spawning Flows are calculated as the actual average daily flow at the Newhalem Gage minus the portion of flow attributed to other sources.[4]
- *November 1 – April 30:* During the remainder of the Incubation Period, Incubation Flows will be based on the Season Spawning Flow which is calculated as the average of the ten (10) highest Daily Spawning Flows at the Newhalem Gage observed during the entire Spawning Period (September 12 – October 31).

Exceptions to these Incubation Flows may occur when higher minimum flows are required for protection of other species and life stages. During such instances, City Light will provide the highest of the competing minimum flow requirements indicated for any particular day. City Light, in consultation with the SLIC, may determine that basing the Incubation Flows on the ten (10) highest Daily Spawning Flows could result in an Incubation Flow that is higher than desirable. Since the main purpose of Incubation Flows is to keep redds inundated during the Incubation Period, City Light, in consultation with the SLIC, may use an adaptive management approach to evaluate the sensitivity and effectiveness of using the ten (10) highest Daily Spawning Flows versus an alternative. Additionally, City Light, in consultation with the SLIC, may apply adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity.

3.1.2.3 Fry Protection

Protection for Pink Salmon fry is provided by implementing flow requirements and restrictions on downramp conditions to minimize the risk of fry stranding during the period when fry are emerging from redds. For Pink Salmon, the Fry Protection Period extends from January 1 through May 31.

[4] I.e., flood risk management, spill, avoiding Firm Load curtailment, high Sidestream Inflow, or Process Flows.

Restrictions on the maximum downramping rates during the Fry Protection Period are differentiated between daytime and nighttime periods and are based on flows at the Newhalem Gage, as described in Section 3.1.5 below.

To maintain inundation of various fry rearing habitats, the Newhalem Flow will be maintained that is the higher of:

(1) The required monthly minimum flow as described in Table 3.0-2 above; or

(2) The required Incubation Flow.

City Light will endeavor to maintain a Predicted Marblemount Flow of at least 3,000 cfs, but will not be required to release flows exceeding 2,600 cfs (as measured at Newhalem Gage) for the purposes of salmon fry protection. Table 3.0-1 provides a graphical illustration of Pink salmon flow protection periods by life stage.

3.1.3 Chum Salmon

3.1.3.1 Spawning Flows

For the purposes of the FMP, the Spawning Period for Chum Salmon extends from November 1 to January 6. During this period, a maximum Daily Spawning Flow of 4,600 cfs will not be exceeded to help prevent dewatering of redds during subsequent flow conditions. Two exceptions to this rule may occur: (1) flows may be higher during the Spawning Period if flow forecasts suggest that there will be a sufficient volume of water available to also provide higher flows during the subsequent Incubation Period; and (2) flows may also be higher during the Spawning Period when high flow events result in uncontrollable flow conditions.

3.1.3.2 Incubation Flows

Incubation Flows are intended to provide flow conditions during the Incubation Period so that redds remain adequately inundated until fry emerge. For Chum Salmon, the Incubation Period begins on November 1, simultaneously with the beginning of the Spawning Period, and extends until May 31. The Incubation Period is further separated into the following three segments during which different instantaneous minimum Incubation Flows are implemented.

- *November 1 – 9*: During the first ten (10) days of the Spawning Period, which also represent the first ten (10) days of the Incubation Period, Incubation Flows will be based on the Planned Spawning Flow. Planned Spawning Flows are the flows targeted for spawning during a given month in City Light's monthly operating plan.
- *November 10 – January 6*: During the remainder of the Spawning Period, Incubation Flows will be based on the average of the ten (10) highest Daily Spawning Flows that have occurred during the Spawning Period up to that day. Daily Spawning Flows are calculated as the actual average daily flow at the Newhalem Gage minus the portion of flow attributed to other sources.[5]
- *January 7 – May 31:* During the remainder of the Incubation Period, Incubation Flows will be based on the Season Spawning Flow which is calculated as the average of the ten (10) highest

[5] I.e., flood risk management, spill, avoiding Firm Load curtailment, high Sidestream Inflow, or Process Flows.

Daily Spawning Flows at the Newhalem Gage observed during the entire Spawning Period (November 1 – January 6).

Exceptions to these Incubation Flows may occur when higher minimum flows are required for protection of other species and life stages. During such instances, City Light will provide the highest of the competing flow requirements indicated for any particular day. City Light, in consultation with the SLIC, may determine that basing the Incubation Flows on the ten (10) highest Daily Spawning Flows could result in an Incubation Flow that is higher than desirable. Since the main purpose of Incubation Flows is to keep redds inundated during the Incubation Period, City Light, in consultation with the SLIC, may use an adaptive management approach to evaluate the sensitivity and effectiveness of using the ten (10) highest Daily Spawning Flows versus an alternative. Additionally, City Light, in consultation with the SLIC, may apply adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity.

3.1.3.3 Fry Protection

Protection for Chum Salmon fry is provided by implementing flow requirements and restrictions on downramp conditions to minimize the risk of fry stranding during the period when fry are emerging from redds. For Chum Salmon, the Fry Protection Period extends from January 1 through May 31. Restrictions on the maximum downramping rates during the Fry Protection Period are differentiated between daytime and nighttime periods and are based on flows at the Newhalem Gage, as described in Section 3.1.5 below.

To maintain inundation of various fry rearing habitats, the Newhalem Flow will be maintained that is the higher of:

(1) The required monthly minimum flow as described in Table 3.0-2 above; or

(2) The required Incubation Flow.

City Light will endeavor to maintain a Predicted Marblemount Flow of at least 3,000 cfs, but will not be required to release flows exceeding 2,600 cfs (as measured at Newhalem Gage) for the purposes of salmon fry protection. Table 3.0-1 provides a graphical illustration of Chum salmon flow protection periods by life stage.

3.1.4 Steelhead

3.1.4.1 Spawning Flows

For the purposes of the FMP, the Spawning Period for steelhead extends from March 15 to June 15. However, given the longer duration of this period, the expected interval between fertilization and fry emergence, and the nature of the springtime Skagit River hydrograph, the Spawning Period for steelhead is divided into three subperiods: March 15 to 31 (March spawners), April 1 to 30 (April spawners), and May 1 to June 15 (May/June spawners). Steelhead spawning during these subperiods will be considered separate spawning groups for which specific Incubation Flows (magnitude and duration) are determined. During these subperiods, a maximum Daily Spawning Flow of 5,000 cfs (as measured at the Newhalem Gage) will not be exceeded to help prevent dewatering of redds during subsequent flow conditions. Two exceptions to this rule may occur: (1) flows may be higher during the Spawning Period if flow forecasts suggest that there will be a

sufficient volume of water available to also provide higher flows during the subsequent Incubation Period; and (2) flows may also be higher during the Spawning Period when high flow events result in uncontrollable flow conditions. City Light, in consultation with the SLIC, may also increase flows during the Spawning Period to meet other resource objectives, such as flushing/connectivity flows and Process Flows (see Section 3.3 of this management plan).[6]

3.1.4.2 Incubation Flows

Incubation Flows are intended to provide flow conditions during the Incubation Period for each subgroup so that redds remain inundated until fry emerge. For March spawners, the Incubation Period begins on March 15, simultaneously with the beginning of the Spawning Period, and extends through June 30. For April spawners, the Incubation Period is from April 1 through July 31, and from May 1 through July 31 for May/June steelhead. The Incubation Period for each subgroup is further separated into the following three segments during which different instantaneous minimum Incubation Flows are implemented. Specific dates for each incubation segment are shown in Table 3.1-4.

- *First 10 Days of Each Spawning Subperiod*. During the first ten (10) days of the Spawning Period, which also represent the first ten (10) days of the Incubation Period, Incubation Flows will be based on the Planned Spawning Flow. Planned Spawning Flows are the flows targeted for spawning during a given month in City Light's monthly operating plan.
- *Remaining Days of Each Spawning Subperiod*. During the remainder of the Spawning Period, Incubation Flows will be based on the average of the ten (10) highest Daily Spawning Flows that have occurred during the Spawning Period up to that day. Daily Spawning Flows are calculated as the actual average daily flow at the Newhalem Gage minus the portion of flow attributed to other sources.[7]
- *Following Each Spawning Subperiod.* During the remainder of the Incubation Period, Incubation Flows will be based on the Season Spawning Flow which is calculated as the average of the ten (10) highest Daily Spawning Flows at the Newhalem Gage observed during that spawning subperiod.

Exceptions to these Incubation Flows may occur when higher minimum flows are required for protection of other species and life stages. During such instances, City Light will provide the highest of the competing minimum flow requirements indicated for any particular day. City Light, in consultation with the SLIC, may determine that basing the Incubation Flows on the ten (10) highest Daily Spawning Flows could result in an Incubation Flow that is higher than desirable. Since the main purpose of Incubation Flows is to keep redds inundated during the Incubation

[6] Historically (1995-2024) steelhead Planned Spawning Flow was based on a Spawning Control Curve that incorporates forecasted hydrologic conditions established prior to the Spawning Period and is adjusted throughout the Spawning Period as prevailing conditions change to maintain a stable flow at Marblemount. The Spawning Control Curve is described in detail in Appendix E (Shaping of Flows During Steelhead Spawning). The output from the Spawning Control Curve represents the maximum Planned Spawning Flows for each subperiod. As part of this approach, the Maximum Planned Spawning Flow for each subperiod (as measured at the Newhalem Gage) is further limited as follows: 5,000 cfs for March steelhead, 5,000 for April steelhead, and 4,000 cfs for May/June steelhead. This approach has resulted in a stable spawning distribution in the managed reach and can be considered a functioning alternative to the approach described in this section.

[7] I.e., flood risk management, spill, avoiding Firm Load curtailment, high Sidestream Inflow, or Process Flows.

Period, City Light, in consultation with the SLIC, may use an adaptive management approach to evaluate the sensitivity and effectiveness of using the ten (10) highest Daily Spawning Flows versus an alternative approach. Additionally, City Light, in consultation with the SLIC, may apply adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity or to meet other resource objectives, such as flushing/connectivity flows and Process Flows.

3.1.4.3 Fry Protection

Protection for fry is provided by implementing flow requirements and restrictions on downramp conditions to minimize the risk of fry stranding during the period when fry are emerging from redds. For steelhead, the Fry Protection Period extends from June 1 through October 15. Restrictions on the maximum downramping rates during the steelhead Fry Protection Period are based on flow at the Newhalem Gage and are described in Section 3.1.5 below.

To maintain inundation of various fry rearing habitats, the Newhalem Flow will be maintained that is the higher of:

(3) The required monthly minimum flow as described in Table 3.0-2 above; or

(4) The required Incubation Flow.

3.1.5 Salmon and Steelhead Fry and Stream-Type Juvenile Protection (Ramping Rates)

City Light anticipates the CWA Section 401 Water Quality Certification will include a compliance schedule and downramping rate attainment plan, consistent with WAC 173-201A-510(5), to develop reasonable and feasible downramping rate requirements that may include actions that balance operational feasibility and competing demands for water while still protecting designated aquatic life uses for the remaining term of the License.[8] The purpose of the attainment plan is to allow time to conduct additional investigations into the population-level effects of ramping on designated aquatic life uses, with a specific emphasis on salmonids, particularly fry and juvenile life stages, most vulnerable to stranding and displacement during Project operations.

The investigations described above will build upon findings from the 2024–2025 Skagit Fry Stranding Study[9] and will be designed to assess whether ramping behavior contributes to effects at the population scale, using analytical frameworks such as the Viable Salmonid Population (VSP) criteria—including abundance, productivity, spatial structure, and diversity. City Light anticipates developing these studies in consultation with the SLIC, and approval by Ecology and the Services, as an early action commitment, which may include:

- Quantitative estimates of abundance and distribution of fry;
- Evaluation of survival and outmigration success among fry exposed to different ramping conditions;
- Hydrologic and habitat modeling to estimate the spatial and temporal footprint of dewatering

[8] This Section 3.1.5 does not necessarily reflect what may be required for ESA purposes after the section 7 analysis is complete, and may be coordinated further or modified during the section 7 consultation process.

[9] The 2024–2025 Skagit Fry Stranding Study was ongoing at the time of Comprehensive Settlement Agreement.

events; and

- Refinement of fry emergence timing, habitat use, and stranding vulnerability windows by species.

City Light anticipates that the attainment plan will identify interim milestones, coordination timelines, and reporting deliverables. During the period under the compliance schedule, City Light will operate under interim ramping thresholds (Table 3.1-1 below) and will conduct a post hoc evaluation annually, including calculation of the geometric mean, to evaluate consistency with historical ramping behavior. This analysis may include:

- Calculation of the geometric mean ramping rate over each protection period, similar to methods used in WAC 173-201A. This approach is intended to be similar to the framework Ecology uses for bacteria attainment standards which use geometric mean values to characterize long-term central tendencies in skewed datasets while minimizing the influence of isolated exceedances.
- Evaluation of the frequency and magnitude distribution of ramping events, including percentiles (e.g., 50th, 80th, and 95th) and exceedance rates.
- Comparison to historical distributions, stratified by the critical flow threshold and daytime/nighttime operations for each protection period.

The objective of this annual analysis is to identify any statistically meaningful deviations from historical ramping behavior and assess whether operations under the interim thresholds remain consistent with historic practices and flow conditions. Results will be shared at the SLIC annual meeting to inform the downramping rate attainment plan process and any required operational adjustments during the interim period if operations deviate from the geometric mean.

Table 3.1-1. Interim Upper Skagit River Downramping Rate Requirements.

Start Date	Jan 1	Feb 1	Mar 1	Apr 1	May 1	Jun 1	Jul 1	Aug 1	Sep 1	Oct 1	Oct 16	Nov 1	Dec 1
Daytime Downramping Start (Hour Start)	7	7	6	6	5	4	4	5	6	6	6	6	8
Nighttime Downramping Start (Hour Start)	17	17	18	19	19	20	20	20	19	18	16	16	16
DAYTIME DOWNRAMPING RATE													
Hourly Daytime Downramping Rate (cfs/hr) when flow is ≤4,480 cfs at Newhalem	2” (± 300 cfs)	2” (± 300 cfs)	2” (± 300 cfs)	2” (± 300 cfs)	2” (± 300 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)
Hourly Daytime Downramping Rate (cfs/hr) when flow is >4,480 cfs at Newhalem	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)
NIGHTTIME DOWNRAMPING RATE													
**Hourly Nighttime Downramping rate (cfs/hr) when flow is ≤4,480 cfs at Newhalem	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)
Hourly Nighttime Downramping rate (cfs/hr) when flow is >4,480 cfs at Newhalem	13.5” (±2000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)
COMPLIANCE POINT													
Downramping Gage	NH	NH	NH	NH	NH	NH	NH	NH	NH	NH	NH	NH	NH

3.2 Measures Beyond Required Operation

City Light plans flows to provide favorable spawning conditions and redd, incubation, fry, and STJ protection each year; however, conditions may arise, especially when uncontrollable flow events occur, where these objectives are not possible. In these cases, certain actions may be taken, such as augmenting flows. The specific actions to be taken shall be cooperatively developed in consultation with the SLIC considering operating constraints, system flexibility, and potential impacts upon all anadromous species and life stages.

City Light will develop proposed actions to protect fishes in the mainstem Skagit River based on the best available options identified at the end of the spawning season for each species (or spawning group in the case of steelhead) or whenever uncontrollable flow events occur during the spawning, incubation, and rearing periods. City Light will consult with the SLIC on the proposed plan of action.

3.2.1 Flow Insufficiency

Flow Insufficiency shall mean water conditions during a month or months characterized by abnormally low precipitation and sidestream runoff that has the potential to result in a failure to maintain target Ross Lake elevations or draw Ross Lake elevations down to the minimum usable pool (i.e., 1,480.76 feet North American Vertical Datum of 1988 [NAVD 88]; 1,474.5 feet City of Seattle Datum [CoSD]) if operations continue to draft at the rate determined by minimum required flows). Months during which any of the Flow Insufficiency criteria in Section 3.2.1.1 below shall be considered Insufficient Months.

3.2.1.1 Determination of Flow Insufficiency

An Insufficient Month shall be deemed to occur when any one of the following criteria are met:

- **Criterion 1:** When discharge of the required flows at the Newhalem Gage, plus 300 cfs, considered along with the forecasted inflow to Ross Lake and the current reservoir volume, results in Ross Lake drafting to the minimum usable pool.
- **Criterion 2**: When discharge of the required flows at the Newhalem Gage, plus 300 cfs, considered along with the forecasted inflow to Ross Lake results in Ross Lake not refilling or maintaining the required elevations by the required refill dates.
- **Criterion 3**: When Natural Flow at the Newhalem Gage on any Inflow Day in August is less than 2,300 cfs.

3.2.1.2 Response to Flow Insufficiency

The goal of the response to flow insufficiency shall be to protect anadromous salmonids. At the earliest possible time after flow insufficiency has been determined, City Light will notify the SLIC of the need to meet to discuss the flow insufficiency problem and proposed action alternatives. Alternatives for action shall include but not be limited to the following: (1) reduce flow requirements to the allowable minimum instream flows (Table 3.0-2) for some or all succeeding months in which the condition of Flow Insufficiency persists; and (2) no action, which could potentially lead to reduced Newhalem Gage flows (to a level equal to Natural Flow) or Project load curtailment.

If an alternative solution to address flow insufficiency is not identified within two weeks of the date City Light notifies the SLIC of a condition of Flow Insufficiency, City Light will take the following actions.

For Criteria 1 and 2, City Light will reduce each month's flow requirements proportionally to the extent necessary to remove the Flow Insufficiency provided that the result of such reductions will be flows no less than the required minimum flows identified in Table 3.0-2 above. Proportional reduction of minimum flows shall be implemented as follows. City Light will:

(1) Notify SLIC representatives of its intent to implement proportional flow reductions;

(2) Calculate the total volume of flow (flow deficit) that is required to remove Flow Insufficiency (i.e., to keep Ross Lake from drafting to the minimum usable pool or to enable refilling Ross Lake to a minimum elevation of 1,600.76 feet NAVD 88 (1,594.5 feet CoSD) by July 31).

(3) Considering a six-month flow planning period, identify the future month in which the probability of drafting Ross Lake to the minimum usable pool at any point exceeds 5% under Flow Insufficiency Criterion 1, or to when the probability of reaching an elevation where the subsequent 50 percent exceedance flow forecast cannot be regulated in such a way that achieves Ross Lake reaching a minimum elevation of 1,600.76 feet NAVD 88 (1,594.5 feet CoSD) by July 31 under Flow Insufficiency Criterion 2. Flows should be divided proportionally from the current (partial) month through the calendar month identified above according to each month's normal minimum flow,[10] and

(4) Either reduce the monthly minimum flows according to each months' proportion of the flow deficit in steps 2 and 3 above, or preferably reduce the monthly flow requirements according to an alternative schedule recommended by the SLIC which will accomplish the same result (i.e., remove Flow Insufficiency within the same timeframe). If the targeted flow is less than the minimum flow required in Table 3.0-2, City Light shall (1) provide notice to and seek approval from Ecology within five (5) business days, and (2) then, unless Ecology disapproves, provide notice to FERC. City Light shall implement the flow modification within seven (7) days of providing such notice, unless otherwise directed by FERC.

For Criterion 3, City Light can reduce flows in August in conformance with Table 3.0-2 above.

3.2.1.3 Inflow Flow Forecasting

City Light utilizes several flow forecasting techniques to develop projected inflows, and these forecasting methods are expected to evolve over time. Accordingly, City Light will make the assumptions and methods of each particular forecast available to SLIC at the time the flow forecast is made. City Light will also regularly evaluate natural inflow and natural sidestream "Forecast Skill" used as input to forecast models for planning regulated discharge flow from the Project's powerhouses and make the results of these evaluations available to the SLIC in a timely manner. Forecast Skill is defined as the relative improvement (i.e., reduction) in forecast error, as compared to a simple, but reasonable, baseline forecast. The standard baseline inflow (or natural sidestream)

[10] Normal Minimum Flow is defined as the higher of the required monthly minimum flow or the required Incubation Flow as measured at the Newhalem Gage.

forecast for monthly flow models would be to use recent historical monthly averages as the expectation of future monthly average flows. For shorter forecast horizons, such as an hourly (or daily) forecast for the next 24 hours (or next day), the standard baseline forecast would use the previous completed hour (or day) projected into the future for the duration of the forecast period. When creating forecasts of natural or regulated discharge flow, City Light will give the highest weighting to forecasts that demonstrate the highest statistical Forecast Skill.

3.2.2 Limitations to Flow Management Capabilities

There are some circumstances (described below) where this management plan will be limited due to City Light's inability to react to or control the flows or operating factors that affect fish.

As soon as is practicable following City Light's awareness of a condition described in Section 3.2.2, City Light shall inform the SLIC of the condition, its anticipated impacts to License implementation, compliance with the 401 Certification, and the schedule and plan for return to normal operations.

3.2.2.1 Emergency Conditions

Nothing in this FMP will constrain City Light from taking appropriate action to respond to an emergency condition which includes, but is not limited to, a cause or event of Force Majeure. An emergency condition may include mechanical or electrical failure, or deficiencies of power necessary to serve Firm Load where there are no other viable options available, including power purchases from other sources. As soon as possible after the end of an emergency condition, City Light will return to an operation schedule in line with this FMP. City Light may be liable and responsible for certain emergency conditions that do not constitute Force Majeure.

3.2.2.2 Force Majeure

City Light shall not be liable or responsible for failure to perform or for delay in performance due to any cause or event or circumstance of Force Majeure. For purposes of this FMP, Force Majeure is any cause or event beyond City Light's reasonable control, and which could not have been reasonably foreseen and addressed by City Light. This may include, but is not limited to, fire, flood, mechanical failure, or accidents that could not reasonably have been avoided by City Light, strike or other labor disruption, act of God, act of any governmental authority or of the Parties, embargo, fuel or energy unavailability (ancillary to, but not including, basic power generation), wrecks or unavoidable delays in transportation, and inability to obtain necessary labor, materials, or manufacturing facilities from generally recognized sources in the applicable industry, or communications systems breakdowns, or for any other reason beyond City Light's control. City Light shall make all reasonable efforts to resume an operation schedule in line with this FMP promptly once the Force Majeure is eliminated.

3.2.2.3 Uncontrolled Flow Measures

The limitations on storage capacity in Gorge and Diablo lakes mean that Ross Dam is the only effective point of control for downstream flows, when considering bulk flows over time periods greater than a day. Nevertheless, there are conditions under which control of downstream flows is not possible even at Ross Dam. City Light will provide for flows protecting fish only so far as it can control the downstream flows. Therefore, the portion of the total daily flow which occurs under

the conditions of flood risk management or spill avoidance, load curtailment avoidance, and high Sidestream Inflow shall be considered uncontrolled flow and will be excluded from the calculation of Season Spawning Flow.

Flood Risk Management Measures or Spill Avoidance

City Light will not be responsible for flow which is released due to actions of the U.S. Army Corps of Engineers or due to reasonable actions taken to avoid exceeding the Flood Risk Management Rule Curve or full pool. In its annual compliance report, City Light will provide information upon which a decision to exercise this clause was made.

Load Curtailment Avoidance

City Light will not be responsible for flow which is released when there are no other viable options available other than Firm Load Curtailment, including purchase of power from other sources. This section is not intended to permit flow releases to meet the generation requirements resulting from an increase in Firm Load growth after the execution of this FMP. For the purpose of this FMP, Firm Load shall mean the minimum amount of power which City Light is obligated to provide from a combination of generation and contract resources for the use of its customers.

High Sidestream Inflow

City Light will not be responsible for that portion of flow which is released due to Sidestream Inflow greater than 3,500 cfs during the Chinook Salmon Spawning Period, 2,500 cfs during the Pink Salmon Spawning Period, 3,000 cfs during the Chum Salmon Spawning Period, or 3,500 cfs during the Steelhead Spawning Period. These Sidestream Inflow values shall be considered Threshold Sidestream Inflows for the purpose of calculating Daily Spawning Flows.

3.2.3 Operating Considerations

3.2.3.1 Scheduling Procedures

General Principles

Schedules of hourly generation during each calendar day are prepared in advance on the preceding Power Scheduling Day. Actual generation may deviate from the scheduled generation due to power system and streamflow conditions that were not anticipated when schedules were prepared on the Power Scheduling Day. Whenever an instrument reading affecting fish flow compliance appears to be erroneous, the power scheduler shall use the last reliable instrument reading available for the purpose of preparing the next generation schedule or an extrapolation based on relationships previously established using available historical data; the method chosen is left to the power scheduler's best judgment and available resources. Malfunctions of instruments affecting fish flow compliance for a period longer than 24 hours will be promptly reported to the SLIC to make a determination of appropriate action.

When changes in operating constraints occur from one day to the next (such as from the end of one month to the beginning of another), the changes must not occur prior to 0001 hours on the day such changes are supposed to be in effect.

Scheduling Generation

When scheduling power generation for the succeeding calendar day, power schedulers shall use best available forecasts, or assume that Tributary Inflow is the same as on the Inflow Day; the method chosen is left to the power scheduler's best judgment and available resources.

3.2.3.2 Operating to Meet the Schedule

Normal Conditions

Ramp rates, which are expressed in cfs/hour,[11] shall be treated as instantaneous constraints and downramping shall be accomplished in as uniform a rate as practical over the hour.

3.3 Process Flow Releases

Appendix N describes City Light's Proposal to Develop a Process Flows Adaptive Management Plan (Process Flows AMP). The goals of the Process Flows AMP, once finalized, shall be consistent with other ecosystem goals and objectives included in the comprehensive settlement agreement including: (1) mainstem Skagit River connectivity to side channel and off-channel areas to be utilized for fish habitat; (2) gravel quality resulting in increased spawning, incubation, and rearing; (3) geomorphic processes that mobilize sediment; and (4) upstream and downstream migration of anadromous fish. Further, the Settlement Parties agree that the Process Flows AMP will be coordinated with the implementation of the Fish Passage Program. These ecosystem goals and objectives may be modified by the SLIC during early implementation of the Process Flow AMP planning process.

Section 3.3.1 through 3.3.3 below describe City Light's proposed minimum Process Flow releases based upon input from Ecology. City Light anticipates that the CWA 401 Water Quality Certification will be conditioned upon providing the minimum process flow requirements specified in Sections 3.3.1 through 3.3.2 below.

3.3.1 Side Channel and Off-Channel Connectivity Flows

City Light will release, at a minimum, side and off-channel connectivity flows of 12,200 cfs as measured at the Newhalem Gage for a period of 24 hours no less than once every 24 months. In addition, City Light will provide for, at a minimum, two (2) discrete releases of side and off-channel flows of 7,521 cfs, as measured at the Newhalem Gage, for a period of 24 hours for each release, during the periods of December 1 through February 15 and May 1 through June 30. Additional details are provided in the Process Flows AMP (Appendix N).

3.3.2 Mainstem Flushing Flows

City Light will provide for, at a minimum, three (3) discrete releases of mainstem flushing flows of 4,620 cfs as measured at the Newhalem Gage for a period of 6-12 hours for each release, during the periods of February 20 through April 20, September 1 through September 30, and October 5 through November 30. Additional details are provided in the Process Flows AMP (Appendix N).

[11] City Light anticipates that downramping rates will be expressed in terms of inches/hour in consultation with the Washington Department of Ecology as part of the Project's Section 401 Water Quality Certification process (required as part of the FERC relicensing effort).

3.3.3 Channel Maintenance Flows

As described in Section 4 of the Process Flows AMP, City Light will consult with the SLIC to achieve the intended outcomes of a channel maintenance flow releases of up to 26,400 cfs. City Light commits to implementing channel maintenance flows, the timing, duration, frequency, and flow magnitude will be based upon the results of the development of the Process Flows AMP. Channel maintenance flow releases will be subject to the conditions described in Section 3.3 below and the planning, coordination and testing described in Section 4 of the Process Flows AMP.

In the event that the results of the development of the Process Flows AMP find that channel maintenance flows are not achievable, City Light, in consultation with the SLIC, shall evaluate implementing additional side channel and off-channel connectivity flows, prioritization of funding from FA-LA-03 Skagit River Mainstem Habitat Funding Obligation and/or FA LA-07 Skagit River Limiting Factors Habitat Enhancement Program through a Science-based Decision-Making Framework, or other Channel Maintenance Flow actions (such as, but not limited to a delayed release, as determined in consultation with the SLIC, in an effort to achieve similar function.

If after the first ten year process flow plan has been implemented and it is determined that the magnitude and/or duration of the channel maintenance flow did not meet the intended objectives and ecological function of a channel maintenance flow, City Light and the SLIC, using a Science-based Decision-Making Framework, will identify a new channel maintenance flow proposal, implement additional side channel and off-channel connectivity flows, or recommend physical habitat projects to be prioritized and implemented using funding from the FA-LA-03 Skagit River Mainstem Habitat Funding Obligation and/or the FA LA-07 Skagit River Limiting Factors Habitat Enhancement Program.

3.3.4 Conditions for Process Flow Releases

City Light will coordinate with the SLIC to release Process Flows under the following conditions:

- City Light's process flows releases are subject to having adequate runoff to refill Ross Lake in order to maintain its ability to provide for anadromous fisheries protection flows, recreation reservoir level, and firm power generation[12] needs.
- City Light's process flow releases will be planned to avoid flooding (to the extent possible) of the Skagit River, which is currently defined[13] for purposes of this protection, mitigation and enhancement (PME) measure as exceeding the National Weather Service threshold of 28 feet (approximately 62,500 cfs) at the USGS Skagit River flow gaging station near Concrete, Washington.
- City Light's process flow releases are subject to complying with dam safety requirements and other regulatory conditions (e.g., Section 401 Water Quality Certificate conditions and water quality standards).
- The magnitude, duration, timing, and frequency of the process flow components may be

[12] Firm power generation means the minimum amount of power which City Light is obligated to provide from a combination of generation and contract resources for the use of its customers.

[13] Release of process flows may identify flooding considerations beyond the criteria listed above. If such instances are identified, this provision may be modified accordingly in consultation with the SLIC.

achieved through any combination of controlled and uncontrolled flow releases (i.e., Gorge Powerhouse discharge, Gorge Dam spill, and accretion flow).

- City Light's process flow releases will not be subject to the FMP down-ramp requirements. City Light will implement an interim down-ramp rate of 3,000 cfs/hour or less for Process Flow releases above 12,200. City Light will implement an interim down-ramp rate of 2,000 cfs/hour or less for process flow release between 4,480 and 12,200 cfs. Modification to the down-ramp rate for process flows will be adaptively managed in consultation with the SLIC and approval from Ecology.

3.4 Annual Flow Planning

Annual flow planning will consider instream flows necessary for spawning and Incubation Flows and Process Flows as well as identify existing and projected hydrological conditions and projections, and consider reservoir habitat and recreational access in Ross Lake. City Light will provide the SLIC the forecast and consult with the SLIC in order to coordinate on the release (timing, magnitude, and duration) of Process Flows and management of Ross Lake elevations within the Summer Operational Zone in consideration of the resource objectives identified in OPS LA-02 and in consideration of the flows necessary to meet compliance obligations related to downstream flows, flood storage, and Ross Lake water surface elevations. City Light will provide publicly available flow data, reservoir level data, and forecast information to the SLIC on a weekly basis.

The preliminary SLIC meeting framework that describes this flow planning process is provided in Appendix M. In addition to the regular planned annual flow meetings, City Light will host ad hoc meetings when needed, or at the request of any member of the SLIC, to address emerging needs.

By License Year 10, City Light, in consultation with the SLIC, will develop a report that evaluates the implementation of the Ross Lake Summer Variable Reservoir Operations Zone in consideration of the resource objectives identified in OPS LA-02. The report may recommend potential modifications to the Ross Lake Summer Variable Reservoir Operations Zone. Any modifications to the Summer Variable Reservoir Operations Zone will be subject to review and approval by the NPS, USFWS, and NMFS (Services) and FERC.

4.0 AQUATIC HABITAT PROGRAM

The Aquatic Habitat Program (AHP) will guide implementation of habitat PME measures downstream of Gorge Dam. The geographic scope includes the freshwater component of the Skagit River and its floodplain, Sauk River and its floodplain, tributary confluences, transmission line ROW stream crossings, and other sites within the Skagit River watershed as identified in consultation with the SLIC to achieve the AHP objectives. The AHP takes a holistic ecosystem approach to improving and restoring ecosystem functions, values, and services to address limiting factors. It prioritizes ESA-listed species (Chinook Salmon, Bull Trout, and steelhead) and the restoration of floodplain connectivity (accessibility, quantity, and quality) to address known limiting factors for Chinook Salmon[14] and other salmonids exhibiting a stream-type life history (Coho Salmon, Coastal Cutthroat Trout, Bull Trout, steelhead, etc.). Life histories and limiting factors for mainstem spawners (Chinook Salmon, Pink Salmon, Chum Salmon, and steelhead),[15] other salmonids utilizing the Skagit River basin (Sockeye Salmon and resident trout), and other aquatic and terrestrial species are also emphasized. The program builds on the existing Anadromous and Resident Fish Non-Flow Plan (City Light 2011) by expanding components of the Habitat Development and Improvement Program and introducing new measures to increase salmonid productivity and support recovery of healthy and harvestable populations.

The AHP details specific PME measures in areas of public ownership to be completed in the first 15 years of license implementation (Section 4.4 of this management plan) and the framework and guidance for developing, prioritizing, and implementing additional enhancement projects with the Skagit River Mainstem Habitat Enhancement Funding Obligation (MH Funding Obligation)[16] to achieve habitat enhancement targets throughout the term of the license (Section 4.5 of this management plan). Aquatic habitat in the transmission line ROW, the third component of the AHP, is described in Section 4.6 of this management plan.

4.1 Coordination and Consultation with the SLIC

The SLIC structure is described in License Article SLIC LA-01. City Light will implement habitat PME projects in consultation with the SLIC including the planning, prioritization, design, and monitoring and adaptive management framework. During implementation planning, restoration projects will undergo a review process that aims to verify that they are designed to meaningfully address limiting factors, remove stressors to the extent feasible, and sustain function with minimal

[14] The Skagit Chinook Recovery Plan (SRSC and WDFW 2005) provides a watershed-specific and scientifically rigorous strategy for recovery of Chinook Salmon. The strategy identifies actions to restore ecosystem processes, remove stressors, and target limiting factors. The 2005 Skagit Chinook Recovery Plan is referenced in the regional recovery plans for Bull Trout (Coastal Recovery Unit Implementation Plan for Bull Trout – *Salvelinus confluentus* [USFWS 2015]) and steelhead (ESA Recovery Plan for the Puget Sound Distinct Population Segment – *Oncorhynchus mykiss* [NMFS 2019]) as consistent with the recovery needs of those species. Therefore, it is highlighted in this management plan. City Light and the Settlement Parties acknowledge the importance of Coho Salmon, Chum Salmon, and other salmonid and non-salmonid species. They will be taken into consideration in project prioritization and design. If other species are listed under the ESA during the license term, their recovery plans will also become guidance documents.

[15] The FMP specifically targets protections for mainstem spawning fish.

[16] License Article FA LA-04 establishes a Skagit Estuary Habitat Enhancement Funding Obligation (Estuary Funding Obligation) that is separate and distinct from the MH Funding Obligation.

future intervention. The implementation schedule is contingent on obtaining timely permits and approvals. Restoration actions on public and conservation properties not owned by City Light are subject to obtaining approval by the landowner prior to implementation. Restoration actions within the boundaries of the Ross Lake National Recreation Area require approval from the National Park Service (NPS), and restoration actions within the National Forest are subject to approval from the U.S. Forest Service (USFS). To the extent FERC finds that PME measures proposed in the designated Wild and Scenic Rivers (WSR) corridors are unenforceable pursuant to Section 7(a) of the WSR Act[17] and does not include the measures in the new license, City Light commits to implement such PME measures pursuant to the Comprehensive Settlement Agreement.

The AHP is consistent with and will be coordinated with other management plans including City Light's Historic Properties Management Plan, Recreation Management Plan, and terrestrial management plans. Where proposed restoration actions are located on mitigation lands, restoration activities will be considered along with objectives in City Light's Fish and Wildlife Mitigation Lands Management Plan, as these sites also provide critical habitat for wildlife.

4.2 Habitat Restoration Goals and Objectives

The fundamental goal of the AHP is to develop and complete PME measures to address limiting factors for Chinook Salmon (Skagit Chinook Recovery Plan [SRSC and WDFW 2005]; Zimmerman et al. 2015, Bull Trout (Coastal Recovery Unit Implementation Plan for Bull Trout – *Salvelinus confluentus* [USFWS 2015]), and steelhead (ESA Recovery Plan for the Puget Sound Distinct Population Segment – *Oncorhynchus mykiss* [NMFS 2019]) and other salmonids by improving and restoring ecological functions, values, and services. Special emphasis is placed on restoring floodplain connectivity and mainstem habitat. Project operations and other watershed stressors such as hydromodifications have impacted riverscape ecosystem and salmonid populations that rely on diverse and productive floodplain habitat.

Rearing habitat capacity has been identified as a limiting factor for Chinook Salmon (Skagit Chinook Recovery Plan [SRSC and WDFW 2005]; Zimmerman et al. 2015). Increasing floodplain habitat accessibility, quantity, and quality for salmonid species that express a stream-type life history (Chinook Salmon, Coho Salmon, Coastal Cutthroat Trout, Bull Trout, steelhead, etc.) is a primary objective. Restoration of the riverscape ecosystem is also hypothesized to address limiting factors for other salmonid species (e.g., Chum Salmon spawning). In some cases, other life history stages, limiting factors or species may be prioritized in consultation with the SLIC in project-specific objectives.[18] For example, an objective of restoring the function of a constructed side channel feature could be to enhance Chum Salmon spawning. In a second example, the objective of a fish passage project on a small stream could be to increase connectivity for a resident trout population.

All mainstem restoration activities will be aligned with the objectives outlined in other license articles and PME measures. They will be coordinated with process flows to support the program's

[17] 16 U.S.C. § 1278(a).

[18] Limiting factors analyses have not been completed for all salmonid species but may be completed for other species by the co-managers within the term of the license. Limiting factors will be further identified through a literature review and evaluated within a Science-based Decision-Making Framework as part of the Ecosystem Monitoring and Adaptive Management Program (EMAMP).

objectives of habitat formation, maintenance, and connectivity. The Specific Mainstem Habitat Measures (Section 4.4 of this management plan) will be designed to work with and support sediment processes[19] and any gravel augmentation actions implemented as part of the MH Funding Obligation to maintain the balance of flow and sediment in support of geomorphic and biological objectives (Section 4.5 of this management plan). Following implementation of the Skagit Fish Passage Program, mainstem habitat enhancements to restore floodplain connectivity will also provide critical habitat for returning adults that spawn upstream of the dams and their progeny, in particular for those species exhibiting a stream type life history strategy. If an access road is built to Ross Lake (thereby allowing for transport of large wood for use in restoration projects in the lower Skagit River watershed), the Ecological Use of Reservoir Wood Management Plan will identify the objectives and guidelines for the transport and use of large wood by City Light and watershed partners in projects.[20]

Until limiting factors analyses are completed for other salmonids, or additional populations are listed, the following plans and documents will be prioritized in setting project objectives: recovery plans for ESA-listed Chinook Salmon, Bull Trout, and steelhead; National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) Biological Opinions; any future updates to recovery plans; and published research. The Skagit Chinook Recovery Plan (SRSC and WDFW 2005) includes targets for restoration of floodplain habitat which has been lost or simplified due to hydromodifications and a reduction in channel forming processes.[21]

Clear objectives and a Science-based Decision-Making Framework are essential for evaluating project effectiveness and adjusting as necessary to better achieve objectives. SMART[22] objectives that address salmonid limiting factors will be developed in consultation with the SLIC for all mainstem habitat measures including biological objectives during implementation planning.

City Light will be deemed to have complied with its obligation under the Aquatic Habitat Program so long as it has implemented the approved project and maintenance plan to sustain design performance over time. Effectiveness monitoring protocols, including biological objectives (e.g., target fish species, stage, and use), will be developed as part of the Ecosystem Monitoring and Adaptive Management Program (EMAMP). The EMAMP will guide experimental design to evaluate the effectiveness of restoration actions to inform adaptive management decision-making, including but not limited to project prioritization and future project designs throughout the term of the license. Table 4.2-1 identifies example high level project objectives at various scales. Compliance monitoring objectives will be evaluated at the site scale, whereas physical and

[19] For example, excavated alluvium from side channel construction could be added to adjacent gravel bars in support of biological and geomorphic objectives.

[20] Wood transported via the existing Haul Road from the top of Ross Dam to the loading dock on Diablo Lake must be cut to navigate the hairpin turns. The wood tracking study (GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study [GE-04 Geomorphology Study; City Light 2023b]) indicated that this wood is highly mobile and quickly flushed from the system, thereby providing little function. Log jams have been incorporated into the Specific Mainstem Habitat Measures as a PME measure for functional purposes.

[21] The Skagit Chinook Recovery Plan (SRSC and WDFW 2005) also generates an estimate of parr capacity associated with restoration of the Plan's targeted floodplain acreage (Section 4.5.4 of this management plan), which summarizes the 2005 Skagit Chinook Recovery Plan floodplain limiting factor hypothesis and describes in further detail how it will be used as a guidance document for prioritizing, developing, implementing, and monitoring aquatic habitat enhancement projects.

[22] SMART: Specific, Measurable, Achievable, Relevant, and Time-bound.

biological effectiveness monitoring may include site, reach, and system scale objectives evaluated over longer timelines. Compliance and effectiveness monitoring are described in Section 5.1 of this management plan.

Table 4.2-1. Example restoration project objectives to address limiting factors for species utilizing floodplain habitats.[1]

Category	Objectives	Scale	Timeline	Monitoring
Habitat Quantity	• Restore area of connected floodplain • Restore off channel and side channel area at various flow levels • Increase habitat complexity and cover	Site	Year 1, 5, 10[2]	Compliance
Habitat Quality	• Increase areas of temperature refugia • Improve water quality conditions	Site, reach	Interval to be determined during implementation planning	Effectiveness (EMAMP)
Physical Process	• Increase floodplain connectivity • Increase side-channel channel flushing • Increase island and bar formation • Increase channel migration and gravel and wood recruitment • Increase channel width • Increase gravel storage and sorting • Reduce vegetation encroachment	Reach, system	5 year interval	Effectiveness (EMAMP)
Biological	• Increase juvenile rearing capacity and productivity, while balancing life history and species tradeoffs • Increase abundance and resiliency	Site, reach, system	Beginning in Year 1; interval to be determined during implementation planning	Effectiveness (EMAMP)

1 SMART restoration project objectives will vary from site to site and will be developed during implementation planning.

2 5-year data collect; 10 year performance compliance point to support decision-making regarding maintenance.

4.3 Project Pipeline

Projects have multiple developmental stages and can be categorized into the following groups:

- Group 0: Implemented projects.
- Group 1: Projects with approved designs and permits that are ready to bid and implement.
- Group 2: Projects ready to design, permit and implement. In public ownership or

conservation designation.

- Group 3: High priority project sites with high potential to be moved into Group 2. Initial feasibility work has been completed or is underway. Implementation may require additional acquisitions, public outreach, analyses, and design decisions.
- Group 4: Project sites identified in plans or at priority locations to address limiting factors including (but not limited to) areas with a high sensitivity to changes in flow and sediment, disconnected habitat features, high juvenile mortality under current conditions, high potential for achieving greater habitat connectivity, and high ecological value (e.g., tributary confluences, ground-water inputs). Existing data (e.g., forward looking infrared [FLIR], light detection and ranging [LiDAR]) and additional modeling, feasibility, partnerships, and public outreach work may be used to identify and scope restoration opportunities and remove barriers to implementation.

The Specific Mainstem Habitat Measures (Section 4.4 of this management plan) to be implemented in Phase 1 of the license are currently in Project Pipeline Group 2. Projects to be implemented with the MH Funding Obligation in Phase 2 (Section 4.5 of this management plan) are currently in Project Pipeline Groups 3 and 4. The Gilligan Floodplain and Goodell Creek Delta[23] sites are described in Appendix O to highlight their importance and support movement through the Project Pipeline. They are not included in Section 4.4 because barriers to implementation (e.g., private property) remain.

4.4 Specific Mainstem Habitat Measures

4.4.1 Overview

This section describes aquatic habitat PME projects to be completed by City Light in Phase 1 of license implementation by the end of License Year 15 (Figure 4.4-1). Phase 1 includes Project Pipeline Group 2 projects in public ownership that are ready to design, permit, and implement. While the design details may evolve during implementation planning and the design process, there are no known barriers to implementation, and thus the likelihood of completion of a successful project consistent with the objectives, scope, and timeline outlined below is high. This differentiates them from Phase 2 projects to be implemented through the MH Funding Obligation (Section 4.5 of this management plan), which have greater uncertainty regarding implementation details (e.g., project footprint, objectives, and timelines of partner agencies such as Washington State Department of Transportation [WSDOT]), and in most cases will require additional land acquisitions or easements.

These sites have been identified as having high restoration potential based on their geomorphic characteristics, potential for ecological functional uplift, and a preliminary assessment of feasibility. Enhancement at these sites should increase the quantity, quality, diversity, complexity, and connectivity of floodplain habitats, and engage the processes and cycles that sustain them. Salmonid species exhibiting a stream-type rearing life history should benefit from these projects, as will Chum, Coho, Pink, and Chinook salmon, and steelhead spawners. While these projects

[23] City Light, in consultation with the SLIC, could allocate funding from the MH Funding Obligation to support additional feasibility studies or match for federal grants to support implementation. This is a large multi-jurisdictional enhancement project contingent on replacement and expansion of the State Route (SR) 20 bridge by WSDOT that is beyond the scope of the license.

have a focus on addressing limiting factors for salmonids, enhancements that improve and restore ecosystem functions and values create diversity and resiliency for the benefit of all terrestrial and aquatic species and communities using floodplain and mainstem habitats.

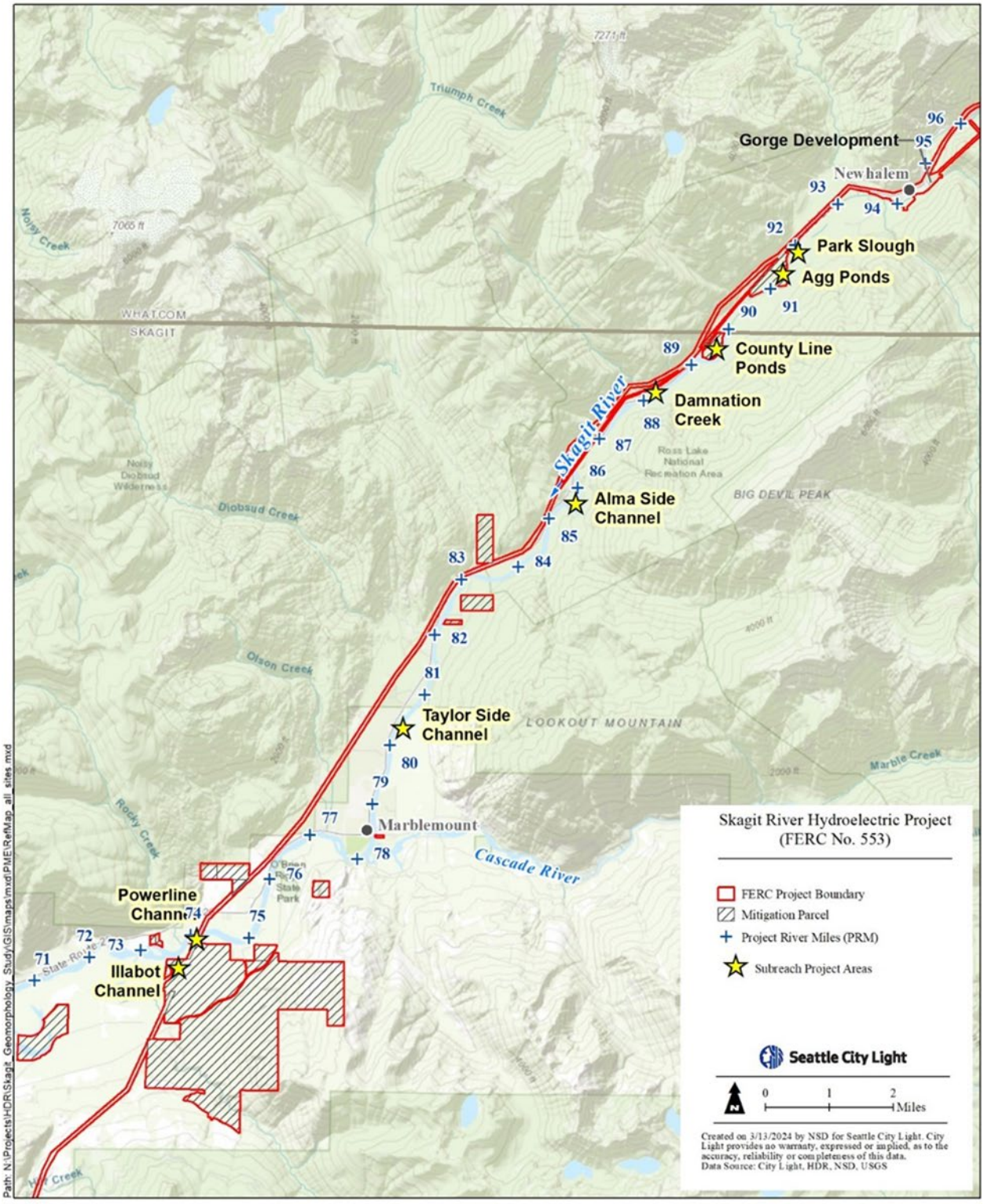

Figure 4.4-1. Specific mainstem habitat sites.

4.4.1.1 Toolbox

Restoration actions at these sites may include but are not limited to:

(1) Removal of hydromodifications that impair floodplain connectivity;

(2) Placement of engineered log jams to engage side channel and promote island formation;

(3) Enhancement of existing log jams to increase their function and longevity;

(4) Installation of wood post arrays to increase ponded area;

(5) Tipping and winching of riparian trees to provide structure and incorporate into jams on site;

(6) Excavation of inlets and outlets to improve, create, or restore connectivity of natural side channels and constructed blind channels;

(7) Excavation and removal of accumulated fines and detritus in constructed blind channels;

(8) Removal of encroaching vegetation at side channel inlets and outlets;

(9) Placement of excavated gravel on mainstem bars; and

(10) Riparian restoration.

4.4.1.2 Integration

Projects will be designed and sequenced with process flows and potentially gravel augmentation to achieve their objectives (e.g., connectivity, sustainability, flushing). They will complement the flow program by guiding fluvial energy to achieve desired outcomes at specific locations on a reach scale, working within the constraints of a managed system (such as flood risk management constraints) to achieve desired outcomes and encourage reactivation and increased connectivity of side and off-channel features. Engineered log jams will be used to minimize erosion in some areas, enhance erosion in other areas (e.g., encourage wood and gravel recruitment; channel widening), and support processes that enhance or restore off-channel floodplain habitats and active sediment storage.

4.4.1.3 Feasibility and Design Process

City Light will define SMART objectives, complete the feasibility and design process, and develop monitoring and adaptive management framework in consultation with the SLIC. During implementation planning, restoration projects will undergo a review process that aims to verify that they are designed to meaningfully address limiting factors, remove stressors to the extent feasible, and sustain function with minimal future intervention.

Some sites include constructed blind side channels for Chum Salmon spawning. Many of the existing constructed habitat features within these sites have declined in functionality over the last several decades, mostly due to discontinuity with river processes. All constructed Chum Salmon channels will be evaluated during implementation planning for current function, maintenance needs, and additional enhancement opportunities in consultation with the SLIC to determine appropriate next steps. Diversifying the current configuration and purpose of the Chum Salmon channels to include spawning and rearing for other salmonids will be an early and primary consideration of the SLIC.

Locations, size, type, and number of features (e.g., engineered log jams and breaches shown in figures) are conceptual and will be refined in consultation with the SLIC during the implementation planning and design phases to best meet project objectives. If unforeseen site constraints are identified or unforeseen opportunities are noted, City Light, in consultation with the SLIC, could adjust the scope and location of projects to best meet the objectives of the Specific Mainstem Habitat Measures. For example, if access is denied for construction or cultural sites identified at a proposed channel excavation location, then City Light, in consultation with the SLIC, could approve a scope adjustment or completion of an alternative project of comparable scale, benefit, and cost in lieu of implementing the projects as described below. Changes from the conceptual project description will be documented in the REP Annual Report.[24]

4.4.1.4 Schedule

Table 4.4-1 provides a preliminary schedule and sequencing for the Specific Mainstem Habitat Measures to be completed by the end of the License Year 15. Implementation planning, which includes additional data collection to support design and to establish the effectiveness monitoring baseline, will be a focus of the first two years of license implementation.[25] This schedule will be refined and integrated with other license measures (e.g., functional flows, habitat enhancement in the transmission line ROW) during implementation planning to balance workload. The REP Annual Report will include an updated schedule, documentation of implementation progress, adjustments, and consultation.

Projects downstream of Newhalem Ponds that may affect water surface elevations may require a Condition Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA), which City Light assumes will add one to two years to the implementation schedule. Other scheduling considerations and constraints include sequencing the release of channel maintenance flows, narrow in-water work windows, permitting timelines, contractor availability, and construction management capacity. These additional constraints for mainstem projects and the relatively large scale of proposed actions will likely limit construction to one mainstem project per year.

[24] Annual reports from various program areas may be consolidated into one annual report for efficiency. Meeting summaries will be attached to document consultation and decisions.

[25] Flow and sediment transport modeling tools developed as part of GE-04 Geomorphology Study (City Light 2023b) will be used in the design process to evaluate how the river may respond to the placement of gravel excavated during construction of the Specific Mainstem Habitat Measures on adjacent river bars. LiDAR change detection analyses and a sediment tracer study may be implemented as part of the EMAMP to evaluate sediment transport processes and the geomorphic response of functional flows, Specific Mainstem Habitat Measures, and associated gravel augmentation. Biological monitoring may also be completed as part of the EMAMP to evaluate whether physical changes are resulting in desired biological outcomes and inform adaptive management decision-making.

Table 4.4-1. Phase 1 aquatic habitat enhancement project preliminary schedule (to be developed).

Project	LY 1	LY 2	LY 3	LY 4	LY 5	LY 6	LY 7	LY 8	LY 9	LY 10	LY 11	LY 12	LY 13	LY 14	LY 15
Park Slough	IP	IP	DP	B	C										
Newhalem Ponds	IP	IP		DP	B	C	C								
County Line Ponds	IP	IP		DP	CL	B	C	C							
Damnation Side Channel	IP	IP													
Alma Creek Side Channel	IP	IP													
Taylor Side Channel	IP	IP													
Illabot Side Channel	IP	IP													
Powerline Side Channel	IP	IP													

B = bid; C = construction; CL = CLOMR; DP = design and permitting; IP = implementation planning; LY = License Year.

4.4.2 Park Slough Subreach

The Park Slough subreach of reach 2B is located downstream of Goodell Creek between Project River Mile (PRM) 91.5 and 92.4. Reach 2B is a response reach with the potential to support an anastomosing channel planform. The current channel pattern has split flow around a small island between PRM 92.0 and 92.2 and is otherwise single threaded. The channel is inset within alluvial terraces that are rarely connected with overbank flows under the current flow regime. Mainstem habitat is primarily comprised of glide, riffle, and run habitat with few pool features. There are no stable logjams in the subreach. Wood recruitment from bank erosion is limited by low rates of channel migration and wood loading is primarily from tributary channel sources.

Park Slough is located in North Cascades National Park and the adjacent property along the opposite bank is owned by City Light. Park Slough is a blind side channel along the left bank terrace that was constructed in the 1990s to support Chum Salmon spawning. The slough channel has a Y-shaped pattern with two groundwater-fed channels, each 20- to 30-feet in width, that merge and follow the flow path of a relict channel feature that joins with the Skagit River across from Newhalem Agg Ponds. The total channel length is approximately 2,900 feet with an area of approximately 71,000 square feet.

The outlet to Park Slough is connected but filled with sand deposited from river backwatering. Upstream of the outlet the channel is a series of constructed pools and riffles with placed spawning gravel and several beaver dams. The channel has been accumulating sediment over time, particularly above the beaver dams, reducing its spawning habitat function. In its current condition, it still provides rearing habitat function due to slow velocities, cold groundwater inputs, and cover from large wood and overhanging vegetation, but as it fills in with sand, silt, and organics, rearing habitat suitability will likely continue to decline.

Habitat enhancement objectives for the Park Slough subreach include:[26]

- Increased active sediment storage and residence time of mobile sediment;
- Increased mainstem channel width;
- Increased channel topographic complexity;
- Increased floodplain connectivity and function;
- Increased rearing habitat area and length;
- Increased connectivity and access for fish;
- Increase functionality of Chum Salmon spawning or other salmonid habitat;
- Increased sustainability of off-channel rearing habitats; and
- Increased quantity of stable log jams that form pools, create velocity refuge, provide edge habitat and cover, capture wood, and split flow to support development of side channels.

The west branch of Park Slough follows the path of a relict side-channel and has an orientation suitable for a sustainable[27] upstream connection. The project concept involves excavation of an inlet channel to connect at least two and up to four branches of Park Slough with the main channel (Figure 4.4-2). Several engineered log structures could be installed on the right bank of the river upstream of the side channel complex to promote channel migration towards the left bank and near the inlet to split flow, raise local water surface elevations to sustain the connection, and form mainstem pools. Wood structures may include a bar apex jam at the head of forested island in the vicinity of the inlet connection, an additional jam or jams along the left bank at the channel inlet(s), and wood structures to create roughness and cover within the side channel. Log structures in this reach would potentially capture and retain additional mobile wood recruited from Goodell Creek. If either the east or west branch of Park Slough is left as a blind side channel (a determination to be made in consultation with the SLIC), it could be refreshed to remove fine sediment and detritus that has accumulated over the last 25 years. Trees removed during construction of the inlet channel would be used in wood structures and excavated alluvium spread on site, used as ballast for jams, placed on mainstem channel bars[28] or stockpiled on site for input to the mainstem to support project and reach scale biological and geomorphic objectives in association with a process flow release.

[26] SMART habitat enhancement objectives will be developed during implementation planning.

[27] Sustainable in the context of a dynamic fluvial system—channel evolution is a natural process. The number of additional channels that are likely to be sustainable will be determined during the feasibility and design process.

[28] Excavated and placed material may include fine sediment and organic matter. These materials may also be beneficial to the river and specifically the Estuary. Onerous turbidity restrictions could limit the feasibility of this method at Park Slough and other mainstem project sites.

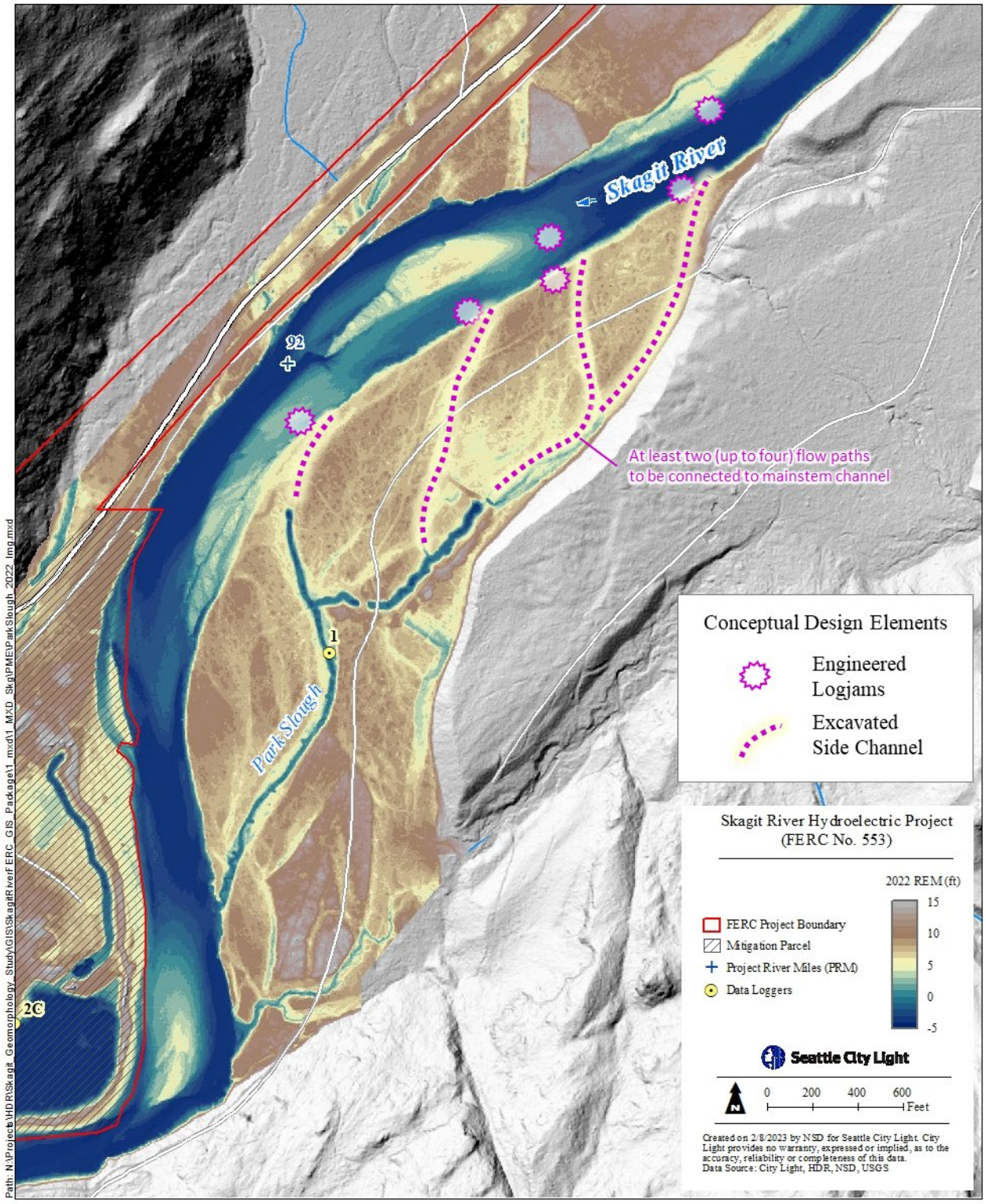

Figure 4.4-2. Conceptual design opportunities in the Park Slough subreach.

4.4.3 Newhalem Ponds (Agg Ponds) Subreach

The Newhalem Agg Ponds subreach is located between PRM 90.6 and 91.8 within reach 2B and is directly downstream of the Park Slough subreach. The channel is inset within alluvial terraces that are rarely connected with overbank flows under the current flow regime. There is an existing seasonally active side channel, approximately 40-feet wide and 600-feet long, that splits around a forested island just upstream of the Agg Ponds near PRM 91.7. A second island is developing within the channel at PRM 91.4 immediately adjacent to the eastern Agg Pond and just downstream of Park Slough. The main channel is characterized by a lack of large wood, and stable log jams and wood recruitment processes are limited by reductions in the rate of bank erosion and channel migration.

The Agg Ponds complex includes a series of constructed, groundwater-fed side channels and off-channel ponds excavated within the alluvial terrace and connect to the main channel upstream of the confluence with Thornton Creek. The ponds were originally created to mine gravel as aggregate for construction of Project facilities and SR 20 and have since been managed to provide off-channel spawning and rearing habitat for salmon. The ponds have aquatic vegetation around the shoreline and open deeper water in the center. The lower (outlet) channel connecting the larger pond to the Skagit River has patches of spawning gravel that appear to be functioning, but the upper channels above the ponds are filled with detritus, aquatic vegetation and a veneer of fine sediment and organics. The groundwater channels draining into the ponds maintain cool water temperatures year-round.

Habitat enhancement objectives for the Agg Ponds subreach include:

- Increased active sediment storage (sediment deposition with increased residence time for mobile sediment transporting through the reach, promote bar development, induce localized aggradation);
- Increased mainstem channel width;
- Increased channel topographic complexity;
- Increased floodplain connectivity and function;
- Increased rearing habitat area and length;
- Increased connectivity and access for fish;
- Increase functionality of Chum and Coho salmon spawning and rearing habitat;
- Increased conveyance through ponds; and
- Increased quantity of stable logjams that form pools and split flow to support development of side channels.

The groundwater-fed channels currently draining into the Agg Ponds are separated from the main channel by a berm that limits floodplain connectivity, narrows the channel width, and constrains channel migration. Therefore, a principal design component should evaluate breaching and/or lowering the berm to allow the mainstem of the river to increase in wetted width and potentially form multiple channels in the bend of the river. This should decrease water velocity and result in an increase in active sediment storage and topologic complexity. Additional design components

could also include a breach in the berm and excavation of a channel connecting the side channel near PRM 91.7 with the Agg Ponds complex through an inlet. The project could integrate this connection with the previously described side channel enhancement at PRM 91.7 and direct flow from the existing side channel into the constructed channel draining to the eastern pond. Engineered log structures within the side channel would aid in deflecting flow toward the new connector channel and increase flow entering the Agg Ponds complex. There is an access road that follows a berm separating the two main pond areas and a culvert connects the ponds on either side. Replacing the culvert would enhance connectivity and reduce maintenance issues created by beaver activity, while maintaining access to the boat ramp. An additional enhancement opportunity exists within the Agg Ponds subreach in the vicinity of an island near PRM 91.4. Restoration actions could include additional engineered log jams to stabilize the island and increase flow into the side channel and removing a portion of the berm to provide an inlet connection to the blind channel closest to SR 20. Other opportunities[29] include refreshing the blind channel closest to SR 20 and potentially restoring a portion of the City Light storage area if a suitable alternative location is identified.

An important design consideration to be evaluated during implementation planning would be the impacts of proposed connections and the potential for a channel avulsion to the relatively deep ponds on sediment transport downstream. A phased approach that allows smaller-grained sediment to accumulate in the ponds before removing additional sections of the berm to increase floodplain connectivity may be warranted. Additional sections of the berm could be mechanically breached once channel elevations equalize. Conceptual design opportunities are shown in Figure 4.4-3.

[29] This site provides habitat for the western toad (*Anaxyrus boreas*). Any alterations to this channel will be considered in consultation with the SLIC.

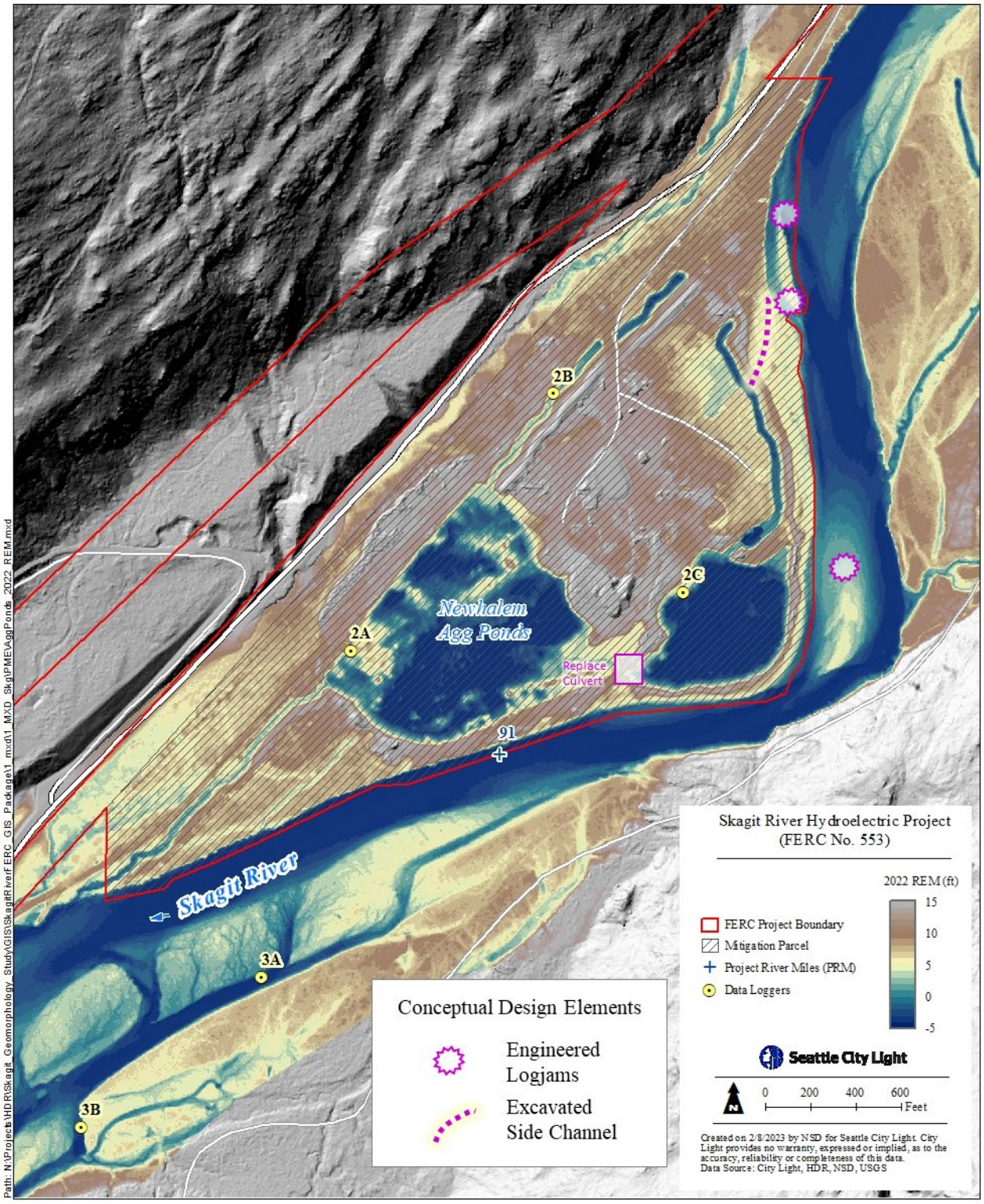

Figure 4.4-3. Conceptual design opportunities in the Agg Ponds subreach.

4.4.4 County Line Ponds Subreach

The County Line Ponds subreach is located between PRM 89.2 and 89.9 at the bottom end of reach 2B. The County Line Ponds complex is a mitigation property owned by City Light and the surrounding area is part of North Cascades National Park. The ponds were originally created to mine gravel aggregate for construction of the dams and other facilities and have since been managed to provide off-channel spawning and rearing habitat for salmon as well as other wildlife habitat functions. The boundary between Whatcom County and Skagit County crosses the Skagit River just upstream of the ponds. The channel is inset within alluvial terraces that are rarely connected with overbank flows under the current flow regime. The main channel is characterized by a lack of large wood, and stable log jams and wood recruitment processes are limited by reductions in the rate of bank erosion and channel migration.

Within the County Line Ponds complex, there are three side channels and two ponds that are perennially connected to the river and a series of ponds that are less connected. The pond complex closer to SR 20 drains through a constructed outlet channel at the south end that joins with the main channel near PRM 89.2. Beaver dams impound the upper section of the outlet channel and influence water levels in the pond. The lower segments of the outlet channel go dry during the summer. The easternmost pond closest to the river is connected with the main channel via a small breach through the berm that separates the pond from the river. The main channel splits to form secondary channels around a series of small, vegetated islands adjacent to the County Line Ponds. The largest of the side channels flows parallel to the berm along the eastern-most pond.

Habitat enhancement objectives for the County Line Ponds subreach include:

- Use large wood structures to maintain and enhance the anabranching channel form, channel complexity, and cover;
- Increase complex edge habitat;
- Increase connectivity of flow between channel and ponds through levee breaches;
- Increase active sediment storage;
- Increase rearing habitat area and length; and
- Increase functionality for Chum and Coho salmon spawning.

Conceptual design opportunities for the County Line Ponds subreach include project actions to install stable wood jams and increase connectivity with off-channel habitat in the ponds complex (Figure 4.4-4). Addition of stable logjams in the subreach should deflect additional flow toward the existing side channel that flows along the berm adjacent to the eastern-most pond. The berm will likely be breached in targeted locations to further enhance connectivity and access for fish. An inlet connecting the mainstem with the constructed Chum Salmon spawning channel nearest the river and actions that could increase groundwater and/or surface water exchange with the pond complex closer to the road will be evaluated in consultation with the SLIC during the design process. Trees removed during construction of the inlet channel would be used in wood structures and excavated alluvium spread on site, used as ballast for jams, placed on mainstem channel bars or stockpiled on site for input to the mainstem to support project and reach scale biological and geomorphic objectives in association with a process flow release.

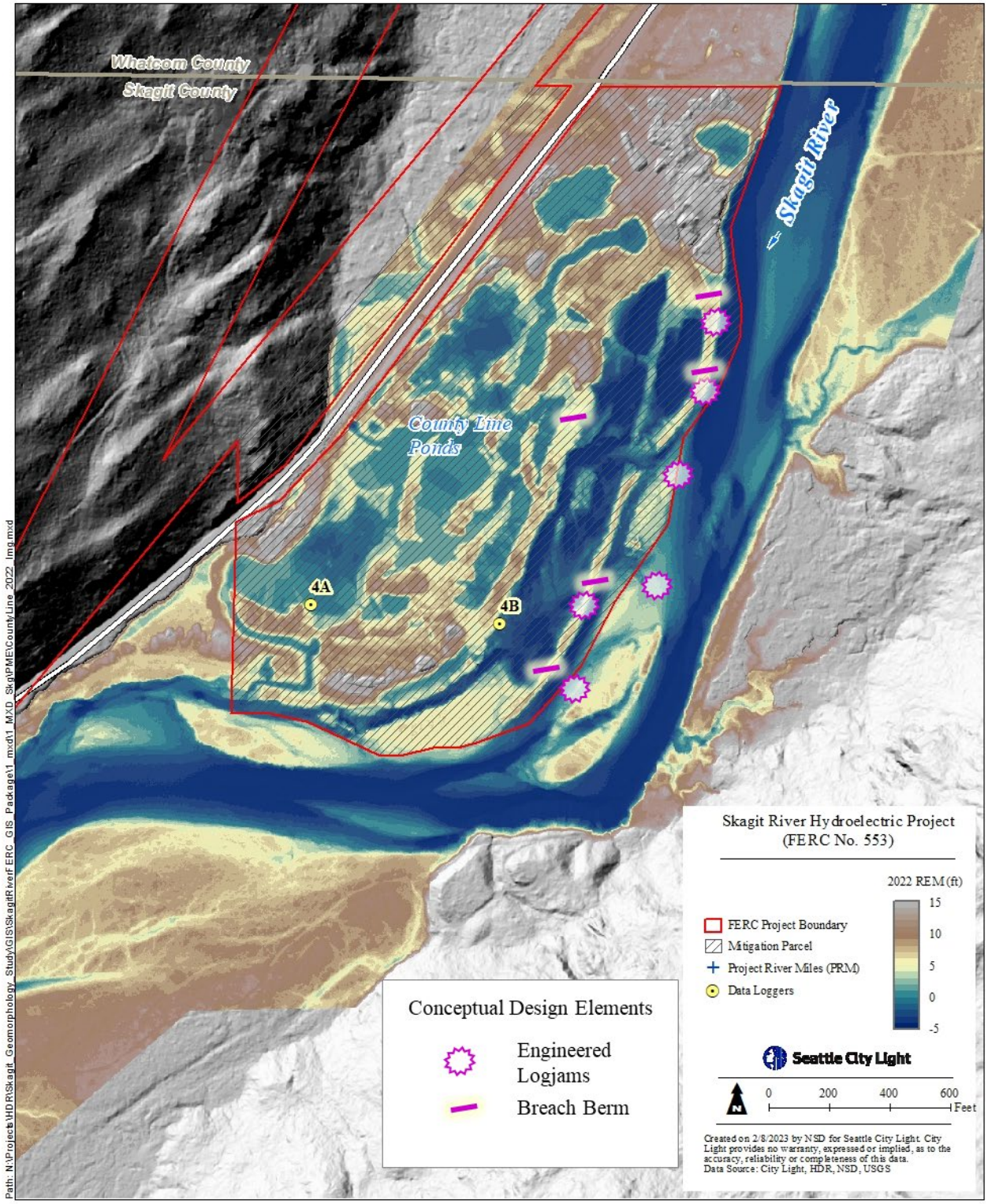

Figure 4.4-4. Conceptual design opportunities in the County Line Ponds subreach.

4.4.5 Damnation Side Channel Subreach

The Damnation Side Channel subreach is located between PRM 88.0 and 88.4 at the downstream end of reach 3A. The subreach has experienced channel width reduction, side channel disconnection, decreased rates of channel migration and avulsion, reduced floodplain connection, and general stagnation in river dynamism. It contains a relict side channel of approximately 500 meters in length (Figure 4.4-5). Bank hardening along SR 20 upstream of the inlet of the side channel, coarse sediment depositional patterns at the outlet of the side channel from Damnation Creek which are influenced by the SR 20 bridge alignment, and alterations to flow and sediment regimes have caused it to become isolated at all but the highest flows.

Conceptual opportunities for this subreach include removal or modification of the bank hardening near the inlet, where feasible without increasing erosion risk of SR 20, excavation of approximately 200 meters of side-channel to remove accumulated sediment and encroaching vegetation from the channel inlet, installation of several log jams to engage activation of the side channel inlet, and installation of log deflectors to manage sediment deposition from Damnation Creek at the side channel outlet. A log crib structure or additional bank armoring with integrated plantings and wood along the right bank of the side channel may also be necessary to prevent erosion of the SR 20 embankment if enhancement measures substantially increase flow into the side channel. While this is shown on the map as a continuous feature, this level of intervention may not be necessary and will be balanced with retention of mature trees along this embankment. Trees removed during construction of the inlet channel would be used in wood structures and excavated alluvium spread on site, used as ballast for jams, placed on mainstem channel bars or stockpiled on site for input to the mainstem to support project and reach scale biological and geomorphic objectives in association with a Process Flow release.

The orientation of the SR 20 bridge over Damnation Creek, which directs coarse sediment deposition at the side-channel outlet, poses a design challenge. The installation of a log jam or jams within Damnation Creek could potentially change sediment deposition patterns to maintain outlet connectivity.

Habitat enhancement objectives for the Damnation Side Channel subreach include:

- Increased side channel habitat;
- Increased sediment recruitment;
- Increased floodplain connectivity and function;
- Increase complex edge habitat;
- Increase rearing habitat area, length, and quality;
- Increase connectivity and access for fish; and
- Increase channel edge complexity.

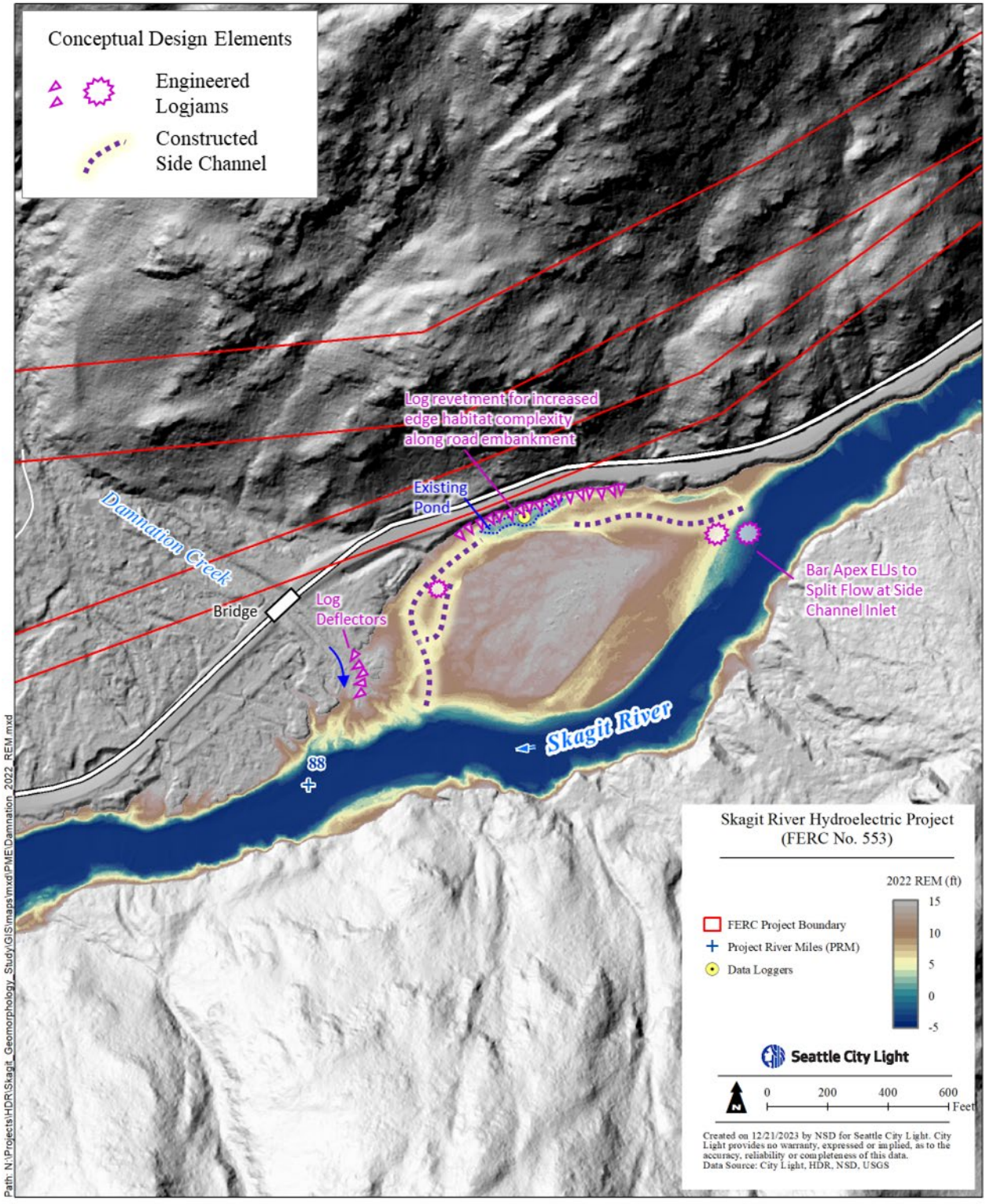

Figure 4.4-5. Conceptual design opportunities in the Damnation Side Channel subreach.

4.4.6 Alma Creek Subreach

The Alma Creek subreach contains a right bank side channel that has a sediment plug on the upstream end and a left bank side channel that has become less engaged over time. The right bank side channel is on City Light property. The design concept includes excavation of the channel inlet, installation of one or more engineered log jams to encourage more frequent channel engagement, and enhancement of the side channel to increase habitat diversity (Figure 4.4-6). Excavated alluvium could be placed on the point bar as necessary to achieve design objectives. The left bank side channel is not accessible with construction machinery but could potentially be enhanced through the removal of encroaching vegetation and restoration activities along the right bank to redirect flow toward the left bank. Trees removed during construction of the inlet channel would be used in wood structures and excavated alluvium spread on site, used as ballast for jams, placed on mainstem channel bars or stockpiled on site for input to the mainstem to support project and reach scale biological and geomorphic objectives in association with a process flow release.

Habitat enhancement objectives for the Alma Creek Side Channel subreach include:

- Increased side channel habitat;
- Increased sediment recruitment;
- Increased floodplain connectivity and function;
- Increase complex edge habitat;
- Increase rearing habitat area, length, and quality;
- Increase connectivity and access for fish; and
- Increase channel edge complexity.

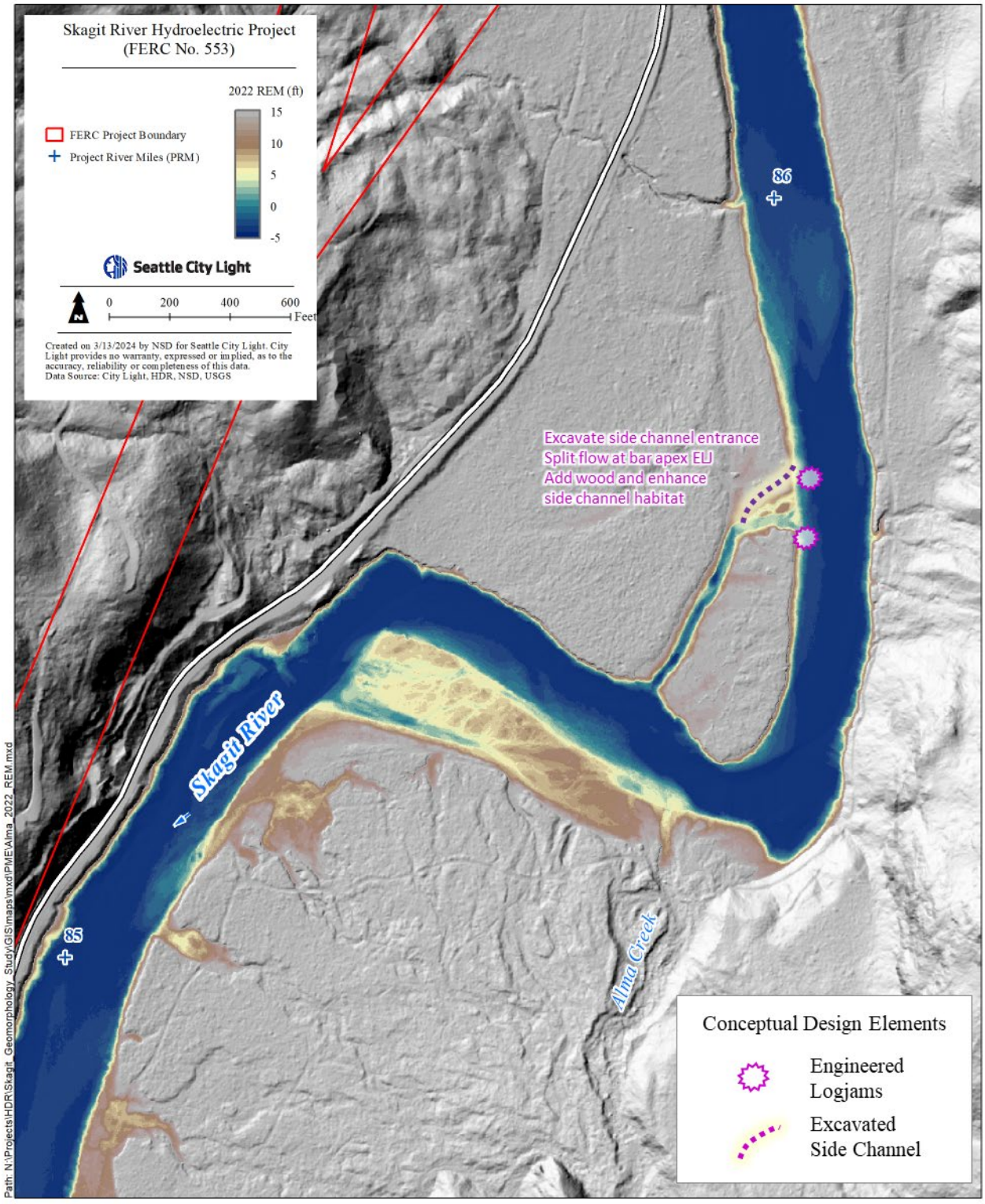

Figure 4.4-6. Conceptual design opportunities in the Alma Creek subreach.

4.4.7 Taylor Side Channel Subreach

The Taylor Side Channel subreach is located between PRM 79.7 and 80.5 within reach 5A upstream of the Cascade River near Marblemount. The Skagit River has a single-thread pattern and is inset within alluvial terraces that are rarely connected with overbank flows under the current flow regime through this reach. The Taylor Side Channel, located on USFS lands, is a blind spawning channel constructed in the 1990s. The channel is connected most of the year and groundwater fed as evidenced by a subsurface inlet and is a cold water refugia in the summer. The lower section of Taylor Side Channel has several log jams and two beaver dams creating relatively deep pools (at least 2 feet deep). The upper section was consistently 1.5 to 3 feet deep during August. The protected slow water and fish cover provides juvenile salmonid rearing habitat. Spawning habitat with suitable gravel substrate is still functional in some locations of the side channel while other areas are covered in a veneer of fine sediment.

Habitat enhancement objectives for the Taylor Side Channel subreach include:

- Increase flushing flows to mobilize detritus and remove fine sediment;
- Increase pulse flows to allow for increased connectivity and groundwater exchange;
- Increase sustainability of off-channel rearing habitats;
- Increase functionality of channels for Chum and Coho salmon spawning;
- Increase connectivity and access for fish;
- Potentially removing all or portions of the berm;
- Increase rearing habitat area and length;
- Increase structure and cover through additional wood placement; and
- Create and maintain habitat through process flows and/or sediment augmentation.

Conceptual design opportunities for the Taylor Side Channel subreach include project actions to install stable wood jams and excavate connecting channels to deflect additional flow from the main channel into upper segments of Taylor Side Channel (Figure 4.4-7). Decisions regarding whether to create one or more upstream connections or alternatively refresh one or more of the channels will be made in consultation with the SLIC. Engineered large wood structures along the left bank would provide additional geomorphic functions to form pools and split flows to promote connectivity with the side channel. Trees removed during construction of the inlet channel would be used in wood structures and excavated alluvium placed on mainstem channel bars or stockpiled on site for input to the mainstem to support project and reach scale biological and geomorphic objectives in association with a process flow release.

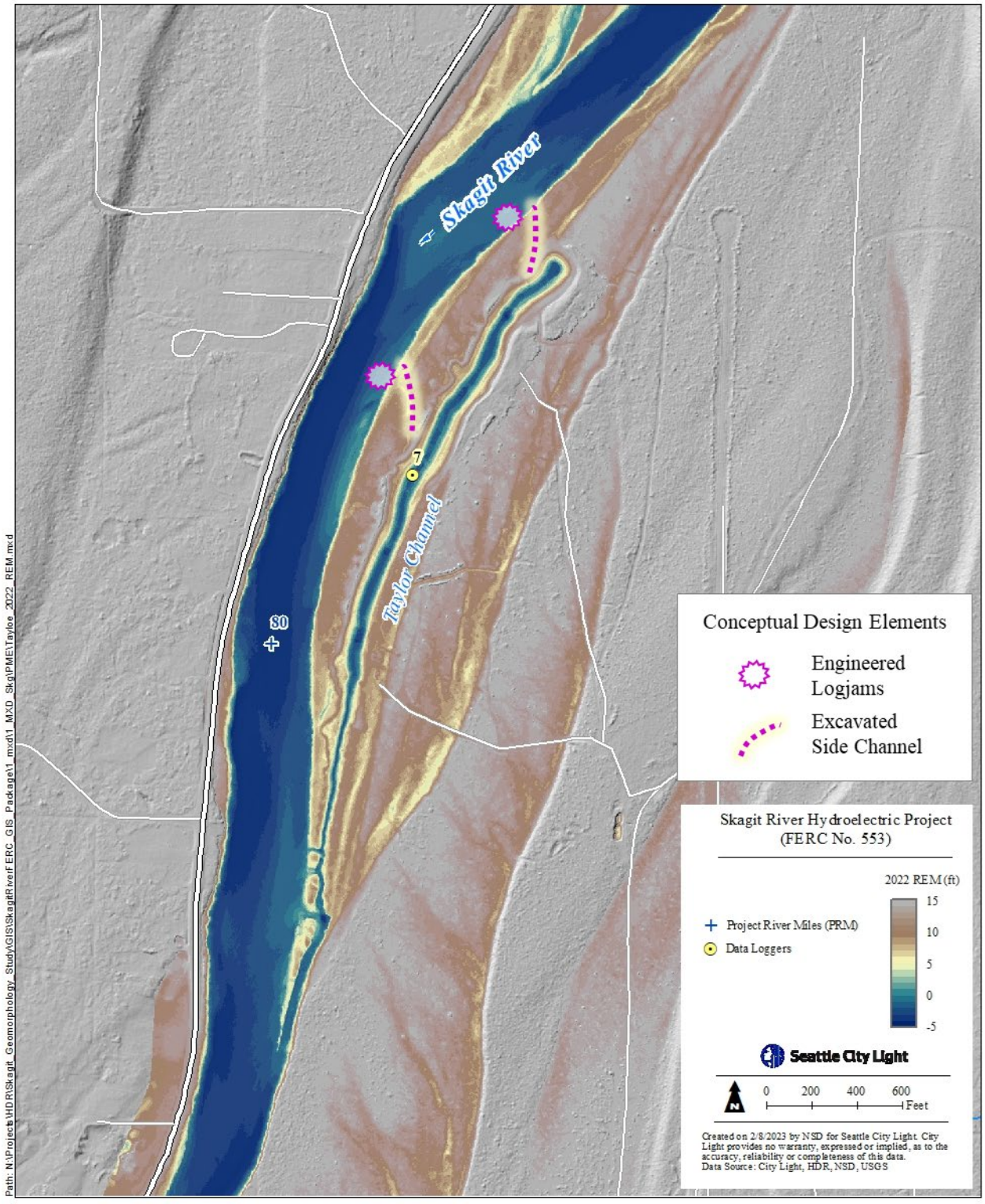

Figure 4.4-7. Conceptual design opportunities in the Taylor Side Channel subreach.

4.4.8 Illabot and Powerline Sites

Illabot and Powerline blind channels were constructed to provide stable spawning habitat for Chum Salmon. They also provide off-channel rearing and refuge for other salmonid species, especially Coho Salmon. These sites have accumulated fine sediment and organic matter, and their function and fish use has declined over time (Figure 4.4-8).

The proposed treatment at these sites is to modify as necessary to improve function. New objectives for the project sites that best benefit salmon habitat based on current site conditions will be developed during implementation in consultation with the SLIC. Constraints at these sites limit opportunities for inlet connections as proposed in the subreaches above; however, opportunities to expand the project and reduce sediment accumulation should be explored in consultation with the SLIC through the design process.[30]

[30] If the project is expanded beyond the scope defined here, funding shall be provided through the MH Funding Obligation.

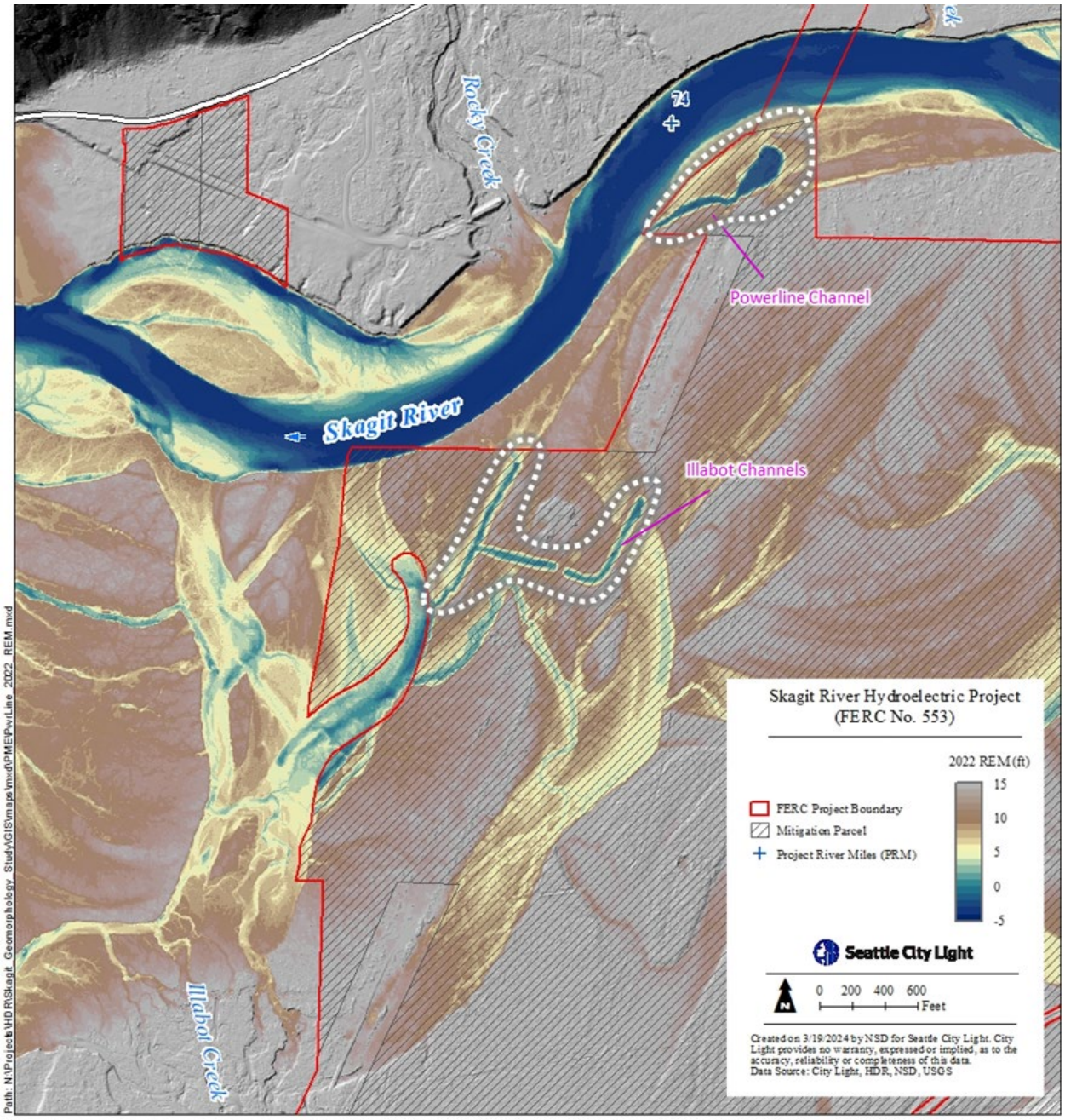

Figure 4.4-8. Illabot and Powerline Channels.

4.5 Mainstem Habitat Funding Obligation

As described in License Article FA LA-03, over the term of the license, City Light will dedicate funds to the MH Funding Obligation to implement projects. The MH Funding Obligation is separate and in addition to the Specific Mainstem Habitat Measures described in Section 4.4 of this management plan and the Estuary Habitat Enhancement Funding Obligation described in License Article FA LA-04.

In general, projects that will be considered for funding with the MH Funding Obligation are in Project Pipeline Group 3 and 4, as of 2024. Project Pipeline Group 3 includes projects identified in the Skagit Chinook Recovery Plan (SRSC and WDFW 2005), Middle Skagit Restoration Plan (2011), and the Sauk River Restoration Plan (2023) where initial feasibility work and public outreach has been completed (e.g., Gilligan Floodplain) but barriers remain (e.g., land acquisition). As new studies become available to inform the strategy or limiting factors are identified for other salmonid species, additional guidance documents may be added for consideration. Project Pipeline Group 4 projects are less developed and defined than Group 3 projects or have greater uncertainty. Additional feasibility work is necessary to refine project concepts. FLIR, LiDAR, sediment transport models, and other modeling tools and studies implemented as part of the EMAMP will assist in guiding identification and prioritization of areas with high potential for uplift of ecological functions and values and areas with the greatest potential for addressing limiting factors.

A brief description of several priority projects is included in Appendix O (Gilligan Side Channel, Goodell Creek Delta, and Sediment Augmentation), which are included to highlight their strong support among watershed partners and next steps. As of 2024, feasibility studies have been completed for Gilligan Side Channel and Goodell Creek Delta, but additional study, coordination, and acquisitions are necessary before they can be moved into Project Pipeline Group 2.

City Light shall implement a pilot project to evaluate the efficacy of gravel augmentation in enhancing salmonid habitat and productivity. City Light will utilize funds from the MH Funding Obligation to evaluate gravel augmentation within a Science-based Decision-Making Framework as part of the EMAMP using alluvium excavated as part of floodplain restoration or through the MH Funding Obligation. City Light, in consultation with the SLIC and as an early action commitment, will review and refine the Draft Skagit River Gravel Augmentation Pilot Study (Appendix P). City Light shall implement the gravel pilot, as modified in consultation with the SLIC during early action and after approval by NPS and other regulatory agencies as necessary, following license issuance.

4.5.1 Goal and Objectives of the Mainstem Habitat Funding Obligation

The primary goal of the MH Funding Obligation is to provide funding to develop and complete enhancement projects to address limiting factors for Chinook Salmon (Skagit Chinook Recovery Plan [SRSC and WDFW 2005], Zimmerman et al. 2015), Bull Trout (Coastal Recovery Unit Implementation Plan for Bull Trout – *Salvelinus confluentus* [USFWS 2015]), and steelhead (ESA Recovery Plan for the Puget Sound Distinct Population Segment – *Oncorhynchus mykiss* [NMFS 2019]), and other salmonids by improving and restoring ecological functions and values. Focal species in addition to ESA-listed salmonid species will be determined in consultation with the SLIC. The geographic scope includes the freshwater component of the Skagit River downstream of Gorge Dam and its floodplain, Sauk River and its floodplain, tributary confluences and other

sites within the Skagit River watershed as identified in consultation with the SLIC to support the goals and objectives of the MH Funding Obligation.

Objectives are as follows:

- Engage with Indian Tribes, government agencies, local landowners, NGOs, and jurisdictions in restoration planning to prioritize and build community support for freshwater habitat enhancement measures.
- Support implementation of ESA-listed salmonid recovery plans and other watershed plans and existing comprehensive efforts to achieve improvement and restoration of ecological functions and values.
- Identify additional opportunities and constraints to achieving the stated goal within the Project vicinity, both large and small.
- Build partnerships and community support to remove constraints and implement reach-scale projects.
- Acquire properties or secure conservation easements where necessary to protect and restore ecosystems processes and to allow for restoration of floodplain processes on a reach scale.[31]
- Implement restoration projects on the list of actions prioritized by the SLIC.
- Leverage available enhancement funds to secure additional grants to support MH Funding Obligation objectives.
- Incorporate monitoring for increased habitat and fish production associated with projects implemented through funds from the MH Funding Obligation into the EMAMP to measure restoration effectiveness at site and watershed scales.
- Integrate habitat enhancement project planning and implementation with other license measures including functional flow measures to achieve maximum ecological functional uplift and salmonid productivity.

4.5.2 Plan and Planning Targets

A MH Funding Obligation guidance memo will be developed in consultation with the SLIC during implementation planning, which builds on concepts described in this section to guide implementation. The memo will identify a scientifically based strategy, prioritization process, priority areas or sites, planning targets, and 10-year schedule to advance projects through the Project Pipeline that are in alignment with the objectives identified in Appendix C of the Skagit

[31] City Light acknowledges that the entity acquiring a property will vary on a case-by-case basis. In some cases, a third party may acquire properties (e.g., conservation organization, Indian Tribe). On a case-by-case basis, City Light may consider holding title to properties. Access may vary based on ownership and title conditions. Providing Tribal access for traditional purposes is an important interest. Based on site specific conditions, ownership that increases public access or restricts it to protect sensitive sites will be considered in regard to project objectives.

Chinook Recovery Plan (SRSC and WDFW 2005)[32] or other guidance documents identified through the SLIC consultation process. It will also articulate next steps and a decision-making framework for the projects identified in Appendix O, as well as other projects identified through the planning process. The strategy will build on existing feasibility and prioritization efforts and have a salmonid multispecies focus. The memo will be completed within two years of license issuance and filed with the REP Annual Report.

Planning targets for floodplain restoration acres and STJ (parr, yearling, sub-adult, etc.) will be aligned with the 2005 Skagit Chinook Recovery Plan strategy to contribute to the collective effort of watershed partners to recover healthy and harvestable populations of native salmonids (Section 4.5.4 of this management plan). Planning targets will be scaled to the size of the fund and cost estimates for projects. Project pipeline workflow planning targets for moving projects through each stage from Group 4 to Group 1 will also be included. Any updates to the planning targets will be included in the REP Annual Report.

4.5.3 Project Prioritization

A preliminary list of prioritization criteria is included in Table 4.5-1. It is organized by geomorphic context, ecological benefit, limiting factors, hypothesized fish response, and social/logistical factors. These criteria will be refined in consultation with the SLIC during implementation planning and included in the freshwater habitat fund guidance memo. The prioritization will include consideration of limiting factors and biological goals for multiple salmonid species and life history stages and strategies. Where limiting factors have not been identified for certain salmonid species, a conceptual framework based on a literature review may be developed within a Science-based Decision-Making Framework in consultation with the SLIC. The relative benefit of projects (e.g., estimated smolt capacity) toward restoration goals and population status will be primary consideration in prioritization.

As a starting point, ESA-listed salmonid species (as of 2024) are identified as the primary focal species, followed by other anadromous salmonids, resident trout, and aquatic species (in this order). Priority projects include those identified in Chapter 10 of the Skagit Chinook Recovery Plan (SRSC and WDFW 2005) and new sites identified in subsequent plans that are consistent with the recovery strategy. Relative Chinook Salmon parr densities from various habitat types described in the 2005 Skagit Chinook Recovery Plan (Appendix C, Table 6.3) and through subsequent research will be used as guidance in planning, design, and prioritization of projects. As scientific understand changes over the course of the license, updates on approach or strategy may change and will be documented in the REP Annual Report.

[32] Appendix C of the Skagit Chinook Recovery Plan (SRSC and WDFW 2005) is referenced here because it provides specific targets for the Skagit Watershed. The Bull Trout (Coastal Recovery Unit Implementation Plan for Bull Trout – *Salvelinus confluentus* [USFWS 2015]) and steelhead (ESA Recovery Plan for the Puget Sound Distinct Population Segment – *Oncorhynchus mykiss* [NMFS 2019]) plans reference this plan and will also be considered in the establishment of targets.

Table 4.5-1. Preliminary list of prioritization criteria.

Category	Prioritization Factors
Geomorphic Context	• Response reaches with potential to sustain a more complex planform • Response reaches at risk of simplification • Large enough scale to restore processes that are dynamic and self-sustaining • Existing or relict features to engage
Ecological Benefit	• Connectivity among habitat features (e.g., working with process flows) • Existing and potential ecological functions and values • Tributary confluences and other zones of ecological richness • Groundwater and other areas of temperature refugia • Opportunity for self-sustaining biological cycles and processes • Diversity • Multi-species benefit
Limiting Factors	• Hydromodifications that limit floodplain connectivity • Zones with high juvenile mortality • Limiting factors analyses to be completed for other salmonids by co-managers
Hypothesized Fish Response	• Function and number of juvenile fishes (productivity) • Improvement of habitat function to address limiting factors (“biggest bang”)
Social/Logistical	• Land ownership • Community support • Accessibility • Partnerships • Cost/benefit • Opportunities to leverage additional funds

4.5.4 Alignment of the Mainstem Habitat Funding Obligation with the 2005 Skagit Chinook Recovery Plan

The Skagit Chinook Recovery Plan (SRSC and WDFW 2005) provides a watershed-specific and scientifically rigorous strategy for recovery of Chinook Salmon. The strategy identifies actions to restore ecosystem processes, remove stressors, and target limiting factors. The 2005 Skagit Chinook Recovery Plan is referenced in the regional recovery plans for Bull Trout (Coastal Recovery Unit Implementation Plan for Bull Trout – *Salvelinus confluentus* [USFWS 2015]) and steelhead (ESA Recovery Plan for the Puget Sound Distinct Population Segment – *Oncorhynchus mykiss* [NMFS 2019]) as consistent with the recovery needs of those species. Therefore, it is highlighted in this management plan.[33] They will be taken into consideration in project prioritization and design. If other species are listed under the ESA during the license term or updates to recovery plans are issued, those updates will also become guidance documents.

The 2005 Skagit Chinook Recovery Plan provides acreage targets necessary to achieve recovery goals for the Skagit River watershed based on estimates of juvenile parr productivity from floodplain, backwater and mainstem edge habitats. Chinook Salmon capacity and productivity are

[33] Settlement Parties acknowledge the importance of Coho, Chum, Sockeye, and Pink salmon, and other salmonid and non-salmonid species.

constrained by available habitat in large floodplains that has been lost or degraded due to hydromodifications and reduced function of natural processes that include impacts to natural flow regimes from hydropower operations.

Total acreage of floodplain habitat is one simple metric for measuring progress toward addressing the loss of floodplain connectivity and the rearing habitat capacity limiting factor identified in the 2005 Skagit Chinook Recovery Plan. It is important to acknowledge that the relationships between acreage, rearing habitat capacity, and productivity varies from site to site depending on location in the watershed, site topography, groundwater influence, ecological conditions, and other factors. Simply stated, ecological functions and values and opportunities for functional uplift are also important considerations in a restoration strategy.

The Skagit Chinook Salmon recovery planning targets for total acreage of restored floodplain habitat are based on the projects described in Chapter 10 of the 2005 Skagit Chinook Recovery Plan (Table 4.5-2). Their inclusion here is to highlight important Project Pipeline Group 3 and 4 projects and the relative scale and type of projects necessary to achieve Chinook Salmon recovery in the Skagit River watershed. Portions of some of these projects have been implemented (e.g., portions of Illabot Creek Barnaby reach and Pressentin Park), others have been determined to be infeasible to implement given land ownership and other constraints (e.g., Little Baker Channel, Salem LC Floodplain), and some are outside the area of project effects (e.g., Sauk River). The Sauk River has not been impacted by Project operations, but restoration actions in the Sauk River implemented through the MH Funding Obligation could benefit several weaker Chinook Salmon stocks in the Skagit River watershed. Diversity and spatial structure of populations are essential elements for Chinook Salmon recovery in the Skagit River watershed, and addressing weaker stocks in the Sauk River could boost recovery and harvest opportunities.

Table 4.5-2. Restoration projects identified in the 2005 Skagit Chinook Recovery Plan.

Project	Area (Ac)	Location	Completed?	Notes
Salem LC Floodplain	291	Skagit	No	There is no likely a viable project because site is currently managed as a mitigation bank
River Bend	240	Skagit	No	
Sterling Reach Restoration	916	Skagit	No	
Nookachamps Confluence	142	Skagit	No	
Britt Slough	140	Skagit	Yes	
Cottonwood Island	420	Skagit	No	
Gilligan Floodplain Restoration	170	Skagit	No	
Skiyou Slough	600	Skagit	No	
Cockerham Island	1,334	Skagit	No	
Little Baker Channel	1[1]	Skagit and Baker	No	There is not currently a viable project at this location
Illabot Creak (Barnaby Reach)	1,300	Skagit and Trib	Partial	This project area includes Illabot Creek and a portion of the Barnaby Reach/Skagit River; there have been two projects completed here
Car Body Hole	50	Skagit	No	

Project	Area (Ac)	Location	Completed?	Notes
Marblemount Bridge	200	Skagit	Partial	A project was completed at the Pressentin Park just downstream of the defined Project area
Bacon Creek	27	Skagit Trib	No	
Government Bridge	54	Sauk	No	
Darrington Area	164	Sauk	No	
Dearinger Campground Road	NR[2]	Suiattle	Yes	
Boundary Bridge	43	Suiattle	No	
Downey Creek Crossing	3	Suiattle	Yes	
Total	**6,094**			

1 Only channel area was reported, not full floodplain area.
2 NR: Not reported in the Skagit Chinook Recovery Plan (SRSC and WDFW 2005).

The 2005 Skagit Chinook Recovery Plan provides a biological target of 400,000 Chinook Salmon parr and 33,000 Chinook Salmon yearlings (SRSC and WDFW 2005; Table 16.5), which corresponds to the hypothesized response based on capacity estimates from restored acreage. Table 4.5-3 provides capacity estimates associated with various habitat types. The primary biological goal of the funding provided for projects via the MH Funding Obligation will be to increase the capacity of rearing habitat available for the Chinook Salmon parr life history type and secondarily by yearling and fry life history types. Although parr will be the primary life history type to benefit from floodplain restoration according to the 2005 Skagit Chinook Recovery Plan hypothesis, fry and yearling life histories will also benefit from restoration activities that act on an ecosystem-based approach that promotes habitat forming processes. The 2005 Skagit Chinook Recovery Plan notes complex edge, backwater, and off-channel as "pass-through" habitats for fry life stages and notes that yearlings will benefit from the same habitat types as parr. Moreover, the emphasis on habitat forming process in the Skagit River floodplain will benefit additional species and life stages. For example, Coho Salmon will rear in newly created off-channel floodplain areas, Chum Salmon spawning success will be improved by creation of sheltered groundwater-fed channels, and steelhead juveniles will utilize productive side channels.

Table 4.5-3. Assumed Chinook Salmon parr migrant capacity estimates from various floodplain and mainstem habitat types.[1]

Habitat type for large rivers (channels > 50 meters wide)	Assumed capacity (fish/m^2)	Source
Natural backwater	1.780	Hayman et al. 1996
Hydromodified backwater	0.639	Hayman et al. 1996 (scaled by bank ratio)
Natural bar	0.440	Hayman et al. 1996
Hydromodified bar	0.158	Hayman et al. 1996 (scaled by bank ratio)
Natural bank	0.970	Hayman et al. 1996
Hydromodified bank	0.348	Hayman et al. 1996
Mid-channel areas	0.001[2]	NOAA, unpublished
Off-channel habitat	486 (per hectare)	Hayman et al. 1996

1 From Appendix C of the Skagit Chinook Recovery Plan (SRSC and WDFW 2005).
2 This value was for riffles, which represents the appropriate juvenile Chinook density in the larger channels because velocities are high and limited data from mid channel habitat does not find rearing sub yearling Chinook Salmon.

4.6 Aquatic Habitat in Transmission Line Right-Of-Way

The transmission line ROW and associated Project Routes[34] extends from Newhalem to Bothell via the Skagit, Sauk, and North Fork Stillaguamish River valleys. The scope of measures in this section include fish passage barriers at stream crossings on Project Routes, interactions between channel migration and Project facilities, and aquatic habitat at transmission line stream crossings. It does not include non-Project Routes and associated infrastructure impacts, which are the responsibility of the landowner.

The overarching goals and objectives for these measures are described in Section 4.2 of this management plan. Objectives specific to this Section 4.6 include:

- Address fish passage barriers at stream crossing structures on Project Routes to restore access and connectivity to significant habitat.
- Protect Project features, Project Routes, aquatic and riparian habitats, and river processes at locations within channel migration zones (CMZ) through proactive planning, monitoring, and implementation of site-specific measures.
- Improve habitat for native fish and wildlife in streams crossed by the transmission line ROW through implementation of programmatic actions and site-specific PME measures.

Road maintenance and vegetation management in the transmission line ROW are included in City Light's Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan, and the Vegetation Management Plan, respectively. Where elements of these programs overlap, they are referenced and will be coordinated with the SLIC.[35] The following measures will also be coordinated with City Light's Fish and Wildlife Mitigation Land Management Plan at Illabot Creek and any other sites that may include mitigation lands. Funding for implementation of habitat enhancement PME measures associated with the transmission line ROW shall not originate from the MH Funding Obligation unless scope beyond what is described here is added by City Light in consultation with the SLIC.

[34] As part of the Final License Application (FLA), City Light conducted an extensive roads and trails ("routes") inventory to review and document all routes used to access the Project, including those through the transmission line ROW. As part of this effort, City Light distinguished between routes considered "Project Routes" (maintained by City Light and exclusively used by City Light for Project purposes), and "Non-Project Routes" (may or may not be maintained by City Light and not exclusively used by City Light [i.e., shared use]). The detailed information gathered as part of the inventory is presented in the FLA as part of Exhibit E Section 4.2.6.

[35] Riparian plantings included as part of stream enhancement measures will be subject to site-specific compliance monitoring and reporting requirements. City Light's Vegetation Management Plan provides the overarching framework for all vegetation management and maintenance in the ROW, on mitigation lands, and at specific enhancement sites identified in the REP.

4.6.1 Passage Barriers on Project Route Stream Crossings

Fish passage barriers at stream crossing structures along Project Routes will be identified and prioritized for improvement. Identification and an initial prioritization of fish passage barriers at stream crossing structures has been completed and summarized in the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-Of-Way Study (GE-02 Erosion and Geologic Hazards Study; City Light 2023a). A more detailed prioritization, which includes field verification, is described below.

4.6.1.1 Prioritization and Planning

Initial Prioritization

All culverts, bridges and fords on Project Routes were evaluated for physical condition in accordance with the WDFW Fish Passage Inventory, Assessment and Prioritization Manual (WDFW 2019) as described in the GE-02 Erosion and Geologic Hazards Study (City Light 2023a). The assessment identifies 19 structures that are less than 100 percent passable on Project Routes according to the criteria outlined in the manual (WDFW 2019):

- 12 culverts (0 percent passable);
- 2 culverts and 1 bridge (33 percent passable);
- 3 culverts (67 percent passable); and
- 1 unknown.

Of these structures, five culverts and one bridge block or restrict access to "significant" habitat defined as greater than 200 meters of stream meeting fish bearing criteria (Table 4.6-1) this definition is consistent with Washington State's culvert prioritization. Upstream potential fish habitat was estimated by compiling potential stream lengths, areas, and gradients using available data and remote sensing techniques. A field assessment of potential upstream fish habitat will be completed, as described below, to confirm and prioritize stream crossing structure replacement or removal in consultation with the SLIC. Both habitat quantity and quality will be considered in prioritization and sequencing of culvert replacements.

Table 4.6-1. Project Route stream crossings identified as full or partial barriers with greater than 200 meters of fish habitat upstream as determined in the Phase 1 assessment.

Site ID	Structure ID	Type of Structure	Percent Passable	Fish Species[1]	HUC Basin Name
FC1060	C1045	Culvert	67	Unknown	Jim Creek
FC1062	C1050	Culvert	0	CO, CK, CH, PK, CT, SH	Jim Creek
FC1091	C1076	Culvert	0	Unknown	French Creek
FC1101	C1087	Culvert	0	CO, CK, CH, PK, CT, SH	Prairie Creek
FC1106	C1092	Culvert	0	Unknown	Sauk River
FB1100	B1005	Bridge	33	CO, CK, CH, PK, CT, SH	Prairie Creek

1 Chinook Salmon (CK); Chum Salmon (CH); Coho Salmon (CO); Pink Salmon (PK); Cutthroat Trout (CT); steelhead (SH).

Field Verification of Upstream Aquatic Habitat

Field verification will be completed at all sites on Projects Routes identified in this section as not meeting fish passage criteria within two years of license issuance, where not already completed. The purpose of field verification is to evaluate the quantity and quality of stream habitat impacted by the structure. The scope will include the five culverts and one bridge identified in Table 4.6-1 that were determined based on the Phase 1 desktop assessment to block or restrict access to over 200 meters of stream habitat and the remaining 13 that were estimated to block or restrict access to less than 200 meters of stream habitat.

Field verification will include the application of the Reduced Sample Full Survey (Fish Passage Inventory, Assessment, and Prioritization Manual; WDFW 2019) or equivalent field verification methods agreed to in consultation with the SLIC. Site survey on private property is subject to landowner approval. In the absence of landowner approval, City Light will consult with the *U.S. v. Washington* Co-managers and SLIC to identify options and available information to inform prioritization.

City Light, in consultation with the SLIC, will use field verification results to sequence within priority groups and make adjustments among Groups (described in Section 4.6.1.2 below). Adjustments may include the following:

- Move fish passage improvement projects in Group A and B that are determined to block less than 200 meters of suitable fish habitat into Group C.
- Move fish passage improvement projects in Group C that are determined to block over 200 meters of suitable fish habitat into Group A or B.
- Move fish passage improvement projects in Group C that block or restrict access to a critical habitat feature such as an oxbow or beaver pond that provides suitable rearing habitat for stream type salmonids into Group A or B.
- Move fish passage improvement projects between Group A and B based on updated information of the potential access by anadromous fish species.

4.6.1.2 Implementation of Passage Improvement Actions

Upon completion of the planning and prioritization process by the end of License Year 2, City Light will implement the identified passage improvement projects over three periods and associated priority groups:

- **Group A:** Culverts and other structures that block over 200 meters of anadromous fish habitat will be replaced or removed by License Year 5.
- **Group B:** Culverts and other structures that block over 200 meters of resident fish habitat will be replaced or removed by License Year 15.
- **Group C:** Culverts and other structures on non-fish bearing streams and fish bearing streams with less than 200 meters of habitat upstream will be replaced at end of usable life or as part of road maintenance or road segment upgrades (prior to end of usable life) throughout the term of the license. A subset of these may not make sense to replace with a much larger culvert if it will require a substantial amount of additional road fill to meet required clearance above a

larger replacement culvert. In such cases where project impacts may exceed benefits, the determination of whether or not to proceed with a marginal project will be determined in consultation with the SLIC.

Improvement projects will be consistent with the WDFW Water Crossing Design Guidelines (Barnard et al. 2013) and any future updates of this management plan. Improvement projects on properties not owned by City Light are subject to landowner approval and easement agreements.

4.6.2 Channel Migration Zones near Project Infrastructure

Channel migration zones (CMZ) have been delineated for 22 stream reaches within the Project Boundary as part of the GE-02 Erosion and Geologic Hazards Study (City Light 2023a). Ten of these areas have transmission line towers or Project features within the mapped CMZ. This section of the management plan describes how City Light will protect Project features, Project Routes, aquatic and riparian habitats, and river processes at locations within CMZs through proactive planning, monitoring, and implementation of site-specific measures.

4.6.2.1 Prioritization and Planning

City Light will continue to identify and monitor existing and potential channel migration and fluvial hazards including bank erosion, bank instability, avulsion, aggradation, incision, head cutting, scour, and deposition with existing or potential future interaction with Project facilities. Ten streams were identified in the GE-02 Erosion and Geologic Hazards Study (City Light 2023a) with existing or potential for future (50-year) channel migration interaction with Project facilities (Ladder Creek, Goodell Creek, Damnation Creek, Bacon Creek, Diobsud Creek, Skagit Crossing near Corkindale, Illabot Creek, Sauk River, Squire Creek, and Montague Creek) and other streams may be identified in the future with potential for channel migration or fluvial hazard interaction with Project facilities (see Table 4.6-2). Identification and monitoring of these hazards will occur by operations staff as part of routine operations and maintenance activities, and during periodic inspections or assessments of Project facilities. Targeted monitoring using LiDAR and aerial photos will be implemented at the ten streams identified for existing or future potential channel migration hazards and at other streams identified in the future with channel migration or other fluvial hazards annually and following major flood events.

Because these channel migration and fluvial hazards typically develop rapidly during high-flow events, immediate emergency intervention mitigation measures may be required to protect or restore integrity to Project facilities or to address public/personnel safety. In these situations, emergency intervention measures may be maintained pending Commission approval, until the long-term mitigation can be determined and implemented (which may include removal, replacement, modification, or retention of the emergency mitigation measures as appropriate). In consultation with regulatory/local governing agencies and Indian Tribes with established treaty rights, the adverse impacts on natural and cultural resources resulting from the emergency intervention will be evaluated and the appropriate mitigation of the resource impacts will be implemented with the long-term hazard mitigation measures.

Site Specific Measures

Table 4.6-2 identifies stream crossings with the potential for channel migration interactions with Project facilities and proposed conceptual actions at those sites. City Light will monitor channel

migration and develop emergency protocols for all sites. The design process at these sites will be completed during implementation planning in consultation with the SLIC. Designs will be filed with FERC as part of the REP Annual Report.

All actions will be designed to result in a net increase in habitat quantity and quality. In addition to monitoring at these sites, potential treatments to be determined on a site-specific basis to meet objectives may include engineered log jams and log cribs to deflect and split flow, wood pile arrays, bioengineered bank treatments, integration of wood and plants into rockery, and where feasible and necessary, relocating transmission towers.

Table 4.6-2. Identified streams crossings within the Project Boundary with the potential for channel migration interactions with Project facilities and proposed monitoring and site-specific measures.

Stream	Channel Migration Issue	Relative Risk	Proposed Action[1]
Ladder Creek	Bank erosion resulting from a high flow event in 2021 at one location along the right bank was observed to be threatening the integrity of the wooden fence near the historic Blue Pool that is part of the Ladder Creek trail and historic area. Continued erosion could impact the Blue Pool, trail, suspension bridge, and other Project facilities.	Medium	Monitor annually and after major flood events. Site evaluation and proactive plan.
Goodell Creek	Alluvial fan. Towers located in swale with potential for avulsion, particularly if berm protecting campground and NPS road fails. Both of these towers have raised concrete bases, suggesting they were designed with future flooding or channel change in mind.	Medium	Monitor annually and after major flood events. Site evaluation and proactive plan. Add additional bank protection around base of towers (two) in swale. Construct two engineered log structures in Goodell Creek to reduce risk of an avulsion and improve pool area and cover.
Damnation Creek	Alluvial fan. Tower located near side channel with risk of channel avulsion. Some evidence of flow and aggradation following November 2021 flood in this side channel.	Low	Monitoring annually and after major flood events. Site evaluation and proactive plan.
Bacon Creek	Alluvial fan. Left bank tower on edge of the CMZ. Low risk of future interaction due to SR 20 bridge constriction upstream of ROW.	Low	Monitor annually and after major flood events. Future modifications to SR 20 bridge could affect risk factors and opportunity for alluvial fan restoration.
Diobsud Creek	Bank erosion along left bank in close proximity to tower.	High	Monitor annually and after major flood events. Site evaluation and placement of four engineered log structures to protect tower and increase habitat quantity and quality in reach. Measure may include vegetated rockery bank protection.

Stream	Channel Migration Issue	Relative Risk	Proposed Action[1]
Skagit River - Corkindale	Bank erosion along the right bank. Monopoles on right bank and traditional towers along the left bank. The towers closest to the channel along the left bank of the Skagit River are most at risk.	Medium	Monitor annually and after major flood events. Site evaluation and proactive plan.
Illabot Creek	Alluvial fan. Towers protected in place. Low risk under current protections which include levees.	Low	Monitor annually and after major flood events. Site evaluation and proactive plan. As part of evaluation, examine options for additional habitat enhancement. Habitat enhancement measures may include up to three additional log structures within or adjacent to the ROW, with a primary goal of enhancing or extending the existing restoration project to increase the quantity and quality of habitat.
Sauk River	Channel migration into glacial deposits at three locations along left bank. Channel avulsed in 2021 toward the east side of the valley, abandoning the channel downstream of Rinker Creek.	Medium	Monitor annually and after major flood events. Site evaluation and proactive plan.
Squire Creek	Tower in close proximity to channel. Very slow migration and bank erosion.	Low	Monitor annually and after major flood events. Site evaluation and proactive plan. Restoration measures could include a large wood structure to redirect flow and riparian planting.
Montague Creek	Towers in close proximity to channel; powerline corridor follows the Creek; Creek channelized and stable. One tower at high risk due to unstable geology.	High	Monitor annually and after major flood events. Site evaluation and proactive plan to address slump (potential measures could include a retaining wall, toe protection, and improved drainage) along confined section of Montague Creek near tower.

1 Proposed actions are initial concepts and may be revised during the feasibility and design process as part of implementation planning in consultation with the SLIC.

Emergency Channel Migration Zone Protocols

It is City Light's intent to proactively address and monitor CMZ/Project feature interactions as described above. However, emergency measures may be necessary despite these actions. City Light will develop programmatic emergency channel migration protocols by License Year 1 that includes best practices for addressing emergency actions related to channel migration that avoid where possible, minimize and mitigate for impacts to aquatic species, aquatic and riparian habitat, and river processes at all sites with ongoing or potential interactions between channel migration and transmission line towers or other City Light infrastructure. Emergency actions and best management practices (BMP) shall also apply to other sites with interactions between Project facilities and aquatic resources (e.g., Hollywood levee). These protocols and procedures will be

developed in consultation with the SLIC, documented in a technical memorandum, and filed with the REP Annual Report.

4.6.2.2 Implementation

Upon completion of the planning and prioritization process, City Light will design, permit, and implement site-specific measures identified in the plan. The three most urgent sites for mitigating risk to infrastructure as determined by City Light in consultation with the SLIC shall be implemented by License Year 6. Measures at three additional sites shall be implemented by License Year 15. City Light shall consider habitat impacts and significance to species recovery when selecting these projects. Triggers associated with monitoring results within the adaptive management framework may accelerate implementation schedules or lead to project implementation at additional sites. The project schedule will be developed in consultation with the SLIC and filed with the first REP Annual Report. The schedule will be integrated with the mainstem habitat enhancement measures and updated periodically in consultation with the SLIC.

4.6.3 Aquatic and Riparian Habitat at Transmission ROW Stream Crossings

Road maintenance and vegetation management activities associated with the transmission ROW impact vegetation composition, structure and function, terrestrial habitat, and aquatic habitat at stream crossings. Road maintenance and vegetation management BMPs and programmatic actions are described in City Light's Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan, and the Vegetation Management Plan, respectively. In addition to the BMPs and programmatic actions described in these plans, City Light will also mitigate for project effects on wood loading through additional programmatic actions and wood augmentation.

Reduced wood loading to streams is the primary effect of ROW management on aquatic habitat. ROW stream segments have lower wood loading on average than non-ROW stream segments. Clearing, development, and hydromodification on private property and impacts from state highways and roads that are not Project Routes also affect relative wood loading.

4.6.3.1 Programmatic Actions

Programmatic actions PME measures are described in City Light's Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan, and the Vegetation Management Plan, respectively. Example BMPs include (and are not limited to):

- Use height zonation mapping to maximize retention of native riparian trees and shrubs.
- Apply integrated weed management practices to control invasives and to replace invasives and non-compatible native plant species to improve riparian areas.
- Place and position wood debris from trees that need to be cut to achieve North American Electric Reliability Corporation (NERC) compliance in small streams.
- Work collaboratively with other jurisdictions to control unauthorized motor vehicle access to Project Routes where feasible.
- Decommission redundant and unnecessary access routes.
- Revegetate and use bioengineering approaches to treat areas of erosion.

4.6.3.2 Wood Augmentation in ROW streams

City Light will add 500 pieces of large wood >15-feet length and 12-inches diameter at breast height (dbh) at ROW stream crossings or alternative locations as approved by the SLIC. At a minimum, one-third of the pieces shall be >25-feet length and 18-inches dbh with a rootwad. In addition to larger key pieces, smaller wood (not included in these totals) and slash will be incorporated into wood structures as part of the design and to increase cover. Subject to consultation with the SLIC, adjustments to wood number and sizing may be revised consistent with total wood volumes (i.e., 25-feet length and 10-inches dbh instead of 15-feet length and 12-inches dbh) to meet design specifications and align with available large wood. The size of functional wood varies with stream size. The size of wood and wood structures and anchoring techniques will be determined through the design process to maintain stability and achieve project objectives. In streams with a bankfull width greater than or equal to 25 feet and as necessary in smaller streams as determined through the design process, wood will be anchored for stability (e.g., posts, boulders, ballast, buried, cable, chain). Wood may be sourced from a variety of locations including (but not limited to) trees removed as part of ROW management, logs retrieved from reservoirs,[36] logs obtained through selective thinning and tree-tipping on City Light and other public properties to achieve silvicultural and terrestrial management plan objectives, and logs purchased from private parties.

Within one year of License issuance and in consultation with the SLIC, City Light will propose subbasin/ecological zone targets (percent of total augmentation distributed among the subbasin) and treatment locations (stream segments with a high potential for functional uplift). Treatment areas and a schedule developed in consultation with the SLIC[37] and filed with FERC as part of the REP Annual Report. Targets are subbasin specific rather than stream specific to maintain flexibility to concentrate wood placement and focus interventions based on geomorphic conditions (e.g., alluvial reaches), specific opportunities (e.g., engagement of a side channel), and limiting factors analysis (e.g., Chinook Salmon or steelhead habitat, rearing), rather than generic wood loading targets for each ROW stream reach. For instance, in the Stillaguamish River basin there is interest to align wood augmentation sites with wood debris targets and locations identified in the Skagit Chinook Recovery Plan update (Stillaguamish Watershed Council 2016). This could include a financial contribution to projects in the Stillaguamish mainstem and large Chinook Salmon-bearing streams in lieu of wood placement in smaller ROW stream segments. In the Skagit River basin, there is a desire to start with assumption of in-place, in-kind targets. Adjustments may be made in consultation with the SLIC and may include the placement of additional wood beyond mitigation requirements at the stream crossings with channel migration identified in Table 4.6-2, and wood added as part of fish passage improvement projects.

[36] If a road is built to Ross Lake or other access improvements implemented as part of the fish passage program make wood transport feasible and cost effective, larger logs removed as part of Project operations could be used in stream restoration. With the current access configuration, wood transport is logistically challenging, and hairpin turns on the Haul Road below Ross limit the length of wood that can be transported to under 15 feet.

[37] City Light will consult with the Stillaguamish Tribe regarding all projects along the ROW within the Stillaguamish River basin regardless of their decision to participate in the SLIC.

Subbasin/ecological zones include:

- Skagit River tributaries upstream of Bacon Creek;
- Skagit River tributaries downstream of Bacon Creek to Sauk River;
- Sauk River tributaries;
- NF Stillaguamish River tributaries;
- SF Stillaguamish River tributaries; and
- Snohomish River tributaries.

4.6.3.3 Implementation

Wood augmentation will occur on the agreed upon schedule at ROW stream crossings or aggregated sites within subbasin/ecological zones by License Year 15. Project objectives, target species and life history stages, and designs will be developed in consultation with the SLIC during implementation planning. Project objectives to enhance ROW stream crossing may include (but are not limited to) enhancing habitat complexity, providing cover, forming pools, sorting gravel, engaging side channels, increasing floodplain connectivity, creating a more defined channel, increasing high flows, enhancing temperature refugia, reducing excessive bank erosion, and improving structure and function of the riparian zone. Riparian enhancement and invasive plant species removal project elements will be closely coordinated with the SLIC.

5.0 MONITORING AND REPORTING

5.1 Monitoring Overview

In support of REP activities and the Skagit River ecosystem overall, City Light shall conduct a multi-faceted monitoring program that includes compliance, performance, and ecosystem outcome monitoring (e.g., biological effectiveness, etc.) as described below.

5.1.1 Flow Management Program Field Monitoring

Several field monitoring procedures will be conducted throughout the duration of this management plan. In particular, the starting and ending dates of salmon and steelhead spawning may be monitored each year as described in Appendix I (Alternative Salmon and Steelhead Spawning Periods). Annual monitoring may also be used to identify when the Steelhead Fry Protection Period begins and/or ends. Fry stranding surveys may be conducted during the peak fry vulnerability periods to monitor fry stranding levels. All field monitoring studies will be developed in consultation with the SLIC and will be conducted by a monitoring team composed of at least one representative of City Light and at least one representative of another partner agency participating in the SLIC.

5.1.1.1 Salmon and Steelhead Spawning Start and End Dates

This management plan specifies default start and end dates for salmon and steelhead spawning. City Light may elect to conduct annual surveys that will provide site specific data required to either delay the start or advance the end dates according to criteria listed in Appendix I. Surveys will be conducted as needed at index locations and/or reaches identified in consultation with the SLIC. These surveys will be conducted by City Light, in consultation with the SLIC, acting through a Field Monitoring team as described in Appendix I.

Redd protection measures will be implemented in the case of start date or maintained in the case of end date on the default dates unless the surveys indicate that spawning activity (according to evidence described in Appendix I) has begun or ceased, respectively. If survey observations are determined to be unreliable, the default dates shall determine the start or end of redd protection measures.

5.1.1.2 Steelhead Fry Protection Period Start and End Dates

This management plan specifies that the default start and end dates for the Steelhead Fry Protection Period shall be June 1 and October 15, respectively. However, annual monitoring efforts may be used to identify alternate Steelhead Fry Protection Period start and end dates. This monitoring procedure is described in Appendix J (Alternative Steelhead Fry Protection Periods).

5.1.1.3 Fry Stranding Index Surveys

Fry stranding surveys will be conducted annually at index locations, with concentration on margins and gravel bars in the Skagit River upstream of the confluence with the Sauk River, for a period of no less than three (3) years to monitor the effectiveness of the Fry Protection measures implemented. These surveys will be conducted during the peak vulnerability periods for both salmon and steelhead fry. Steelhead fry surveys will be conducted between August 1 and August

31, and salmon fry surveys will be conducted between March 15 and April 15, unless modified in consultation with the SLIC.

City Light will develop survey methodology in consultation with the SLIC. Surveys will be completed during the steelhead survey period and the salmon survey period by the Field Monitoring team. The surveys, which will record species, locations, and numbers of stranded fry, will be conducted on 300-foot sections of exposed river bars between the high and low water lines of a downramp event. City Light will present the results of surveys to the SLIC for review and discussion. After three (3) years of annual surveys, City Light, in consultation with the SLIC, may agree to continue, suspend, or modify the surveys as appropriate at annual intervals or otherwise.

5.1.1.4 Fry Stranding Validation Surveys

Fry stranding vulnerability is a function of periodicity, size, local morphology, downramping rate, and downramping amplitude (Beck 1989). In order to validate the assumptions and results of past fry stranding assessments, City Light will conduct empirical studies from the Gorge Powerhouse to the Sauk River confluence during salmon and steelhead Fry Protection Periods. These investigations will be designed to quantify stranding risk based on key uncertainties that have been identified through consultation with LPs and the SLIC. These key uncertainties and underlying assumptions were used to develop a question driven study plan with the goal of determining and quantifying the spatial extent and period of stranding by meeting the following objectives, 1) confirm that August 1-31 and March 15 – April 15 are still the periods of high vulnerability, 2) determine the factors such as habitat, redd location, and emergence timing that influence stranding risk, 3) determine how stranding risk changes through time, season, and among species, and 4) evaluate the potential of sub-surface stranding and conditions that influence stranding risk.

5.1.2 Flow Management Program Compliance Monitoring

The flow levels specified in this management plan will be measured at USGS gages, which have certain inherent ranges of accuracy. For the purposes of this management plan, operations will be determined based on real-time gage readings which will be recorded by City Light.

City Light will prepare an Annual FMP Compliance Report to demonstrate compliance with the instream flows and operating restrictions embodied in this management plan. The reporting period shall be February 1 to January 31. The report shall be sent to the SLIC and to FERC within 120 days of the end of the reporting period. The report will include (but may not be limited to) the following:

(1) Minimum flows recorded at Newhalem Gage;

(2) Hourly downramping rates during Salmon and Steelhead Fry Protection Periods;

(3) Hourly downramping rates during the STJ Protection Period;

(4) Mean Daily Tributary Inflow;

(5) Daily total Downramp Amplitude and portion of amplitude that occurred at Newhalem Gage flows less than 4,480 cfs during Salmon and Steelhead Fry Protection Periods;

(6) Daily required instantaneous Incubation Flows based on Appendix C (Salmon Spawning/Incubation Flow Tables) and Appendix G (Steelhead Spawning/Incubation Flow Tables);

(7) The Season Spawning Flow or spawning flows calculated to date for each salmon species or steelhead spawning group;

(8) Documentation and explanation of any flow or downramping rate violations;

(9) Calculated Daily Spawning Flows;

(10) Planned Spawning Flow for each species spawning or incubating during the reporting period;

(11) Documentation of any decision to exercise a limitations clause (per Section 3.2.2 of this management plan), including consultations with the SLIC;

(12) Documentation of any emergencies that caused deviation from this management plan;

(13) Summary list of the SLIC actions during the reporting period; and

(14) Applicable Minimum Flows for the reporting period.

5.1.3 Process Flow Monitoring

Compliance Monitoring – Document the timing (dates), magnitude, and duration of flows released from the Project and the rationale for decisions made regarding flow release as part of the Annual Compliance Report

Flood Monitoring – Collect high water mark data following Process Flow releases. Evaluate effects at locations of vulnerable infrastructure.

Geomorphic Work Performance Monitoring –City Light, in consultation with the SLIC, will use topobathymetric LiDAR to evaluate changes in channel dimensions and planform, channel migration rates, areas of bed mobilization, changes in channel planform (deposition and incision), and wood recruitment. Field surveys will include scour monitoring at redd locations and substrate mapping within reference reaches. Changes in wood loading within reference reaches will be evaluated through remote sensing techniques.

Monitoring completed by City Light as part of a collaborative efforts to advance scientific understanding of fish population dynamics and inform the Science-based Decision-Making Framework that will be described in the EMAMP. Population monitoring studies may be designed to inform scientific understanding of tradeoffs and relative benefits between life history stages, strategies, and species from flow releases of a given magnitude and frequency at a given time of year.

Research and Biological Effectiveness Monitoring – Monitoring completed by City Light as part of a collaborative efforts to advance scientific understanding of fish population dynamics and inform the Science-based Decision-Making Framework that will be described in the EMAMP. Population monitoring studies may be designed to inform scientific understanding of tradeoffs and relative benefits between life history stages, strategies, and species from flow releases of a given magnitude and frequency at a given time of year. A sediment augmentation pilot in the context of

a Process Flow release could involve placement of sediment from side-channel excavation on river bars.

5.1.4 Flow Management Program Research and Biological Effectiveness Monitoring

Monitoring completed by City Light as part of collaborative efforts to advance scientific understanding of fish populations and inform the Science-based Decision-Making Framework that will be described in the EMAMP. The EMAMP may provide for biological research and monitoring to be implemented in collaboration with the SLIC. Biological monitoring may include population modeling, smolt traps, and other agreed-upon monitoring actions. Biological project effectiveness monitoring may follow a before-after-control-impact (BACI) design within a hypothesis-driven framework centered on research questions that will be described in the EMAMP.

5.1.5 Aquatic Habitat Monitoring and Adaptive Management

This section describes compliance and effectiveness monitoring for the Specific Mainstem Habitat Measures, projects funded via the MH Funding Obligation, and aquatic habitat in the transmission line ROW. Compliance monitoring documents City Light's implementation of license measures. Thus, it focuses on project elements that City Light can reasonably control. Effectiveness monitoring looks at biological outcomes, large scale changes in channel conditions, and the complex interactions of the broader ecosystem related to PME measures and other factors (e.g., population dynamics, climate change, development impacts) as part of an integrated framework, which is described in the EMAMP. Effectiveness monitoring is focused on questions and hypotheses in a Science-based Decision-Making Framework to advance scientific understanding and inform adaptive management throughout the term of the license.

5.1.5.1 Compliance Monitoring, Maintenance, and Reporting

Specific Mainstem Habitat Measures

Compliance monitoring will be completed for all Specific Mainstem Habitat Measures to document implementation of projects consistent with the approved designs or as specified in permit conditions to achieve the habitat objectives developed in consultation with the SLIC. Compliance reporting will be integrated into the REP Annual Report and will include redline as-builts and photos of completed projects.

Habitat quantity metrics associated with the design are the basis for evaluating a project's compliance and to inform decision-making regarding maintenance. Depending on the habitat objectives of a specific site, performance metrics may include but are not limited to area of side channel and off channel habitat; extent of side-channel engagement at various flow levels, and/or log jams, substrate, and riparian planting success metrics. Water quality metrics (temperature, dissolved oxygen) will be measured but will not be used for evaluating continued compliance as they may be affected by off-site conditions beyond City Light's control.

Projects will be designed to be self-sustaining, while recognizing that mechanical intervention may still be necessary in some cases to maintain design function (e.g., blind side channels). Unless otherwise specified, City Light shall maintain projects consistent with the design throughout the

term of the license in consultation with the SLIC. It is important to note that the riverscape is dynamic over time, and that channel evolution may be natural and desirable. For example, a large flood could significantly alter channel planform. In such cases where the river migrates into a project site or alternatively away from a project site, changes in site conditions will not be considered a compliance issue.

The baseline for compliance monitoring will be established at project completion.[38] City Light will visually inspect sites annually and after major flood events. Field and remote sensing data will be collected at 5-year intervals. For projects or groups of projects implemented over several years, the first monitoring interval may be aligned for efficiency. For example, the compliance monitoring and evaluation schedule for specific mainstem projects implemented in License Year 3-6 could be aligned.

Decisions regarding non-emergency maintenance actions related to the project design will be made in consultation with the SLIC at 10-year intervals from the first monitoring interval throughout the term of the license. When maintenance is warranted to restore performance, City Light will prepare a design and schedule in consultation with the SLIC. An important consideration is whether the benefit of a maintenance action exceeds the ecological cost of the construction disturbance from re-entering the site with heavy equipment. Emergency maintenance actions (e.g., threat to SR 20, public safety issue) will be implemented as soon as possible and reported to the SLIC. Documentation of the decision-making process in consultation with the SLIC and all compliance maintenance activities will be incorporated into the REP Annual Report.

Mainstem Habitat Funding Obligation

To document compliance, City Light will include a progress report on the projects utilizing funds from the MH Funding Obligation in the REP Annual Report. The progress report shall include an annual accounting of funds spent, actions taken to advance projects through the Project Pipeline, progress toward the planning targets, prioritization decisions made in consultation with the SLIC, any barriers to implementation encountered, an updated priority list, and an updated 10-year schedule.

The intent of acreage, parr, and workflow planning targets is to guide efficient allocation of resources to address salmonid recovery and measure progress toward the goal. There are factors outside of City Light's control which influence biological outcomes (e.g., climate change, ocean conditions) and limit the rate of project implementation that is achievable (e.g., willing sellers). Thus, funding utilized from the MH Funding Obligation and documentation of good faith efforts by City Light to achieve the planning targets and move projects through the pipeline (rather than acreage or parr numbers) shall be used for measuring compliance with the license obligation.

Aquatic Habitat in the Transmission Line ROW

City Light will complete compliance monitoring for all transmission line ROW PME measures to document implementation of projects consistent with the approved designs or specified in permit conditions to achieve the habitat objectives developed in consultation with the SLIC. The baseline for compliance monitoring will be established at project completion. Compliance reporting will be

[38] The baseline for effectiveness monitoring will be completed prior to project implementation.

integrated into the REP Annual Report and will include redline as-builts and photos of completed projects. Field and remote sensing data will be collected at 5-year and 10-year intervals (depending on the program area) for comparison to the baseline to inform the need for maintenance activities. Biological metrics are not included in compliance monitoring but may be included as part of the EMAMP effectiveness monitoring on specific sites identified as being beneficial for informing adaptive management decision-making in consultation with the SLIC. For example, an EMAMP study plan could be developed to evaluate a hypothesis related to relative fish use of various habitat treatment types designed to increase rearing capacity and productivity for stream-type salmonids to inform the types of projects to prioritize during the next phase of implementation.

For stream crossing passage improvement projects, City Light will complete photo documentation and file as-builts with the REP Annual Report following project completion. Newly installed culverts will also be evaluated after the first high flow season and after 5 years to ensure that they are functioning as designed, consistent with WDFW Water Crossing Design Guidelines (Barnard et al. 2013).

City Light will complete visual inspection annually and after major flood events to inform routine maintenance activities on all Project Route stream crossings. Documentation will include photos of the upstream and downstream end of each culvert. At 10-year intervals throughout the term of the license, a culvert survey will be completed on all Project Route stream crossings. If a Stream Crossing Passage Improvement Project issue cannot be addressed through routine maintenance and it no longer meets passage criteria or new issues on Project Route stream crossings develop, City Light will propose a plan and schedule to remedy the situation in consultation with the SLIC.

For habitat and river process improvements at ROW stream crossings, City Light will inspect sites with ongoing or potential CMZ/tower interactions annually and after major flood events. City Light will establish transects and/or complete a LiDAR change detection analysis on 5-year intervals at sites identified in Table 4.6-2 to track channel migration rates and erosion within reaches with channel migration in close proximity to transmission towers.

Where PME actions are implemented, City Light will monitor stability of bank protection measures, engineered log jams, and other design elements. Where a project objective includes habitat enhancement measures, habitat metrics associated with project objectives will be identified in consultation with the SLIC. Depending on the habitat objectives of a specific site, performance metrics may include but are not limited to area of side channel and off channel habitat, pools, and/or log jams, wood loading, substrate, and riparian planting success criteria.

For wood augmentation at ROW stream crossings, City Light will inspect enhancement sites annually and after major flood events to identify major changes and urgent maintenance needs. If any are identified, City Light will develop a plan to address issues in consultation with the SLIC. On 10-year intervals[39] log jams and individual pieces meeting minimum size criteria will be tallied into size bins and spatially documented through field and/or remote sensing surveys. If total wood

[39] For projects or groups of projects implemented over several years, the first monitoring interval may be aligned for efficiency. For example, the compliance monitoring and evaluation schedule for specific mainstem projects implemented in License Year 3-6 could be aligned.

loading[40] in the treatment reach falls more than 10 percent below the number placed, City Light will identify follow-up actions and a schedule in consultation with the SLIC.

5.1.5.2 Effectiveness Monitoring, Adaptive Management and Reporting.

In addition to monitoring of physical habitat for compliance purposes, City Light, in consultation with the SLIC, will develop and implement the EMAMP consistent with License Article AM LA-01. The focus of the EMAMP is to advance scientific understanding of fish populations and evaluate effectiveness of PME actions in achieving biological objectives within a Science-based Decision-Making Framework. City Light and the SLIC will collaboratively prioritize and develop objectives, research questions, hypotheses, performance metrics, and an appropriate study design. The relationship between objectives, hypotheses, parameters, targets, and protocols is as follows: Objective → Key Questions/Hypotheses Parameters/Attributes to Measure → Targets or Performance Criteria → Protocols for Data Collection and Analysis (Beamer et al. 2019). The EMAMP will include effectiveness monitoring at different scales (e.g., project, reach, and watershed) and over different timeframes. A monitoring baseline will be established for evaluating trends over time.

On the project scale, effectiveness monitoring will include the collection of data on biological metrics (e.g., fish abundance, species composition, life history stage) and habitat quality metrics (in addition to habitat quantity metrics measured for compliance/performance) to test hypotheses. While restoration actions will be focused on hypothesized limiting factors for Chinook Salmon and other salmonid focal species, outcomes are inherently uncertain. The EMAMP provides the framework and conceptual model for dealing with this uncertainty. A fundamental first step in project effectiveness monitoring is to establish clear goals and objectives, which describe what the project seeks to achieve. They should be specific, measurable, achievable, realistic and timely (SMART). Performance criteria that align with the objectives are selected to test the hypotheses. A BACI design or other study design as appropriate will be applied. Therefore, the number and list of metrics will vary from site to site depending on the study design and objectives. The SRSC and other watershed partners have developed project effectiveness monitoring plans, which provide a template for project effectiveness monitoring through the AHP consistent with other restoration projects implemented in the basin (e.g., Beamer et al. 2019).

Results of project effectiveness monitoring, and research will inform refinement of the strategy, future project priorities, and designs throughout the license term. Project effectiveness monitoring results may also lead to recommendations for design modifications to already implemented projects beyond routine maintenance.[41] In such cases, funding for the design, permitting and implementation of additional project elements will be provided from the MH Funding Obligation. Likewise, if City Light, in consultation with the SLIC, prioritizes addressing a project effectiveness issue that results from alterations to the functional flow regime or that has been exacerbated by gravel augmentation experimental actions, it shall be paid for through the MH Funding Obligation.

[40] Total wood loading includes placed wood and natural recruited wood.

[41] During project implementation, City Light will aim to establish a contracting structure that facilitates modifications to address performance issues that may become evident soon after completion while permits remain open.

At larger scales than an individual project, the EMAMP provides the framework for evaluating progress toward geomorphic and biological objectives, tradeoffs among program elements, and population level trends. At the reach scale, geomorphic metrics will be evaluated using topobathymetric LiDAR to evaluate changes in channel dimensions and planform, channel bed elevations, channel migration rates, areas of bed mobilization, and wood recruitment to evaluate the combine effect of functional flow releases, mainstem habitat measures, and major flood events. Field surveys may include (but are not limited to) scour monitoring at redd locations, ground-truthing of substrate mapping within reference reaches, and sediment tracer particle tracking. Changes in wood loading within reference reaches will also be evaluated through remote sensing techniques. At reach and larger scales, biological monitoring will be completed to evaluate relative use of side and off-channel enhancement projects by stream type salmonids, characteristics of the outmigration (e.g., species composition, size, timing), and the number and spatial distribution of redds. Smolt trapping is an important monitoring component for developing annualized estimates for various species and life history types. During implementation planning, City Light and the SLIC will prioritize data gaps and research topics for the Research Fund (described in the EMAMP).

5.1.6 Aquatic Habitat Program Physical Habitat Performance Monitoring

Mainstem Habitat Mitigation and Enhancement – Baseline topobathymetric data will be collected along the mainstem Skagit River during implementation planning and at 5-year intervals throughout the term of the license. Topobathymetric LiDAR will be used both for project physical habitat performance monitoring within restoration subreaches and to evaluate geomorphic changes from Process Flow releases (Section 5.1.3 of this management plan) to be implemented through a Science-based Decision-Making Framework (EMAMP). Because implementation within restoration subreaches will occur over several years, baseline data may be collected from 1 to 4 years prior to implementation. If a flow of greater than 10-year recurrence interval occurs after the baseline collection but before implementation, additional LiDAR or field survey data may be collected within select subreaches prior to construction, if necessary.

Physical habitat performance monitoring for each project site would include the following elements to establish a baseline and evaluate change in function over time:

- Topography – Landscape level assessments will be completed using topobathymetric LiDAR at 5-year intervals and following flow events above the 10-year recurrence interval. Drone flights and field survey with real-time kinematic positioning (RTK) may be used to supplement LiDAR and to evaluate near-term changes, following restoration intervention and peak flow events.
- Edge habitat – Use LiDAR to evaluate changes in edge habitat length and LiDAR and field data collection to characterize changes in edge habitat width and cover.
- Channel engagement – Level loggers (one per side channel/off-channel network) will be installed to document changes in the level of connection and inflow at each monitoring location. Level loggers will be left in place and downloaded as needed for a minimum of five (5) years following construction as determined by the SLIC. Some loggers may be left in place for a longer period as part of EMAMP. At side channel inlets, cameras (set to take photos at intervals) will be installed to gather additional information on the flows at which channels

become engaged. Cameras will also be downloaded annually for a minimum of five (5) years following construction.

- Pools – Number and depth of pools (primary, backwater, side-channel) will be spatially documented using field and/or remote sensing techniques, where feasible given site conditions and available technology (baseline, Year 1, 5, 10).[42]
- Large wood – Log jams (natural and constructed) and individual pieces meeting minimum size criteria will be tallied within size bins and spatially recorded. Presence/absence of rootwads will also be noted (baseline, Year 1, 5, 10). Observations of changes in jam features will be noted.
- Substrate – Pebble counts, visual assessment of (dominant/subdominant) and facies mapping will be completed (baseline, Year 1, 5, 10) including at side channel inlets and outlets.

5.1.7 Management Actions and Adaptive Management

Based on results of performance monitoring, design adjustments, and maintenance activities may be warranted. Details of the evaluation and adjustment process and associated triggers and schedule will be developed in consultation with the SLIC. Data collected according to the protocols outlined in the REP will be applied in the context of the EMAMP, as appropriate (determinations regarding which data are applicable, and how they are to be used, will be made in consultation with the SLIC).

5.2 Implementation and Monitoring Schedule

Implementation of the REP will begin upon license issuance and continue through the license term. The schedule for specific measures is shown in Table 5.2-1 for FMP-related activities and Table 5.2-2 for AHP related activities.

5.2.1 Adaptive Management

City Light will apply adaptive management through the process of implementing testable management actions, and assessing the need to update management decisions outlined in this Riverscape Ecosystem Plan. At five (5) year intervals, or more frequently as needed and proposed by the SLIC, City Light will produce a report that evaluates monitoring information to determine if new or modified flow and restoration measures are required. The report will be produced in consultation with the SLIC, and will identify any amendments that are needed to address the goals of this REP.

City Light will engage in regular consultation with the SLIC ahead of submittals to FERC. City Light will report annually to the SLIC on the status of flow, restoration, and monitoring activities, the schedule of current year's work, anticipated work in the following year, and other pertinent issues. Unless otherwise addressed or approved in this REP, annual work plan activities described in Section 4 of this REP and monitoring activities described in Section 5 of this REP, for locations on or affecting NPS lands and waters, are subject to NPS approval.

[42] Monitoring may be adjusted to align longer term monitoring efforts for similar types of projects for efficient evaluation and reporting, in consultation with the SLIC.

Any amendments to the REP shall be made in consultation with the SLIC before filing with the Commission. Amendments to the REP that may require an amendment to the Section 401 Water Quality Certification or impact City Light's ability to comply with conditions of the Section 401 Water Quality Certificate are subject to approval by Ecology before filing with the Commission. Similarly, any amendments to the REP are subject to the approval of the NPS for locations on or affecting NPS lands or waters, and any amendments affecting species and/or its habitat listed under the ESA are subject to approval by USFWS and/or NMFS. If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan outside of the five year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

Table 5.2-1. Timeline for Riverscape Ecosystem Plan activities – Flow Management Program.

Timeline	Protection and Enhancement Monitoring Activity
Annually or as requested by the SLIC	Conduct monitoring of starting and ending dates of salmon and steelhead spawning.
Annually or as requested by the SLIC	Conduct redd protection surveys.
Annually (by the SLIC)	Conduct monitoring to identify when the Steelhead Fry Protection Period begins and ends.
Annually or by License Years 1-3 (minimum) unless City Light, in consultation with the SLIC, suspends	Conduct fry stranding surveys.
Annually	Provide Annual Flow Plan Forecast to the SLIC.
No less than two times per year	Release flushing and connectivity flows (if not already provided by Project operation requirements or flood risk management protocols).
No less than once every five (5) years and no more than once every two (2) years	Release channel maintenance flows (if not already provided by Project operation requirements or flood risk management protocols).
Annually	Compile and file Annual FMP Compliance Report with FERC.
Annually	Compile and file Annual Process Flows Report with FERC.
By LY 11 and every 10 years following	Compile and file Process Flows Effectiveness Report with FERC.

Table 5.2-2. Timeline for Riverscape Ecosystem Plan activities – Aquatic Habitat Program.

Timeline	Protection and Enhancement Monitoring Activity
Mainstem Habitat Measures	
Within fifteen (15) years of license issuance	Implement restoration of subreaches with high restoration potential (Park Slough, Newhalem Ponds (Agg Ponds), County Line Ponds, Damnation Side Channel, Alma Creek, Taylor Side Channel, Illabot, and Powerline sites).
Within one (1) years of individual project completion	Compliance monitoring including as-builts required.
Aquatic Habitat in Transmission Line Right-of-Way	
Within two (2) years of license issuance	Commence field verification of upstream aquatic habitat.
Within two (2) years of license issuance	Planning and prioritization of passage improvement actions.
Within five (5) years of license issuance	Removal or replacement of culverts and other structures that block over 200 meters of anadromous fish habitat (Group A of passage improvement actions).
Within fifteen (15) years of license issuance	Removal or replacement of culverts and other structures that block over 200 meters of resident fish habitat (Group B of passage improvement actions).
Year 15 – license expiration	Replacement of culverts and other structures on non-fish bearing streams and fish bearing streams with less than 200 meters of habitat at the end of usable life or as part of road maintenance and upgrades (Group C of passage improvement actions).
Channel Migration Zones near Project Infrastructure	
Within one (1) year of license issuance	Develop programmatic emergency channel migration protocols.
Within five (5) years of license issuance	Develop an implementation plan to reduce risk to infrastructure and need for emergency actions for Project features within mapped CMZ.
Within six (6) years of license issuance	Commence site-specific measures related to three most urgent sites for mitigating risk to infrastructure as determined by City Light (in consultation with the SLIC).
Within fifteen (15) years of license issuance	Commence site-specific measures related to three additional sites for mitigating risk to infrastructure as determined by City Light (in consultation with the SLIC).
Aquatic and Riparian Habitat at Transmission ROW Stream Crossings	
Within fifteen (15) years of license issuance	Commence wood augmentation on the agreed upon schedule at tributary stream crossings or aggregated sites within subbasin / ecological zones.

6.0 DEFINITIONS

Daily Spawning Flow

Shall mean the actual average daily flow at the Newhalem Gage minus the portion of flow due to flood risk management, spill, avoiding Firm Load curtailment, high Sidestream Inflow, or Process Flows. A sample calculation is shown in Appendix A (Calculation of Daily and Seasonal Spawning Flows for salmon and steelhead).

Estuary

The tidally influenced portion of the Skagit River including Skagit Bay (extending to Camano Island), the Swinomish Channel, and the southern portion of Padilla Bay that is adjacent to the Swinomish Channel.

Firm Load

Shall mean the minimum amount of power which City Light is obligated to provide from a combination of generation and contract resources for the use of its customers.

Forecast Skill

Forecast Skill is defined as the relative improvement (i.e., reduction) in forecast error, as compared to a simple, but reasonable, baseline forecast. A forecast demonstrating improvement over a reasonable baseline forecast can also be referred to as a "skillful forecast."

Fry Protection Flow

Shall mean the flow requirements and restrictions on downramp conditions that are implemented to minimize risk of fry stranding during the period when fry are emerging from redds.

Fry Protection Period

Shall mean the period when flow requirements and restrictions on downramp conditions are implemented to minimize risk of fry stranding during the period when fry are emerging from redds.

Inflow Day

Shall mean the last calendar day preceding a Power Scheduling Day for which data are available to calculate inflow conditions.

Incubation Flow

Shall mean the minimum flow levels throughout the Incubation Period such that redds are adequately inundated from the onset of spawning until the fry emerge.

Incubation Period

Shall mean the time it takes for a fish egg to develop into a larva after fertilization.

Instantaneous Flow

Shall mean the incremental flow as measured at the Skagit River at Newhalem, Washington USGS flow gaging station (12178000).

Insufficient Month

Shall mean a month for which it is determined that there is insufficient stream flow to meet both minimum flows and other constraints.

Marblemount Gage

Shall mean the Skagit River at Marblemount, Washington flow gaging station (USGS Station Number 1218100).

Maximum Spawning Flow

Shall mean an average daily flow measured at the Newhalem Gage and the highest average daily flow that City Light can release during the salmon and steelhead spawning season.

Natural Flow

Shall mean the flow that represents the average daily flow that would occur without the Skagit River Hydroelectric Project in place, which is calculated as shown in Appendix K (Miscellaneous Calculations).

Newhalem Flow

Shall mean the flow of the Skagit River as measured at Newhalem, Washington flow gaging station (USGS Station Number 12178000).

Newhalem Gage

Shall mean the Skagit River at Newhalem, Washington flow gaging station (USGS Station Number 12178000).

Normal Minimum Flow

Shall mean the higher of the required monthly minimum flow or the required Incubation Flow as measured at the Newhalem Gage (USGS Station Number 12178000).

Historic Percent Exceedance Flow

Shall mean the flow calculated from historical flow records that represents the flow that is exceeded with a specific probability frequency. For example, the “50 percent exceedance flow” (or P50) means 50 percent of the historical flows are higher than this value and 50 percent of the historic flows are lower.

Planned Spawning Flow

Shall mean the average daily flow included in the monthly operating plan of City Light as the target flow for spawning during a particular month.

Power Scheduling Day

Shall mean any day in which power schedulers at City Light's Power Control Center prepare generation schedules for the following day(s).

Predicted Marblemount Flow

Shall mean the sum of the planned total discharge from Gorge Powerhouse and Gorge Dam during the target day, the forecast natural sidestream flow between Gorge Dam and the Newhalem Gage, and the forecast Tributary Inflow (between Newhalem and Marblemount). In the absence of reliable sidestream and Tributary Inflow forecasts, the sum of: the most recent observed daily average natural sidestream flow between Gorge Dam and the Newhalem Gage for a given calendar day and the Tributary Inflow for the corresponding Inflow Day can be added to the planned Gorge Powerhouse discharge for the target day in order to obtain the Predicted Marblemount Flow.

Process Flow

Shall mean flows necessary to promote connectivity to side- and off-channel fish habitat and improve gravel quality for spawning and incubation by providing flushing flows and to promote geomorphic processes and mobilize sediment (i.e., channel maintenance flows).

Ramping Rate

Shall mean a change in flow at the Newhalem Gage due to a controlled change in generation at the Gorge Powerhouse and/or spill at Gorge Dam. Ramping rate is calculated in units of inches per hour and cfs per hour as the difference in real-time stage and flow between one hour and the next for each successive time step in the gage’s measurements.

Redd

Shall mean the gravel nest in which salmon or steelhead lay their eggs.

Season Spawning Flow

Shall mean the flow at the Newhalem Gage that determines Incubation Flows based on spawning conditions over the entire Spawning Period of a salmon species or steelhead spawning group. Sample calculations are shown in Appendix A (Calculation of Daily and Seasonal Spawning Flows for salmon and steelhead).

Sidestream Inflow

Shall mean the inflow from tributaries between Ross Dam and the Newhalem Gage.

Spawning Period

Shall mean the planned start and end dates associated with spawning activity for salmonid species as described in the FMP. The planned start and end dates are species-specific and may be adjusted each year based on field monitoring/observations.

Threshold Sidestream Inflow

Shall mean the inflow between Ross Dam and the Newhalem Gage which is beyond City Light's reasonable means to control and shall be defined as 3,500 cfs during the Chinook Salmon Spawning Period, 2,500 cfs during the Pink Salmon Spawning Period, 3,000 cfs during the Chum Salmon Spawning Period, or 3,500 cfs during the steelhead Spawning Period.

Tributary Inflow

Shall mean the inflow from tributaries between the Newhalem Gage and the Marblemount Gage calculated as the mean daily flow at Marblemount Gage minus the mean daily flow at Newhalem Gage on the same calendar day. A sample calculation is included in Appendix K (Miscellaneous Calculations).

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RIVERSCAPE ECOSYSTEM PLAN

APPENDIX A

CALCULATION OF DAILY AND SEASONAL SPAWNING FLOWS FOR SALMON AND STEELHEAD

A. CALCULATION OF DAILY AND SEASONAL SPAWNING FLOWS FOR SALMON AND STEELHEAD

A.1 General Calculation of Daily Spawning Flow

Mean Daily Spawning Flows for salmon and steelhead shall be calculated as follows:

DSF = ANF - MAX (RDF, RDL) - MAX (SS - TSS, 0)

where:

- DSF = Mean Daily Spawning Flow.[1]
- ANF = Actual average daily flow at Newhalem Gage.
- RDF = Mean daily Ross Dam discharge for flood risk mitigation, which shall be calculated as the average amount released throughout the day to avoid exceeding the Flood Risk Management Rule Curve or spilling (equal to inflow to Ross Lake from the moment that the Flood Risk Management Rule Curve or spill point is reached).
- RDL = Mean daily Ross Dam Discharge to serve Firm Load,[1] which shall mean the average amount released to avoid curtailing firm load beyond the Maximum Spawning Flow[1] (Section 3.2.2.3).
- SS = Mean Daily Sidestream Inflow[1] from Ross Dam to Newhalem Gage.
- TSS = Threshold Sidestream Inflow.[1]

Sample calculations are provided in Appendix A Section 1.1 – 1.4 below:

A.1.1 Normal Conditions

Assumptions: Assume that you are calculating the flow for a day during the Pink Salmon Spawning Period during which no water is released from Ross Lake for flood risk mitigation or to avoid curtailing Firm Load, and there is no high Sidestream Inflow.

- RDF = 0
- RDL = 0
- SS = 900 cfs
- TSS = 2,500
- ANF = 3,500 cfs

Calculations:

DSF = 3,500 - 0 - (0) = 3,500 cfs

Conclusion: the Mean Daily Spawning Flow is calculated as 3,500 cfs for that day.

[1] Defined in Section 6 (Definition) of the Riverscape Ecosystem Plan (REP).

A.1.2 Flood Risk Management Measures or Spill Avoidance

"City Light will not be responsible for flow which is released due to actions of the U.S. Army Corps of Engineers or due to reasonable actions taken to avoid exceeding the Flood Risk Management Rule Curve or full pool." (Section 3.2.2.3).

Assumptions: Assume that you are calculating the flow for a day during the Chum Salmon Spawning Period during which a flood risk mitigation release was required. Ross Lake elevation is near full or Flood Risk Management Rule Curve.

- RDF = 6,000 cfs
- RDL = 0
- SS = 3,000 cfs
- TSS = 3,000 cfs
- ANF = 9,000 cfs

Calculations:

DSF = 9,000 - 6,000 - (0) = 3,000 cfs

Conclusion: the Mean Daily Spawning Flow is calculated as 3,000 cfs for that day.

A.1.3 Load Curtailment Avoidance

"City Light will not be responsible for flow which is released when there are no other viable options available other than Firm Load Curtailment, including purchase of power from other sources. This section is not intended to permit flow releases to meet the generation requirements resulting from an increase in Firm Load growth after the execution of this FMP. For the purpose of this FMP, Firm Load shall mean the minimum amount of power which City Light is obligated to provide from a combination of generation and contract resources for the use of its customers." (Section 3.2.2.3).

Assumptions: A power scheduler is calculating the flow for a day during the Pink Salmon Spawning Period during which heating loads in Seattle are expected to be very high due to effects of an arctic air mass in the area. The Seattle generating system is operating at maximum capacity. No secondary, exchange, or stored energy is available for acquisition and all firm contract rights are being exercised. Increased generation at the Skagit River Project is required to meet the load without curtailing power supplies to some firm power customers. City Light can voluntarily increase flows at Newhalem up to the Maximum Spawning Flow which for Pink Salmon is 4,000 cfs. Since the Sidestream Inflow is 2,500 cfs, 4,000 – 2,500 = 1,500 cfs is within the City Light's control. Therefore RDL = 5,500 – 1,500 = 4,000 cfs.

- Actual Ross Discharge = 5,500 cfs
- RDF = 0
- RDL = 4,000
- SS = 2,500 cfs

- TSS = 2,500 cfs
- ANF = 8,000 cfs

Calculations:

DSF = 8,000 - 4,000 - 0 = 4,000 cfs

Conclusion: the Daily Spawning Flow is calculated as 4,000 cfs for that day.

A.1.4 Sidestream Inflow Greater than the Threshold Sidestream Inflow

"City Light will not be responsible for that portion of flow which is released due to Sidestream Inflow greater than 3,500 cfs during the Chinook Salmon Spawning Period, 2,500 cfs during the Pink salmon Spawning Period, 3,000 cfs during the Chum Salmon Spawning Period, or 3,500 cfs during the Steelhead Spawning Period. These Sidestream Inflow values shall be considered Threshold Sidestream Inflows for the purpose of calculating Daily Spawning Flows." (Section 3.2.2.3).

Assumptions: Assume that you are calculating the flow for a day during the Pink Salmon Spawning Period during which no water is released for flood risk mitigation or for meeting a firm load requirement.

- RDF = 0
- RDL = 0
- SS = 5,500 cfs
- TSS = 2,500 cfs
- ANF = 6,000 cfs

Calculations:

DSF = 6,000 - 0 - (5,500 - 2,500) = 3,000 cfs

Conclusion: The Daily Spawning Flow is calculated as 3,000 cfs for that day.

A.2 Season Spawning Flow for Salmon

The Season Spawning Flow is calculated as the average of the 10 highest Daily Spawning Flows at the Newhalem Gage observed during the entire Spawning Period. Exceptions to these Incubation Flows may occur when higher minimum flows are required for protection of other species and life stages. During such instances, City Light will provide the highest of the competing minimum flow requirements indicated for any particular day. City Light, in consultation with the Skagit License Implementation Committee (SLIC), may determine that basing the Incubation Flows on the 10 highest Daily Spawning Flows could result in an Incubation Flow that is higher than desirable. Since the main purpose of Incubation Flows is to keep redds inundated during the Incubation Period, City Light, in consultation with the SLIC, may use an adaptive management approach to evaluate the sensitivity and effectiveness of using the 10 highest Daily Spawning Flows versus an alternative approach. Additionally, City Light, in consultation with the SLIC, may apply

adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity (Section 3.1).

A sample calculation follows:

Suppose that Season Spawning Flow is based on the 10 highest days in a 50-day Spawning Period. In the Year X, City Light planned a Pink Salmon average Daily Spawning Flow of 3,500 cfs or less. The fish actually spawned over a 50-day period at the following average Daily Spawning Flows. Days marked with an asterisk are characterized by high Sidestream Inflow conditions beyond City Light's means of control (see Sidestream Inflow, above). The Daily Spawning Flow calculated for those days excludes the effect of Sidestream Inflow beyond the threshold of 2,500 cfs.

Table A-1. Daily Spawning Flows at Newhalem Gage (cfs) (Sept 12-Oct 21, Year X).

Day	cfs	Day	cfs	Day	cfs
Day 1	3,021	Day 19*	**3,400**	Day 37	2,657
Day 2	3,202	Day 20	**3,389**	Day 38	2,678
Day 3	3,105	Day 21	3,107	Day 39	2,790
Day 4	3,220	Day 22	3,025	Day 40	2,899
Day 5	3,305	Day 23	2,987	Day 41	2,869
Day 6	3,011	Day 24	2,807	Day 42	2,765
Day 7	3,232	Day 25	2,524	Day 43	2,876
Day 8	3,111	Day 26	2,789	Day 44	2,975
Day 9	2,993	Day 27	2,987	Day 45	3,081
Day 10	3,002	Day 28	3,154	Day 46	3,110
Day 11	3,209	Day 29	3,218	Day 47	3,265
Day 12	**3,403**	Day 30	3,212	Day 48	3,350
Day 13	**3,577**	Day 31	3,290	Day 49	**3,449**
Day 14	**3,598**	Day 32	3,110	Day 50	3,354
Day 15	**3,899**	Day 33	3,009		
Day 16*	**3,555**	Day 34	3,005		
Day 17*	**3,600**	Day 35	2,998		
Day 18*	**3,450**	Day 36	2,780		

Calculations:

> The average of the 10 highest Daily Spawning Flows (3899, 3577, 3598, 3600, 3555, 3450, 3403, 3400, 3449, and 3389) is 3,532 cfs.
>
> This is the Season Spawning Flow for Pink Salmon in the Year X.

Action: Referring to the nearest Season Spawning Flow (3,500 cfs) listed in Table C-2, Appendix C (Salmon Spawning/Incubation Flow Tables), the power scheduler determines the minimum requirements for Pink Salmon Incubation Flow:

November	2,200 cfs	February	2,500 cfs
December	2,600 cfs	March	2,300 cfs
January	2,600 cfs	April	2,400 cfs

A.3 Season Spawning Flow for Steelhead

The Season Spawning Flow is calculated as the average of the 10 highest Daily Spawning Flows at the Newhalem Gage observed during the entire Spawning Period. Exceptions to these Incubation Flows may occur when higher minimum flows are required for protection of other species and life stages. During such instances, City Light will provide the highest of the competing minimum flow requirements indicated for any particular day. City Light, in consultation with the SLIC, may determine that basing the Incubation Flows on the 10 highest Daily Spawning Flows could result in an Incubation Flow that is higher than desirable. Since the main purpose of Incubation Flows is to keep redds inundated during the Incubation Period, City Light, in consultation with the SLIC, may use an adaptive management approach to evaluate the sensitivity and effectiveness of using the 10 highest Daily Spawning Flows versus an alternative approach. Additionally, City Light, in consultation with the SLIC, may apply adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity (Section 3.1).

A sample calculation follows:

The Season Spawning Flow in April is based on the 10 highest days in a 30-day Spawning Period. The fish actually spawned over a 30-day period at the following average Daily Spawning Flows. Days marked with an asterisk are characterized by high Sidestream Inflow conditions beyond City Light's means of control (see Sidestream Inflow above). The Daily Spawning Flow calculated for those days excludes the effect of Sidestream Inflow beyond the threshold of 3,500 cfs.

Table A-2. Daily Spawning Flows at Newhalem Gage in CFS (April, Year X).

Day	cfs	Day	cfs
Day 1	4,021	Day 16	3,789
Day 2	4,202	Day 17	3,987
Day 3	4,105	Day 18	4,154
Day 4	4,220	Day 19	4,218
Day 5	**4,350**	Day 20	4,212
Day 6	4,011	Day 21	**4,290**
Day 7	4,232	Day 22	4,110
Day 8	4,111	Day 23	4,009
Day 9	**4,693**	Day 24	4,005
Day 10*	**4,500**	Day 25	3,998
Day 11*	**4,500**	Day 26	4,280
Day 12*	**4,500**	Day 27	**4,290**
Day 13	**4,577**	Day 28	**4,478**
Day 14	4,245	Day 29	**4,450**
Day 15	3,899	Day 30	4,199

Calculations:

The average of the 10 highest Daily Spawning Flows (4,693; 4,577; 4,500; 4,500; 4,500; 4,478; 4,450; 4,350; 4,290; and 4,290) is 4,463 cfs.

This is the Season Spawning Flow for April steelhead in the Year X.

Action: Referring to the nearest Season Spawning Flow (4,500 cfs) listed in Table G-2, Appendix G (Steelhead Spawning/Incubation Flow Tables), the power scheduler determines the minimum requirements for Incubation Flow:

April	1,800 cfs	Newhalem Gage
May	2,200 cfs	Newhalem Gage
June	4,059 cfs	Predicted Marblemount Flow
July	3,793 cfs	Predicted Marblemount Flow

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX B

SALMON SPAWNING/INCUBATION EXAMPLES

B. SALMON SPAWNING/INCUBATION EXAMPLES

B.1 Salmon Incubation Flow – During Spawning (First 10 Days)

"During the first ten (10) days of the Spawning Period, which also represent the first ten (10) days of the Incubation Period, Incubation Flows will be based on the Planned Spawning Flow. Planned Spawning Flows are the flows targeted for spawning during a given month in City Light's monthly operating plan." (Section 3.1.1).

Assumptions:

- The power scheduler is preparing a schedule for September 19 on September 18.
- Chinook Salmon spawning is ongoing.
- Calculated Spawning Flow for Chinook Salmon through September 18 = 4,000 cfs.
- Pink Salmon are spawning for the second day.
- The Planned Spawning Flow = 3,300 cfs.
- Minimum Instream Flow requirement for September = 2,000 cfs.

Calculation:

The required Incubation Flow for Pink Salmon based on the Planned Spawning Flow is obtained from Table C-2, Appendix C, and for the month of September is 1,900 cfs. The required Incubation Flow for Chinook Salmon based on the calculated spawning flow is 1,500 cfs. The Minimum Instream Flow requirement for September is 2,000 cfs.

Action: The higher Incubation Flow or Minimum Instream Flow requirement takes precedence; therefore, the power scheduler must schedule a flow of at least 2,000 cfs for each hour of September 19.

B.1.1 Salmon Incubation Flow - During Spawning (After First 10 Days)

"During the remainder of the Spawning Period, Incubation Flows will be based on the average of the ten (10) highest Daily Spawning Flows that have occurred during the Spawning Period up to that day. Daily Spawning Flows are calculated as the actual average daily flow at the Newhalem Gage minus the portion of flow attributed to other sources. City Light, in consultation with the SLIC, may determine that basing the Incubation Flows on the 10 highest Daily Spawning Flows could result in an Incubation Flow that is higher than desirable. Since the main purpose of Incubation Flows is to keep redds inundated during the Incubation Period, City Light may use an adaptive management approach to evaluate the sensitivity and effectiveness of using the ten (10) highest Daily Spawning Flows versus an alternative approach. Additionally, City Light, in consultation with the SLIC, may apply adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity." (Section 3.1.1).

Assumptions:

- The power scheduler is preparing a schedule for October 4 on October 3.

- Chinook Salmon spawning is ongoing.
- Calculated Spawning Flow for Chinook Salmon through October 3 = 4,000 cfs.
- Pink Salmon spawned on October 2 for the fifteenth day.
- Daily Spawning Flows through October 2 = 3,011; 3,124; 3,190; 3,012; 2,991; 2,725; 2,601; 2,788; 2,790; 2,897; 2,993; 3,110; 3,007; 3,101; and 2,868 cfs.
- Minimum Instream Flow Requirement for October = 2,000 cfs.

Calculation:

The spawning flow for Pinks calculated as the ten (10) highest Daily Spawning Flows through the last Inflow Day is 3,044 cfs. Thus, the required Incubation Flow for Pink Salmon which is obtained from Table C-2, Appendix C, is 1,700 cfs. The required Incubation Flow for Chinook Salmon based on the calculated spawning flow (i.e., 4,000 cfs) is 1,500 cfs (from Table C-1, Appendix C).

Action: The higher Incubation Flow or Minimum Instream Flow requirement takes precedence; therefore, the power scheduler must schedule flows that ensure an actual flow of at least 2,000 cfs for each hour of October 4.

B.1.2 Salmon Incubation Flow - After Spawning

"During the remainder of the Incubation Period, Incubation Flows will be based on the Season Spawning Flow which is calculated as the average of the ten (10) highest Daily Spawning Flows at the Newhalem Gage observed during the entire Spawning Period." (Section 3.1.1).

Assumptions:

- A power scheduler is preparing a schedule for November 4 on November 3.
- Chinook Salmon spawning ended October 15.
- Season Spawning Flow for Chinook Salmon = 4,000 cfs.
- Pink Salmon spawning ended October 31.
- Season Spawning Flow for Pink Salmon = 3,500 cfs.
- Chum Salmon have not begun to spawn.
- Minimum Instream Flow requirement for November 4 = 2,000 cfs

Calculation:

The required Incubation Flow for the next day based on the Season Spawning Flows are obtained from Table C-1 and Table C-2 in Appendix C for Chinook and Pink Salmon, respectively. The required Incubation Flows for Chinook and Pink Salmon during the month of November are 1,100 and 2,200 cfs, respectively.

Action: The higher Incubation Flow or Minimum Instream Flow requirement takes precedence, therefore, the power scheduler must schedule a flow of at least 2,200 cfs for each hour of the day on November 4.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX C

SALMON SPAWNING/INCUBATION FLOW TABLES

C. SALMON SPAWNING/INCUBATION FLOW TABLES

Table C-1. Chinook Salmon.

Season Spawning Flow (cfs)	Minimum Instantaneous Incubation Flow (cfs)								
	Aug*	Sep*	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2,000	**2,000**	**1,500**	**1,500**	**1,000**	**1,000**	**1,000**	**1,800**	**1,800**	**1,800**
2,100	**2,000**	**1,500**	**1,500**	**1,000**	**1,000**	**1,000**	**1,800**	**1,800**	**1,800**
2,200	**2,000**	**1,500**	**1,500**	**1,000**	**1,000**	**1,000**	**1,800**	**1,800**	**1,800**
2,300	**2,000**	**1,500**	**1,500**	**1,000**	**1,100**	**1,100**	**1,800**	**1,800**	**1,800**
2,400	**2,000**	**1,500**	**1,500**	**1,000**	**1,100**	**1,100**	**1,800**	**1,800**	**1,800**
2,500	**2,000**	**1,500**	**1,500**	**1,000**	**1,200**	**1,200**	**1,800**	**1,800**	**1,800**
2,600	**2,000**	**1,500**	**1,500**	**1,000**	**1,300**	**1,300**	**1,800**	**1,800**	**1,800**
2,700	**2,000**	**1,500**	**1,500**	**1,000**	**1,300**	**1,300**	**1,800**	**1,800**	**1,800**
2,800	**2,000**	**1,500**	**1,500**	**1,000**	**1,400**	**1,400**	**1,800**	**1,800**	**1,800**
2,900	**2,000**	**1,500**	**1,500**	**1,000**	**1,400**	**1,400**	**1,800**	**1,800**	**1,800**
3,000	**2,000**	**1,500**	**1,500**	**1,000**	**1,400**	**1,400**	**1,800**	**1,800**	**1,800**
3,100	**2,000**	**1,500**	**1,500**	**1,000**	**1,500**	**1,500**	**1,800**	**1,800**	**1,800**
3,200	**2,000**	**1,500**	**1,500**	**1,000**	**1,500**	**1,500**	**1,800**	**1,800**	**1,800**
3,300	**2,000**	**1,500**	**1,500**	**1,000**	**1,600**	**1,800**	**1,800**	**1,800**	**1,800**
3,400	**2,000**	**1,500**	**1,500**	**1,000**	**1,700**	**1,700**	**1,800**	**1,800**	**1,800**
3,500	**2,000**	**1,500**	**1,500**	**1,000**	**1,700**	**1,700**	**1,800**	**1,800**	**1,800**
3,600	**2,000**	**1,500**	**1,500**	**1,000**	**1,800**	**1,800**	**1,800**	**1,800**	**1,800**
3,700	**2,000**	**1,500**	**1,500**	**1,000**	**1,800**	**1,800**	**1,800**	**1,800**	**1,800**
3,800	**2,000**	**1,500**	**1,500**	**1,000**	**1,800**	**1,800**	**1,800**	**1,800**	**1,800**
3,900	**2,000**	**1,500**	**1,500**	**1,100**	**1,900**	**1,900**	**1,800**	**1,800**	**1,800**
4,000	**2,000**	**1,500**	**1,500**	**1,100**	**2,000**	**2,000**	**1,800**	**1,800**	**1,800**
4,100	**2,000**	**1,500**	**1,500**	**1,100**	**2,100**	**2,100**	**1,900**	**1,800**	**1,800**
4,200	**2,000**	**1,500**	**1,500**	**1,200**	**2,100**	**2,100**	**1,900**	**1,800**	**1,800**
4,300	**2,000**	**1,500**	**1,500**	**1,200**	**2,200**	**2,200**	**2,100**	**1,900**	**1,900**
4,400	**2,000**	**1,500**	**1,500**	**1,200**	**2,300**	**2,300**	**2,100**	**2,000**	**1,900**
4,500	**2,000**	**1,500**	**1,500**	**1,300**	**2,300**	**2,300**	**2,200**	**2,100**	**2,000**
4,600	2,000	1,500	1,500	1,300	2,400	2,400	2,200	2,100	2,000
4,700	2,000	1,500	1,500	1,300	2,500	2,500	2,300	2,200	2,100
4,800	2,000	1,500	1,500	1,300	2,500	2,500	2,400	2,200	2,200
4,900	2,000	1,500	1,500	1,400	2,500	2,500	2,400	2,200	2,200
5,000	2,000	1,500	1,500	1,500	2,600	2,600	2,400	2300	2,200
5,100	2,000	1,500	1,600	1,500	2,600	2,600	2,500	2,300	2,300
5,200	2,000	1,500	1,800	1,600	2,700	2,700	2,500	2,400	2,400
5,300	2,000	1,500	1,800	1,700	2,700	2,700	2,600	2,500	2,400
5,400	2,000	1,600	1,900	1,800	2,700	2,700	2,600	2,500	2,500

Season Spawning Flow (cfs)	Minimum Instantaneous Incubation Flow (cfs)								
	Aug*	Sep*	Oct	Nov	Dec	Jan	Feb	Mar	Apr
5,500	2,000	1,700	1,900	1,900	2,700	2,700	2,600	2,500	2,500
5,600	2,000	1,800	2,000	1,900	2,900	2,900	2,600	2,600	2,500
5,700	2000	1,800	2,000	2,000	3,100	3,100	2,900	2,800	2,700
5,800	2000	1,900	2,000	2,000	3,100	3,100	2,900	2,800	2,700
5,900	2000	1,900	2,100	2,000	3,100	3,100	3,000	3,000	2,900
6,000	2000	1,900	2,100	2,000	3,100	3,100	3,000	3,000	2,900
6,100	2000	2,000	2,100	2,100	3,100	3,100	3,000	3,000	2,900
6,200	2000	2,000	2,100	2,100	3,200	3,200	3,100	3,000	2,900
6,300	2000	2,000	2,400	2,300	3,400	3,400	3,100	3,000	2,900
6,400	2100	2,000	2,400	2,400	3,400	3,400	3,200	3,000	2,900
6,500	2100	2,200	2,400	2,400	3,500	3,500	3,300	3,100	3,000
6,600	2200	2,300	2,600	2,500	3,700	3,700	3,400	3,200	3,100
6,700	2200	2,300	2,700	2,500	4,000	4,000	3,600	3,300	3,100
6,800	2500	2,300	2,800	2,600	4,000	4,000	3,800	3,500	3,100
6,900	2500	2,400	2,800	2,700	4,000	4,000	3,800	3,700	3,600
7,000	2500	2,600	2,800	2,700	4,100	4,100	3,900	3,900	3,800

Typical Season Spawning Flows are shown as **bold** values. When Season Spawning Flows (as measured at the Newhalem Gage) are within the bolded range, City Light power schedulers set minimum instantaneous Incubation Flows for Chinook Salmon according to values in Table C-1. If Season Spawning Flows are outside the bolded range, City Light will initiate consultation with the SLIC.

* Months during which spawning occurs are based on 50 percent tributary inflow exceedance probabilities (EP) for both spawning and incubation. Succeeding Incubation Flows are based on 50 percent EP during spawning and 90 percent EP during incubation.

Note: City Light may use an adaptive management approach to evaluate the efficacy of the Spawning and Incubation Flow Tables over the term of the new license. Modifications may be made in consultation with the SLIC and with approval from the Services.

Table C-2. Pink Salmon.

Season Spawning Flow (cfs)	Minimum Instantaneous Incubation Flow (cfs)							
	Sep*	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2,000	**1,500**	**1,500**	**1,200**	**1,400**	**1,300**	**1,900**	**1,800**	**1,800**
2,100	**1,500**	**1,500**	**1,200**	**1,600**	**1,600**	**1,900**	**1,800**	**1,800**
2,200	**1,500**	**1,500**	**1,400**	**1,600**	**1,600**	**1,900**	**1,900**	**1,800**
2,300	**1,500**	**1,500**	**1,400**	**1,800**	**1,800**	**1,900**	**1,900**	**1,800**
2,400	**1,500**	**1,500**	**1,400**	**1,800**	**1,800**	**1,900**	**1,900**	**1,800**
2,500	**1,500**	**1,500**	**1,400**	**1,800**	**1,800**	**1,900**	**1,900**	**1,800**
2,600	**1,500**	**1,500**	**1,400**	**1,800**	**1,900**	**1,900**	**1,900**	**1,800**
2,700	**1,500**	**1,600**	**1,400**	**1,900**	**1,900**	**1,900**	**1,900**	**1,800**
2,800	**1,500**	**1,700**	**1,400**	**1,900**	**1,900**	**1,900**	**1,900**	**1,900**
2,900	**1,500**	**1,700**	**1,400**	**1,900**	**1,900**	**1,900**	**1,900**	**1,900**
3,000	**1,500**	**1,700**	**1,500**	**1,900**	**1,900**	**1,900**	**1,900**	**1,900**
3,100	**1,500**	**1,700**	**1,600**	**2,100**	**2,200**	**1,900**	**1,900**	**1,900**
3,200	**1,500**	**1,700**	**1,700**	**2,300**	**2,300**	**2,100**	**2,000**	**2,000**
3,300	**1,900**	**1,800**	**1,900**	**2,500**	**2,400**	**2,200**	**2,200**	**2,200**
3,400	**1,900**	**1,800**	**2,100**	**2,600**	**2,600**	**2,500**	**2,300**	**2,400**
3,500	**2,000**	**2,100**	**2,200**	**2,600**	**2,600**	**2,500**	**2,300**	**2,400**
3,600	**2,100**	**2,100**	**2,200**	**2,600**	**2,700**	**2,600**	**2,400**	**2,400**
3,700	**2,100**	**2,100**	**2,200**	**2,700**	**2,700**	**2,700**	**2,500**	**2,500**
3,800	**2,100**	**2,200**	**2,200**	**2,800**	**2,800**	**2,700**	**2,500**	**2,600**
3,900	**2,200**	**2,200**	**2,200**	**2,800**	**2,800**	**2,700**	**2,600**	**2,600**
4,000	**2,200**	**2,200**	**2,300**	**2,800**	**2,800**	**2,700**	**2,600**	**2,600**
4,100	2,200	2,200	2,300	2,800	2,800	2,700	2,600	2,600
4,200	2,200	2,300	2,300	2,800	2,800	2,700	2,700	2,600
4,300	2,300	2,300	2,400	3,100	3,200	2,900	2,800	2,600
4,400	2,300	2,300	2,500	3,100	3,200	2,900	3,000	2,900
4,500	2,400	2,500	2,600	3,100	3,200	3,000	3,000	3,000
4,600	2,400	2,500	2,600	3,100	3,200	3,000	3,000	3,000
4,700	2,600	2,500	2,600	3,100	3,200	3,000	3,100	3,000
4,800	2,600	2,500	2,700	3,500	3,400	3,100	3,100	3,000
4,900	2,600	2,500	2,700	3,500	3,500	3,300	3,200	3,000
5,000	2,600	2,700	2,700	3,500	3,500	3,300	3,200	3,000
5,100	2,700	2,700	2,800	3,600	3,600	3,400	3,200	3,000
5,200	2,700	2,700	2,800	3,600	3,600	3,400	3,300	3,100
5,300	2,900	2,800	3,100	3,700	3,800	3,600	3,600	3,500
5,400	3,100	3,200	3,200	4,200	4,100	4,100	4,000	4,000
5,500	3,200	3,200	3,300	4,200	4,100	4,100	4,000	4,000
5,600	3,200	3,200	3,300	4,200	4,100	4,100	4,000	4,000

Season Spawning Flow (cfs)	Minimum Instantaneous Incubation Flow (cfs)							
	Sep*	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**
5,700	3,200	3,200	3,300	4,200	4,200	4,100	4,000	4,000
5,800	3,200	3,200	3,300	4,200	4,200	4,100	4,000	4,000
5,900	3,200	3,300	3,400	4,200	4,200	4,100	4,000	4,000
6,000	3,200	3,300	3,400	4,200	4,200	4,100	4,100	4,000
6,100	3,300	3,300	3,400	4,200	4,200	4,100	4,100	4,000
6,200	3,300	3,300	3,400	4,200	4,300	4,100	4,100	4,000
6,300	3,300	3,300	3,400	4,300	4,300	4,200	4,200	4,100
6,400	3,400	3,400	3,500	4,300	4,300	4,200	4,200	4,100
6,500	3,400	3,400	3,500	4,300	4,300	4,200	4,200	4,100
6,600	3,500	3,800	3,700	4,300	4,300	4,200	4,200	4,100
6,700	3,700	3,800	3,700	4,300	4,300	4,200	4,200	4,100
6,800	3,700	3,800	3,800	5,000	5,000	5,000	4,300	4,100
6,900	3,700	4,000	4,100	5,000	5,000	5,000	5,000	4,600
7,000	4,100	4,100	4,200	5,100	5,100	5,000	5,000	4,900

Typical Season Spawning Flows are shown as **bold** values. When Season Spawning Flows (as measured at the Newhalem Gage) are within the bolded range, City Light power schedulers set minimum instantaneous Incubation Flows for Pink Salmon according to values in Table C-2. If Season Spawning Flows are outside the bolded range, City Light will initiate consultation with the SLIC.

* Months during which spawning occurs are based on 50 percent tributary inflow exceedance probabilities (EP) for both spawning and incubation. Succeeding Incubation Flows are based on 50 percent EP during spawning and 90 percent EP during incubation.

Note: City Light may use an adaptive management approach to evaluate the efficacy of the Spawning and Incubation Flow Tables over the term of the new license. Modifications may be made in consultation with the SLIC and with approval from the Services.

Table C-3. Chum Salmon.

Season Spawning Flow (cfs)	Minimum Instantaneous Incubation Flow (cfs)						
	Nov*	Dec	Jan	Feb	Mar	Apr	May
3,000	**2,100**	**1,800**	**1,500**	**1,800**	**1,800**	**2,100**	**1,500**
3,100	**2,100**	**1,800**	**1,500**	**1,800**	**1,800**	**2,100**	**1,500**
3,200	**2,200**	**1,800**	**1,500**	**1,800**	**1,800**	**2,100**	**1,500**
3,300	**2,200**	**1,800**	**1,500**	**1,800**	**1,800**	**2,100**	**1,500**
3,400	**2,200**	**1,800**	**1,800**	**1,800**	**2,100**	**2,100**	**1,500**
3,500	**2,200**	**1,800**	**2,200**	**1,800**	**2,100**	**2,100**	**1,500**
3,600	**2,200**	**1,800**	**2,200**	**1,800**	**2,100**	**2,100**	**1,500**
3,700	**2,200**	**1,800**	**2,200**	**1,800**	**2,200**	**2,100**	**1,500**
3,800	**2,200**	**1,800**	**2,200**	**1,800**	**2,200**	**2,100**	**1,500**
3,900	**2,200**	**1,800**	**2,200**	**1,800**	**2,200**	**2,100**	**1,500**
4,000	**2,200**	**1,800**	**2,200**	**1,800**	**2,200**	**2,100**	**1,500**
4,100	**2,200**	**1,800**	**2,200**	**1,900**	**2,300**	**2,200**	**1,500**
4,200	**2,200**	**1,800**	**2,300**	**1,900**	**2,300**	**2,200**	**1,500**
4,300	**2,200**	**1,900**	**2,400**	**1,900**	**2,300**	**2,200**	**1,500**
4,400	**2,200**	**1,900**	**2,400**	**1,900**	**2,300**	**2,200**	**1,500**
4,500	**2,200**	**2,100**	**2,400**	**2,000**	**2,300**	**2,300**	**1,600**
4,600	**2,200**	**2,100**	**2,600**	**2,300**	**2,600**	**2,500**	**1,600**
4,700	2,200	2,100	2,800	2,500	2,800	2,600	1,700
4,800	2,200	2,100	2,900	2,600	2,800	2,600	1,800
4,900	2,400	2,200	3,000	2,600	2,900	2,800	1,900
5,000	2,600	2,200	3,000	2,600	2,900	2,800	1,900
5,100	2,600	2,500	3,000	2,600	3,000	2,800	1,900
5,200	2,600	2,500	3,000	2,600	3,000	2,900	1,900
5,300	2,600	2,500	3,000	2,600	3,100	3,000	2,100
5,400	2,800	2,500	3,200	2,800	3,300	3,100	2,100
5,500	2,900	2,500	3,200	2,800	3,300	3,100	2,200
5,600	3,000	2,500	3,200	2,800	3,300	3,100	2,200
5,700	3,000	2,600	3,200	3,000	3,500	3,300	2,300
5,800	3,000	2,700	3,400	3,000	3,500	3,300	2,400
5,900	3,300	2,800	3,400	3,000	3,500	3,300	2,500
6,000	3,400	3,100	3,400	3,000	3,500	3,300	2,700
6,100	3,500	3,200	3,500	3,000	3,700	3,600	2,900
6,200	3,500	3,200	3,500	3,300	3,900	3,700	2,900
6,300	3,800	3,200	4,100	3,700	4,000	4,000	3,000
6,400	4,000	3,300	4,100	3,700	4,000	4,000	3,300
6,500	4,200	3,300	4,100	3,700	4,100	4,100	3,500
6,600	4,200	3,800	4,100	3,800	4,400	4,300	3,600
6,700	4,300	3,800	4,200	3,800	4,400	4,300	3,600

Season Spawning Flow (cfs)	Minimum Instantaneous Incubation Flow (cfs)						
	Nov*	Dec	Jan	Feb	Mar	Apr	May
6,800	4,600	3,900	4,200	4,100	4,700	4,500	3,700
6,900	4,600	4,000	4,700	4,200	4,800	4,500	3,700
7,000	4,600	4,000	4,700	4,200	4,800	4,500	3,800

Typical Season Spawning Flows are shown as **bold** values. When Season Spawning Flows (as measured at the Newhalem Gage) are within the bolded range, City Light power schedulers set minimum instantaneous Incubation Flows for Chum Salmon according to values in Table C-3. If Season Spawning Flows are outside the bolded range, City Light will initiate consultation with the SLIC.

* Months during which spawning occurs are based on 50 percent tributary inflow exceedance probabilities (EP) for both spawning and incubation. Succeeding Incubation Flows are based on 50 percent EP during spawning and 90 percent EP during incubation.

Note: City Light may use an adaptive management approach to evaluate the efficacy of the Spawning and Incubation Flow Tables over the term of the new license. Modifications may be made in consultation with the SLIC and with approval from the Services.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX D

SALMON FRY PROTECTION EXAMPLES

D. SALMON FRY PROTECTION EXAMPLES

D.1 Salmon Fry Protection Flow

"Protection for Chinook Salmon fry is provided by implementing flow requirements and restrictions on downramp conditions to minimize the risk of fry stranding during the period when fry are emerging from redds. For Chinook Salmon, the Fry Protection Period extends from January 1 through May 31." (Section 3.1.1.3).

The default start and end dates for the Salmon Fry Protection Period shall be January 1 and May 31, respectively, unless City Light, in consultation with the SLIC, agrees to alternative start and end dates for Fry Protection restrictions. Alternative start and end dates shall be based on field monitoring or the start date may be based on the use of adaptive management. City Light, in consultation with the SLIC, may apply adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity.

Assumptions:

- A power scheduler is preparing a schedule for a Thursday on a Wednesday in April.
- Minimum Predicted Marblemount Flow target = 3,000 cfs.
- Required Fry Protection Flow at Newhalem Gage = 1,800 cfs.
- Required Incubation Flow at Newhalem Gage = 1,900 cfs.
- Tributary Inflow on Inflow Day (Tuesday) = 300 cfs.
- Maximum required Fry Protection Flow at Newhalem Gage = 2,600 cfs.
- Minimum Instream Flow requirement for April = 1,700 cfs.

Calculation:

- Minimum Flow at Newhalem Gage plus Tributary Inflow = 1,900 + 300 = 2,200 cfs.
- Minimum Flow needed to achieve the targeted 3,000 cfs Predicted Marblemount Flow = 3,000 - 300 = 2,700 cfs.

Action: A release of the minimum required Incubation Flow (1,900 cfs) plus Tributary Inflow (300 cfs) would result in a Predicted Marblemount Flow which is 800 cfs short of the targeted 3,000 cfs. However, the amount of Newhalem flow to provide a Predicted Marblemount flow of 3,000 (i.e., 2,700 cfs) is greater than the maximum required Fry Protection Flow of 2,600 cfs and the Minimum Instream Flow requirement, so generation schedules will be prepared such that a minimum flow of at least 2,600 cfs is provided for each hour on Thursday.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX E

SHAPING OF FLOWS DURING STEELHEAD SPAWNING (FOR REFERENCE ONLY)

E. SHAPING OF FLOWS FOR STEELHEAD SPAWNING (FOR REFERENCE ONLY)

Historically, steelhead Planned Spawning Flow was based on a Spawning Control Curve that incorporates forecasted hydrologic conditions established prior to the Spawning Period and is adjusted throughout the Spawning Period as prevailing conditions change to maintain a stable flow at Marblemount. The output from the Spawning Control Curve represents the maximum Planned Spawning Flows for each subperiod. As part of this approach, the maximum Planned Spawning Flow for each subperiod (as measured at the Newhalem Gage) is further limited as follows: 5,000 cfs for March steelhead, 5,000 for April steelhead, and 4,000 cfs for May/June steelhead. This approach has resulted in a stable spawning distribution in the managed reach and can be considered a functioning alternative to the approach described in Section 3.1.4. **This Appendix E is retained for reference only.**

The basic objective of intentional shaping, or redistributing, the spawning flows during steelhead spawning was to provide relatively uniform spawning and incubation conditions for steelhead throughout the Steelhead Spawning Period. Also, Incubation Flows were selected that protect redds without jeopardizing refill nor causing avoidable spill. Shaping the flows required recognition that the Tributary Inflow is less in the earlier part of the Steelhead Spawning Period (March) than at the end of the Steelhead Spawning Period (June). Also, the greatest proportion of wild steelhead spawning occurs in the middle of the Steelhead Spawning Period, April and May. To achieve uniform flow at Marblemount, Daily Spawning Flows at the Newhalem Gage were kept as low as is consistent with actual available reservoir storage and sidestream flows below Ross Lake during periods of high Tributary Inflow and peak spawning (i.e., April and May).

Note that for all historical inflow volumes (from both liquid precipitation and snowmelt runoff) to-date during the whole of the Steelhead Spawning Period were greater than the maximum volumes allowed to be released during the Steelhead Spawning Period, requiring the excess water to be stored in Ross Lake, and consequently that Ross Lake must be drafted in the prior winter. The requirement to absorb excess water in Ross Lake aided the effort to refill Ross Lake by July 31; however, as maximum and minimum flows must also be respected throughout the Steelhead Spawning Period, this interaction of objectives requires the winter draft of Ross Lake to be planned carefully, based on the best forecasts available, and with consideration of forecast uncertainty if possible, such that the expected excess volume of water beyond planned releases during the steelhead Spawning Period that must be absorbed into Ross Lake is equal to the volume drafted from Ross Lake the previous winter. A primary assumption of the calculations below is that Ross Lake will refill (VS=0 on June 30). If the forecasted runoff indicates that Ross Lake will not refill (VS≠0 on June 30), then the calculations become more complex and are not represented here.

E.1 Operating Principles

Shaping discharge from Gorge Powerhouse to maintain uniform (i.e., flat) flows was planned with consideration of the expected sum of sidestream flows between Gorge Powerhouse and the Marblemount Gage. This roughly reversed the trend of Tributary Inflow and helped achieve the goal of uniform spawning and incubation conditions for steelhead throughout the Spawning Period. The actual spawning flows that were created in each of the spawning months by this

shaping effort are later compared to the Steelhead Spawning/Incubation Flow Tables (Appendix G) to determine the required Incubation Flow for each month.

E.2 Methodology

Monthly Planned Spawning Flows were calculated in advance of the Steelhead Spawning Period and adjusted each week, or more frequently as needed, during the period based on the following criteria:

(15) current runoff volume forecast;

(16) maximum capability (output) of Gorge Powerhouse;

(17) refill requirements; and

(18) storage ability of Ross Lake.

In advance of the start of steelhead Spawning Period, these Planned Spawning Flows were defined by the Spawning Control Curve, the basic planning tool in this shaping process. The actual Daily Spawning Flows were influenced by two additional criteria: actual runoff (timing and volume) and daily adherence to physical limitations. Further, Monthly Planned Spawning Flows were limited to the maximums provided in Section 3.1.4.1.

The Spawning Control Curve i was a set of Planned Spawning Flows derived by solving an equation that includes three variables: (1) forecast total runoff into Ross Lake; (2) forecast storage available in Ross Lake; and (3) monthly flows that sum to the total volume. In general terms, the water that creates Spawning Flows is the difference between the water that runs off into Ross Lake and the available storage at Ross Lake. Sidestream Inflow is also a factor, and the equation takes that into account by shaping forecast flows at Gorge Powerhouse using available Ross Lake storage. Actual Sidestream Inflow may produce minor variations.

More specifically, the entire volume of runoff at Gorge from March 1 to June 30 was divided among the months that constitute the forecast period, namely March, April, May, and June. Each monthly flow in the equation is expressed in terms of the flow in May (X), the month of highest expected Tributary Inflow. Forecast average Tributary Inflow in March is typically lower than in May and is represented by T_{Mar}, so the Planned Spawning Flow in March should be $X + T_{Mar}$ cfs. Tributary Inflow in April is also typically lower than in May, and the Planned Spawning Flow in April should be $X + T_{Apr}$ cfs. Tributary Inflow in the first half of June is typically about the same as in May, and June $1^{st} – 15^{th}$ Planned Spawning Flows are denoted as T_{Jun}.

Finally, it was assumed that a discharge flow of Y cfs at the Newhalem Gage would be planned to be equal to the midpoint between the maximum discharge flow from Gorge Powerhouse without spilling (taking planned unit outages into consideration) plus predicted natural sidestreams between Gorge Powerhouse and Newhalem, and the minimum discharge flow at Ross Lake plus the forecast Sidestream Inflow, for the June 15^{th} - 30^{th} period, independent of X. Planning for a discharge at the midpoint of the allowed possible range maximizes flexibility and opportunity for later correction, in light of significant forecast uncertainty when planning flows in the months-ahead time frame.

Expressed as an equation, the sum of expected volume flows in March, April, May, and June is set equal to the total volume of forecast runoff (measured in volume terms of second-foot-days or SFD), less the total amount of forecast storage in Ross Lake.

That is, March + April + May + June average flows = forecast runoff - forecast storage.

In algebraic terms:

$$[(X+T_{Mar})*31 \text{ days}] + [(X+T_{Apr})*30 \text{ days}] + [X*31 \text{ days}] + [X*15 \text{ days} + Y*15 \text{ days}] = VF - VS$$

where:

- VF = forecasted runoff to Ross Lake from March 1 to June 30.
- VS = storage available in Ross Lake from March 1 to June 30.

For example, suppose the March 1 elevation in Ross Lake is measured at 1,535 feet City of Seattle datum (CoSD) and the June 30 elevation is forecasted to be 1,595 feet CoSD, then VS is 60 feet, which is approximately 296,000 SFD when converted to volume terms. Suppose also that the expected March Tributary Inflows are 1,500 cfs lower than those expected in May, expected April Tributary Inflows are 1,000 cfs lower than those expected in May, expected June 1 to June 15 Tributary Inflows are expected to be about equal to those expected in May, and the planned June 16 to June 30 flows at Newhalem are Y=6,000 cfs. Then the Spawning Control Curve equation is solved as follows:

$$[(X + 1500)*31] + [(X + 1000)*30] + [X*31] + [X*15 + 6000*15] = VF - 296,000$$

Multiplying out and collecting terms,

$$31X + 46,500 + 30X + 30,000 + 31X + 15X + 90,000 = VF – 296,000$$

$$107X + 166,500 = VF - 296,000$$

Solving for X,

$$X = (VF - 296,000 - 166,500) / 107$$

Assume further that based on snow surveys and historical data that the runoff forecast, VF, for the sample year is 730,000 SFD. Then, the equation above is solved giving X = 2,500 cfs.

Therefore, the Planned Spawning Flows in the forecast period are:

March = X + 1,500 = 4,000 cfs

April = X + 1,000 = 3,500 cfs

May = X = 2,500 cfs

June 1-15 = X = 2,500 cfs

In summary, the Spawning Control Curve for this sample year for the period March 1 to June 15 was determined by (a) the set of monthly average forecasted flows, (b) total forecasted runoff, and (c) forecasted storage in Ross Lake.

The flows that constitute the Spawning Control Curve were recalculated at least monthly as runoff forecasts were updated, and a new set of spawning flows were derived. Plant operators at the Skagit River Project would then endeavor to operate the Project such that the spawning flows, as measured at the Marblemount Gage, would be as uniform as possible through the Steelhead Spawning Period.

Occasionally, however, things did not go as planned. For example, severe weather conditions or the lack of perfect foresight could require Planned Spawning Flows to differ from the Spawning Control Curve. To minimize the impact of forecast uncertainty, the Spawning Control Curve was therefore to be updated regularly leading up to and throughout the Steelhead Spawning Period. Just before steelhead spawning begins on March 15, a final Spawning Control Curve would be calculated using the 50 percent exceedance (P50) natural inflow and sidestream forecasts, resulting in a target value of total Marblemount flow, to be maintained as uniformly as possible throughout the Steelhead Spawning Period. That Marblemount flow would be targeted and maintained as uniformly as possible through the end of March. At the start of April, the average total flow at the Marblemount Gage from March 15 to March 30 was considered the established target Marblemount flow for the remainder of the Steelhead Spawning Period.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX F

STEELHEAD INCUBATION FLOW EXAMPLES

F. STEELHEAD INCUBATION FLOW EXAMPLES

F.1 Steelhead Incubation Flow - During Spawning (Early Subperiod)

"During the first 10 days of the Spawning Period, which also represent the first 10 days of the Incubation Period, Incubation Flows will be based on the Planned Spawning Flow. Planned spawning flows are the flows targeted for spawning during a given month in City Light's monthly operating plan." (Section 3.1.4.2).

Assumptions:

- The power scheduler is preparing a schedule for April 3 on April 2.
- Season Spawning Flow for March steelhead = 5,000 cfs.
- April steelhead are spawning for the third day.
- The Planned Spawning Flow for April steelhead = 4,500 cfs.
- The required Fry Protection Flow for salmon = 1,800 cfs.
- Minimum Instream Flow requirement for April = 1,700 cfs.

Procedure: The required Incubation Flow for early April spawners based on the Planned Spawning Flow is obtained from Table G-2, Appendix G, and for April 3 is 1,800 cfs. The required Incubation Flow for March steelhead incubating in April based on the Season Spawning Flow (from Table G-1) is 2,000 cfs.

Action: The higher of the two Incubation Flows (1,800 cfs and 2,000 cfs), Fry Protection Flow (1,800 cfs), or Minimum Instream Flow (1,700 cfs) takes precedence. Therefore, the power scheduler must schedule a flow of at least 2,000 cfs for each hour of April 3.

F.2 Steelhead Incubation Flow - During Spawning (Mid- Subperiod)

"During the remainder of the Spawning Period, Incubation Flows will be based on the average of the 10 highest Daily Spawning Flows that have occurred during the Spawning Period up to that day. Daily Spawning Flows are calculated as the actual average daily flow at the Newhalem Gage minus the portion of flow attributed to other sources. City Light, in consultation with the SLIC may determine that basing the Incubation Flows on the 10 highest Daily Spawning Flows could result in an Incubation Flow that is higher than desirable. Since the main purpose of Incubation Flows is to keep redds inundated during the Incubation Period, City Light may use an adaptive management approach to evaluate the sensitivity and effectiveness of using the 10 highest Daily Spawning Flows versus an alternative approach in consultation with the SLIC. Additionally, City Light, in consultation with the SLIC may apply adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity." (Section 3.1.4.2).

Assumptions:

- The power scheduler is preparing a schedule for April 15 on April 14.

- Season Spawning Flow for March steelhead = 5,000 cfs.
- April steelhead spawned on April 13 for the thirteenth day.
- Daily Spawning Flows through April 13 = **5,011; 5,024; 4,990; 5,012; 4,910; 4,870;** 4,650; **4,690;** 4,450; **5,010; 5,007; 5,101;** and 4,468 cfs.
- The required Fry Protection Flow for salmon = 1,800 cfs.
- Minimum Instream Flow requirement for April = 1,700 cfs.

Procedure: The spawning flow for April steelhead calculated as the 10 highest Daily Spawning Flows through the last Inflow Day is 4,962 cfs. Thus, the required Incubation Flow for April steelhead which is obtained from Table G-2, Appendix G, is 1,800 cfs. The required Incubation Flow for March steelhead based on the Season Spawning Flow (from Table G-1) is 2,000 cfs.

Action: The higher of the two Incubation Flows (1,800 cfs and 2,000 cfs), Fry Protection Flow (1,800 cfs), or Minimum Instream Flow (1,700 cfs) takes precedence. Therefore, the power scheduler must schedule a flow of at least 2,000 cfs for each hour of April 15.

F.3 Steelhead Incubation Flow - After Spawning

"During the remainder of the Incubation Period, Incubation Flows will be based on the Season Spawning Flow which is calculated as the average of the 10 highest Daily Spawning Flows at the Newhalem Gage observed during that spawning subperiod." (Section 3.1.4.2).

Assumptions:

- The power scheduler is preparing a schedule for a day in late June.
- Season Spawning Flow for March steelhead = 5,000 cfs.
- Season Spawning Flow for April steelhead = 4,000 cfs.
- Season Spawning Flow for May - June 15 steelhead = 3,500 cfs.
- The required Fry Protection Flow for salmon = none.
- The required Fry Protection Flow for steelhead = 1,500 cfs.
- Tributary Inflow on last Inflow Day = 2,100 cfs.
- Minimum Instream Flow requirement for June = 1,600 cfs.

Procedure: The required Incubation Flows for March, April, and May - June 15 steelhead which are obtained from Tables G-1, G-2, and G-3 in Appendix G are 3,859; 4,059; and 4,560 cfs (based on Predicted Marblemount Flow), respectively, during the incubation month of June. Based on Tributary Inflow on the Inflow Day (2,100 cfs), these flows correspond to Newhalem Gage flows of 1,759; 1,959; and 2,460 cfs, respectively.

Action: When scheduling minimum daily flows, the higher of the Incubation Flow, Fry Protection Flow, or Minimum Instream Flow takes precedence. In this case the highest required Incubation Flow (4,560 cfs, Predicted Marblemount Flow, which corresponds to 2,460 cfs at Newhalem based

on the last Inflow Day's Tributary Inflow) takes precedence over the lower Fry Protection Flow that is measured at Newhalem Gage (1,500 cfs) and the Minimum Instream Flow requirement of 1,600 cfs for June. Therefore the power scheduler must schedule an instantaneous flow of at least 2,460 cfs at the Newhalem Gage for each hour of the day in June being scheduled.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX G

STEELHEAD SPAWNING/INCUBATION FLOW TABLES

G. STEELHEAD SPAWNING/INCUBATION FLOW TABLES

Table G-1. March steelhead.

	Minimum Instantaneous Incubation Flow (cfs)			
Season Spawning Flow (cfs)	**Mar***	**Apr**	**May**	**Jun**
3,000	1,800	1,800	1,500	3,859
3,100	1,800	1,800	1,500	3,859
3,200	1,800	1,800	1,500	3,859
3,300	1,800	1,800	1,500	3,859
3,400	1,800	1,800	1,500	3,859
3,500	**1,800**	**1,800**	**1,700**	**3,859**
3,600	**1,800**	**1,800**	**1,700**	**3,859**
3,700	**1,800**	**1,800**	**1,700**	**3,859**
3,800	**1,800**	**1,800**	**1,700**	**3,859**
3,900	**1,800**	**1,800**	**1,700**	**3,859**
4,000	**1,800**	**1,800**	**1,700**	**3,859**
4,100	**1,800**	**1,800**	**1,700**	**3,859**
4,200	**1,800**	**1,800**	**1,700**	**3,859**
4,300	**1,800**	**1,800**	**1,800**	**3,859**
4,400	**1,800**	**1,800**	**1,900**	**3,859**
4,500	**1,800**	**1,800**	**1,900**	**3,859**
4,600	**1,800**	**1,900**	**1,900**	**3,859**
4,700	**1,800**	**1,900**	**1,900**	**3,859**
4,800	**1,800**	**1,900**	**1,900**	**3,859**
4,900	**1,800**	**2,000**	**1,900**	**3,859**
5,000	**1,800**	**2,000**	**1,900**	**3,859**
5,100	1,800	2,100	1,900	3,859
5,200	1,800	2,100	1,900	3,859
5,300	1,800	2,100	1,900	3,859
5,400	1,800	2,100	1,900	3,859
5,500	1,800	2,100	1,900	3,859
5,600	1,900	2,300	2,100	3,859
5,700	1,900	2,300	2,100	3,859
5,800	1,900	2,300	2,100	3,859
5,900	1,900	2,300	2,100	3,959
6,000	1,900	2,300	2,100	4,059
6,100	2,200	2,500	2,300	4,159
6,200	2,200	2,500	2,400	4,259
6,300	2,300	2,500	2,500	4,359
6,400	2,400	2,600	2,500	4,359
6,500	2,400	2,600	2,600	4,559

Typical Season Spawning Flows are shown as **bold** values. When Season Spawning Flows (as measured at the Newhalem Gage) are within the bolded range, City Light power schedulers set minimum instantaneous Incubation Flows for March steelhead according to values in Table G-1. If Season Spawning Flows are outside the bolded range, City Light will initiate consultation with the SLIC.

* Months during which spawning occurs are based on 50 percent tributary inflow exceedance probabilities (EP) for both spawning and incubation. Succeeding Incubation Flows are based on 50 percent EP during spawning and 90 percent EP during incubation.

\# Predicted Marblemount Flow.

Note: City Light may use an adaptive management approach to evaluate the efficacy of the Spawning and Incubation Flow Tables over the term of the new license. Modifications may be made in consultation with the SLIC and with approval from the Services.

Table G-2. April steelhead.

	Minimum Instantaneous Incubation Flow (cfs)			
Season Spawning Flow (cfs)	**Apr***	**May**	**Jun#**	**Jul#**
1,000	1,000	1,000	2,369	2,035
1,100	1,000	1,000	2,469	2,135
1,200	1,100	1,000	2,569	2,235
1,300	1,200	1,000	2,669	2,335
1,400	1,300	1,000	2,769	2,435
1,500	1,400	1,000	2,535	2,535
1,600	1,500	1,100	2,969	2,635
1,700	1,600	1,200	3,069	2,735
1,800	1,700	1,300	3,169	2,835
1,900	1,800	1,400	3,269	2,935
2,000	1,800	1,500	3,369	3,035
2,100	1,800	1,500	3,469	3,135
2,200	1,800	1,600	3,569	3,235
2,300	1,800	1,700	3,669	3,335
2,400	1,800	1,800	3,769	3,435
2,500	1,800	1,900	3,869	3,535
2,600	1,800	1,900	3,869	3,535
2,700	1,800	2,000	3,869	3,535
2,800	1,800	2,000	3,969	3,635
2,900	1,800	2,100	3,969	3,635
3,000	1,800	1,500	3,859	3,193
3,100	1,800	1,700	3,859	3,493
3,200	1,800	1,900	3,859	3,493
3,300	1,800	1,900	3,859	3,493
3,400	1,800	1,900	3,959	3,593
3,500	**1,800**	**1,900**	**4,059**	**3,593**
3,600	**1,800**	**1,900**	**4,059**	**3,693**
3,700	**1,800**	**1,900**	**4,059**	**3,693**
3,800	**1,800**	**1,900**	**4,059**	**3,693**
3,900	**1,800**	**1,900**	**4,059**	**3,693**
4,000	**1,800**	**2,000**	**4,059**	**3,693**
4,100	**1,800**	**2,100**	**4,059**	**3,793**
4,200	**1,800**	**2,100**	**4,059**	**3,793**
4,300	**1,800**	**2,200**	**4,059**	**3,793**
4,400	**1,800**	**2,200**	**4,059**	**3,793**
4,500	**1,800**	**2,200**	**4,059**	**3,793**
4,600	**1,800**	**2,200**	**4,059**	**3,793**
4,700	**1,800**	**2,200**	**4,059**	**3,793**
4,800	**1,800**	**2,200**	**4,059**	**3,793**
4,900	**1,800**	**2,200**	**4,059**	**3,793**
5,000	**1,800**	**2,200**	**4,059**	**3,793**
5,100	1,900	2,200	4,059	3,793
5,200	1,900	2,200	4,059	3,793
5,300	1,900	2,300	4,059	3,793
5,400	1,900	2,300	4,059	3,793
5,500	1,900	2,300	4,059	3,793
5,600	2,100	2,400	4,259	3,793
5,700	2,200	2,400	4,359	3,793
5,800	2,400	2,400	4,359	3,793
5,900	2,500	2,500	4,559	3,793
6,000	2,500	2,600	4,659	3,793
6,100	2,500	2,600	4,659	3,793
6,200	2,500	2,600	4,659	3,793
6,300	2,500	2,600	4,659	3,793

Season Spawning Flow (cfs)	Minimum Instantaneous Incubation Flow (cfs)			
	Apr*	May	Jun#	Jul#
6,400	2,500	2,600	4,659	3,793
6,500	2,500	2,600	4,659	3,793

Typical Season Spawning Flows are shown as **bold** values. When Season Spawning Flows (as measured at the Newhalem Gage) are within the bolded range, City Light power schedulers set minimum instantaneous Incubation Flows for April steelhead according to values in Table G-2. If Season Spawning Flows are outside the bolded range, City Light will initiate consultation with the SLIC.

* Months during which spawning occurs are based on 50 percent tributary inflow exceedance probabilities (EP) for both spawning and incubation. Succeeding Incubation Flows are based on 50 percent EP during spawning and 90 percent EP during incubation.

\# Predicted Marblemount Flow.

Note: City Light may use an adaptive management approach to evaluate the efficacy of the Spawning and Incubation Flow Tables over the term of the new license. Modifications may be made in consultation with the SLIC and with approval from the Services.

Table G-3. May-June 15 steelhead.

Season Spawning Flow (cfs)	Minimum Instantaneous Incubation Flow (cfs)		
	May*	Jun*#	Jul#
2,000	1,500	4,160	3,093
2,100	1,500	4,160	3,093
2,200	1,500	4,160	3,093
2,300	1,500	4,160	3,193
2,400	1,500	4,160	3,193
2,500	1,500	4,160	3,293
2,600	1,500	4,160	3,293
2,700	1,500	4,160	3,293
2,800	1,500	4,160	3,693
2,900	1,500	4,160	3,793
3,000	**1,500**	**4,360**	**3,793**
3,100	**1,500**	**4,560**	**3,793**
3,200	**1,500**	**4,560**	**3,793**
3,300	**1,500**	**4,560**	**3,793**
3,400	**1,500**	**4,560**	**3,793**
3,500	**1,500**	**4,560**	**3,793**
3,600	**1,500**	**4,660**	**3,793**
3,700	**1,500**	**4,660**	**3,793**
3,800	**1,500**	**4,660**	**3,793**
3,900	**1,500**	**4,660**	**3,793**
4,000	**1,500**	**4,660**	**3,793**
4,100	1,500	4,660	3,793
4,200	1,500	4,660	3,793
4,300	1,500	4,660	3,793
4,400	1,500	4,660	3,793
4,500	1,500	4,660	3,793
4,600	1,500	4,660	3,793
4,700	1,500	4,660	3,793
4,800	1,500	4,660	3,793
4,900	1,500	4,660	3,793
5,000	1,500	4,660	3,793
5,100	1,800	4,660	3,793
5,200	1,800	4,660	3,793
5,300	2,000	4,660	3,793
5,400	2,100	4,660	3,793
5,500	2,100	4,660	3,793
5,600	2,100	4,660	3,793
5,700	2,100	4,660	3,793
5,800	2,100	4,660	3,793
5,900	2,100	4,660	3,793
6,000	2,100	4,660	3,793
6,100	2,100	4,660	3,793
6,200	2,100	4,660	3,793
6,300	2,100	4,660	3,793
6,400	2,100	4,660	3,793
6,500	2,100	4,660	3,793
6,600	2,200	4,681	3,908
6,700	2,200	4,681	3,908
6,800	2,200	4,681	3,908
6,900	2,200	4,681	3,908
7,000	2,200	4,681	3,908
7,100	2,200	4,681	3,908

Typical Season Spawning Flows are shown as **bold** values. When Season Spawning Flows (as measured at the Newhalem Gage) are within the bolded range, City Light power schedulers set minimum instantaneous Incubation Flows for May-June 15 steelhead according to values in Table G-3. If Season Spawning Flows are outside the

bolded range, City Light will initiate consultation with the SLIC.

* Months during which spawning occurs are based on 50 percent tributary inflow exceedance probabilities (EP) for both spawning and incubation. Succeeding Incubation Flows are based on 50 percent EP during spawning and 90 percent EP during incubation.

\# Predicted Marblemount Flow.

Note: City Light may use an adaptive management approach to evaluate the efficacy of the Spawning and Incubation Flow Tables over the term of the new license. Modifications may be made in consultation with the SLIC and with approval from the Services.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX H

MINIMUM INSTREAM FLOW REQUIREMENTS AT NEWHALEM GAGE

H. MINIMUM INSTREAM FLOW REQUIREMENTS AT NEWHALEM GAGE

Table H-1. Minimum Instream Flow Requirements at Newhalem Gage.

Months	Minimum Instantaneous Flow (cfs)
January	1,700
February	1,700
March	1,700
April	1,700
May	1,600
June	1,600
July	1,400
August	1,400
September	2000
October	2000
November 1-15	2000
November 16-30	1,700
December	1,700

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX I

ALTERNATIVE SALMON AND STEELHEAD SPAWNING PERIODS

I. ALTERNATIVE SALMON AND STEELHEAD SPAWNING PERIODS

In any year, City Light may elect to conduct surveys to monitor and make annual changes to the actual start and end dates of the Spawning Periods of each salmon species and steelhead. For any particular season, monitoring may result in delaying or advancing the start or end dates of the Spawning Period of a particular salmon species and/or steelhead during which operational constraints are imposed to protect spawning fish. The monitoring program will be developed by City Light in consultation with the SLIC and composed of at least one representative of City Light and at least one representative of another SLIC party.

Whenever disputes arise concerning interpretation of field observations or other data pertaining to the alternative start or end date, which the SLIC cannot resolve in a timely fashion, the default date shall prevail, or, if the default start date has passed, City Light shall implement Spawning/Incubation Flow restrictions on the day following the next Power Scheduling Day. If written objection to alternative state or end dates is not provided by the Services within two (2) business days following notification of the alternative start or end date, concurrence with the alternative state or end date is implied.

I.1 Start of Spawning Periods

The start of spawning may be determined by field monitoring that ascertains the presence of spawning fish or redds. City Light, in consultation with the SLIC, shall agree on certain reaches of river to be observed daily beginning at least two days prior to the default spawning start dates of each species. Default start dates and criteria for evidence of onset of spawning are as follows:

Table I-1. Spawning Start Date by Species.

Species	Evidence of Spawning	Default Start Date
Steelhead	Observed behavior or redd construction	March 15
Chinook	Observed behavior or redd construction	September 1
Pink	Observed behavior or redd construction	September 12
Chum	Observed behavior or redd construction	November 1

I.2 End of Spawning Periods

The end of spawning may be determined by field monitoring that ascertains the absence of fish spawning. City Light, in consultation with the SLIC, shall agree on certain reaches of river to be observed daily beginning any number of days prior to the default spawning end dates of each species. Default end dates and evidence of cessation of spawning are as follows:

Table I-2. Spawning End Date by Species.

Species	Evidence of Cessation of Spawning	Default End Date
Steelhead	No observed behavior	June 15

Species	Evidence of Cessation of Spawning	Default End Date
Chinook	No observed behavior	October 31
Pink	No observed behavior	October 31
Chum	No observed behavior	January 6

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX J

ALTERNATIVE STEELHEAD FRY PROTECTION PERIOD

J. ALTERNATIVE STEELHEAD FRY PROTECTION PERIOD

The default start and end dates for the Steelhead Fry Protection Period shall be June 1 and October 15, respectively, unless City Light, in consultation with the SLIC, agrees to alternative start and end dates for Fry Protection restrictions. Alternative start and end dates shall be based on field monitoring or the start date may be based on the use of adaptive management. City Light, in consultation with the SLIC, may apply annual adjustments to the default Spawning Flows and Incubation Flows based on monitoring of conditions and observed periodicity. If written objection to alternative state or end dates is not provided by the Services within two (2) business days following notification of the alternative start or end date, concurrence with the alternative state or end date is implied.

J.1 Field Monitoring

Field monitoring of steelhead fry presence shall be performed initially to determine the start of emergence and the end of the period during which steelhead fry are vulnerable to stranding. City Light will develop field monitoring plans in consultation with the SLIC. Eventually, the start date may be determined as the first day that emerged fry are captured in steelhead redd caps or via some other mutually agreeable sampling method.

J.1.1 Start Date

The start date shall be either June 1 or an alternate date, based upon field surveys, as determined by City Light in consultation with the SLIC. A field crew comprised of one monitoring representative from City Light and at least one from the SLIC shall select appropriate habitat to sample within those reaches according to flow conditions.

J.1.2 End Date

The end date shall be either October 15 or an alternate date, based upon field surveys, as determined by City Light in consultation with the SLIC. A field crew comprised of one monitoring representative from City Light and at least one from the SLIC shall select appropriate habitat to sample within those reaches according to flow conditions.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX K

MISCELLANEOUS CALCULATIONS

K. MISCELLANEOUS CALCULATIONS

K.1 Natural Flow

Natural Flow:

"Shall mean the flow which represents the average daily flow which would occur without the Skagit Project in place." (Section 6.0 Definitions).

Natural Flow is calculated as the sum of inflow into Ross Lake and the total sidestreams above Newhalem Gage.

Assumptions:

- A power scheduler calculates the inflow into Ross Lake = 1,851 cfs and the natural sidestreams above Newhalem Gage = 849 cfs.

Calculation: Natural Flow at Newhalem Gage = 1,851 cfs + 849 cfs = 2,700 cfs.

Conclusion: The Natural Flow at Newhalem Gage on the Inflow Day is calculated as 2,700 cfs.

K.2 Predicted Marblemount Flow

Predicted Marblemount Flow:

"Shall mean the sum of the planned total discharge from Gorge Powerhouse and Gorge Dam during the target day, the forecast natural sidestream flow between Gorge Dam and the Newhalem Gage, and the forecast Tributary Inflow (between Newhalem and Marblemount). In the absence of reliable sidestream and Tributary Inflow forecasts, the sum of the most recent observed daily average instantaneous natural sidestream flow between Gorge Dam and the Newhalem Gage for a given calendar day, the Tributary Inflow for the corresponding Inflow Day, and the daily average Tributary Inflow can be added to the planned Gorge Powerhouse discharge for the target day in order to obtain the Predicted Marblemount Flow." (Section 6.0 Definitions).

Assumptions:

- A power scheduler is preparing a schedule for Thursday on a Wednesday in April.
- Minimum Predicted Marblemount Flow target = 3,000 cfs.
- Required Fry Protection Flow at Newhalem Gage = 1,800 cfs.
- Required Incubation Flow at Newhalem Gage = 1,800 cfs.
- Mean daily Tributary Inflow on Inflow Day (Tuesday) = 1,100 cfs.
- Minimum Instream Flow requirement for April = 1,700 cfs.

Calculation:

Predicted Marblemount Flow for Thursday = 1,800 cfs + 1,100 cfs = 2,900 cfs.

Action: 2,900 cfs is 100 cfs less than the targeted 3,000 cfs, so the generation schedules will be made such that a minimum target flow of at least 1,900 cfs is provided at Newhalem Gage for each hour on Thursday. This target flow release at Newhalem Gage (i.e., 1,900 cfs) also meets the Fry Protection Flow, Incubation Flow, and Minimum Instream Flow requirements.

K.3 Tributary Inflow

Tributary Inflow:

"Shall mean the inflow from tributaries between the Newhalem Gage and the Marblemount Gage calculated as the mean daily flow at Marblemount Gage minus the mean daily flow at Newhalem Gage on the same calendar day." (Section 6.0 Definitions).

Assumptions:

- Mean daily flow target at Marblemount Gage = 6,000 cfs.
- Mean daily flow at Newhalem Gage = 3,400 cfs.

Calculation:

Tributary Inflow = 6,000 – 3,400 = 2,600 cfs.

Conclusion: The Tributary Inflow is 2,600 cfs for the Inflow Day.

K.4 Flow Insufficiency – Criterion 1

"When discharge of the required minimum flows at the Newhalem Gage, plus 300 cfs, combined with the forecasted inflow to Ross Lake and the current reservoir volume, results in Ross Lake drafting to the minimum useable pool." (Section 3.2.1.1).

An example of how this criterion will be determined is:

Assumptions:

Spawning conditions for Chinook, Pink and Chum Salmon resulted in minimum Incubation Flows for February, March, and April of 2,500 cfs; 2,400 cfs; and 2,400 cfs, respectively. Volume in storage at Ross Lake on January 31 is 63,900 second-foot-days (SFD) (this corresponds to an elevation of 1,505 feet CoSD, which would be caused by abnormally low winter runoff.) City Light provides forecast flows for February and March, with documentation to the SLIC, that shows 95 percent confidence forecast inflow into Ross Lake is 800 cfs in both February and March with 200 cfs Sidestream Inflow between Ross Lake and Newhalem Gage. The forecast for April is 3,500 cfs, with 800 cfs Sidestream Inflow. The calculations are:

Ross Volume

	Start	63,900	SFD
+	February Inflow	22,400	= 800 cfs x 28 days
-	Ross Minimum Volume	- 72,800	= (2,500 + 300 – 200) cfs x 28 days
	February 28 Volume	13,500	= elevation 1,481 ft CoSD – no problem yet
+	March Inflow	24,800	= 800 cfs x 31 days
-	Ross Minimum	- 77,500	= (2,400 +300 – 200) cfs x 31 days
	March 31 Volume	-39,200	= below minimum usable pool (elev < 1,474.5 ft CoSD) –problem
+	April Inflow	105,000	= (2,400 +300 – 800) cfs x 30 days
-	Ross Minimum	-57,000	= (2,400 +300 – 800) cfs x 30 days
	April 30 volume	8,800	= above minimum usable pool (elev > 1,474.5 ft CoSD) – no problem

This calculation would set February and March as insufficient months. This would call for a quick meeting of the SLIC to determine the best course of action. Absent consensus agreement, City Light would reduce minimum flows in February and March by equal percentages (pro-rata reduction) until the March 31 volume is just enough above zero to meet minimum flows in April. In this example a 27 percent reduction in minimum flow will achieve sufficiency. The new February minimum would be 1,825 cfs and March would be 1,752 cfs. Since the targeted flows for February and March are greater than the Minimum Instream Flow requirements for February and March (1,700 cfs as described in Table 3.0-2), additional notifications (beyond the SLIC) are not required.

This procedure would leave Ross Lake below the minimum usable pool elevation at the end of March (i.e., 1,474.5 feet CoSD). If spring runoff was expected to be normal, this would be no problem. However, the action City Light would recommend would be to reduce minimum flows so that February and March would be lower still, to protect against a continuation of 1,000 cfs natural flow at the Newhalem Gage with Ross Lake below the minimum usable pool elevation.

Note that this example was picked for illustrative purposes and to demonstrate the calculation technique. In practice, this calculation would be done each month through July 31 so that an early warning could be given. Also note that in this circumstance something must be done as Ross Lake cannot physically release enough water to maintain minimum flows.

K.5 Flow Insufficiency - Criterion 2

"When discharge of the required minimum flows at the Newhalem Gage, plus 300 cfs, considered

along with the forecasted inflow to Ross Lake results in Ross Lake not refilling or maintaining the required elevations by the required refill dates." (Section 3.2.1.1)
An example of how this criterion is determined is:

Assumptions:

Previous spawning conditions produce required Incubation Flows in May, June, and July of 1,700 cfs; 1,300 cfs; and 1,700 cfs, respectively. Ross Lake begins May at 1,500 feet CoSD, which is a volume of 60,000 SFD. The 95 percent confidence inflow to Ross Lake is 5,500 cfs in May, 5,000 cfs in June, and 4,000 cfs in July. Sidestream Inflow between Ross Lake and the Newhalem Gage is 1,700 cfs; 2,000 cfs; and 1,200 cfs in May, June and July, respectively (90 percent confidence).

Ross Volume

	Start	60,000	SFD
+	May inflow	170,500	= 5,500 cfs x 31 days
-	Ross Minimum volume	-9,300	= (1,700 + 300 – 1,700) cfs x 31 days
	May 31 Volume	221,200	
+	June inflow	150,000	= 5,000 cfs x 30 days
-	Minimum	0	= (1,300 + 300 – 2,000) cfs x 30 days (Minimum is zero because there is more Sidestream Inflow [2,000 cfs] than needed to maintain minimum flow.)
	June 30 value	371,200	
+	July inflow	124,000	= 4,000 cfs x 31 days
-	Minimum	-24,800	= (1,700 + 300 – 1,200) cfs x 31 days
	July 31 value	470,400	= below full (full is 530,000 SFD)
	Full	-530,000	
	Deficit	-59,600	SFD

This calculation would set May, June, and July as insufficient months since Ross Lake does not refill. This would call for a meeting of the SLIC to determine the best course of action. In consultation with the SLIC, City Light would reduce minimum flows in May, June, and July by equal percentages (pro-rata) so that Ross Lake can refill. In this example a reduction of 20 percent in May and July would achieve sufficiency (no additional reduction is needed in June because the minimum required release from Ross Lake is already zero). The new minimum at Newhalem for May, June, and July would be 1,360 cfs; 1,300 cfs; and 1,360 cfs, respectively. Since the targeted flow is less than the Minimum Instream flow requirements (as described in Table 3.0-2), City Light shall (1) provide notice to and seek approval from Ecology within five (5) business days,

and (2) then, unless Ecology disapproves, provide notice to FERC. City Light shall implement the flow modification within seven (7) days of providing such notice, unless otherwise directed by FERC.

It is important to take into consideration that forecast uncertainty increases with forecast horizon, and seasonal (monthly) forecasts will likely not have skill more than a few months ahead, so at times this situation may be difficult to foresee with confidence with more than a few months' warning. However, the SLIC should be kept apprised whenever risk of flow insufficiency is significant, which will give them an opportunity to spread the reduction in flows over more months, alleviating the impact on any given month.

K.6 Flow Insufficiency - Criterion 3

"When Natural Flow at the Newhalem Gage on any Inflow Day in August is less than 2,300 cfs." (Section 3.2.1.1).

Assumptions:

The power scheduler is preparing a schedule for Wednesday on a Tuesday in August. Natural Flow at the Newhalem Gage on the Inflow Day is 1,800 cfs. The Fry Protection Flow requirement is 2,000 cfs.

Action: The power schedulers may drop the flow to as low as 1,400 cfs (the required Minimum Instream Flow for August described in Table 3.0-2), subject to the hourly downramp rate for all days in which the minimum flow is below 2,000 cfs. The schedule for Wednesday may show a minimum flow as low as 1,400 cfs.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX L

TRIBUTARY PERCENT EXCEEDANCE FLOW BETWEEN NEWHALEM AND MARBLEMOUNT

L. TRIBUTARY PERCENT EXCEEDANCE FLOW BETWEEN NEWHALEM AND MARBLEMOUNT

Table L-1. Tributary Percent Exceedance Flow between Newhalem and Marblemount.

Month	50 Percent Exceedance Flow (cfs)	90 Percent Exceedance Flow (cfs)
January	1,164	684
February	1,533	853
March	1,450	1,044
April	1,504	1,111
May	2,530	1,742
June	2,763	2,084
July	2,174	1,223
August	1,093	644
September	975	617
October	968	611
November	1,781	742
December	1,537	656

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX M

SKAGIT LICENSE IMPLEMENTATION COMMITTEE RESERVOIR AND FLOW PLANNING CALENDAR

M. SKAGIT LICENSE IMPLEMENTATION COMMITTEE RESERVOIR AND FLOW PLANNING CALENDAR

Table M-1. Example SLIC meeting framework for flow planning and reservoir operations discussions. At a minimum the final framework will include the following schedule and elements.

Meeting Timeframe	Agenda Topics
December	**Annual Meeting** Update on Water Balance and Forecasts • Extreme hydro events for water year-to-date (e.g., flood) • Severe weather to date • Upcoming risks of severe (cold) weather • Snowpack and precipitation health to date, analog historical years • Forecast flow conditions, analog historical years Update on Fish • Chum Salmon spawning update • Established minimum Incubation Flows for Salmon redds Operational Look Ahead • Seasonal weather and inflow forecasts review (e.g., water-year status) Resource Coordination • Review performance of measures implemented • Review scheduled programmatic activities for next 3 years • Identify resource protection/management concerns from reservoir water levels and river flows and need and opportunities for cross-resource collaboration Proposed Flow Plan and Ross Lake Elevations • Forecast flow conditions • Plan upcoming Ross Lake Summer Variable Operations and operational priorities • Risks of flood or refill probability Confidence Triggers –discuss and identify relevant triggers given programmed activities.
Mid-January	Update on Water Balance and Forecasts • Look back at water year draft to date, any significant storm events, etc. • Expected minimum Ross Lake elevation / minimum elevation date • Similar historical years in terms of inflows Update on Fish • Retrospective of Salmon Season Spawning Flow • Established minimum monthly flows for incubation Proposed Flow Plan and Ross Lake Elevations • Expected steelhead spawning flows • Potential spring process flows • Discuss probability of refilling Ross Lake by July 1 and July 31 in context of planned Ross Lake Summer Variable Reservoir Operations • Flexibility for extreme load events / cold snaps Look Ahead • Seasonal weather and inflow forecasts review (e.g., water-year status) • Update Confidence Triggers

Meeting Timeframe	Agenda Topics
	• Review priorities and expectations
Mid-April	Update on Water Balance and Forecasts • Expected minimum Ross Lake elevation / minimum elevation date • Established/expected snowpack relative to normal • Similar historical years in terms of snowpack and/or inflows Update on Fish • Salmon redd incubation/emergence • Steelhead spawning progress Proposed Flow Plan • Established steelhead spawning flows • Remaining steelhead spawning targets • Potential spring/summer process flows • Discuss probability of refilling Ross Lake by July 1 and July 31 in context of planned Ross Lake Summer Variable Reservoir Operations Confidence Triggers • Additional updates on Ross Lake refill if and when probability of refill by July 1st or by July 31st crosses 25%, 50% or 75% thresholds • Potential spring/summer process flows Look Ahead • Seasonal weather and inflow forecasts review (e.g., water-year status) • Update Confidence Triggers • Review priorities and expectations for Process Flows
June	Update on Water Balance and Forecasts • Established/expected snowpack relative to normal, and similar historical years • Fire weather risk Update on Fish • Salmon incubation / emergence • Steelhead spawning season wrap up • Established minimum flows through July Proposed Flow Plan • Discuss probability of refilling Ross Lake by July 1 and July 31 in context of planned Ross Lake Summer Variable Reservoir Operations • Flexibility in Ross Lake elevation / draft for Process Flows or emergency firm load events (e.g., heat wave) • Potential summer/fall process flows Confidence Triggers • Additional updates on Ross Lake refill if and when probability of refill by July 1st or by July 31st crosses 25%, 50% or 75% thresholds • Potential summer/fall process flows Look Ahead • Seasonal weather and inflow forecasts review (e.g., water-year status) • Plans and opportunities for Process Flows
August	Update on Water Balance and Forecasts • Ability to meet minimum flows until fall draft begins the day after Labor Day • Fire weather risk Update on Fish

Meeting Timeframe	Agenda Topics
	Proposed Flow Plan • Planned salmon Season Spawning Flows • Potential summer/fall process flows Confidence Triggers • Report on likelihood of flow insufficiency conditions due to low August inflows • Potential summer/fall process flows Look Ahead • Review proposed flow plan for September-August (upcoming year) • Seasonal weather and inflow forecasts review (e.g., water-year status) • Plans and opportunities for Process Flows
Mid-October	Update on Water Balance and Forecasts • Weather forecasts coinciding with seasonal update at Flood Awareness week • Recent severe weather • Risks for more severe weather Update on Fish • Salmon spawning progress Proposed Flow Plan • Established Chinook Salmon Spawning Flows • Established Pink Salmon Spawning Flows if applicable • Established winter incubation minimum flows to date • Planned Chum Salmon Spawning Flows • Potential fall/winter process flows • Planned winter draft Confidence Triggers Look Ahead • Seasonal weather and inflow forecasts review (e.g., water-year status) • Plans and opportunities for Process Flows

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX N

DEVELOPMENT PROPOSAL FOR A PROCESS FLOWS ADAPTIVE MANAGEMENT PLAN

N. DEVELOPMENT PROPOSAL FOR A PROCESS FLOWS ADAPTIVE MANAGEMENT PLAN

N.1 Introduction

This document describes Seattle City Light's (City Light) proposal to develop a Process Flows Adaptive Management Plan (Process Flows AMP), included as an appendix of the Riverscape Ecosystem Plan (REP), for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) No. 553. The Process Flows AMP will outline the schedule and frequency for providing process flow releases, describe the monitoring process to evaluate the effectiveness of process flows, and quantify, to the extent possible, the biological, physical, and chemical benefits of such releases. Upon FERC approval, City Light will implement the Process Flow Release Schedule per the approved plan.

The Process Flow AMP requires the development of a Process Flows Effectiveness (PFE) Report. Within 11 years after FERC's approval of the Process Flows AMP, and every 11 years thereafter for the term of the License and any subsequent annual license, City Light will file with FERC, for approval, a PFE Report. City Light will develop the PFE Report in consultation with the Skagit License Implementation Committee (SLIC). The PFE Report will 1) report on implementation of the Process Flows AMP, 2) analyze the results of the monitoring information on fisheries, river processes, and the overall water budget, and 3) include recommendations, derived from a Science-based Decision-Making Framework, to further implement, evaluate, refine, or suspend certain elements of the Process Flows AMP. Upon FERC approval, City Light will implement such recommendations.

The Settlement Parties have previously acknowledged that process flows may impact City Light's ability to meet other license protection, mitigation, and enhancement (PME) measures and generation obligations, and that the mainstem habitat enhancement measures (proposed in the REP Aquatic Habitat Program [AHP]) and process flows are closely linked mitigation strategies addressing similar objectives and would benefit from close coordination.

This proposed Process Flows AMP seeks to learn how best to implement process flows and other aligned measures most effectively with respect to measurable outcomes. The tradeoffs and necessity of providing or modifying such process flows to improve the quantity and quality of habitat conditions, the productivity of targeted fish populations, and other ecological outcomes in the Skagit River will be examined annually, or on a regular schedule identified by the SLIC in a Science-based Decision-Making Framework. This process will provide the Settlement Parties the opportunity to address the scientific uncertainty and the net benefits of process flow releases as well as the magnitude, duration, and frequency of process flow components requiring releases above and beyond what already occurs from the Project and what occurs naturally.

City Light will coordinate the efforts required to develop the Process Flows AMP with other license article obligations, including other Project resource management plans included in the new license.

N.2 Purpose and Scope of the Plan

The purpose of this document is to describe City Light's proposal to develop the Process Flows AMP, which will outline the schedule and frequency for providing process flow releases, describe the monitoring process to evaluate the effectiveness of process flows, and quantify, to the extent possible, the biological, physical, and chemical benefits of such releases.

N.2.1 Goals and Guiding Principles

City Light recognizes the role of process flows in optimizing the net ecological benefits available through flow manipulation within the range of operations stipulated by the license. City Light is committed to developing the tools to model potential flow regimes and is committed to developing and implementing a flow regime that optimizes the net benefits of process flows to the river while balancing with the other uses for the water, including other environmental flows and power generation. Process flows are one element of the comprehensive Riverscape Ecosystem Plan (REP) proposed by City Light. The REP includes a Flow Management Program and Aquatic Habitat Program. This document summarizes the license commitments City Light proposes related to process flows within the Flow Management Program.

The goals of the Process Flows AMP, once finalized, shall be consistent with other ecosystem goals and objectives included in the comprehensive Settlement Agreement including (1) mainstem Skagit River connectivity to side channel and off-channel areas to be utilized for fish habitat; (2) gravel quality resulting in increased spawning, incubation, and rearing; and (3) geomorphic processes that mobilize sediment; and (4) upstream and downstream migration of anadromous fish. Further, the Settlement Parties agree that this Process Flows AMP will be coordinated with the implementation of the Fish Passage Program. These ecosystem goals and objectives may be modified by the SLIC during early implementation of the Process Flow AMP planning process.

In developing the Process Flows AMP, City Light, in consultation with the SLIC, will, at a minimum:

- Define/refine the specific, measurable, achievable, realistic and timely (SMART) goals, objectives, monitoring requirements, and metrics of success using scientifically based decision making tools;
- Utilize hydrologic, hydraulic, sediment transport, water quality, and operations modeling tools to further inform development and implementation of the Process Flows AMP;
- Review and analyze forecasting tools and National Resource Conservation Service (NRCS) measurements of Snow Water Equivalent (SWE) to inform water-year types and develop a Process Flow Release Schedule that describes the sequencing of process flow releases, based on water-year type and reservoir levels, in coordination with other license commitments, such as the habitat restoration activities described in the REP AHP; and
- Coordinate with local jurisdictions, regulatory agencies and stakeholders to implement communications protocols and preparedness procedures for process flow releases.

Once developed, City Light will file the Process Flows AMP with FERC for approval.

Following the initiation of the SLIC, City Light will begin consultation with the SLIC to develop the Process Flows AMP (early action) for submittal to FERC within 1 year of license issuance. This will be coordinated with the development of the Ecosystem and Adaptive Management Plan (EMAMP).

N.2.2 Minimum Process Flow Requirements (See CWA Section 401 Water Quality Certification)

City Light anticipates that the Clean Water Act (CWA) Section 401 Water Quality Certification includes minimum process flow requirements specified in Table 2.2-1.[44]

Table 2.2-1. Minimum Process Flow Requirements.

Process Flow Type	Magnitude at Newhalem Gage	Duration	Frequency	Timing
Winter Side Channel Connectivity Flow	7,521 cfs	24 hours	Once every 12 months	December 1 – February 15
Spring Flushing and Outmigration Flow	4,620 cfs	6-12 hours	Once every 12 months	February 20 – April 20
Spring Connectivity Flow	7,521 cfs	24 hours	Once every 12 months	May 1 – June 30
Fall Flushing Flow	4.620 cfs	6-12 hours	Once every 12 months	September 1 – September 30
Fall Upmigration Flow	4.620 cfs	6-12 hours	Once every 12 months	October 5 – November 30
Large Side Channel Connectivity Flow	12,200 cfs	24 hours	Once every 24 months	SLIC TBD

N.2.3 Conditions for Process Flow Releases

The Process Flows AMP will specify the release of process flows that are consistent with at least the following conditions:

- City Light's process flows releases are subject to having adequate runoff to refill Ross Lake in order to maintain its ability to provide for anadromous fisheries protection flows, recreation reservoir level, and firm power generation[45] needs.
- City Light's process flow releases will be planned to avoid flooding (to the extent possible) of

[44] Based upon input from Ecology, City Light anticipates that the CWA 401 Water Quality Certification will be conditioned upon providing the minimum process flow requirements specified in Table 2.2-1.

[45] Firm power generation means the minimum amount of power which City Light is obligated to provide from a combination of generation and contract resources for the use of its customers.

the Skagit River, which is currently defined[46] for purposes of this protection, mitigation and enhancement (PME) measure as exceeding the National Weather Service threshold of 28 feet (approximately 62,500 cfs) at the U.S. Geological Survey (USGS) Skagit River flow gaging station near Concrete, Washington.

- City Light's process flow releases are subject to complying with dam safety requirements and other regulatory conditions (e.g., Section 401 Water Quality Certificate conditions and water quality standards).
- The magnitude, duration, timing, and frequency of the process flow components may be achieved through any combination of controlled and uncontrolled flow releases (i.e., Gorge Powerhouse discharge, Gorge Dam spill, and accretion flow).
- City Light's process flow releases will not be subject to the FMP down-ramp requirements. City Light will implement an interim down-ramp rate of 3,000 cfs/hour or less for Process Flow releases above 12,200 cfs. City Light will implement an interim down-ramp rate of 2,000 cfs/hour or less for process flow release between 4,480 and 12,200 cfs. Modification to the down-ramp rate for process flows will be adaptively managed in consultation with the SLIC and approval from Ecology.

For process flows in addition to the minimums described in Table 2.2-1 above, such flows may be adaptively managed in consultation with the SLIC to adjust the timing, duration, and magnitude of the process flow releases to reflect the water-year type.

N.3 Proposed Flows for Investigation

The Washington State Report on Investigations in Instream Flow: High Flows for Fish and Wildlife in Washington describes process flows, also known as functional flows, within a regulated river system as high flow releases designed to provide processes important for stream habitat, such as channel flushing, sediment transport, wood recruitment, and maintenance of riparian and floodplain habitat (Wald 2009). Wald (2009) also provides approximated recommendations on the magnitude, duration and frequency of process flow releases in Washington State. The report states:

"Duration and frequency of these high flow recommendations are based on the natural hydrologic regime. They are expected to vary seasonally from wet to dry years based on runoff characteristics and climatic conditions in different areas of the state. Timing is based on the shape of naturally occurring hydrographs for the stream. Seasonality is tied to the life stages of fish and wildlife historically common to each stream. These recommendations are first estimates for unregulated streams in the state. Detailed recommendations for instream flows and high flow releases on regulated streams may require additional assessment of watershed conditions, runoff processes and flow regulation, channel conditions, hydrologic regime, and life stages and seasonal occurrence of fish and wildlife using the stream."

All applicable best available science should be considered in the development of the Process Flows AMP.

[46] Release of process flows may identify flooding considerations beyond the criteria listed above. If such instances are identified, this provision may be modified accordingly in consultation with the SLIC.

Process flow magnitude, duration and frequency are often approximated for a regulated system based on naturalized hydrology, however, as described above, they are first estimates and recommendations that should be refined for each individual system.

For purposes of the Process Flows AMP, process flows are categorized as channel maintenance flows, side channel and off-channel flushing and connectivity flows, mainstem flushing flows, and fish migration flows.

N.3.1 Channel Maintenance Flows

City Light will consult with the SLIC to achieve the intended outcomes of a channel maintenance flow releases of up to 26,400 cfs. City Light commits to implementing channel maintenance flows, the timing, duration, frequency, and flow magnitude of which will be based upon the results of the development of the Process Flows AMP. Channel maintenance flow releases will be subject to the conditions described in Section N.2.3 above and the planning, coordination and testing described in Section N.4 below.

In the event that the results of the development of the Process Flows AMP find that channel maintenance flows are not achievable, City Light, in consultation with the SLIC, shall evaluate implementing additional side channel and off-channel connectivity flows, prioritization of funding from FA-LA-03 Skagit River Mainstem Habitat Funding Obligation and/or FA LA-07 Skagit River Limiting Factors Habitat Enhancement Program through a Science-based Decision-Making Framework, or other Channel Maintenance Flow actions (such as, but not limited to a delayed release), as determined in consultation with the SLIC, in an effort to achieve similar function.

If after the first ten year process flow plan has been implemented and it is determined that the magnitude and/or duration of the channel maintenance flow did not meet the intended objectives and ecological function of a channel maintenance flow, City Light and the SLIC, using a Science-based Decision-Making Framework, will identify a new channel maintenance flow proposal, implement additional side channel and off-channel connectivity flows, or recommend physical habitat projects to be prioritized and implemented using funding from the FA-LA-03 Skagit River Mainstem Habitat Funding Obligation and/or the FA LA-07 Skagit River Limiting Factors Habitat Enhancement Program.

The preliminary goals of the channel maintenance flow releases, to be refined in the Process Flows AMP (in consultation with the SLIC), are to promote geomorphic and ecological processes, such as mobilizing sand and larger sediments, scour streambeds and undercut banks, encourage recruitment and jam formation of in-channel wood, and prevent riparian encroachment on bars and side channel inlets. Channel maintenance flows should also provide floodplain connectivity and access to important side and off-channel rearing areas for juvenile salmon. The initial objectives of the channel maintenance flows include:

- Formation and re-distribution of physical habitat features (riffles, pools, runs, point bars);
- Effective transport, sorting, and distribution of large woody debris (LWD) and sediment; and
- Alteration of channel features (increase lateral channel movement, improved connectivity between mainstem and side channel habitats).

High flows have the potential to impact private property, public infrastructure, and human safety and will be closely monitored. Channel maintenance flows are often prescribed at magnitudes that represent the peak flows that meet or exceed the 2-year naturalized recurrence interval, which on the Skagit River at Newhalem is 26,400 cfs.

Flows of this magnitude released for 24 hours, in addition to the water requirements for the associated up-ramp and down ramp, would require approximately a 5.5-foot drawdown of Ross Lake subject to inflow conditions. This averages out to an approximate 2.8-foot per day drawdown rate, which may impact City Light's ability to meet other license and generation obligations.

Adjustments in magnitude, duration, frequency, timing, and shape of the process flow releases could be adjusted to achieve desired positive outcomes while minimizing negative impacts. Prior to the release of channel maintenance flows, the hydrologic, hydraulic, sediment transport, water quality, and operations modeling tools developed during the relicensing process will be utilized to refine initial flow magnitude, duration, and frequency to meet the objectives of the channel maintenance flow releases. For example, a release of a lower flow magnitude and longer duration (e.g. 20,000 cfs for 30 hours), a variable release that pulses flows above and below the sediment mobilization threshold, or a lower release coupled with vegetation removal on bars, banks and side channel inlets may all accomplish more geomorphic work with less impact on the water budget, less risk of flooding, and could be evaluated with modeling tools. City Light will utilize the suite of four sediment transport models developed as part of the GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (GE-04 Geomorphology Study) (City Light 2023c) and the OM-01 Operations Model Study (Operations Model) (City Light 2023d) to analyze the target channel maintenance flow releases that will meet the goals and objectives of the program. In addition, City Light in consultation with the SLIC will need to evaluate the risk of impacting private property and public infrastructure at various tributary inflow discharges to better understand the opportunities to provide for channel maintenance releases safely.

N.3.2 Side Channel and Off-Channel Flushing and Connectivity Flows

City Light will release, at a minimum, side and off-channel connectivity flows of 12,200 cfs as measured at the Newhalem gage for a period of 24 hours no less than once every 24 months. In addition, City Light will provide for, at a minimum, two (2) discrete releases of side and off-channel flows of 7,521 cfs, as measured at the Newhalem gage, for a period of 24 hours for each release, during the periods of December 1 through February 15 and May 1 through June 30 each year. The preliminary goal of the side channel and off-channel flushing and connectivity flows, to be refined in consultation with the SLIC, are to flush side and off-channel fish habitat areas of fine sand and organic matter and provide connection of the side and off-channel fish habitat areas to the mainstem Skagit River. City Light may exceed these minimums in accordance with the Final Process Flows AMP that will be submitted to FERC.

As part of the Project relicensing, City Light conducted the GE-04 Geomorphology Study which assessed the connection of side channel and off-channel inlets and outlets to the mainstem Skagit River. In total, 76 side channel and off-channel features were evaluated. At flows of 5,734 cfs, 58 of the 76 side and off-channel habitat areas are connected to the mainstem Skagit River at the outlet of the side channel or off-channel. At flows of 7,440 cfs, 72 of the 76 side and off-channel habitat areas are outlet connected, providing access to 95 percent of the side and off-channel areas identified.

The GE-04 Geomorphology Study found that the lack of recurring flows that provide inlet connection can be a contributing factor to the loss and degradation of side channel and off-channel areas over time (City Light 2023c). Areas with only outlets connected can become inundated via backwatering from the mainstem river, and suspended sediment can be deposited which over time will reduce area and volume in features where inlets are not connected to flush fine sediment, which can also reduce spawning habitat. The GE-04 Geomorphology Study found that of the 76 side channel and off-channel features evaluated, 26 had no inlet connection, and 42 of the remaining 50 (84 percent) inlets were connected at flows of 7,440 cfs or less.

As part of the monitoring program for this Process Flows AMP, City Light will investigate the effectiveness of the flow releases to meet the objectives of the program. This will include the evaluation of approaches to further increase connectivity including releasing flushing flows between 7,440 and 12,200 cfs and/or additional physical modification of side channels to increase connectivity to activate additional side-channel and off-channel features at flows within the 5,734 cfs to 7,440 cfs range.

N.3.3 Mainstem Flushing Flows

City Light will provide for, at a minimum, three (3) discrete releases of mainstem flushing flows of 4,620 cfs as measured at the Newhalem gage for a period of 6-12 hours for each release, during the periods of February 20 through April 20, September 1 through September 30, and October 5 through November 30, each year. The purpose of providing mainstem flushing flows is to remove organic matter and fines to improve gravel quality for spawning and incubation in the mainstem Skagit River. These flushing flows are often prescribed at magnitudes that represent the mean annual discharge, or 4,620 cfs at the Newhalem gage, for 6-12 hours at least twice per year, if not provided for annually. Wald (2009) finds that flushing flows to improve gravel quality for spawning and incubation habitat provide the greatest benefit when they occur at the beginning of spawning seasons. For this purpose in the Skagit River, flushing flow may be investigated for release prior to the Steelhead Spawning Season (March 15) and the Salmon Spawning Season (September 1). City Light may exceed these minimums in accordance with the Final Process Flows AMP that will be submitted to FERC.

N.3.4 Fish Migration Flows

City Light will provide for, at a minimum two (2) discrete releases of fish migration flows of 4,620 cfs as measured at the Newhalem gage for a period of 6-12 hours for each release, during the periods of February 20 through April 20 and October 5 through November 30 each year. Fish migration flows are flow pulses (short term [6-12 hours] increases in discharge from the Project) that are intended to trigger smolt outmigration, adult up-migration, and fall redistribution. City Light may exceed these minimums in accordance with the Final Process Flows AMP that will be submitted to FERC.

N.4 Development of the Process Flows AMP

The development of the Process Flows AMP will begin prior to license issuance, targeting finalization of the Process Flows AMP within 1 year of license issuance. Upon FERC approval, City Light will implement process flows according to the magnitude, duration, and frequency described in the plan. No later than 11 years after FERC's approval of the Process Flows AMP,

City Light will develop a Process Flows Effectiveness Report. The development of the Process Flows AMP will be implemented using the following steps.

N.4.1 Step 1: Development of SMART goals, objectives, metrics and monitoring requirements through a Science-based Decision-Making Framework

City Light intends to develop the Process Flows AMP in coordination with the EMAMP. The first step in the process will be the development of specific, measurable, achievable, realistic and timely (SMART) goals and objectives of the Process Flows AMP. Once goals and objectives are identified, the proposed series of experimental flow releases, as well as the monitoring program described in Section 5 of the REP, may be refined to better meet the needs of the program. Below is a summary of the current monitoring elements proposed in Section 5 of the REP for process flows:

- Compliance Monitoring – Document the timing (dates), magnitude, and duration of flows released from the Project and the rationale for decisions made regarding flow release as part of the Annual Compliance Report;
- Flood Monitoring – Collect high water mark data following process flow releases. Evaluate effects at locations of vulnerable infrastructure; and
- Geomorphic Work Performance Monitoring – City Light, in consultation with the SLIC, will use topobathymetric Light Detection and Ranging (LiDAR) to evaluate changes in channel dimensions and planform, channel migration rates, areas of bed mobilization, changes in channel planform (deposition and incision), and wood recruitment. Field surveys will include scour monitoring at redd locations and substrate mapping within reference reaches. Changes in wood loading within reference reaches will be evaluated through remote sensing techniques.
- Monitoring completed by City Light as part of a collaborative efforts to advance scientific understanding of fish population dynamics and inform a Science-based Decision-Making Framework that will be described in the EMAMP. Population monitoring studies may be designed to inform scientific understanding of tradeoffs and relative benefits between life history stages, strategies, and species from flow releases of a given magnitude and frequency at a given time of year.

N.4.2 Step 2: Modeling, Forecasting and Development of a Process Flow Release Schedule based on Water-Year Type

As described in Sections N.3 and N.4.1 above, additional modeling and analysis will be necessary to refine the flow magnitudes, duration and frequency of process flow releases to meet the goals and objectives of the program. This modeling will inform the development of a Process Flow Release Schedule. This schedule will identify the process flow magnitudes, duration, and frequency to be released based on water-year type and Ross Lake water surface elevations. Table 4.2-1 through Table 4.2-3 below provides potential Process Flow Release Schedules. Table 4.2-1 was developed by NPS. Table 4.2-2 was developed by the Swinomish Indian Tribal Community (SITC) and Table 4.2-3 was developed by City Light. The SLIC will determine which of the potential flow release schedules (along with other potential flow release scheduled subsequently submitted to the SLIC) to prioritize for initial analysis. The default starting point for evaluation of the operational ability to provide the number, magnitude and duration of flows that comprise a

process flow program will be Table 4.2-1 unless otherwise decided by the SLIC. The initial process flow regime should have an estimable probability of generating an observable effect within a given timeframe.

Table 4.2-1. Potential Process Flow Release Schedule 1 (NPS Proposal) to be Analyzed for the Process Flows AMP.

Water-Year Type	Flushing and Migration Flows Spring: Mar 15-Apr 15 Fall: Aug 20 Sept 10	Spring Connectivity Flow April 1-June 30	Channel Maintenance Flow (Up to 26,400 cfs for 24 hrs) Timing TBD	Fall Connectivity Flow Aug 1-Jan 30
Wet	4,620 cfs 12 hrs	12,200 cfs 48 hrs	Minimum of 4 out of 10 years; Target: 5 out of 10 years. Water-year type will be a factor in which years to release this flow.	12,200 cfs 48 hrs
Above Normal	4,620 cfs 12 hrs	12,200 cfs 48 hrs		12,200 cfs 48 hrs
Normal	4,620 cfs 12 hrs	12,200 cfs 48 hrs		12,200 cfs 48 hrs
Below Normal	4,620 cfs 6 hrs	12,200 cfs 48 hrs		12,200 cfs 48 hrs
Dry	4,620 cfs 6 hrs	12,200 cfs 24 hrs		7,440 cfs 24 hrs
Critically Dry	TBD	TBD		TBD

Table 4.2-2. Potential Process Flow Release Schedule 2 (SITC Proposal) to be Analyzed for the Process Flows AMP.

Water-Year Type	Spring Flushing and Outmigration Flow Mar 1-Apr 30	Spring Connectivity Flow June 1-June 30	Channel Maintenance Flow (Up to 26,400 cfs for 24 hrs) Timing TBD	Fall Flushing and Migration Flow July 15-August 15	Fall Connectivity Flow August 1-19 & January 7-31
Wet	4,620 cfs 12 hrs	9,820 cfs 48 hrs	Released if no channel maintenance flow released in previous 12 months.	4,620 cfs 12 hrs	9,820 cfs 48 hrs
Above Normal	4,620 cfs 12 hrs	9,820 cfs 48 hrs	Released if no channel maintenance flow released in previous 24 months.	4,620 cfs 12 hrs	9,820 cfs 48 hrs
Normal	4,620 cfs 12 hrs	9,820 cfs for 24 hrs, then 7,440 for 48 hrs	Released if no channel maintenance flow released in previous 4 calendar years.	4,620 cfs 12 hrs	9,820 cfs for 24 hrs, then 7,440 for 48 hrs
Below Normal	4,620 cfs 6 hrs	7,440 cfs 48 hrs	Released if no channel maintenance flow released in previous 5 calendar years.	4,620 cfs 6 hrs	7,440 cfs 48 hrs
Dry	4,620 cfs 6 hrs	7,440 cfs 24 hrs	TBD	4,620 cfs 6 hrs	7,440 cfs 24 hrs
Critically Dry	TBD	TBD	TBD	TBD	TBD

Table 4.2-3. Potential Process Flow Release Schedule 3 (City Light Proposal) to be Analyzed for the Process Flows AMP.

Water-Year Type	Winter Side Channel Connectivity Flow Dec 1-Feb 15	Spring Flushing and Outmigration Flow Feb 20 – Apr 20	Spring Connectivity Flow May 1 – June 30	Channel Maintenance Flow	Fall Flushing Flow Sep 1-Sep 30	Fall Upmigration Flow Oct 5 – Nov 30	Large Side Channel Connectivity Flow
Wet	7,521 cfs 24 hours	4,620 cfs 12 hrs	7,521 cfs 24 hours	During wet years, City Light shall release a channel maintenance flow unless such flow has been released within the prior 12 months.	4,620 cfs 12 hrs	4,620 cfs 12 hrs	12,200 cfs 24 hours Every 24 months
Above Normal	7,521 cfs 24 hours	4,620 cfs 12 hrs	7,521 cfs 24 hours	During above normal years, City Light shall release a channel maintenance flow unless such flow has been released within prior 24 months.	4,620 cfs 12 hrs	4,620 cfs 12 hrs	12,200 cfs 24 hours Every 24 months
Normal	7,521 cfs 24 hours	4,620 cfs 12 hrs	7,521 cfs 24 hours	During normal years, City Light will not release a channel maintenance flow unless such a flow has not been released within prior 4 calendar years.	4,620 cfs 12 hrs	4,620 cfs 12 hrs	12,200 cfs 24 hours Every 24 months
Below Normal	7,521 cfs 24 hours	4,620 cfs 6 hrs	7,521 cfs 24 hours	During below normal years, City Light will not release a channel maintenance flow unless such a flow has not been released within prior 5 calendar years.	4,620 cfs 6 hrs	4,620 cfs 6 hrs	12,200 cfs 24 hours Every 24 months
Dry	7,521 cfs 24 hours	4,620 cfs 6 hrs	7,521 cfs 24 hours	TBD	4,620 cfs 6 hrs	4,620 cfs 6 hrs	12,200 cfs 24 hours Every 24 months
Critically Dry	7,521 cfs 24 hours	4,620 cfs 6 hrs	7,521 cfs 24 hours	TBD	4,620 cfs 6 hrs	4,620 cfs 6 hrs	12,200 cfs 24 hours Every 24 months

In addition, City Light will consult with the SLIC to review information from available forecasting tools and document the use of water-year type metrics to inform the release of flows.

City Light will investigate using long-range National Weather Service Forecasts, NRCS measurements of SWE to determine the applicable water-year type. Water-years will be classified into six water year types based on a rolling 30-year median peak of SWE (currently April 13th) for the Upper Skagit Watershed (Hydrologic Unit Code [HUC] 17110005) as follows:

- Wet: Above the 90th percentile SWE;
- Above Normal: Between the 70th and 90th percentile;
- Normal: Between the 30th and 70th percentile;
- Below Normal: Between the 10th and 30th percentile;
- Dry: Between the 5th and 10th percentile; and
- Critically Dry: Below the 5th percentile.

If there are significant discrepancies between NRCS forecasts and City Light's established forecasting tools to inform operational decisions, City Light will consult with the SLIC and provide information that describes and accounts for the discrepancy and may continue to rely on the established tools used to make operational decisions ensuring the SLIC is provided transparency in how water availability is determined. This consultation and determination of water year type and/or water availability will be an iterative process with an initial determination of water year type and/or water availability being provided in early December and be updated through at least mid-April.

The Process Flow Release Schedule will be coordinated with other license commitments, such as the habitat restoration activities described in the REP AHP. The sequencing will follow a systematic Science-based Decision-Making Framework to better understand the results of specific process flow releases (to the extent possible) in coordination with the other monitoring elements to be described in the EMAMP.

N.4.3 Step 3: Planning, Coordination and Testing

As stated in Section N.2 above, City Light's process flow releases will be planned to minimize the risk of flooding (to the extent possible). However, high flows of the magnitude being considered in this program have the potential to impact private property, public infrastructure, and human safety when combined with unregulated tributary inflows into the Skagit River. As such, City Light, in consultation with the SLIC, will coordinate with local jurisdictions, regulatory agencies and stakeholders to verify, modify, and implement communications protocols and preparedness procedures in advance of process flow releases.

In addition, City Light will advance permitting requirements needed for the installation of monitoring equipment and additional data gathering to establish the baseline conditions (to the extent possible) prior to FERC's approval of the plan.

N.4.4 Step 4: Refinement and Finalization of Process Flows AMP to be filed with FERC

Following steps 1-4, City Light, in consultation with the SLIC and the NPS, will refine the Process Flows AMP and file with FERC within 1 year of license issuance. The Process Flows AMP will be implemented in coordination with the suite of measures identified in the REP, consistent with the conditions described in Section N.2 above.

The Parties recognize that the 12 river miles below Gorge Dam are within the RLNRA and are impacted by the Process Flow regime. The Parties acknowledge the NPS has an important interest in Process Flows. In the event of a dispute related to the Process Flows AMP, the Parties will engage in the dispute resolution process provided in the Settlement Agreement. If a dispute remains between City Light and NPS, City Light and NPS will define and document the dispute and attempt to resolve the dispute at the lowest level of management possible. If a Process Flow issue remains in dispute, City Light and NPS will jointly elevate the issue to the next management level. City Light and NPS will attempt to resolve any disputes within 10 working days.

N.4.5 Step 5: Evaluate Implementation of the Process Flow AMP

This proposed Process Flows AMP will provide for an approach to inform how best to implement process flows and other aligned measures most effectively with respect to measurable outcomes. The tradeoffs and necessity of providing or modifying such process flows to improve the quantity and quality of habitat conditions, the productivity of targeted fish populations, and other ecological outcomes in the Skagit River will be examined annually, or on a regular schedule identified by the SLIC, in a Science-based Decision-Making Framework. This process will provide the Settlement Parties the opportunity to address the scientific uncertainty and the net benefits of process flow releases as well as the magnitude, duration, and frequency of process flow components requiring releases above and beyond what already occurs from the Project and what occurs naturally.

City Light will provide annual reports to FERC regarding the implementation of the Process Flows AMP consistent with Section (5.1.3) of the REP.

Within 11 years after FERC's approval of the Process Flows AMP and every 11 years thereafter for the term of the License and any subsequent annual license, City Light will file with FERC, for approval, a PFE Report. City Light will develop the PFE Report in consultation with the SLIC. The PFE Report will 1) report on implementation of the Process Flows AMP, 2) analyze the results of the monitoring information on fisheries, river processes, and the overall water budget, and 3) include recommendations, derived from a Science-based Decision-Making Framework, to further implement, evaluate, refine, or suspend certain elements of the Process Flows AMP. Upon FERC approval, City Light will implement such recommendations.

N.5 REFERENCES

Seattle City Light (City Light). 2023a. Final License Application for the Skagit River Hydroelectric Project, FERC No. 553. April 2023.

_____. 2023b. FA-02 Instream Flow Model Development Study, Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by Northwest Hydraulic Consultants, Inc. and HDR Engineering, Inc.

_____. 2023c. GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study, Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by Natural Systems Design, Inc., Northwest Hydraulic Consultants, Inc., and Fain Environmental.

_____. 2023d. OM-01 Operations Model Study, Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by HDR Engineering, Inc.

Wald, A.R. 2009. High flow for fish and wildlife in Washington. Report of investigation in instream flow. Washington Department of Fish and Wildlife (WDFW). [Online] URL: https://wdfw.wa.gov/sites/default/files/publications/00578/wdfw00578.pdf. Accessed in February 2022.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX O

PRIORITY PROJECTS THAT COULD BE FUNDED VIA THE SKAGIT RIVER MAINSTEM HABITAT ENHANCEMENT FUNDING OBLIGATION

O. PRIORITY PROJECTS THAT COULD BE FUNDED VIA THE SKAGIT RIVER MAINSTEM HABITAT ENHANCEMENT FUNDING OBLIGATION

O.1 Gilligan Floodplain Restoration

To facilitate environmental review, the Gilligan floodplain enhancement project is highlighted here as a priority Project Pipeline Group 3 project. The goal of the Gilligan floodplain restoration project is to restore connectivity to approximately 4,375 feet of side channel and 170 acres of floodplain by removing an existing levee (Figure 1). The levee is located on USFS lands in the Skagit River floodplain downstream from Gilligan Creek at approximately River Mile 28. The property was previously managed as a hybrid poplar plantation before being acquired by the USFS, and revegetation efforts with native species are anticipated. The Skagit Chinook Recovery Plan (SRSC and WDFW 2005) documents the importance of side channel and floodplain habitats for rearing and specifically identifies the Gilligan project as a priority.

An assessment completed in 2009 evaluated several restoration alternatives that included varying amounts of levee removal and all of them were likely to result in the development of a side channel. The assessment also indicated that channel migration over time might affect private properties outside of USFS ownership, so a restoration project would need to address this through property acquisition, construction of a setback berm or levee, and/or the inclusion of engineered log jams. Relocation or levee setbacks will require maintenance over the term of the license. Land acquisitions may be necessary and are anticipated to be held by the USFS.

Habitat objectives for the Gilligan site include:

- Increase mainstem edge habitat;
- Increase amount and quality of side channel and floodplain habitat;
- Increase rearing habitat to benefit Chinook salmon and other species; and
- Improve species diversity for floodplain vegetation.

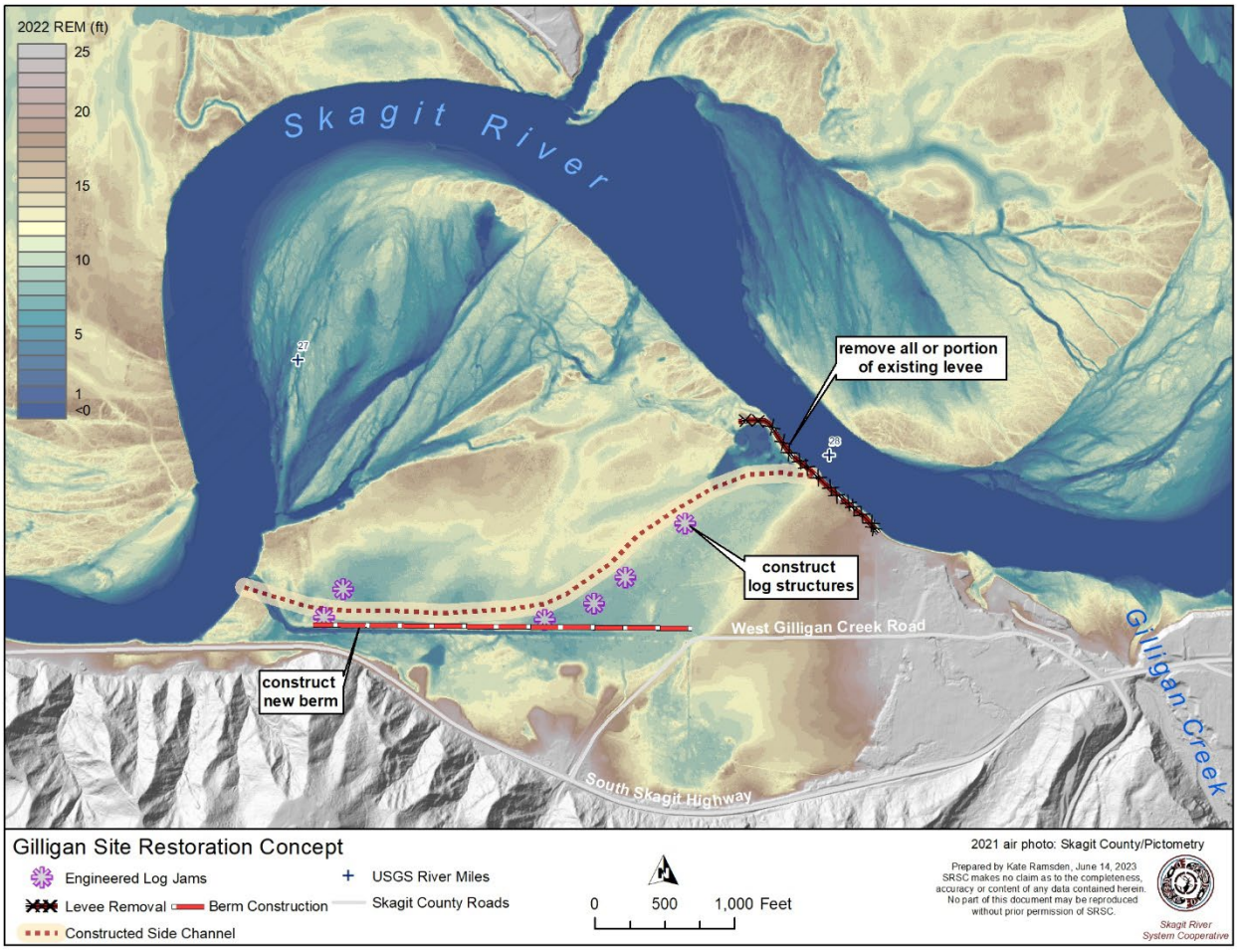

Figure O-1. Conceptual Design for Gilligan Side Channel Restoration.

O.2 Goodell Creek Delta

The Goodell Creek delta project is a large multi-jurisdictional project that is contingent on replacement and expansion of the Highway 20 bridge by WDOT[47]. It is highlighted here in support of collaborative efforts to advance development through the project pipeline. City Light and the SLIC may consider using Aquatic Habitat Enhancement dollars for additional feasibility and design studies or as match for WDOT led efforts to obtain federal grants for implementation.

Goodell Creek exits a narrow and relatively steep canyon approximately 0.6 miles upstream from the confluence with the Skagit River. Between the canyon and the Skagit River, the creek forms an alluvial fan with three main distributary channels. Flow is confined to the eastern-most channel by hydromodifications and the State Route 20 bridge crossing. The dynamic nature of the alluvial fan has increased since a landslide in 2003 deposited large amounts of material upstream. A

[47] Whether or not to proceed with bridge replacement, the width of spans, and the timeline are within the purview of WDOT, not City Light.

restoration assessment observed aggradation at the fan apex and concluded there is high risk of avulsion into one of the abandoned distributary channels (Herrera 2017).

The restoration plan recommends reconnecting the western-most distributary channel to restore alluvial fan function, aquatic habitat, and spawning and rearing for salmonids (Figure 2).

Habitat enhancement objectives for Goodell Creek alluvial fan include:

- Restore alluvial fan and channel forming process
- Increase rearing habitat area, length, and quality
- Increase connectivity and access for fish
- Increase area and stability of bull trout, Chinook, coho, and steelhead spawning habitat
- Increase pool formation and channel edge complexity
- Increase side channel formation
- Increase wood retention and jam formation
- Increase sediment transport into Skagit River

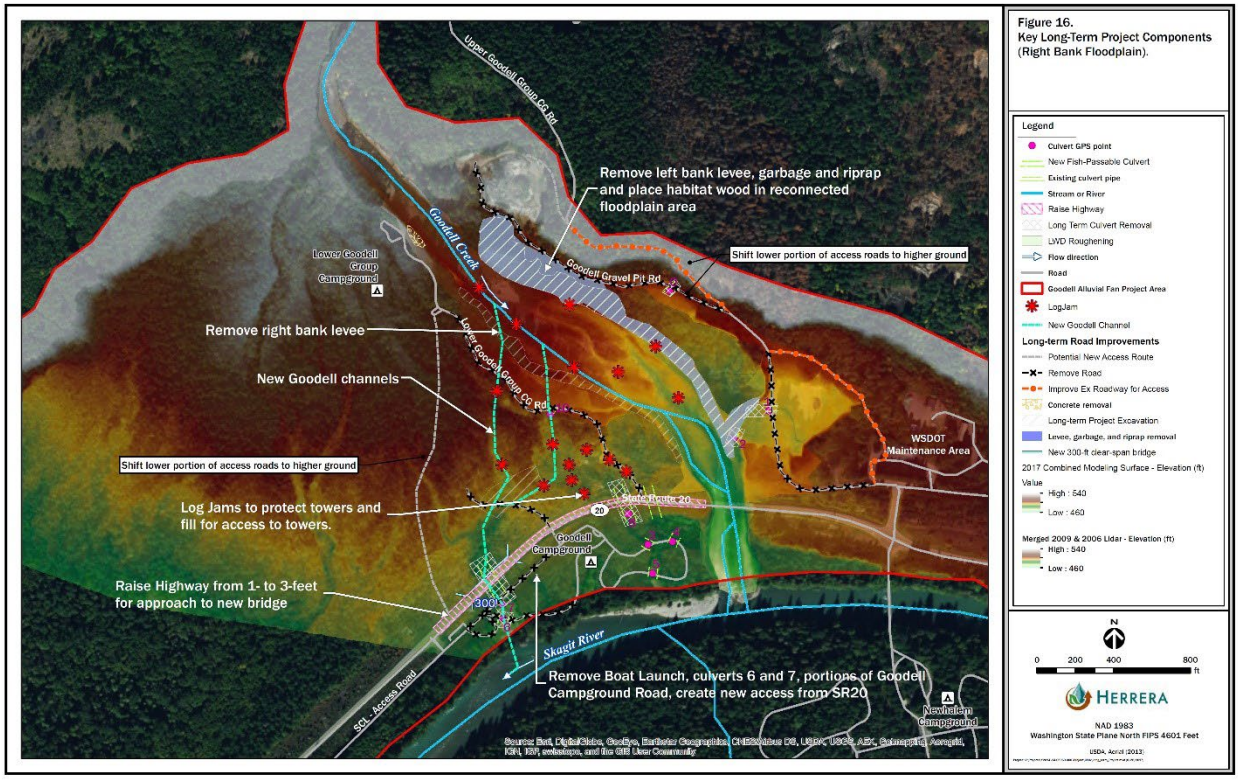

Figure O-2 Conceptual Design for Goodell Creek Delta

O.3 Gravel Augmentation

Gravel augmentation is highlighted here as a potential enhancement measure to be implemented through the Skagit River Mainstem Habitat Enhancement Funding Obligation. The GE-04 Skagit River Geomorphology between Gorge Dam and the Sauk River Study (Geomorphology Study) completed to support relicensing found flow and sediment processes to be in relative balance and did not find evidence of systemic channel incision under the current flow regime. Slight aggradation of the channel bed, rather than incision, was documented through LiDAR change detection analysis before and after the November 2021 flood.

Under a modified flow regime including additional channel maintenance flows to be implemented as part of the license, however, incision could occur. As part of Phase 1 of license implementation, City Light, in consultation with the SLIC, will evaluate within a Science-based Decision-Making framework the geomorphic and biological response to functional flows and mainstem enhancement measures. The placement of alluvium excavated during implementation of mainstem habitat measures on adjacent bars to support site and reach scale objectives is proposed at multiple sites. Based on study results, City Light, and the SLIC may prioritize additional gravel augmentation through the Skagit River Mainstem Habitat Enhancement Funding Obligation.

O.4 References

Skagit River System Cooperative (SRSC) and Washington Department of Fish and Wildlife (WDFW). 2005. Skagit Chinook Recovery Plan. Skagit River System Cooperative, LaConner, Washington, and Washington Department of Fish and Wildlife, Olympia, Washington.

RIVERSCAPE ECOSYSTEM PLAN

APPENDIX P

DRAFT SKAGIT RIVER GRAVEL AUGMENTATION PILOT STUDY

P. DRAFT SKAGIT RIVER GRAVEL AUGMENTATION PILOT STUDY

Draft Skagit River Gravel Augmentation Pilot Study
Proposed by the National Park Service
January 2025

Study Description

This study proposes to conduct a gravel augmentation pilot study on the Skagit River in support of relicensing efforts for the Skagit River Hydroelectric Project No. 533. The study proposes to place a total volume of 2,000 cubic yards and monitor the initial mobilization and downstream displacement of the material following high flow events.

Primary Study Objectives

- *Determine what magnitude flow and duration mobilize coarse sediment in the Skagit River.*
- *Assess the distance traveled of augmentation material at specified flow magnitudes.*
- *Determine the geomorphic features and habitat types where augmentation material deposits.*
- *Assess potential gravel augmentation strategies and volumes in the context of likely channel connectivity and channel maintenance flows.*
- *Refine existing hydraulic/sediment transport models for the project with empirical gravel augmentation data to be able to predict results of potential long-term augmentation strategies and volumes of material.*

Proposed Augmentation Sites

A suitable augmentation site should have several key attributes: 1) accessible by truck and likely heavy equipment to deliver and potentially contour the material; 2) have adequate accommodation space for the additional sediment in areas that are hydraulically conducive for mobilization; 3) located in a reach where augmenting the coarse sediment supply is relevant; and 4) have cooperating landowners from egress into and out of the augmentation sites. The following sites were identified as potential candidates for the pilot augmentation, which sites are used will be determined in consultation with the SLIC in order to reach the total proposed annual 2,000 cubic yards augmentation. Once selected, only those sites will be treated annually under this pilot:

1. Newhalem Maintenance Yard: on the river right bank adjacent to the Newhalem Maintenance Yard, believed to be where accumulated snow was pushed into the Skagit in the past. There are two potential access points at this location (see Figure P-1), approximately 200 yards apart. Gravel placed at the further upstream point could potentially mobilize at lower discharges. Further investigation of both access points is needed; however, if both are deemed suitable with adequate space, then the intent would be to split the augmentation volume in half between the access points. This site is

downstream of Ladder Creek and upstream of Newhalem Creek (both tributaries entering from the opposite bank on river left).

2. Newhalem Ponds (also known as Agg Ponds): recommended placement location is the gravel bar just upstream of the current City Light boat launch, river right. The augmentation would be designed to extend/supplement the bar feature that is present (see Figure P-2).

3. Newhalem townsite bar: on the river right bank within the townsite of Newhalem would be another candidate as a mass injection site, like the Newhalem Maintenance Yard location (Figure P-3).

4. Newhalem townsite water treatment building area: on the river right bank within the townsite of Newhalem would be another candidate as a mass injection site, like the Newhalem Maintenance Yard location (Figure P-3).

5. Newhalem Creek Powerhouse Outfall Channel: recommendation location is on river left, just downstream of the Newhalem Creek Powerhouse outfall channel, which is upstream of the Newhalem Creek confluence. The intent would be to supplement the depositional feature at this location that appears to be coarser than the surrounding bed material. Access would occur from the parking lot that is on adjacent to the outfall channel on the downstream side, access that is anticipated to be further developed with the decommissioning of the Newhalem Creek Powerhouse and associated infrastructure (Figure P-3).

Volumes and Method of Proposed Augmentation Sites

The Newhalem Maintenance Yard, Newhalem townsite bar, and the Newhalem townsite water treatment building location are proposed as a mass injection sites, where the material would be delivered as a general broadcast to the channel that would take either a cone or berm shape (see Figure 5). 1,000 cubic yards is recommended for augmentation at one of these sites or split between then depending on issues of access. The material would not necessarily be 100 percent available for transport at initial placement. Over time, as the toe of the pile or berm is winnowed or eroded away, additional material would slump into the channel, becoming available for transport. Additional mechanical forcing of the backside of the pile into the channel may be needed.

The Agg Ponds and Newhalem powerhouse outfall channel are recommended as contoured or graded injections, where the material is placed in a manner that is topographically and hydraulically similar to the bar feature that is already somewhat developed on the inside of these meander bends. 500 yards of augmentation material are recommended for placement at each site. All of the material placed at these sites would be hydraulically available for transport for any given flow. Erosion of the features is expected, however not necessarily all of the material will evacuate the site as the location is conducive to deposition. Material left behind is expected to be redistributed and reworked into a form similar to a natural bar form that would provide geomorphic and biologic function.

Grain Size Distribution of Augmentation Material

The grain size distribution of the augmentation material is a key component for the overall success of a gravel augmentation program. The size distribution will affect the mobility and residence time of the augmentation material, as well as the geomorphic function and biologic utility of the sediment as it moves through the Skagit River system. For the pilot study, we propose using a size distribution that is reflective of the primary alluvium inputs into the study reach (reaches 2A through 4) under current conditions, which is assumed sourced from the primary tributaries to the study area: Ladder, Newhalem, and Goodell creeks. We used the bulk and hybrid bulk sample data from Study GE-04 to develop a proposed distribution, which would range in size from about 2 to 128 mm, have a D50 of 60 mm, and D84 of 100 mm. Table P-1 summarizes a proposed grain size distribution:

Table P-1: Proposed grain size distribution for augmentation material for pilot study on Skagit River.

Summary Statistic	Grain Size (mm)
D90	128
D84	100
D50	60
D16	16
D10	2

Source of Augmentation Material

Where possible, coarse sediment of appropriate grain sizes generated from nearby project related activities could be used in the pilot experiment. Examples of potential project related activities include excavation of side channel inlets and outlets to increase connectivity with the mainstem or dredging of coarser reservoir deposits coming into project reservoirs. If coarse sediment generated from project activities is either insufficient in volume or an inappropriate size distribution (and cost prohibitive to sort and sieve), then additional material will likely need to be purchased from nearby rock quarries. An initial survey of nearby rock quarries indicated there are several within the Skagit watershed. Transportation costs often represent a significant cost for obtaining augmentation material, thus if feasible and can supply the appropriate size distribution, the rock quarry closest to the proposed pilot sites is likely the best candidate. The rock quarry that appears to be closest to the proposed sites is Skagit Aggregates Rockport Pit (approximately 16 to 24 miles from the proposed sites). Discussions with Skagit Aggregates indicated that they could deliver approximately 120 cubic yards per day to the sites. Skagit Aggregates also indicated that they may have “pit-run” (i.e., unprocessed or sieved material) available at the Rockport Pit that would be suitable, which would decrease the project costs.

Monitoring

Baseline Data

Prior to placement of augmentation material, a detailed topographic survey should be completed at the selected sites. The survey, likely completed via a total station, should include establishing benchmarks and control points with RTK GPS and collect topo points sufficient to produce a localized Digital Elevation Model (DEM) at a 0.5 ft contour level of the augmentation area. The

topo survey should extend approximately double the intended footprint of the augmentation, with emphasis on capturing additional area downstream of the augmentation site and recognizing that deeper areas toward the channel thalweg may be infeasible to survey. After the augmentation material is placed and graded in the channel, an additional "as-built" topographic survey should be completed. The as-built survey would focus on capturing topographic changes following gravel augmentation. DEM's would be produced documenting baseline and as-built conditions, and differencing these two surfaces would provide an accurate measurement of the volume and location of the augmentation material.

To determine the distance traveled and depositional environment, we recommend placing RFID tags in approximately 100 tracer particles at each augmentation site. The proposed methodology and technology would mimic the study methods used for tracer particle monitoring in Study GE04, described in detail section 4.5.2.2 of the USR GE04 report. The tags would be placed in range of rocks representative of the dominant size classes of the augmentation material. Personnel that implemented Study GE04 undoubtedly gained invaluable insight into the most appropriate and efficient manner to conduct an RFID tracer study on the Skagit River, and this study proposes to leverage and utilize their experience to design and implement an RFID tracking component for the gravel augmentation pilot.

Monitoring Post High Flow Events

Monitoring at pilot augmentation sites would generally occur following high flows. This study proposes coordinating monitoring following connectivity, flushing, and channel maintenance flows anticipated being released by the Project as part of other relicensing studies. The anticipated high flows of interest include: 7,521 cfs for side channel inlet and outlet connectivity (also a 5 percent exceedance flow); 12,200 cfs flushing flow where maximum side channel connectivity is expected, and a 26,400 cfs channel maintenance flow where sediment mobilization, veg, and bank scour are expected to occur. Other flow events of intermediate or greater magnitudes may occur naturally and provide additional monitoring opportunities. Augmentation material is expected to mobilize at a lower discharge than the mainstem channel bed, but unlikely at a flow as low as 7,521 cfs or potentially 12,200 cfs; however, documenting that the augmentation material did not mobilize at the smaller magnitude high flow events is pertinent information. Depending on the order of high flow events, monitoring information may exclude the need for monitoring at other discharges. For example, if a 12,200 cfs flow occurs first and does not indicate mobilization of the augmentation material, then there is minimal utility in monitoring following a 7,521 cfs event.

Once a high flow triggering event occurs, the primary monitoring would include a topographic survey of the initial augmentation sites and recovery of mobilized and tagged RFID particles. The topo survey would allow for creating of a DEM that would document the volume and location of material mobilized by each high flow event. Recovery of RFID tracer particles would be triggered if topo surveys of the initial placement sites indicated loss of material. Study GE04 describes two tracking methods (Recovery method 1 utilized IS1001 LF passive RFID system provided from Biomark and method 2 BioMark HPR Plus Handheld PIT Tag Reader) for locating RFID particles. We would rely on the expertise and experience gained from GE04 to determine which method was suitable for relatively rapid assessment of tracer particles following high flow events. RFID particles recovered downstream would document the distance traveled during the high flow event and also include notation of the type of geomorphic/habitat unit where found, e.g., point bar, riffle

crest, pool, etc. For recovered RFID particles, effort should be made to locate that particle at that location following subsequent high flows to determine if the particle remained in its initial depositional area.

Biological monitoring (e.g., redd surveys) being conducted as part of other studies and implementation of the current license should be added to the two augmentation sites (Agg Ponds and Newhalem Powerhouse Outfall Channel) that are designed as in-channel placements supplementing existing bar features.

Analysis

- Calculate volume of material evacuated from each augmentation site following all relevant high flows.
- Assess the form and function of the bar augmentation sites following all relevant high flows.
- From the recovered particles RFID particles, calculate the distance traveled and determine the depositional environment. Synthesize this data by particle size for each flow magnitude.
- Overlay redd monitoring data with the locations of recovered RFID tagged particles to assess whether augmentation material is depositing in places utilized by fish for spawning.
- Conduct model runs using the most relevant hydraulic/sediment transport model (e.g., HEC RAS 2D model) developed for the project with the flow magnitudes that occurred during the pilot study. Model input geometry should be adjusted to include augmentation volumes, as well as potential modifications to roughness and/or grain size to reflect the augmentation as best as possible. Model results should be compared with observed augmentation volumes mobilized and distance traveled. These results could then potential calibrate the model for future augmentation efforts that could include different sediment volumes, flow magnitudes, location of injection sites, and/or styles of placement of augmentation material.

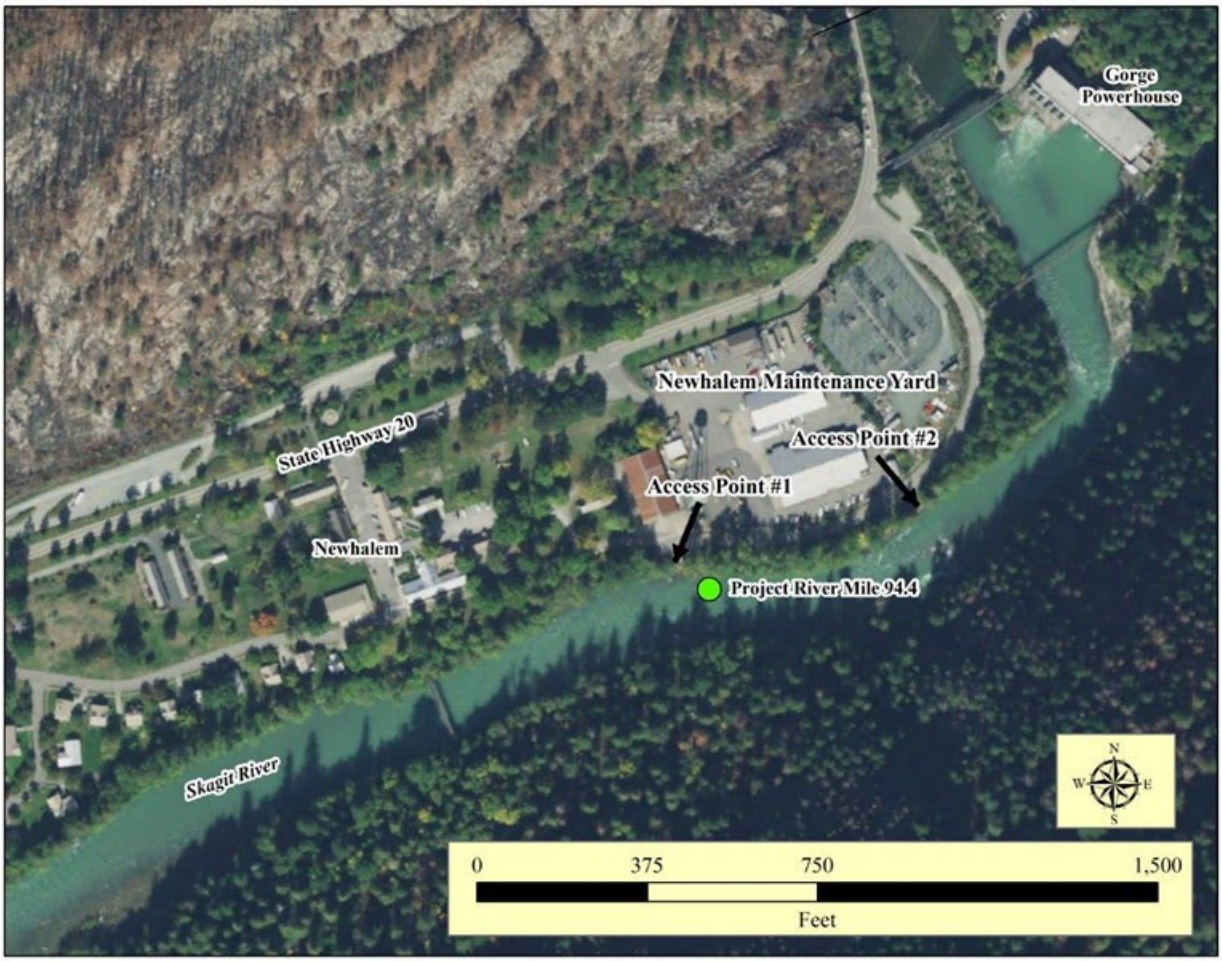

Figure P-1: Location of Newhalem Maintenance Yard proposed augmentation site.

Figure P-2: Location of Agg Ponds proposed augmentation site.

Figure P-3: Location of Newhalem Powerhouse Outfall Channel site, Townsite Bar mass injection site, and Townsite Water Treatment Building mass injection site.

RESERVOIR FISHERIES MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

November 2025

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List of Acronyms and Abbreviations

City Light.....Seattle City Light
EMAMP.....Ecosystem Monitoring and Adaptive Management Program
FERC.....Federal Energy Regulatory Commission
FPIP.....Fish Passage Implementation Plan
NPS .....National Park Service
PIT.....Passive Integrated Transponder (tags)
Plan .....Reservoir Fisheries Monitoring Study Plan
Project .....Skagit River Hydroelectric Project
PWE .....problematic water surface elevation
RFMP.....Reservoir Fish Management Plan
SLIC.....Skagit License Implementation Committee
WDFW.....Washington Department of Fish and Wildlife

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Reservoir Fisheries Management Plan (RFMP) for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) No. 553. The RFMP will provide information to support aquatic resource management in Project reservoirs upstream of Gorge Dam.

City Light will integrate the efforts required under this RFMP with other license article obligations, including Fish Passage Program, Flood Risk Management Operations, the Skagit Riverscape Ecosystem Plan, and other license article obligations included in the new license. These obligations are not included in this document, however they, and other related license measures, are anticipated to be included within the scope of the Ecosystem Monitoring and Adaptive Management Program (EMAMP) discussed herein.

2.0 PLAN AMENDMENT PROCESS

The Skagit Fish Passage Program (License Article FA LA-01) includes Early Action Due Diligence Activities including, but not limited to, physical and hydraulic studies, biological and ecological studies, and development of a Stock Selection and Management Plan. These Early Action Due Diligence Activities will inform City Light's development of a Fish Passage Implementation Plan (FPIP), which will be submitted to FERC for approval as required under the Settlement Agreement.

The reservoir fisheries monitoring elements of this RFMP (Section 3.1 below) are intended to complement the activities in the Skagit Fish Passage Program. Within one (1) year of FERC's approval of the FPIP, City Light will submit to FERC for approval a revised RFMP, developed in consultation with the Skagit License Implementation Committee (SLIC) and subject to the review and approval of the Services.

3.0 PURPOSE AND SCOPE OF THE PLAN

The RFMP will provide information to support aquatic resource management in Project reservoirs upstream of Gorge Dam. Information obtained through the implementation of the RFMP will also be used to inform adaptive management of reservoir fisheries over the term of the Project license.

3.1 Goals and Objectives

The goal of the RFMP is to monitor and evaluate the status of reservoir fish communities in all three Project reservoirs to provide federal, state, and Tribal agencies with demographic and population information on fish species to guide implementation of management actions. Specific objectives of the RFMP are as follows:

- Monitor and evaluate the health and status (size, structure, genetic viability, and ecology) of reservoir fish populations and monitor changes to those populations and identify any changes influenced by Project operations.
- Monitor, and mitigate, reservoir fish stranding and trapping risk by identifying problematic water surface elevations (PWE) and locations where risk is elevated and assessing potential impacts to native fish. Consistent with Section 4.2, mitigation may, but is not limited to, fish salvaging activities in those areas where problematic water surface elevations are identified.
- Monitor and evaluate reservoir tributary access for native fish.
- Use information gathered to assess the health and status of reservoir fish populations, evaluate the appropriateness of continuing the existing Rainbow Trout Broodstock Program recreational fishery after anadromous fish or Skagit River O. mykiss are introduced into Gorge and Diablo reservoirs. The evaluation will also provide information to support management of recreational fishing opportunities.

As described above, within one (1) year of FERC's approval of the FPIP, City Light will file, for FERC approval, a modified RFMP intended to compliment the activities described in the approved FPIP and with modified reservoir fishery goals and objectives developed in consultation with the SLIC and subject to approval of the Services. The modified RFMP may include modified goals, objectives, and management actions to support the Fish Passage Program, including additional measures related to stranding and trapping, tributary access, and other monitoring parameters. To the extent those actions increase the scope of activities described in this RFMP, funding for those additional management actions will be allocated from either the North Cascades Resource Enhancement Funding Obligation (License Article FA LA-08) or the Skagit Fish Passage Program (FA LA-01), unless otherwise agreed to in consultation with the SLIC.

3.2 Scope of the Plan

City Light proposes to monitor fish communities within the Project reservoirs (Ross, Diablo, and Gorge lakes) through evaluation of direct fisheries assessments, genetic health, risk of stranding and trapping related to Project operations, and spawning and rearing habitat suitability and accessibility. Most RFMP activities will fall within the boundaries of the Project reservoirs; however, genetic sampling may include sampling juveniles on spawning grounds within tributaries to the Project reservoirs. All management plan activities would occur above Gorge Dam.

4.0 RESOURCE MANAGEMENT PROGRAMS

4.1 Reservoir Fisheries Monitoring

In consultation with the SLIC, and subject to review and approval of the Services, City Light shall develop and implement a Reservoir Fisheries Monitoring Plan (Monitoring Plan) within two (2) years of the Effective Date of the Settlement Agreement with FERC. Monitoring Plan activities will support an assessment of the status of reservoir fish communities in all three Project reservoirs and include monitoring of these communities over the license term in coordination with activities to support the Fish Passage Program and implementation of fisheries management activities. Specific elements of the Plan to support the status assessment may include tagging/mark-recapture, fish sampling, genetic monitoring, monitoring and evaluating interactions with nonnative fish species (e.g., eastern brook trout and Redside Shiner) additional assessments of food web/bioenergetic implications, and analyses of monitoring data to determine reservoir fish life history information.

Other elements of the RFMP, not addressed in the Monitoring Plan, will be developed in consultation with the SLIC and subject to the review and approval of the Services including a Reservoir Stranding and Trapping Monitoring Program, a Reservoir Tributary Access Monitoring Program, and a Rainbow Trout Broodstock Program for Project reservoirs (see Sections 4.2 through 4.4 below).

4.1.1 Fish Population Monitoring

Population assessment and monitoring are key elements in evaluating the health and status of the fish community and protected species in Project reservoirs. These proposed activities will support the establishment of a baseline for reservoir fish populations and inform their management through the term of the Project license. As part of a suite of analytical tools, City Light will develop and implement population models. Fish population monitoring activities that may be implemented as part of the Plan include:

- Implementing a mark-recapture tagging program (e.g., PIT tags) and/or expanding the active tagging program (acoustic, radiotelemetry) for resident salmonid fish species in Ross, Diablo and Gorge lakes.
- Implementing a sampling program to recapture fish to support population estimation through fisheries monitoring activities and establishment of monitoring locations at select tributary outlets in reservoirs.
- Conducting population monitoring activities for resident fish species that could include, but would not be limited to, spawning ground surveys, fyke netting, snorkeling, and gillnetting. This program may also be used to recapture tagged fish as part of population estimation objectives.
- Building from the results and recommendations of the Food Web Studies, periodically implement recommended activities to monitor Redside Shiner status and the species' effect on native fish populations.
- Utilizing monitoring information and population modeling to determine spatial and temporal

patterns of habitat use, and migration timing of reservoir fish species and life history stages toward understanding species use of Project reservoirs, including spatial and temporal patterns of stranding and trapping.

- Monitor eastern brook trout status and the species' effect on native fish populations.
- Implementing genetic monitoring to assess potential changes in population structure viability, genetic variability and gene flow among reservoirs, the need for targeted translocation, and levels of hybridization among and between native and non-native salmonids. Activities will be determined as part of the Monitoring Plan development, but could include continued sampling of juveniles on spawning grounds (to improve upon effective population size and viability estimates for native species), opportunistic tissue collection and analysis associated with fish population sampling programs, monitoring hybridization and other genetic effects from non-native species and additional modeling and monitoring to assess whether the Rainbow Trout Broodstock Program should be continued when anadromous fish are introduced to Gorge and Diablo reservoirs.

Within six (6) months of FERC's approval of the FPIP, City Light will develop a report summarizing the findings of information collected over the reservoir fisheries monitoring period. In consultation with the SLIC and subject to approval by the Services, City Light will also develop an Updated Reservoir Fisheries Monitoring Study Plan with appropriate evaluation milestones, reporting, and (if appropriate), monitoring and mitigation recommendations for the remainder of the license term. The Updated Reservoir Fisheries Monitoring Study Plan will be filed with FERC within one (1) year of FERC's approval of the FPIP. The Updated Reservoir Fisheries Monitoring Study Plan will be implemented upon FERC's approval.

4.2 Reservoir Stranding and Trapping Monitoring

City Light will implement a Reservoir Stranding and Trapping Monitoring Program to prevent and/or minimize the potential for negative impacts of Project operational and maintenance activities in all three reservoirs on fisheries resources due to stranding and trapping. The Program will include, at a minimum the elements identified in Sections 4.2.1 through 4.2.2 below and, where reasonable and feasible, identify and implement potential solutions to address high-risk stranding/trapping sites.

4.2.1 Ross Lake

- Conduct at least two programmatic stranding and trapping surveys per year on Ross Lake during the reservoir's drawdown cycle when salmonid fry are likely to be using the shallow water habitat and stranding and trapping features are exposed in the littoral zone (i.e., spring, late summer/fall).
- Conduct at least one fish stranding and trapping survey coinciding with the release of channel maintenance flows during years when channel maintenance flows are provided in the Skagit River.

4.2.2 Diablo and Gorge lakes

- Establish low-risk elevation zones where no monitoring or rescue is necessary; establish high-risk PWEs and locations where surveillance will be conducted.

- At times when the intersection of PWEs and fish and/or amphibian presence occur, survey for stranded and/or trapped fish and amphibians with comparison with reservoir operations to refine understanding of stranding and trapping risk.
- Conduct native fish and amphibian (when amphibians are co-located with fish) salvage when drawdown is expected to reach PWEs when native species are likely present in at-risk habitats.

In Year 4 of the license, City Light will develop a Stranding and Trapping Report summarizing the results of the three (3) year monitoring effort. Monitoring results shall include (but will not be limited to) species observed and corresponding number of fish and co-located amphibians stranded or trapped, related operations information, and habitat conditions of the sites sampled. In consultation with the SLIC, City Light will develop recommendations to address future stranding and trapping activities based upon the Report's findings. The Stranding and Trapping Report will include recommendations for additional stranding and trapping monitoring and mitigation measures. After consultation with the SLIC, and subject to the review and approval of the Services, the report will be filed with FERC and implemented upon their approval. Approval and implementation are anticipated to occur no later than Year 5 of the license. The implementation of stranding and trapping recommendations included in the Report will be adaptively managed and updated on a 10-year basis or more frequently as conditions warrant

4.3 Reservoir Tributary Access Monitoring

Access to spawning tributaries is critical to the survival and reproduction of native reservoir fishes in the Project reservoirs. Due to ongoing Skagit Project operations, especially in Ross Lake, sediment and wood can form transitory barriers in the drawdown zone, which may block spawning migrations of native fish in some reservoir tributaries. Activities under the Reservoir Tributary Access Monitoring Program include:

- Implement a transitory barrier monitoring and removal program for the duration of the new license (unless subsequently revised in consultation with the SLIC) to maintain reservoir tributary access for species of management concern at various pool levels in consideration of reservoir management.
- For the duration of the new license, (unless subsequently revised in consultation with the SLIC) conduct tributary transitory barrier surveys twice annually (spring/fall) within the reservoir operations zones of Ross Lake tributaries. Tributaries to be surveyed will be determined in consultation with the SLIC.
- Conduct tributary transitory barrier surveys twice annually (spring/fall) within the reservoir drawdown zones and at the mouths of Diablo and Gorge lakes tributaries. Tributaries to be surveyed will be determined in consultation with the SLIC.
- Implement a barrier removal plan to facilitate fish spawning migrations, as appropriate, and in consultation with the SLIC. Appropriate barrier removal operations shall continue for the duration of the new license (unless subsequently revised in consultation with the SLIC).

City Light will develop a Reservoir Tributary Access Report every six (6) years summarizing the results of the tributary transitory barrier surveys which have occurred during the previous five (5) years. The Report will include:

(1) the numbers and identification of tributaries surveyed;

(2) photos/photo log documenting tributary condition;

(3) date and time of survey;

(4) the survey team participants;

(5) status of access/description of transitory barrier;

(6) measurements of turbidity (as part of the WQDMP) at the tributary mouths; details of barrier removals, if required;

(7) the results of follow-up monitoring if appropriate; and

(8) associated reservoir elevation/operations information.

In consultation with the SLIC and subject to review and approval of the Services, City Light will develop recommendations for future reservoir tributary access monitoring activities to be implemented based upon the findings of the Reservoir Tributary Access Report. Recommendations may include modifications to the tributary transitory barrier surveys including modification to the list of reservoir tributaries surveyed, survey frequency, and data collected. The Reservoir Tributary Access Report is subject to review and approval of the Services and will include recommendations for additional monitoring and mitigation measures and will be filed with FERC and implemented upon approval.

4.4 Rainbow Trout Broodstock Program

The 1991 Settlement Agreement for relicensing the Skagit River Project (City Light 1991) provided for the creation of a native Rainbow Trout Broodstock Program. The Broodstock Program involved collection of fish from Ross Lake to produce hatchery fish to supplement the Diablo and Gorge lakes Rainbow Trout fisheries. The rationale for this Program was to compensate for lost habitat in the bypass reach downstream of Diablo Dam as stated in the current Project license order. The Washington Department of Fish and Wildlife (WDFW) began collecting broodstock annually from Roland and Dry creeks for the stocking program in 2002 as a component of City Light's resident fish mitigation program. The stated goal was to produce 400,000 fingerling Rainbow Trout each year. Actual annual releases of Upper Skagit hatchery Rainbow Trout have ranged from 1,000 to 286,000 fish into Diablo Lake and 2,040 to 4,000 fish into Gorge Lake to support the recreational fishery (Downen 2014). Starting in 2010, an updated production target was agreed upon by City Light, the National Park Service (NPS), and WDFW. These goals were to (1) annually produce 265,000 Rainbow Trout fry (1,200/lb) to be stocked in September of each year in Diablo (N=170,000) and Gorge (N=95,000) lakes, (2) annually produce 95,000 Rainbow Trout fingerlings (200/lb) to be stocked in May of each year into Diablo (N=75,000) and Gorge (N=20,000) lakes, and (3) to maintain the broodstock to support the fishery.

Given the findings of the FA-06 Reservoir Native Fish Genetics Baseline study (City Light 2023) and a paucity of reservoir fish population information, additional monitoring and evaluation is necessary to understand the genetic structure and overall population health and status of Rainbow Trout in the Upper Skagit (above the Gorge Dam) as part of evaluating the continuation of the broodstock/stocking program including beyond the time anadromous fish are introduced to Gorge and Diablo reservoirs. City Light proposes to continue the current program upon new license

issuance and conduct an evaluation to identify any potential biological or ecological effects to anadromous species above Gorge Dam.

Management goals of any future program for a recreational fishery will be developed by the federal, state, and Tribal resource managers (i.e., co-managers), in consultation with City Light. Monitoring data collected as part of Plan activities (described in Section 3.1) as well as other relevant monitoring data (e.g., collected by other entities in the Skagit River, such as part of fish passage evaluation studies, etc.) will be used to support an evaluation of whether continuing a broodstock program along with anadromous fish introduction is consistent with established management goals. The evaluation will be conducted after license issuance when the initial phase of data collection from the Plan is complete but can be conducted earlier if the SLIC determines that sufficient data from fewer years of monitoring can support such an evaluation. Based upon the results of the evaluation, City Light, in consultation with the SLIC, may continue the Rainbow Trout Broodstock Program, implement a modified program, or terminate the program.

City Light will develop a Rainbow Trout Broodstock Evaluation Report and consult with the SLIC on recommendations for future implementation of the program, if any. These recommendations will be based upon the ability to implement a program consistent with Rainbow Trout management goals and recreational fishery interests. Any future program will focus on minimizing biological impacts to Rainbow Trout, consider effects to the Skagit River ecosystem and will be based upon the findings of relevant data collected during monitoring. The Rainbow Trout Broodstock Evaluation Report will include recommendations for a future program, including considerations related to the Skagit River Fish Passage Program, if appropriate, and subject to the approval of the Services will be filed with FERC and implemented upon their approval.

5.0 SCHEDULE AND REPORTING

5.1 Implementation and Monitoring Schedule

Implementation of the RFMP will begin upon license issuance and continue through the license term. The schedule for specific measures is shown in Table 5.1-1.

Table 5.1-1. Timeline for Reservoir Fisheries Management Plan Activities.

Timeline	Protection and Enhancement Monitoring Activity
Implementation Work Plan	Within two (2) years after license issuance, City Light in consultation with the SLIC and subject approval by the Services, will prepare an Implementation Work Plan that includes an implementation schedule, list of management actions, based on monitoring information, best available science, and/or modeling, identified in this RFMP to be implemented by City Light.
Reservoir Fisheries Monitoring	
Within two (2) years of the Effective Date of Settlement Agreement	Develop a Reservoir Fisheries Monitoring Study Plan (Plan) in consultation with the SLIC, and subject to approval by the Services.
Within two (2) years of Effective Date of Settlement Agreement	Develop a Work Plan to conduct fish population monitoring activities in accordance with the duration and frequency established in the Monitoring Plan. Work Plan activities on locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing, and scope of the activities), and are subject to approval from the Services if not previously approved through the Implementation Work Plan.
Annually and consistent with Fish Passage Program	Report on the findings of Plan activities and determine potential future steps for the remainder of the license term, in consultation with the SLIC. Future steps will be detailed in an Updated Reservoir Fisheries Monitoring Study Plan. The Plan Report and the Updated Reservoir Fisheries Monitoring Study Plan will be developed in consultation with the SLIC and subject to the review and approval of by the Services, and then filed with FERC for approval.
Annually and consistent with Fish Passage Program	Upon FERC approval, implement recommendations of Updated Reservoir Fisheries Monitoring Study Plan for the remainder of the license term. Implementation activities on locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing, and scope of the activities), and are subject to approval of the Services if not previously approved through the Implementation Work Plan.
Stranding and Trapping Monitoring	
Within two (2) years of Effective Date of Settlement Agreement	In consultation with the SLIC, and subject to approval from the Services, City Light will develop and implement a Stranding and Monitoring Study Plan.
Annually for three (3) years upon license issuance	Conduct spring and fall stranding and trapping surveys on Diablo and Gorge lakes and at least two annual surveys during the drawdown cycle on Ross Lake.

Timeline	Protection and Enhancement Monitoring Activity
Year 4	In consultation with the SLIC and subject to approval from the Services, develop a Stranding and Trapping Report and Work Plan that will recommend actions to mitigate for stranding and trapping of fish and amphibians.
No Later than Year 5	Upon FERC approval, implement recommendations of Year 4 Stranding and Trapping Report. Implementation activities on locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing, and scope of the activities), and are subject to approval of the Services if not previously approved through the Implementation Work Plan.
Reservoir Tributary Access Monitoring and Transitory Barrier Removal	
Within two (2) years of Effective Date of Settlement Agreement	In consultation with the SLIC, and subject to approval from the Services, City Light will develop and implement a Reservoir Tributary Access Study Plan.
Twice-annually upon license issuance	Survey tributary mouths in the spring and fall for access barriers
Year 6 and every 5 years thereafter (LY11, LY 16, LY 21, LY 26, LY 31, LY 36, LY 41, and LY 46)	Development of a Reservoir Tributary Access Report and consultation with the SLIC on recommendations for reservoir tributary access monitoring activities to be implemented.
No later than 1 year after FERC approval of a Reservoir Tributary Access Report to FERC	Upon FERC approval, implement recommendations of Year 6 (or any subsequent report) Reservoir Tributary Access Report and Plan. Implementation activities on locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing, and scope of the activities), and are subject to approval of the Services if not previously approved through the Implementation Work Plan.
Rainbow Trout Broodstock Program and Recreational Fishing Program	
TBD consistent with Fish Passage Program [1]	In consultation with the SLIC and subject to approval from the NPS, develop a Rainbow Trout Broodstock Program Evaluation Report to determine the feasibility and actions necessary to support a recreational fishery in the reservoirs. Actions necessary to support recreational fisheries in the reservoirs will be reflected in revisions to this plan.
Year 14	Upon FERC approval, implement the recommendations from the Rainbow Trout Broodstock Program Evaluation Report Implementation activities on locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing, and scope of the activities), and are subject to approval of the Services if not previously approved through the Implementation Work Plan.

1 Evaluation can be conducted earlier if the SLIC determines through consultation that sufficient data from fewer years of monitoring can support a robust, scientifically rigorous analysis.

5.2 Reporting Schedule

RFMP activities will be developed into a report that summarizes and analyzes the monitoring results from the preceding year. This annual report will be provided to the SLIC and filed with

FERC during the first quarter of each year to document compliance with RFMP and any Plan or Program requirements.

5.3 Adaptive Management and Plan Review

Over the course of its implementation, this management plan will be updated and revised as necessary to support adaptive management and implementation. Recommendations for fisheries management upstream of Gorge Dam will be proposed based on a consolidated review of available information from the Plan and other best available sources.

Adaptive management is the iterative process by which City Light will gather information, synthesize new and existing information, and assess the need to update management decisions outlined in this Plan and the other related plans. Adaptive management will be applied to each implementation activity through monitoring using previously gathered information. At five (5) year intervals, or as determined by the SLIC, City Light will evaluate monitoring information to determine if new best available science, BMPs, or updates to fisheries management strategies in this Reservoir Fisheries Management Plan (including the Implementation Work Plan) are needed to protect or improve reservoir fish and amphibians.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

6.0 REFERENCES

Downen, M. 2014. Final report: Ross Lake Rainbow Broodstock Program, upper Skagit reservoir fish community surveys and management plan, dated September 2014. Washington Department of Fish and Wildlife (WDFW). Shelton, Washington.

Seattle City Light (City Light). 1991. Offer of Settlement, Skagit River Hydroelectric Project, FERC No. 553. Seattle, WA. April 1991.

_____. 2023. FA-06 Reservoir Native Fish Genetics Baseline Study Report for the Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by Cramer Fish Sciences, Inc. March 2023.

AQUATIC INVASIVE SPECIES MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

November 2025

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List of Acronyms and Abbreviations

AIS .....Aquatic Invasive Species
AISMP .....Aquatic Invasive Species Management Plan
AISU .....Aquatic Invasive Species Unit
B.C. .....British Columbia
BMP .....Best Management Practice
City Light .....Seattle City Light
eDNA .....environmental DNA
EDRR .....early detection and rapid response
FERC .....Federal Energy Regulatory Commission
LP .....Licensing Participant
NISC .....National Invasive Species Council
NPS .....National Park Service
O&M .....Operations and Maintenance
Project .....Skagit River Hydroelectric Project
RCW .....Revised Code of Washington
SLIC .....Skagit License Implementation Committee
USDA .....U.S. Department of Agriculture
USDOI .....U.S. Department of the Interior
USFS .....U.S. Forest Service
USFWS .....U.S. Fish and Wildlife Service
USGS .....U.S. Geological Survey
WDFW .....Washington Department of Fish and Wildlife
WISC .....Washington Invasive Species Council

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Aquatic Invasive Species Management Plan (AISMP) for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) No. 553. The AISMP will implement prevention measures and an effective early detection and rapid response (EDRR) program to control non-native aquatic invasive species in Project waters to support and sustain healthy native aquatic species populations. Implementation of the AISMP can also support decision-making and management activities of agencies and organizations with responsibility for aquatic invasive species (AIS) management to ensure prevention, detection, and responses are maximized. The AISMP briefly summarizes relevant Project information, further details its purpose, identifies individual steps for implementation, and lays out the schedule and communication framework.

City Light will coordinate the efforts required under this AISMP with other license article requirements and resource management plans included in the new license.

2.0 PURPOSE AND SCOPE OF THE PLAN

The AISMP will implement prevention measures and an effective EDRR program to prevent and control non-native aquatic invasive species in Project waters to support and sustain healthy native aquatic species populations. The Project Boundary includes three reservoirs (Ross, Diablo, and Gorge lakes) where the risks of AIS invasions and impacts are of greatest concern. Recreation access and activities, including fishing, boating, day-use, and camping are potential pathways through which AIS could be introduced to Project waters. Thus, recreation facilities in the Project Boundary (e.g., boat ramps, docks, campgrounds, beaches, and trailheads) represent point locations with the highest potential for AIS introductions, as well as the greatest potential for successfully implementing preventive measures. This Plan is subject to annual reporting and periodic five (5) year review and updates in consultation with the Skagit License Implementation Committee (SLIC).

Tributaries that enter Ross, Diablo, and Gorge lakes are another potential pathway for AIS introduction, although access is more dispersed (e.g., trailheads and hiking trails). Other activities in the Project Boundary that warrant consideration as potential AIS pathways include facility operations and maintenance (O&M), fire suppression, and monitoring and restoration efforts.

A unique characteristic of the Project that also has implications for the risk of AIS is that at full pool, the upper portion of Ross Lake is in Canada and is fed by the Canadian portion of the mainstem Skagit River. Similar types of recreation access and activities described above exist in this area and represent a potential AIS pathway beyond the Project Boundary and outside of the U.S.

2.1 Goals and Objectives

The goal of the AISMP is to prevent the introduction of AIS in Project reservoirs to promote a healthy aquatic ecosystem. Specific objectives of this management plan are as follows:

- Provide for AIS education and outreach activities within the Project area.
- Participate in regional and state efforts to prevent the introduction and spread of aquatic nuisance species at the Project and in the Skagit River Basin.
- Develop an Early Detection Plan that includes monitoring to identify AIS establishment.
- Develop a Rapid Response Plan to be implemented upon AIS detection.
- Integrate adaptive management principles to refine the plan based on new information.
- As feasible, ensure the AISMP is compatible with other AIS management activities in the Skagit River Basin.
- Manage risk from City Light watercraft.

2.2 Geographic Scope

The geographic scope of the AISMP encompasses areas within the Project Boundary including Project reservoirs, shorelines, dams, and recreational facilities.

2.3 Applicable Laws and Regulations

Under the Revised Code of Washington (RCW 77.135.020), the Washington Department of Fish and Wildlife (WDFW) is the lead agency for managing AIS animal species in Washington State. Within WDFW, the Aquatic Invasive Species Unit (AISU) is tasked with preventing the introduction of AIS and conducting early detection monitoring (WDFW 2022). The Washington Invasive Species Council (WISC) was created by the state legislature in 2006 and is comprised of federal, state, and local government, and Indian Tribe and non-governmental organization representatives. WISC provides policy-level direction, planning, and coordination to prevent and combat harmful invasive species throughout the state. Other state agencies with key AIS roles and responsibilities include the Washington State Patrol, the Washington State Department of Agriculture, the Washington State Department of Ecology, and the Washington Department of Natural Resources (DeBruyckere et al. 2014). Federal jurisdiction related to invasive species management is covered by a patchwork of legal authorities derived from various laws, regulations, policies, and programs (Reaser et al. 2020) that include the National Park Service (NPS), U.S. Forest Service (USFS), U.S. Department of Agriculture (USDA), U.S. Fish and Wildlife Service (USFWS), and U.S. Geological Survey (USGS) (WISC 2014). Also, the National Marine Fisheries Service (NMFS) has an indirect role in AIS management to the extent that AIS adversely impact Endangered Species Act (ESA) listed species, ESA designated critical habitat, or essential fish habitat designated under the Magnuson-Stevens Fishery Conservation and Management Act.

3.0 PLAN IMPLEMENTATION

The two foundational components of this AISMP are a risk assessment model and EDRR principles which are both widely applied as best management practices (BMP) in invasive species management (Reaser et al. 2020; National Invasive Species Council [NISC] 2016; U.S. Department of Interior 2016; Mendoza et al. 2009). The AISMP is comprised of five discrete steps as described in the following sections: (1) risk assessment, (2) preventative measures, (3) early detection, (4) rapid response, and (5) adaptive management. These steps are iterative and are presented sequentially below. However, as discussed under Section 3.5 Adaptive Management, they collectively represent an ongoing process throughout AISMP implementation during the license term.

3.1 Risk Assessment

Assessing the risk of introduction for a given AIS is a critical first step that will be used to guide prevention and EDRR efforts. Overall risks can be considered in terms of both the potential ecological, economic, and social impacts of introduction, and the likelihood that introduction could occur based on the species' biological requirements, current distribution, and the number and scale of potential pathways for introduction (Mendoza et al. 2009). AIS representing the greatest risks are those that would cause severe impacts and have a high likelihood of introduction (Figure 3.1-1).

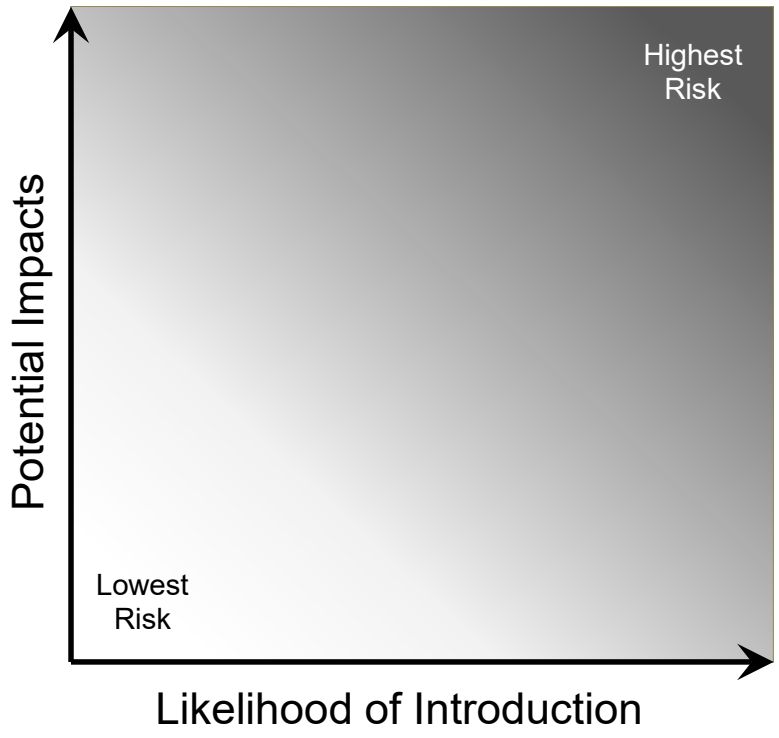

Figure 3.1-1. Conceptual diagram showing cumulative risk based on the severity of potential impacts from, and the likelihood of an invasive species introduction.

As part of their state-wide efforts, WISC evaluated over 700 different invasive species deemed to pose the greatest threat to Washington State, including plants, animals, insects, algae, and pathogens (WISC 2020). Of these, WISC identified 50 taxonomic groups as having the highest priority for near-term action. WISC evaluates AIS using an assessment tool to score species based on (1) current presence in or proximity to Washington, (2) ecological impacts, (3) economic impacts, (4) human health impacts, (5) invasive potential, (6) difficulty of control, and (7) feasibility of prevention and early action. The resulting scores are then plotted in an "invasive species management priorities grid" comprised of four categories based on potential impacts and the ability to take preventative or early action for a given species (Figure 3.1-2).

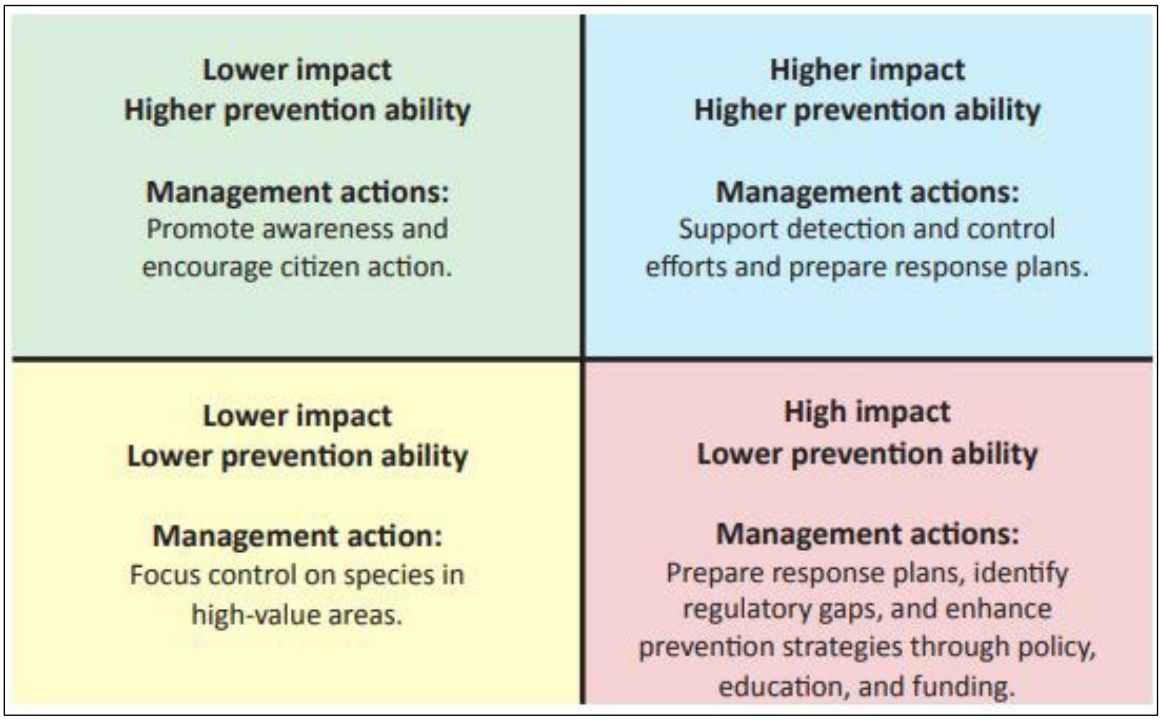

Figure 3.1-2. Invasive species management priorities grid developed by the Washington Invasive Species Council and used to guide council actions (Source: WISC 2020).

WISC's prioritization list is developed by invasive species professionals who review and reevaluate candidate species annually (WISC 2020). As an initial risk assessment step, this list will be used in implementing City Light's AISMP and reviewed annually to identify those species that fall under the scope of the AISMP (i.e., freshwater aquatic fauna).

Taxa currently prioritized by WISC that are within the scope of this AISMP are:

- Dreissenids: Zebra (*Dreissena polymorpha*) and quagga (*D. bugensis*) mussels;
- New Zealand mud snail (*Potamopyrgus antipodarum*);
- Invasive crayfish, including virile (*Orconectes virilis*), rusty (*O. rusticus*), and red swamp (*Procambarus clarkii*) crayfish;

- Bullfrog (*Rana catesbeiana*) and African clawed frog (*Xenopus laevis*);[1]
- Invasive fish predatory fish, including Northern Snakehead and Northern Pike and
- Invasive aquatic plants, including (but not limited to) Eurasian milfoil (*Myriophyllum spicatum*);

WISC scoring categorizes zebra and quagga mussel as "higher impact, higher prevention ability," recommending management actions that support detection and control efforts and development of a response plan (Figure 3.1-2). New Zealand mudsnail and invasive crayfish and frog species are categorized as "higher impact, lower prevention ability," with recommended management actions that develop response plans, identify regulatory gaps, and enhance prevention strategies through policy, education, and funding.

The second step in risk assessment will focus on identifying and evaluating pathways of introduction to Project waters for a given AIS. Potential AIS pathways include:

- Boats and fishing gear
- Downstream dispersal
- Aquaria specimens
- Live bait releases
- Biological supply houses
- Construction activities/heavy equipment
- Scuba/ROVs
- Aquatic monitoring/sampling gear
- Firefighting activities
- Restoration activities
- Intentional releases

For each species, relevant pathways will be identified and evaluated in terms of their scale/magnitude, proximity to Project waters, and probability/frequency of pathway occurrence. The above list of pathways is neither exhaustive nor fixed; new pathways may develop, or existing pathways may become obsolete as activities, facilities, or regulations change over time. Thus, an important step in implementing the AISMP will be to routinely review potential pathways.

The risk assessment steps outlined above will identify priority AIS for which feasible introduction pathways exist in the vicinity of Project waters. The following implementation steps (prevention, early detection, rapid response, and adaptive management) will be geared toward these species.

[1] City Light will coordinate any efforts or information collected related to amphibians with other license article obligations, including management plan activities focused on terrestrial resources.

3.2 Prevention

Prevention will rely on a layered approach involving both active and passive measures that target specific pathways, including education, watercraft inspections, install gates or other preventative measures, at boat launches, and regional coordination. Preventive measures will initially focus on those species identified through the risk assessment steps (i.e., invasive Dreissenids, crayfish, and frog species). However, measures may be refined through adaptive management should new or additional species become prioritized or additional pathways are identified.

3.2.1 Information and Education Outreach

City Light will develop and make available an informational brochure describing the risks and costs associated with AIS introductions, the importance of preventing introductions, recommended practices for their prevention, and steps for reporting observations. The brochure will be geared toward recreational user groups representing specific pathways (e.g., anglers, boaters, campers, etc.) and made available for distribution at Project recreation points of access and facilities.

City Light will also place signage relaying similar information in an abbreviated format at locations throughout the Project that represent the most likely points of introduction. These include docks, angler access locations, beaches, campgrounds, and all boat ramps or launch facilities.

Annually, City Light will provide training for Project staff and contractors relating to BMPs for preventing the introduction of AIS. This training will be focused on activities related to Project O&M and facilities where introduction pathways exist, such as heavy equipment operation, facility maintenance, boat usage, and any habitat restoration actions or environmental research and monitoring efforts. Specific protocols will be adapted from the latest Invasive Species Management Protocols developed by WDFW (2022).

3.2.2 Watercraft Inspection and Cleaning

Watercraft inspections are an integral component of AIS prevention. City Light will continue implementing watercraft inspections and best management practices for AIS consistent with activities under the current license. Within three (3) years of license issuance, City Light, in consultation with the Skagit License Implementation Committee (SLIC), will develop an updated AIS watercraft inspection and operations program to continue addressing AIS introduction risk from recreational, research or operations-related watercraft use on Project reservoirs. As part of an updated watercraft inspection program, City Light will construct and operate a watercraft inspection, decontamination, and cleaning station in Newhalem. City Light staff and contractors will use this facility to conduct inspections and decontamination of any of their watercraft used in waters outside the Project Boundary prior to Project use. Additionally, City Light will cooperate with relevant authorities to make the facility available to the public during the recreation season to support regional AIS inspection and decontamination efforts.

3.2.3 Regional Coordination

City Light will coordinate directly with the WDFW, AISU, and WISC regarding information-sharing, planning, activities, and rapid response actions related to AIS. In addition, City Light staff will engage with regional AIS coordinators including partners in neighboring states and provinces.

Such regional coordination will be integral to ongoing understanding of new AIS species, risks, pathways, and monitoring and mitigation approaches.

In consideration of flow dispersal pathways, and because the Skagit River Basin includes 381 square miles upstream of Ross Lake in British Columbia (B.C.), City Light will also engage with Canadian partners. This will occur either directly with the Invasive Species Council of B.C. or via international fora such as the Invasive Species Working Group of the Pacific Northwest Economic Region, a statutory public/private non-profit created by northwestern states and provinces.

As invasion pathways are identified and evaluated during AISMP implementation, City Light may form partnerships with other stakeholders or user-groups to facilitate further educational, monitoring, or response activities.

3.3 Early Detection

The early detection of AIS following an initial invasion is a critical component of invasive species management because it increases the likelihood that eradication measures can be successfully implemented before the founding population becomes established or spreads (USDOI 2016). Early detection concepts are typically paired with a rapid response plan as part of a coordinated EDRR framework (although early detection and rapid response steps are listed separately here, this AISMP follows such a framework). Early detection efforts will be comprised of three measures: (1) support and supplementation of AISU's ongoing monitoring efforts; (2) deployment and monitoring of artificial substrates and shoreline surveys; and (3) facilitating incidental observations.

3.3.1 AISU Support

The foundation of City Light's early detection efforts will be coordination with and support of AISU's ongoing efforts in the Project Boundary through supplemental sampling. In developing the current sampling program, AISU chose the number of monitoring sites and the sampling frequency based on a risk assessment of each water body using over 17 different variables (e.g., access, calcium concentrations, land use, etc.) (City Light 2020). As described above and based on the resulting "low-risk" rating, the current monitoring program involves sampling at one site in Gorge Lake and two sites in Ross Lake on an annual basis. City Light will provide funds or in-kind support to increase the sampling frequency at existing sites. City Light may also support monitoring at additional sites as warranted based on annual risk assessment. The actual number of sampling sites and sampling frequency will be determined annually based on the prevailing understanding of invasion pathways and priority species for monitoring in consultation with AISU.

The monitoring methods used to date by AISU in lentic waterbodies include plankton net tows, Ponar grabs, deployment and monitoring of artificial substrates for AIS colonization, visual shoreline inspections, water quality sampling (including dissolved calcium concentration), and collection of eDNA samples (Schultz 2019). Appropriate monitoring method(s) will be dependent on the prevailing understanding of invasion pathways and priority species for monitoring. Because monitoring priorities may change over time, and AIS monitoring techniques and technologies are rapidly evolving (Larson et al. 2020), the monitoring approach will be selected in consultation with AISU and reviewed with the SLIC, annually. As an example, if water quality parameters in Project reservoirs were deemed to be limiting for colonization by zebra/quagga mussels, sampling

for mussel veligers with plankton net tows may be ruled out in favor of methods that target AIS having a higher risk profile.

3.3.2 Artificial Substrate Monitoring and Shoreline Surveys

To further increase early detection capabilities for zebra/quagga mussels, and separate from support of other AISU efforts, within one (1) year of license issuance, City Light will deploy artificial substrates at each development (i.e., at Ross, Diablo, and Gorge dams), in coordination with AISU or as part of supporting AISU efforts (Section 3.3.1), and inspect them for colonization on no less than a quarterly basis. In addition, City Light will conduct shoreline surveys in Ross Lake annually after the seasonal drawdown is complete. Specific methods for both efforts will be adapted from the Zebra and Quagga Mussel Field Sampling and Monitoring Protocol developed by the Western Regional Panel on Aquatic Nuisance Species (WRP 2020).

3.3.3 Incidental Observations

In addition to the targeted monitoring described above, City Light will facilitate the reporting of any AIS incidentally observed in the Project Boundary through the following mechanisms:

- *Other monitoring activities*: Activities associated with other resource measures/management plans at the Project (e.g., sampling or surveys) that have the potential to encounter AIS. City Light will establish protocols for coordination, documentation, retention of specimen vouchers, and reporting of any AIS observed as part of these activities.
- *City Light staff and contractors*: AIS training described in Section 3.2.1 will include guidance on priority AIS, their identification, documentation, and reporting protocols for personnel routinely working at the Project.
- *Members of the public*: Signage and brochures described in Section 3.2.1 will include guidance on identifying priority AIS and provide contact information in the event of observation.

3.4 Rapid Response

After early detection, a rapid response is equally essential to maximizing the likelihood that prospective mitigation measures will be successful in preventing or limiting colonization. WISC (2020) identifies several key elements of best management practices for EDRR. Specific to rapid response planning, these include (1) clear interagency and public communication, (2) access to necessary resources, (3) secure funding, (4) predetermined protocols, and (5) a level of detail balanced against the need for species-specific flexibility. WISC also identified activation of the Incident Command System, used widely in emergency response, as a valuable component for many rapid response efforts.

Washington State's Aquatic Nuisance Species Management Plan (WDFW 2001) provides a broad framework to guide the state's management of AIS by coordinating ongoing actions and identifying new strategies. However, for select high-priority AIS, WDFW has also developed species-specific rapid response plans. Notable is the Washington Dreissenid Mussel Rapid Response Plan (WDFW 2014), which identifies the following response steps:

(1) *Verification of Reported Introduction*: Evaluate details of initial detection to determine waterbody status.

(a) Inconclusive – One positive test result, but has not met minimum criteria for detection (temporary status).

(b) Suspect – Meets minimum criteria for detection (management trigger).

(c) Positive – Multiple subsequent sampling events that meet minimum criteria for detection.

(d) Infested – Established reproducing population (both juveniles and adults).

(2) *Initial Response*: Specific procedures will depend on waterbody status but will entail the following actions.

(a) Reporting

(b) Notification

(c) Defining extent of colonization

(d) Preventing further spread

(e) Initiating control actions

(3) *Extended response and long-term monitoring*

(a) Continue control strategy of Initial Response phase

(b) Develop long-term control objectives

(c) Design monitoring program

(d) Communicate findings

(e) Evaluate and revise control strategy as needed

Within one (1) year of license issuance, City Light, in consultation with the SLIC, and subject to approval by the NPS on areas on or affecting NPS land and waters, will develop a Project Rapid Response Plan in the event of a potential AIS observation that is generally consistent with the steps described above. City Light's primary role in the implementation of rapid response measures will be to immediately notify appropriate agencies of any suspected AIS observed by Project staff, by contractors, or through implementation of the prevention/detection measures described above. In such an event, City Light will strive to contact WDFW in its role as the lead agency (via an established AISU contact) and WISC (via the online/mobile reporting system) within 24 hours and the NPS for areas on or affecting NPS lands and waters. As feasible, a voucher specimen will be retained for transport to WDFW for verification and the time and precise location at which the observation occurred will be reported.

City Light will also strive to notify SLIC members within 72 hours of suspected AIS detection. In addition, City Light will actively participate in regional response coordination efforts at a level commensurate with the magnitude of the risk and its nexus to Project facilities, operations, or programs.

3.5 Adaptive Management

AIS management is a rapidly evolving field, partly because of the nature of invasion biology, but also because of evolving responsibilities and responses (e.g., regulations, legislation, monitoring techniques, and control tools). As such, adaptive management principles will be applied throughout implementation of the AISMP. Where practicable, implementing adaptive management will incorporate the testing of hypotheses that specific measures representing best practices (Walters 1986). Specific components of the plan for which routine review and refinement are particularly important are as follows:

- New or obsolete AIS species risks and prioritization;
- New or obsolete invasion pathways;
- Efficacy of information and education outreach;
- Watercraft inspection;
- Detection monitoring techniques and technologies;
- Sampling frequencies;
- Number of monitoring sites; and
- Communication protocols and coordination efforts.

The mechanism for adaptively managing the AISMP will be through an annual meeting with the SLIC to review management plan implementation. If not previously approved by the NPS, any proposed changes to monitoring or implementation measures on or affecting NPS land and waters will be subject to approval by the NPS prior to implementation or filing with the FERC. If not previously approved, any proposed changes to monitoring or implementation measures affecting ESA-listed species and/or their habitats, will be subject to approval of USFWS and/or NMFS before filing the proposed changes with FERC.

Within two (2) years after license issuance, City Light in consultation with the SLIC, will prepare an Implementation Plan that includes a list of management actions, based on monitoring information, best available science, and/or modeling, to be implemented by City Light. The Implementation Plan will be submitted to the SLIC for technical review and evaluation and will be subject to approval by the NPS as it relates to prevention strategies and measures on or affecting NPS land and waters.

At five (5) year intervals, or as needed and proposed by the SLIC, City Light will evaluate monitoring information to determine if new best available science, BMPs, updates to AISMP strategies, or changes to locations would increase the success of the protection and enhancement measures included in this AISMP (including the Implementation Work Plan).

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects

ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

4.0 SCHEDULE AND REPORTING

4.1 Implementation and Monitoring Schedule

Implementation of the AISMP will begin upon license issuance and continue through the license term. The schedule for specific measures is shown in Table 4.1-1.

Table 4.1-1. Implementation schedule for AISMP measures.

Measure	Timing	Frequency
Implementation Work Plan	Within 2 years after License Issuance in consultation with the SLIC and subject to NPS approval.	Review every five years
Risk Assessment	Annual meeting (date TBD)	Annually
Prevention		
Annual Report	Report to SLIC on annual activities based on the Implementation Work Plan and shared through the Annual Report (previous year's activities and planned current and upcoming activities). Annual work plan activities on locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing, and scope of the activities). If not previously approved, any proposed changes to monitoring or implementation measures affecting ESA-listed species and/or their habitats, will be subject to approval of USFWS and/or NMFS before filing the proposed changes with FERC.	Annually
Information and Education Outreach	Beginning within one (1) year of license issuance	Content reviewed annually for accuracy and relevance
Develop an updated AIS watercraft inspection and operations program	Beginning within three (3) years of license issuance	Annually
Construct Watercraft Inspection and Decontamination Facility at Newhalem	Construction will commence within ten (10) years of license issuance	Once constructed, operated annually for remainder of the license
Regional Coordination	Annual meeting (date TBD)	Annually

Measure	Timing	Frequency
Early Detection Monitoring		
Annual Report	Report to SLIC on annual activities based on the Implementation Plan and shared through the Annual Report (previous year's activities and planned current and upcoming activities). Annual work plan activities on locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing and scope of the activities).	Annually
AISU Support	TBD in consultation with AISU	TBD in consultation with AISU, but greater than once annually
Artificial Substrate Monitoring	Continual deployment beginning within one (1) year of license issuance	Inspection of substrates to occur at minimum, once quarterly
Shoreline Inspections	To be conducted following fall drawdown	Once annually
Rapid Response	Completion within one (1) year of license issuance	As warranted
Adaptive Management	Annual meeting (date TBD)	Annually and as warranted

4.2 Reporting Schedule

City Light will provide a draft annual report summarizing AISMP efforts and results during the preceding year, proposed current year and out year activities including and any recommended changes to the SLIC. When filing this annual report with FERC, City Light shall include documentation of consultation, copies of comments and recommendations, and specific descriptions of how comments and recommendations from the SLIC were accommodated. Annual work plan activities and monitoring on locations on or affecting NPS lands and waters shall be subject to NPS approval if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing and scope of the activities). If City Light does not adopt a recommendation, the filing shall include the reasons based on project-specific information.

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RESERVOIR EROSION MANAGEMENT AND MONITORING PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT FERC NO. 553

Seattle City Light

November 2025

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List of Acronyms and Abbreviations

City Light.....Seattle City Light
CRWG.....Cultural Resources Work Group
FERC.....Federal Energy Regulatory Commission
GIS .....Geographic Information System
GPS .....Global Positioning System
HPMP.....Historic Properties Management Plan
LiDAR.....Light Detection and Ranging
NPS .....National Park Service
Project .....Skagit River Hydroelectric Project
RTE.....rare, threatened, and endangered
SLIC.....Skagit License Implementation Committee
SR.....State Route

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Reservoir Erosion Management and Monitoring Plan for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) Project No. 553. This Reservoir Erosion Management and Monitoring Plan describes the goals and recommendations for erosion control measures and erosion monitoring along Project reservoir shorelines and within the drawdown zones of the reservoirs. The goals of this Reservoir Erosion Management and Monitoring Plan are to minimize erosion along reservoir shorelines and drawdown zones that affect important natural, cultural, and recreational resources and to provide a framework for monitoring erosion over the term of the new license to inform management measures.

City Light will coordinate the efforts required under this Reservoir Erosion Management and Monitoring Plan with other license article obligations, including other Project resource management plans and measures included in the new license. Close coordination will take place between the efforts undertaken during planning and implementation of this Reservoir Erosion Monitoring and Management Plan and City Light's Historic Properties Management Plan (HPMP) to ensure adequate protection and monitoring of erosion effects related to cultural and historic properties near and within Project reservoirs while maintaining confidentiality of such resources. In addition, City Light will coordinate implementation with other related management plans and measures to protect wetlands and amphibians, and measures to handle woody debris on Project reservoirs will take place during implementation of this Reservoir Erosion Management and Monitoring Plan. City Light's other management plans and measures relevant to this Reservoir Erosion Monitoring and Management Plan include:

- Aquatic Invasive Species Management Plan;
- HPMP;
- Invasive Plants Management Plan;
- Recreation Management Plan;
- Reservoir Fisheries Management Plan;
- Wetland Enhancement Measures[1];
- Vegetation Management Plan;
- Water Quality Monitoring and Data Management Plan; and
- Wildlife Protection and Enhancement Plan.

[1] The Wetland Enhancement Measures will be developed in consultation with the Skagit License Implementation Committee (SLIC) following license issuance.

2.0 PURPOSE AND SCOPE OF THE PLAN

This Reservoir Erosion Management and Monitoring Plan includes measures and monitoring to guide City Light's actions to minimize potential effects of reservoir erosion on identified important resources under the new license. Reservoir operations have the potential to affect erosion along reservoir shorelines and within reservoir drawdown zones. Erosion has the potential to affect cultural resources and historic properties; recreation facilities at boat-in campsites, boat docks, and reservoir-adjacent trails; water quality; and terrestrial and aquatic habitat. This Reservoir Erosion Management and Monitoring Plan is effective for the term of the new license including any annual licenses and is subject to annual reporting, periodic five (5) year review and updates in consultation with the SLIC,[2] and periodic 10-year reporting to FERC.

2.1 Goals and Objectives

The primary goals of this Reservoir Erosion Management and Monitoring Plan are as follows:

- Minimize the extent and rate of erosion along reservoir shorelines and within reservoir drawdown zones where erosion is affecting important cultural resources and historic properties, recreation sites, terrestrial habitat, aquatic habitat, or water quality.
- Consider a range of erosion control measures at locations chosen for erosion control, including vegetation and bioengineering techniques as appropriate, based on site and resource characteristics.
- Coordinate with the protocols and management measures in the HPMP to provide information needed for HPMP and National Historic Preservation Act compliance.
- Monitor reservoir erosion and erosion control measures:
    - Assess reservoir shoreline erosion rates and vegetation loss at shoreline monitoring sites;
    - Inventory shoreline erosion along entire reservoir shorelines at 10-year intervals to document any changes to all shoreline erosion sites;
    - Assess ongoing erosion and deposition within the drawdown zone (below the normal maximum water surface elevation) at stump monitoring sites within the Ross Lake drawdown zone; and
    - Monitor erosion control structures and revegetation sites to assess effectiveness and provide maintenance, as needed.
- Identify and employ an adaptive management strategy for implementing erosion control that includes monitoring and triggers for management actions.

[2] The SLIC includes entities that will consult regarding implementation and monitoring of this Reservoir Erosion Management and Monitoring Plan and contribute to adaptive management decisions.

2.2 Geographic Area

The geographic scope of this Reservoir Erosion Management and Monitoring Plan includes the reservoir shoreline and drawdown zones of the three Project reservoirs: Ross Lake, Diablo Lake, and Gorge Lake.

2.3 Reservoir Erosion Setting, Existing Erosion Control Measures and Past Erosion Monitoring

The Skagit River Project includes three Project reservoirs (Ross, Diablo, and Gorge lakes). Operation of the Project results in erosion of portions of the shoreline in each reservoir, and seasonal drawdown of Ross Lake results in erosion and re-working of substrate in the drawdown zone. Reservoir shoreline erosion was inventoried in 1990 and in 2021-2022 as part of City Light's licensing studies (Riedel 1990 and City Light 2023a).

The 1990 reservoir erosion inventory identified 76,479 feet of eroding shoreline in Ross Lake, 8,038 feet of eroding shoreline in Diablo Lake, and 925 feet in Gorge Lake. The reservoir erosion inventory conducted in 2021-2022 identified a total of 306 erosion sites covering 74,272 feet (19 percent) of reservoir shoreline length in Ross Lake, 43 sites (4,556 feet or 4 percent of shoreline length) in Diablo Lake, and 13 sites (3,874 feet or 6 percent) in Gorge Lake. In Ross Lake, 87 of the sites shown on the 1990 map were stabilized, and 79 new sites were identified. In Diablo Lake, 49 of the 1990 sites were stabilized, and 15 new sites were mapped. In Gorge Lake, 13 of the 1990 sites were stabilized, and 9 new sites were inventoried in 2022.

Bank retreat rates in the three lakes were used to estimate loss of terrestrial land around each lake. Average annual loss was estimated to be 0.8-1.6 acres/year at Ross Lake, 0.2-0.4 acres/year at Diablo Lake, and 0.02-0.04 acres/year at Gorge Lake.

Reservoir shoreline erosion control measures were installed as part of the previous Project license at thirty-two locations near recreation areas. As of 2021, existing erosion control measures include rock walls, crib walls, and revegetation with native vegetation.

In 2022, erosion within the Ross Lake drawdown zone was measured using exposed tree stumps. Stumps were marked for future monitoring purposes. Measured erosion was compared to site conditions (e.g., substrate, slope gradient, aspect, elevation) but no obvious consistent correlations were found. Observations during field measurements suggested that at a given site, there was generally more erosion at higher elevation/more frequently exposed sites, but site-specific factors such as local small-scale topography appeared to override these trends when all data were analyzed together. The lack of correlation among factors that are hypothesized to influence erosion using the entire root crown height dataset demonstrates the potential need for assessing site -specific factors at areas where erosion (or deposition) is a concern for other resources.

The Variable Summer Operational changes proposed under the new Project license will result in a generally lower and more variable summer water elevation in Ross Lake. It is likely that the lower reservoir elevation will alter the rates and locations of shoreline and drawdown erosion in Ross Lake compared to past operations. With generally lower water levels, the toe of the shoreline may no longer be the primary locus of erosion in Ross Lake. However, it is not clear how overall erosion will be affected. If locations are identified (through either monitoring or incidental

observations) where erosion is adversely affecting identified important resources, implementation of erosion control or other appropriate measures will be developed in a timely manner and emergency action may be necessary for sensitive resources.

3.0 PLAN IMPLEMENTATION

This Reservoir Erosion Management and Monitoring Plan will be implemented in consultation with the SLIC. Collaboration with agencies, Indian Tribes and Canadian First Nations, non-governmental organizations, landowners or managers, or other groups will be included for specific efforts, as appropriate.

SLIC consultation will include locations for potential new or modified erosion control treatments at existing erosion sites and identification, prioritization, and metrics/triggers for any new erosion sites identified as part of monitoring efforts. Review of implementation effectiveness will be communicated annually to the SLIC by City Light and formal reports will be submitted to FERC every ten (10) years. Implementation of this Reservoir Erosion Management and Monitoring Plan includes:

- Identify areas where shoreline or drawdown erosion intersect with important resource values.
- Prioritize areas for erosion control/revegetation efforts by erodibility and magnitude of effects on identified resources.[3]
- Based on prioritization, areas will be identified for:
  - Implementation of new erosion control measures;
  - Inclusion as a resource-specific monitoring site; or
  - Re-evaluation after each ten (10) year period and five (5) year update of the general shoreline/drawdown monitoring program.

3.1 Identification and Prioritization of Reservoir Erosion and Resource-Specific Affected Sites

This section describes the identification and prioritization process that will consider baseline data of reservoir erosion with known:

- Cultural resources/historic properties;
- Recreation resources;
- Terrestrial habitats, including wetlands, shoreline tree and shrub habitats, invasive plants, and rare, threatened, and endangered (RTE) plants;
- Aquatic habitat including aquatic invasive species; and
- Water quality.

Identified sites will be prioritized for implementation of erosion control, monitoring, or re-evaluation. The prioritization will be based on factors such as resource(s) affected, location, extent,

[3] Prioritization of areas will use baseline data established during City Light's relicensing studies, as described in the GE-01 Reservoir Shoreline Erosion Study Report (City Light 2023a) and the GE-03 Sediment Deposition in Reservoirs affecting Resource Areas of Concern Study Report (City Light 2023b).

geology and soils, slope conditions, vegetation present, and the feasibility of implementing effective erosion control measures.

Sites on Diablo Lake and Gorge Lake will be prioritized in Years 1-3 of license issuance.

Reservoir erosion sites within the Ross Lake drawdown zone will be prioritized for any additional monitoring or any erosion control needs in Years 1-3 of license issuance. If critical erosion/resource impact areas are identified in the Ross Lake drawdown zone, those areas will be considered for erosion control planning in Years 1-3.

Existing shoreline erosion control measures on Ross Lake that require rehabilitation or were in the process of treatment under the previous license, will be prioritized in Years 1-2 of license issuance, as well as identifying and removing select non-functioning shoreline structures[4] made with non-natural materials, which may affect shoreline erosion (i.e., bulk concrete or metal structures) (see Table 3.1.1).No new areas of critical reservoir shoreline erosion associated with important resource effects were identified on Ross Lake during relicensing studies. Shoreline erosion sites on Ross Lake will be assessed and prioritized in Years 1-3 of license issuance to determine if any additional monitoring (beyond that proposed in Section 4 of this Reservoir Erosion Management and Monitoring Plan) is needed. Information from the first 10 years of monitoring will be used to identify effects of the proposed new reservoir operating levels on erosion patterns and the potential need for new erosion control measures. Consideration for erosion control measures at Ross Lake shoreline erosion sites will be completed during Years 11-13 following the first 10 years of monitoring.

After the initial analysis and prioritization described above, consideration for new or updated erosion control measures will occur every five years through the term of the new license (see Table 4.1.3 below). However, if new erosion areas or unusually active areas of erosion are noted either as part of monitoring or incidental observations, they will be evaluated on an annual basis and as-needed in consultation with the Cultural Resources Work Group (CRWG) and/or as a part of HPMP implementation.

3.1.1 Cultural Resources/Historic Properties

To protect confidentiality of cultural resources and historic properties, evaluation of such resources that may need erosion control and implementation of erosion control treatments are not included in this Reservoir Erosion Management and Monitoring Plan but will be addressed under the HPMP, as needed.

Reservoir erosion monitoring described within this Reservoir Erosion Management and Monitoring Plan may include locations that pertain to cultural resources or historic properties, and new monitoring sites may be added to this Reservoir Erosion Management and Monitoring Plan as part of HPMP implementation, as needed. Continued close coordination between the HPMP and this Reservoir Erosion Management and Monitoring Plan will take place through sharing of annual reports and implementation of the activity review process outlined in the HPMP. If new areas of erosion are found during the erosion/deposition monitoring, the City Light Cultural Resources Coordinator will assess the new information and will consult with the CRWG, as needed

[4] Removal of structures will undergo environmental and cultural review.

in compliance with the HPMP, to review potential effects and to identify means for erosion monitoring and/or treatment areas.

3.1.2 Recreation Facility Erosion Control Sites

Erosion control measures were implemented as part of the existing license at recreation sites around Project reservoirs. Thirty-two sites where erosion control measures have been implemented were evaluated in 2021 as part of the reservoir shoreline erosion inventory—29 sites on Ross Lake and 3 sites on Diablo Lake (Figure 3.1-1 and Table 3.1-1). No sites were located on Gorge Lake. Observations made at each site in 2021 are included in Table 3.1-1. Erosion control measures included installation of rock walls, rock stairs to access the lake, log walls, wood cribbing, and rerouted sections of trails and log booms at boat-in campsites, along trails, and at other recreation facilities (trailheads, docks).

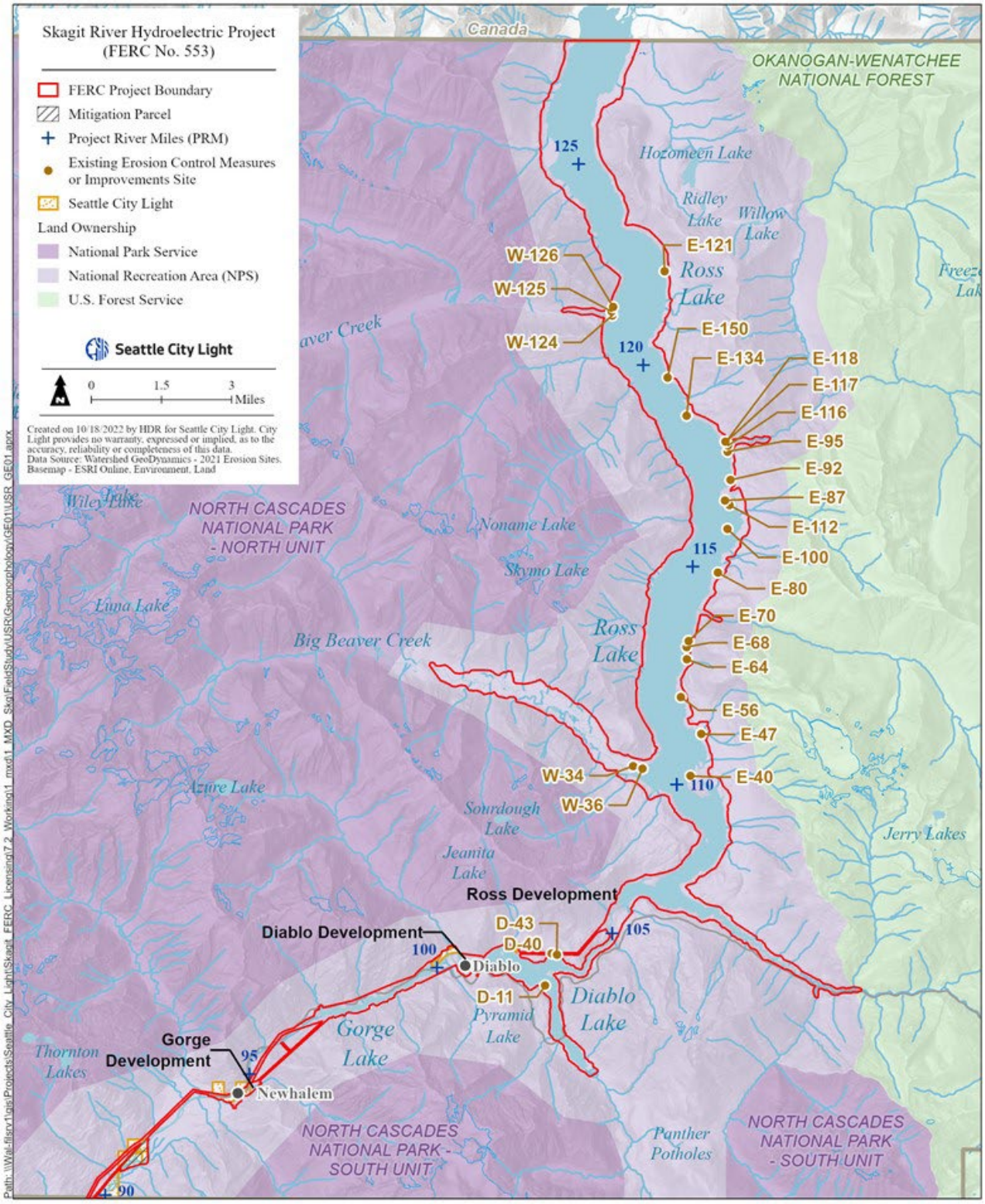

Figure 3.1-1. Existing erosion control site locations, 2021.

Table 3.1-1. Status of sites with existing erosion control measures or improvements, 2021.[1]

Reservoir	1990 Site Number	Name and Erosion Control Method	Year Constructed	Condition Assessment Summer 2021
Ross	E-40	McMillian - rock wall 33ft x 3ft	2004	Rock wall is a jumble (failing) but still providing erosion protection.
Ross	E-47	May Creek - rock wall 39ft x 4.5ft (north of dock) 4ft x 4.5, (south of dock)	2002	North side of wall needs fill around base rocks. South side good.
Ross	E-56	Rainbow Point - rock wall 170ft x 4ft	N/A	Not found. Note that there is piping of sediment from behind the Rainbow Point dock footings.
Ross	E-64	East Bank Trail - reroute 120ft x 3ft (height estimated)	2003	Not visited.
Ross	E-68	East Bank Trail - rock wall 80ft x 4ft	2003	Not found.
Ross	E-70 (A-1)[2]	East Bank Trail - cribbing 30ft x 60ft	1995	Cribbing in good condition.
Ross	E-70 (A-lA)	East Bank Trail - cribbing	1997-98	Cribbing in good condition.
Ross	E-70 (A-2)	East Bank Trail - cribbing upper tier: 35ft x 6ft lower tier: 30ft x 6ft	1996-97	Cribbing in good condition.
Ross	E-70 (A-3)	East Bank Trail - cribbing 100ft x 15ft	1998	Cribbing in good condition.
Ross	E-70 (A-4)	East Bank Trail - cribbing 45ft x 25ft	2001	Cribbing in good condition.
Ross	E-70 (A-5)	East Bank Trail - cribbing 30ft x 3ft and 50ft x 10ft; also 40ft x 5ft mid-section	1995	Cribbing in good condition.
Ross	E-70 (A-5A)	East Bank Trail - cribbing	1997	Cribbing in good condition.[3]
Ross	E-70 (A-6)	East Bank Trail - cribbing no rebuild, only reveg. 2,000 sq ft	2000-2001	Cribbing in good condition.
Ross	E-80 (A)	Devils Junction - rock wall 103ft x 4.5ft	1992	Cribbing in good condition.
Ross	E-80 (B)	Devils Junction - rock wall 44ft x 2 to 3ft	2004	Cribbing in good condition.
Ross	E-100	10 Mile - rock wall and logs 54ft x 3.5ft (E of NE point) 60ft x 4ft (W of N point)	2001	Walls in good shape.
Ross	E-112	Dry Creek - rock wall & logs 23ft x 3ft (SE corner of campground) 45ft x 4.5ft (S shore of campground)	1999	Rock wall in good condition but could use fill around base rocks.
Ross	E-87	Ponderosa - rock wall 141ft x 5ft	2003	Wall to south side of stairs needs fill around base rocks.

Reservoir	1990 Site Number	Name and Erosion Control Method	Year Constructed	Condition Assessment Summer 2021
Ross	E-92	Lodgepole - two rock walls 10ft x 3- 4ft	2004	Walls not found; site eroding.[4]
Ross	E-95	Lightning Horse - rock wall 287ft x 4ft faced with 2-3ft diameter rocks	1998-99	Wall looks to be in good shape but could use fill around base rocks in a few spots.
Ross	E-116	Lightning Trail - reroute about 350ft long	Unknown	Trail re-route not found; large wood anchored along shoreline.
Ross	E-117	Lightning Trail - rock wall 60ft x 2 to 3ft	2000	New section of wall is in good shape; old section of wall is failing in spots because rocks are too small.
Ross	E-118A	Lightning Camp - log wall Two 20ft x 1ft walls	2000	In good shape; accumulating wood at base of wall.
Ross	E-118B	Lightning Camp - rock wall 45ft x 1ft	2000	In good shape; accumulating wood at base of wall.
Ross	E-134A	Cat Island - rock wall 18ft x <2ft	2000	Wall generally in good shape, but a few rocks have fallen off wall on east end. Logs cabled parallel to shoreline.
Ross	E-134B	Cat Island - rock wall 50ft x 6ft (W of dock) 68ft x 3.5ft (Further W of bedrock)	2001	Wall in good shape. Base of dock support is being undermined by waves.
Ross	E-150	Desolation Peak Trailhead rock wall	Unknown	Rock wall has failed; not long enough, eroding.
Ross	E-181	Boundary bay - rock wall 155ftx 4 to 5ft	1993	Needs fill around base rocks in several locations. Raveling on north end of wall.
Ross	W-34	Big Beaver trail - rock wall 200ft x 3ft	1996	Wall generally in good shape. Needs fill around base rocks on east end.
Ross	W-36	Big Beaver - rock wall 50ft x 2ft	2002	In good shape.
Ross	W-124	Little Beaver - rock wall, steps, stairs are 25ft section	1998	Rock wall and dock anchor are being undermined by wave action. Stairs are raveling.
Ross	W-125	Little Beaver - rock wall 70ft x 5 to 6ft	N/A	Rock wall not found. Log boom parallel to shore.
Ross	W-126	Little Beaver Trail - cribbing and dock removal	N/A	Not removed yet. Cribbing failing.
Diablo	D-11	Thunder Point - rock wall 290ft x 2 to 3ft	2005	Needs fill around base rocks along wall. Dock anchor wall being undermined.
Diablo	D-40	Power Line - rock & log boom 93ft x 2-3ft	2005	Log boom in good shape. Did not see wall; area not eroding.
Diablo	D-43	Buster Brown - rock wall 100ft x3.5ft	2005	West end of wall is tumbling down because fill behind wall is eroded (piping through wall?). Wall could use fill under base rock in several places.[5] Dock footings are in good shape.

1 Note that this table reflects 2021 inventory conditions. The Site Number, Erosion Control Method, and Year Constructed are based on National Parks Service (NPS) data. Comments received as of 2024 from NPS about updates to specific locations are included as table notes.

2 The crib walls at Ross E-70 and E-80 are differentiated by letters in this table but shown as single locations on Figure 3.1-1 due to map scale.
3 Failing rock wall at Ross E-70A-5b is currently being repaired by the North Cascades National Park Complex erosion control staff (Sarrantonio 2024, personal communication).
4 Ross E-92 Lodgepole - two rock walls 10ft x 3- 4ft requires action (Sarrantonio 2024, personal communication).
5 Failing wall at Diablo D-43 work completed in 2022 and is now in good shape (Sarrantonio 2024, personal communication).

If new recreational resources are added to the reservoirs under the new license, then erosion management treatments will be designed and implemented to protect these resources in consultation with the SLIC and with approval by the NPS that measures are consistent with this Reservoir Erosion Management and Monitoring Plan. If Project operations result in erosion that affects the new recreation areas, appropriate monitoring will be undertaken (Section 4 of this Reservoir Erosion Management and Monitoring Plan).

3.1.3 Terrestrial Habitats, including Wetlands, Invasive Plants, and RTE Plants

Terrestrial habitat that can be affected by reservoir erosion include upland and riparian areas along eroding reservoir shorelines and vegetated areas within the drawdown zones. Potential erosion effects include:

- Loss of terrestrial habitat from bank retreat (possibly including loss of upland and riparian plants, RTE plant habitat, and wildlife habitat). The 2021-2022 reservoir shoreline erosion inventory data were used to evaluate potential effects to these resources; no specific RTE plant or important wildlife habitat effects were noted. Loss of terrestrial habitat/upland plants along eroding shorelines will continue; monitoring described in Section 4 of this Reservoir Erosion Management and Monitoring Plan will be used to evaluate these effects.
- Changes to wetlands within the drawdown zone. The 2021 -2022 reservoir shoreline erosion inventory data were overlain with wetland mapping completed as part of relicensing studies. Identified overlaps include:
  - Ross Lake erosion site 2034 and Wetland site 3701 (PEM).
  - Ross Lake erosion site 2060 and Wetland site 3716 (PEM).
- Unvegetated areas have the potential for invasive plant growth. The 2021-2022 reservoir shoreline erosion inventory data were overlain with invasive species mapping completed as part of relicensing studies. Identified overlaps include:
  - Two Gorge Lake erosion sites (4020 and 4021) had mapped periwinkle.
  - Ten Ross Lake erosion sites (2033b, 2034, 2094f, 2101, 2112, 2113, 2117a, 2123, 2124a, 2131) had mapped reed canary grass.

These sites as well as other areas of the reservoirs will continue to be monitored and evaluated over the term of the new license as described in Section 4 of this Reservoir Erosion Management and Monitoring Plan and in coordination with City Light's Invasive Plants Management Plan to determine if reservoir erosion is contributing to invasive plant spread or establishment. If so, appropriate site-specific erosion control treatments and monitoring will be implemented in coordination with the Invasive Plants Management Plan.

3.1.4 Aquatic Habitat including Aquatic Invasive Species

Reservoir erosion and sediment movement within the drawdown zones has the potential to affect littoral habitat. Ongoing monitoring of fish resources in the reservoirs will take place as part of City Light's Reservoir Fisheries Management Plan and invasive aquatic species will be addressed through City Light's Aquatic Invasive Species Management Plan.

3.1.5 Water Quality

Reservoir shoreline erosion and erosion within the drawdown zones has the potential to produce localized short-term turbidity and suspended sediment within the reservoirs. Incidental observations and water quality monitoring as part of relicensing studies showed that turbidity effects were minor, localized, and ephemeral (City Light 2023c). Turbidity events occur if the reservoir elevation and wave/wind patterns (City Light 2023c) result in wave energy at specific shoreline locations with erodible fine-grained material. The magnitude of erosion effects on water quality will continue to be monitored and evaluated as part of City Light's Water Quality Monitoring and Data Management Plan. If deemed necessary by the Water Quality Monitoring and Data Management Plan, site-specific erosion control measure locations will be identified, and appropriate erosion control measures will be implemented.

3.2 Identification and Prioritization of New Erosion Control Sites

The results of erosion monitoring (Section 4 of this Reservoir Erosion Management and Monitoring Plan) and information collected on other resources (e.g., cultural, recreation, terrestrial, aquatic, water quality) will be used to identify potential locations for erosion control measures/revegetation throughout the new license period (Sections 3.1 and 4 of this Reservoir Erosion Management and Monitoring Plan). Reservoir shoreline and drawdown zone sites considered for implementation of erosion control measures/revegetation will be prioritized based on the following parameters:

- Magnitude of erosion effect on the identified important resource;
- Likelihood that erosion control measures/revegetation will be effective at reducing erosion effects to the resource of interest; and
- Cost-effectiveness of erosion control/measure/revegetation.

Additionally, the location of erosion control treatments will be reviewed by a cultural resources specialist in accordance with the activity review process outlined in the HPMP.

3.2.1 Triggering Metrics

Metrics that will trigger implementation of, or maintenance to erosion control or revegetation sites will be determined for each resource area (e.g., cultural, recreation, terrestrial, aquatic, water quality, substantial littoral/riparian vegetation) in consultation with the SLIC. Definition of trigger mechanisms will take place as a first step (Years 1-2) in implementation of this Reservoir Erosion Management and Monitoring Plan and will be driven by the resource of concern. Note that the CRWG will define triggers for cultural/historical resources. Potential triggering metrics include:

- Adverse measurable impact of shoreline or drawdown zone erosion on an important resource, including drawdown areas in the Summer Variable Pool zone;

- Need for maintenance of erosion control measures at a treatment site;
- High percent of bare ground or lack of native vegetative cover on revegetation sites; or
- Substantial tree loss at active erosion locations.

3.3 Erosion Control Treatments

Erosion control treatments will be developed and implemented at sites identified for treatment as described in Section 3.2 of this Reservoir Erosion Management and Monitoring Plan. Site-specific erosion control measure planning and design will use an integrated management process to select from a continuum of "green" (soil bioengineering) to "gray" (hard structure). Planning and design will consider the factors affecting erosion, geology, erosion mechanisms, public safety/recreation needs, vegetation, terrestrial and aquatic habitat values, water quality, and the level of acceptable risk if the erosion control measures do not function as designed. Bioengineering approaches will be prioritized, where possible, but may not be appropriate if public safety risk or risk of erosion control failure is not acceptable. Pilot projects may include soil bioengineering in conjunction with "harder" or "gray" structural approaches. Pilot projects to reduce erosion and/or dissipate wave energy may be undertaken and monitored to test the effectiveness and long-term suitability of these measures. The selection of erosion control treatments will be reviewed by a cultural resources specialist in accordance with the activity review process outlined in the HPMP. The NPS will be a partner in designing erosion control treatments and must approve any proposed erosion control treatments prior to permitting and installation.

Potential treatments include, but are not limited to:

- Use of bioengineering approaches and wood features as part of erosion control structures where appropriate for the site and compatible with erosion control objectives and public safety;
- Incorporation of revegetation with native plant species at sites to minimize erosion and restore[5] lost vegetation where possible. Continue plant propagation, seed collecting, and outplanting at erosion control sites based on site-specific vegetation targets. Plantings may be from seed, bare root, potted, sod, or live-stake stock. Revegetation may include a variety of techniques including seeding, planting, fascines, brush-mats, etc. To the extent possible, plantings should use climate-suitable species of appropriate provenance based on anticipated climatic conditions in the new license period;
- Bioengineering treatment approaches to dissipate wave energy and create greater edge habitat complexity at selected sites. Structures may include edges, sills, and floating wetlands, such as "log-bog" booms, or bio barges. City Light will collect woody debris from the reservoir, including large logs and root wads as part of woody debris management; some of these materials may be used for shoreline protection or floating wetlands if needed; and

[5] City Light recognizes four major categories of activities along the restorative continuum: 1) reduced impacts; 2) remediation; 3) rehabilitation, and; 4) ecological restoration (Nelson et al. 2024). City Light prioritizes and designs management actions to gain the greatest native ecosystem repair or recovery based on continued land-use, location and other constraints.

- Hardened erosion control measures such as riprap, check dams, rock walls, revetments, breakwaters or reefs, or concrete or rock steps, may be part of erosion control design where bioengineering measures alone are not appropriate or would not provide the necessary level of resource protection. Vegetation and bioengineering may be incorporated with hardening measures to provide resource protection and enhance habitat, as appropriate, and may include nearby shoreline locations. Note that there are many areas of naturally hardened shoreline along Project reservoirs (e.g., bedrock or talus banks), so hardened shorelines are not unnatural.

Following implementation of any reservoir-associated erosion control measures or erosion-related revegetation, the locations will be monitored as described in Section 4 of this Reservoir Erosion Management and Monitoring Plan. Maintenance or modifications will be implemented as needed on erosion control structures and revegetation based on monitoring results as specified in Section 4 of this Reservoir Erosion Management and Monitoring Plan.

3.4 Erosion Control Tracking

A database of all reservoir-related erosion control treatment areas will be established to track implementation of erosion control measures and erosion treatment site conditions, and maintenance/repairs of erosion control measures through time. This database will be updated on an as-needed basis and will include information about the location, type of treatment, monitoring, maintenance needs, repairs made, and date of each action. These data will be provided to the SLIC as part of annual consultation.

4.0 MONITORING AND REPORTING

This section describes the monitoring efforts, reporting, and communication protocols that will be performed to document the progress of meeting this Reservoir Erosion Management and Monitoring Plan goals and objectives.

4.1 Monitoring Plan

The goals of monitoring are to document the condition of existing erosion control measures, monitor reservoir shoreline and drawdown erosion rates, and to provide information on erosion sites to help identify any new locations where erosion is affecting important cultural resources/historic properties, recreation, terrestrial, aquatic resources, or water quality.

4.1.1 Erosion Control Measures

Monitoring of reservoir shoreline/drawdown zone erosion control measures and erosion-associated revegetation will be conducted to determine the short-term and long-term condition of the measures and maintenance needs.

For established erosion control/revegetation sites, monitoring will take place every two (2) years and consist of:

- Visual observations of the condition of erosion control treatment sites noting condition of erosion control features;
- For revegetation sites: visual estimation of percent bare ground to nearest 10 percent within the revegetation site; general notes on exposed roots, plant health (healthy vs. sick or dying vegetation); and estimate of percent native vegetation cover by species. Note if there are large areas with different vegetation health or erosion areas (e.g., over 500 square feet). Note presence of invasives and percent cover by species (coordinate with City Light's Invasive Plants Management Plan);
- Note and photograph any areas of ongoing erosion within the site (Global Positioning System [GPS] point, description, type, and cause of erosion);
- Note any maintenance of erosion control treatments or revegetation areas required ; and
- Photograph each erosion control treatment or revegetation site from a similar vantage point and focal length as previous monitoring photographs for comparison of site condition/revegetation over time.

For new erosion control measures or erosion-associated revegetation locations, the monitoring will be conducted annually for three (3) years, then monitoring will follow the established site monitoring timing (every two [2] years on same schedule as rest of sites).

4.1.1.1 Trigger Metrics

Erosion control sites with hardened erosion control measures (e.g., stone walls, rip rap, concrete stairs) are expected to provide effective control soon after construction but may take three years to settle in and become completely effective. As part of erosion control planning at each site, a site-specific target for percent of acceptable erosion (e.g., percent of site that continues to erode) will

be determined in consultation with the SLIC. If the erosion target is exceeded, maintenance or re - design of the site will be triggered.

Bioengineered erosion control generally takes 3-5 or more years to become effective. As part of erosion control planning at each site, a site-specific target for percent of acceptable erosion (e.g., percent of site that continues to erode) will be determined. If, after 5 years of monitoring, the erosion target is exceeded, maintenance or re-design of the site will be triggered. Once established, bioengineered controls typically require less maintenance, as the plants continue to grow and roots become more extensive and stronger.

Revegetation sites are expected to take a minimum of five (5) years to become established. As part of revegetation planning at each site, a site-specific target for vegetation cover will be determined. After five years of monitoring revegetation areas, the percent vegetation cover and trends in cover through time (e.g., is vegetation becoming established or not) will be compared to targets for that site to determine if additional planting, maintenance, invasive control, or other measures are needed. Invasive plant control or other measures may be needed within the first five years of planting and will be conducted on an as-needed basis.

4.1.2 LiDAR

A light detection and ranging (LiDAR) survey will be conducted every 10 years and will covering the three reservoir shorelines and at least 100 vertical feet above the shoreline. The LiDAR inventory for Ross Lake will be conducted during low pool elevation to capture as much of the drawdown zone as feasible, given weather and logistical constraints. The survey timing may be supplemented or adjusted if an unusually large drawdown of Ross Lake is anticipated. The use of these LiDAR data for specific erosion/deposition monitoring in Section 4.1.3.2 Additional Shoreline Erosion Monitoring Sites, Section 4.1.4 Erosion and Deposition within the Ross Lake Drawdown Zone, and Section 4.1.4.3 Ross Lake drawdown zone monitoring methods.[6]

4.1.3 Shoreline Erosion/Retreat Rates

Reservoir shoreline erosion/retreat rates will be monitored at select locations to help determine overall loss of terrestrial habitat. Retreat rates will be monitored at the five sites established in 1990 (see Section 4.1.2.1 of this Reservoir Erosion Management and Monitoring Plan) and at any additional sites selected to monitor specific erosion or resource effects. New sites will be considered during years 1-2 of the new license and as needed.

The selection, locations, and methods of monitoring shoreline erosion/retreat rates will be reviewed by a cultural resources specialist in accordance with the activity review process outlined in the HPMP.

4.1.3.1 Existing/Past Shoreline Erosion Monitoring Sites

NPS has monitored five 1990 Class I bank erosion sites (22 total transects) in Ross Lake as part of the Erosion Control Plan (Ebasco Environmental and NPS 1990). The 1990 Class I sites were assumed to have higher erosion rates compared to Class II or III sites (Table 4.1-1). The site

[6] This LiDAR survey may also be coordinated with and used for other resource interests (e.g., wetland vegetation or stranding and trapping).

designations in Table 4.1-1 refer to the 1990 erosion site numbers as shown on maps in Attachment B of the GE-01 Reservoir Shoreline Erosion Study Report (City Light 2023a). The E and W represent the east and west side of Ross Lake, respectively.

Table 4.1-1. Shoreline erosion monitoring sites established on Ross Lake in 1990.

NPS 1990 Site ID	Material type
E-9	Glacial outwash (unconsolidated)
E-55	Glacial lake silt and clay
E-99	Colluvium over bedrock
W-63	Glacial till over glacial silt and clay
W-78	Dense glacial till (consolidated)

Source: NPS 2022.

Monitoring of these five sites every two (2) years will continue and will include measurements of associated stump transects within the exposed drawdown area at the time of monitoring.

4.1.3.2 Additional Shoreline Erosion Monitoring Sites

Additional shoreline retreat rate monitoring sites will be added during the new license as determined through consultation with the SLIC to help establish bank retreat at other locations. Potential sites include:

- Sites stratified by geology, landform, aspect, and other attributes noted as part of the shoreline erosion inventory included in the GE-01 Reservoir Shoreline Erosion Study Report (City Light 2023a) to provide bank retreat rate measurements at sites with attributes not included in the existing five locations;
- Sites that measure bank retreat near specific resources of concern (e.g., recreation site, important terrestrial or aquatic habitat site, water quality); or
- LiDAR data sets will be compared through time (every 10 years when LiDAR is collected) to evaluate large-scale changes to shoreline erosion at each of the Project reservoirs.

4.1.3.3 Shoreline Erosion Monitoring Methods

Monitoring methods used at existing sites include measurement of the distance from a series of stakes established along the eroding bank to the break in slope at the top of the bank. These methods will be continued and used for new sites unless consultation with the SLIC determines that a different method is more appropriate. New monitoring methods for consideration will evolve over the term of the license as technology improves and may include:

- Documentation of exposed or overhanging tree roots;
- Documentation of tree loss;
- Remote sensing (including drones);
- Aerial or ground-based LiDAR; or
- Survey position of top of bank using a total station.

4.1.4 Erosion and Deposition within the Ross Lake Drawdown Zone

Erosion and deposition within the Ross Lake drawdown zone will be measured using the stump transects established as part of the GE-01 Reservoir Shoreline Erosion Study Report (City Light 2023a) and any additional stump transect locations determined in consultation with the SLIC. Evaluation of the LiDAR data within the Ross Lake drawdown zone will also identify large-scale changes to erosion or deposition zones. Monitoring methods may evolve over the term of the new license as technology improves; adaptation of new methods will be considered in consultation with the SLIC.

4.1.4.1 Existing/Past Ross Lake Drawdown Zone Monitoring Sites

Transects within the Ross Lake drawdown zone were selected in consultation with cultural resources and geology staff from the NPS to measure erosion (and deposition at some locations) within the drawdown zone (Table 4.1-2 and Figure 4.1-1 through 4.1-3).

Table 4.1-2. 2022 Stump erosion monitoring transects and number of stumps measured at each transect.

Transect	General Location	Number of Stumps Measured
101	Ruby Arm	21
102	Lightning Creek Camp	5
103	Ponderosa	13
104	10 Mile Island	15
105	Big Beaver	15
106	Ruby Arm	12
107	Arctic Creek	18
108	West side of lake across from Devil's Creek	17
110	Rainbow Point	22
111	Ruby Arm	19
120	Silver Creek	28
121	Little Beaver	19
122	Boundary Bay	23
B	Roland Point	12
C	Roland Creek	22
E	Big Beaver	15
F	Big Beaver	19
G	Spencer	20
H	Spencer	4
I	Dry Creek Flats	35
J	Dry Creek	20
L	North of Lightning Creek	5
M	North of Lightning Creek	12
N	Cat Island	15
O	Cat Island	17
P	Cat Island-Desolation Peak Trail	16

Transect	General Location	Number of Stumps Measured
S	Hozomeen	21
T	Hozomeen	23
200	Near NPS Bank Monitoring Site E-55	8
201	Near NPS Bank Monitoring Site W-63	8
202	Near NPS Bank Monitoring Site W-63	10

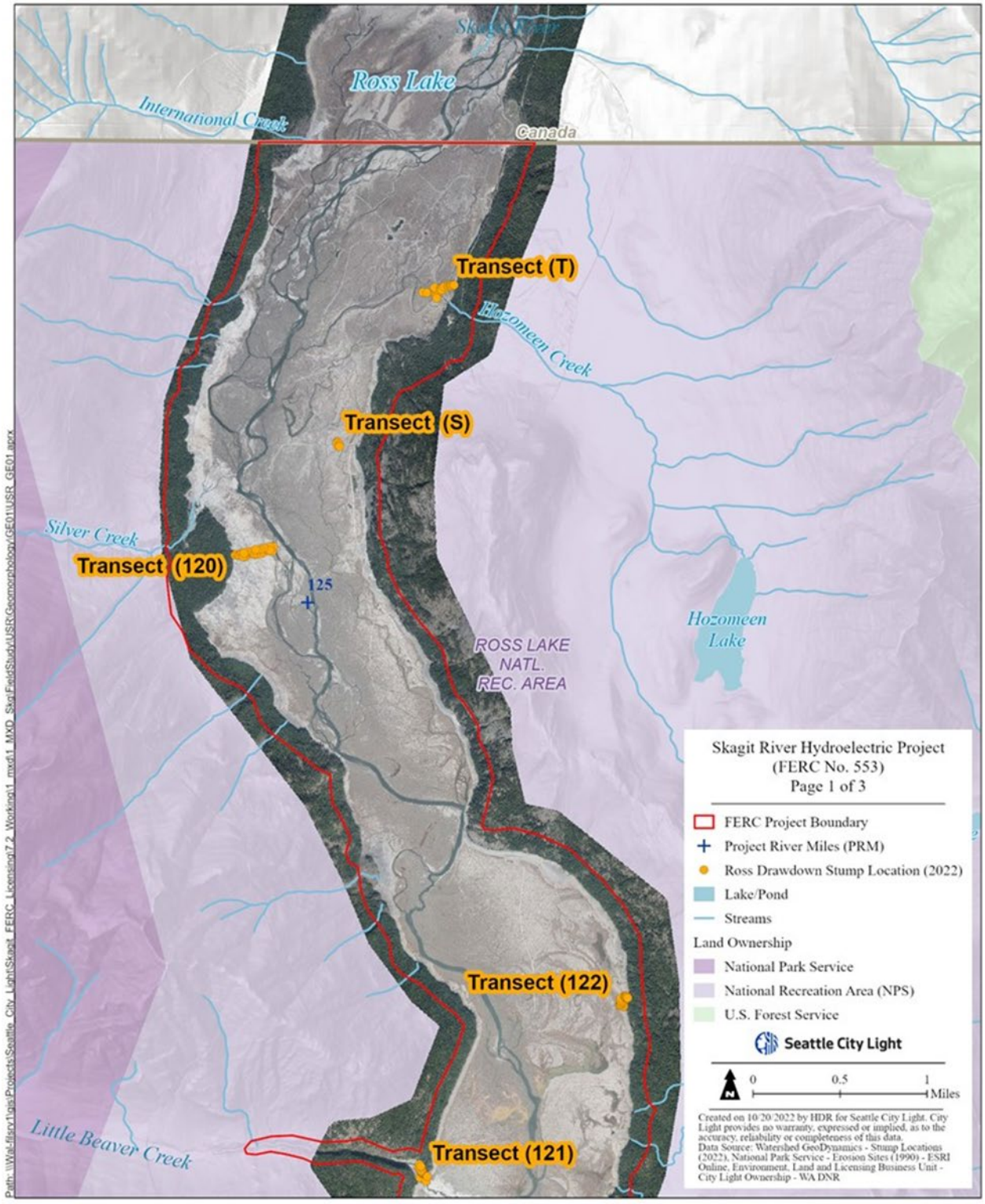

Figure 4.1-1. 2022 Stump transects in the Ross Lake drawdown area (page 1 of 3).

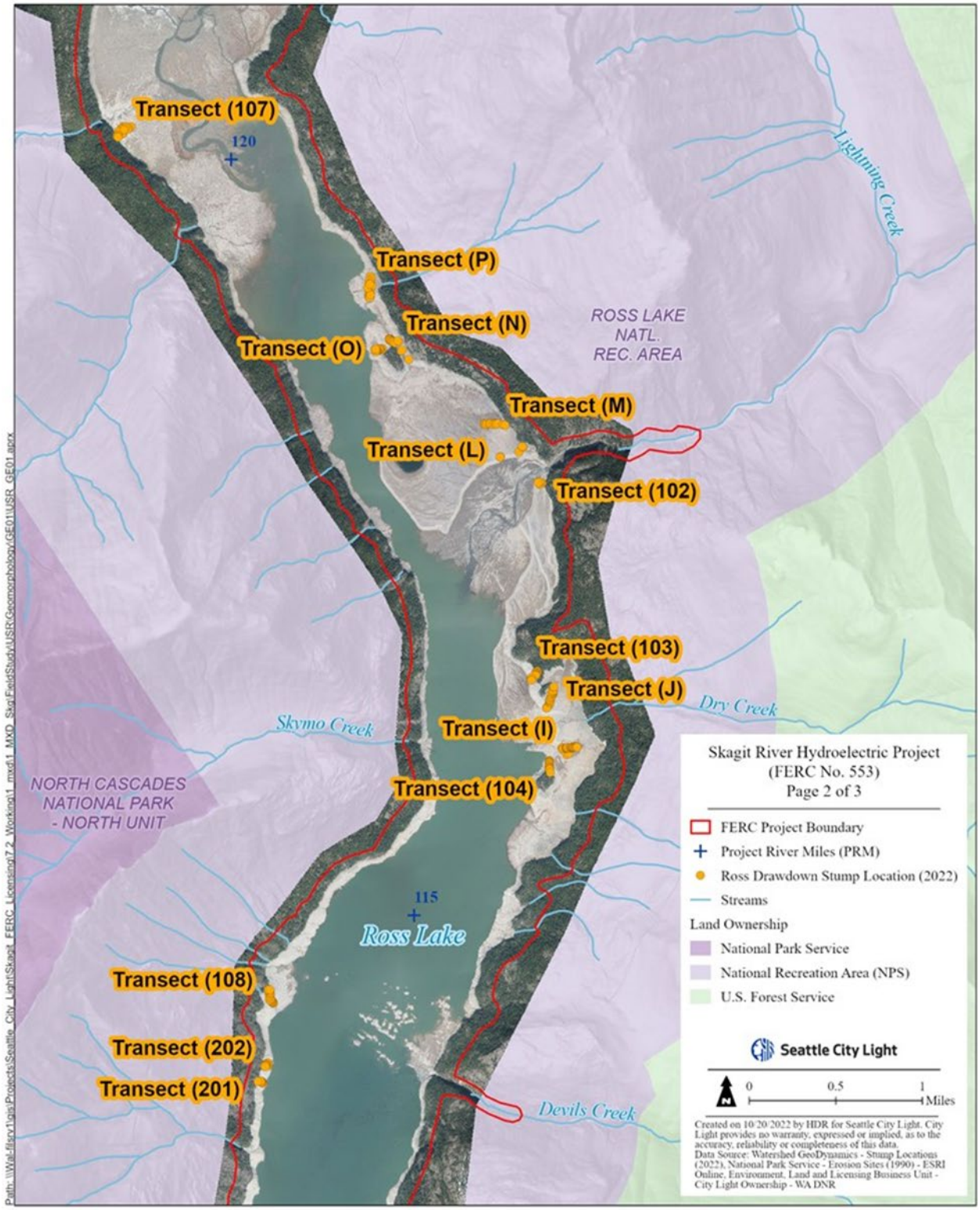

Figure 4.1-2. 2022 Stump transects in the Ross Lake drawdown area (page 2 of 3).

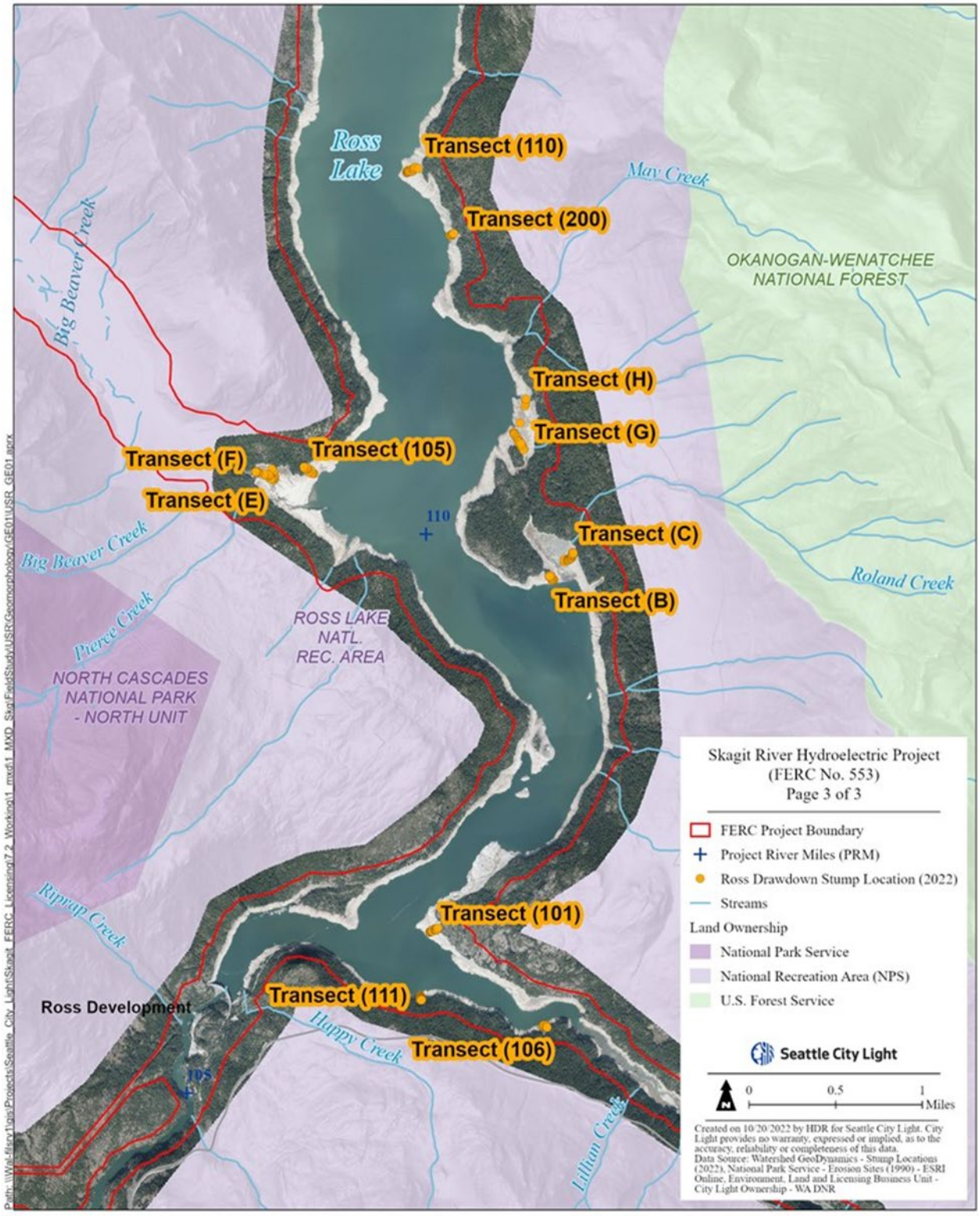

Figure 4.1-3. 2022 Stump transects in the Ross Lake drawdown area (page 3 of 3).

At each stump along each transect, the following information was collected in 2022 using the ESRI Field Maps application on an iPad with an EOS Arrow 100+™ GPS antenna (accuracy of each point included in Geographic Information System [GIS] database):

- Location (GPS point);
- Transect identifier;
- Dominant and sub-dominant substrate around each stump (bedrock, boulder, cobble, gravel, sand, fines, or organics);
- Slope gradient (measured with a clinometer);
- Marker: markers to designate the elevation of root crown height were installed where possible on each of the four sides of the stump where measurements were taken to aid in future monitoring. Mag Nails were installed if there were no other marks such as driver board or springboard notches on the tree. Fewer than four Mag Nails were installed in smaller diameter trees or in cases where parts of the stump were too rotted to hold a nail. If there were existing driver board/springboard or other markings on stumps, the distance from the bottom of these existing marks were used to measure to ground surface and the distance from the marks to the root crown height was recorded. Mag Nails were not installed on these stumps;
- Root crown height (feet) above ground surface: root crown height was measured on four sides of each stump (uphill, left side looking downhill, downhill, and right side looking downhill). The root crown height was measured as the distance from a marker designating the top of the butt swell to the ground surface. In cases where a marker was not installed (see Figure 4.1-4), the location of the butt swell was visually estimated to measure distance. On sloping ground, the top of the butt swell was often at a different elevation on the uphill vs. downhill side of the stump. The highest elevation (generally uphill) of the butt swell on the stump was designated as the top of the butt swell for the entire stump and an approximate horizontal plane at that elevation was used to mark and measure root crown height for all four quadrants; and
- Photograph of stump.

In some locations, stumps were buried by sediment; these were noted in the comment field and markers were placed around the stump (not at the butt swell, which was buried beneath sediment) for future monitoring of erosion/deposition.

Figure 4.1-4. Measurement of erosion around exposed stumps. Additional Ross Lake Drawdown Zone Monitoring Sites.

Additional Ross Lake drawdown zone monitoring sites may be added as determined through consultation with the SLIC to help establish drawdown zone erosion or deposition at other locations. Sites to monitor areas with cultural resources and/or historic properties will be coordinated with the HPMP. Potential sites include:

- Transects below the five 1990 bank retreat sites (Table 4.1 -1 above).
- Sites that measure drawdown zone erosion near specific resources of concern (e.g., cultural resources, important wetlands, aquatic habitat).

4.1.4.2 Ross Lake drawdown zone monitoring methods

Ross Lake drawdown zone monitoring will take place at established (and any added) stump locations on a five (5) year cycle, with a contingency to accommodate anticipated higher/lower reservoir drawdown levels within 1-2 years of the 5-year cycle.[7] Stumps that are exposed during

[7] Stumps associated with shoreline erosion monitoring locations will be monitored every two years within the exposed drawdown area during the time of shoreline erosion monitoring (Section 4.1.3 Shoreline Erosion/Retreat Rates).

the monitoring period (generally winter/spring when reservoir is drawn down) will be monitored. Depending upon the depth and length of drawdown, not all stumps may be exposed or able to be measured during each monitoring period.

At sites where stump transects are already established, measurements will consist of:

- Dominant and sub-dominant substrate around each stump (bedrock, boulder, cobble, gravel, sand, fines, or organics).
- Slope gradient (measured with a clinometer).
- Root crown height (feet) above ground surface: root crown height was measured on four sides of each stump (uphill, left side looking downhill, downhill, and right side looking downhill), or at the locations measured during previous surveys.
- Photograph of stump.

If stumps that were previously marked are missing, this will be noted. At new stump transects that were not previously measured, all the information collected during the initial inventory will be measured (Section 4.1.3.1 of this Reservoir Erosion Management and Monitoring Plan).

LiDAR data sets will be compared through time (every 10 years when LiDAR is collected) to evaluate large-scale changes to erosion and deposition within the Ross Lake drawdown zone. New or modified monitoring methods may be considered over the term of the license as technology improves. Any modifications will be made in consultation with the SLIC.

4.1.5 Shoreline Erosion Re-inventory

A re-inventory of shoreline erosion at all three reservoirs will be made every ten (10)[8] years using methods similar to those during the 2021-2022 inventory. The results of this inventory will be used to collaborate with other resources to determine if identified erosion sites are affecting important cultural resources/historic properties, recreation, terrestrial, aquatic resources, or water quality. In addition, LiDAR datasets will be used to assist in evaluating areas of shoreline erosion.

New large, unusual erosion events such as areas of new mass wasting along the reservoir shorelines that may be incidentally noticed by NPS or City Light staff will be documented and reported upon in timely manner to the SLIC.

Re-inventory of shoreline erosion will be reviewed by a cultural resources specialist in accordance with the activity review process outlined in the HPMP.

4.1.5.1 Shoreline Erosion Monitoring Methods

The 2021-2022 inventory GIS database will be used as a basis for the re-inventories (Attachment A shows the field form used to collect data at each site, Attachment B shows maps developed from the database). This database includes GPS locations of each shoreline erosion site as well as a unique identifier. If the site was identified as part of the 1990 erosion inventory (Riedel 1990), the 1990 site number was also recorded on the data sheet for correlation between the two inventories.

[8] To the extent possible, field inventory will be timed to occur the year after new LiDAR datasets become available.

Relevant characteristics for each site were collected, including: eroding length; average bank height (or area as appropriate); disturbed and undisturbed bank gradient; bank composition (underlying geology); type of erosion process; vegetation characteristics (life form [e.g., tree, shrub, herbaceous, etc.], tree diameter, condition, age); factors that appear to be affecting erosion; any evidence of seepage/groundwater; condition, type, and effectiveness of any stabilization measures; any evidence of recent erosion (e.g., fresh or old tree fall, fresh soil at base of bluff); percent cover by type for the disturbed and surrounding undisturbed areas (tree, shrub, herbaceous, other such as rocks/moss); and large wood present on the bank or extending into the water at normal maximum water surface elevation. One or more photographs were taken of each erosion site.

If areas identified in 1990 were observed to be revegetated or no erosion at these locations was noted, this information was recorded in the 2021-2022 database as "Stable" with the corresponding 1990 site ID. A photograph was taken of the location as well.

During subsequent 10-year re-inventories, the 2021-2022 database will be loaded onto a device that provides GPS location and allows viewing of past inventory site characteristics and photographs. All reservoir shorelines will be observed via boat or walking, when the reservoir is at or near the normal maximum surface elevation, and each 2021-2022 site will be observed and photographed to determine if any of the site characteristics have changed. If characteristics have changed, they will be noted in the database. Any sites that are revegetated or stabilized will be noted. Any new sites will be identified, a GPS point/line taken, and site characteristics and photographs will be taken.

The re-inventory data will be compared to previous survey results to track any trends in total length of shoreline eroding, erosion mechanisms, types, and stabilized or new erosion areas.

4.1.6 Monitoring Schedule

Reservoir shoreline and drawdown erosion monitoring will take place according to the schedule in Table 4.1-3.

Table 4.1-3. Timeline for reservoir erosion monitoring activities.

Timeline	Protection and Enhancement Monitoring Activity
Annually	Report to and consult with SLIC (consistent with the SLIC Governance Document) on previous year's activities and monitoring, and planned current and upcoming activities that are based on the Implementation Work Plan and shared through the Annual Report (three year rolling plan (previous year activities, and two year rolling work plan)). Annual work plan activities and monitoring locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing and scope of the activities).
Annually or as needed through license period	Consult with the SLIC on an annual basis and as needed if new or extreme erosion areas are observed as part of monitoring or incidental observations.
Years 1-2 following license issuance and annually as needed through the life of the	Consult with the SLIC to determine sites where reservoir shoreline or drawdown erosion is affecting important resources.

Timeline	Protection and Enhancement Monitoring Activity
license	Define or refine trigger mechanism. Assess and prioritize erosion sites, including new sites, for treatment and monitoring or removal.
	In consultation with the SLIC, and subject to NPS approval, City Light will develop an Implementation Work Plan that will include a schedule to design and implement erosion control/revegetation at chosen locations.
Every two (2) years following license issuance	Monitor shoreline retreat rate sites, including associated stumps within the exposed drawdown zone.
	Monitor erosion control/revegetation measures (monitor new erosion control sites annually for first 3 years following construction).
Every five (5) years following license issuance	Monitor Ross drawdown zone (stump) transects.[1]
	Consult with the SLIC to evaluate monitoring information to determine if new erosion control measures or erosion monitoring methods are warranted.
Every ten (10) years following license issuance	Re-inventory shoreline erosion along entire shorelines of Ross, Diablo, and Gorge lakes.
	Acquire LiDAR datasets for the reservoirs.[2]
	File report with FERC (following consultation with the SLIC summarizing erosion measures and monitoring.

1 Schedule for stump monitoring may shift (1-2 years) depending upon anticipated drawdown levels so that monitoring can take place during lower drawdown years. If there is a deep drawdown of Ross Lake that will allow monitoring of stumps that are not normally exposed, monitor just these stumps opportunistically.

2 Timing of LiDAR data acquisition may vary based on anticipated drawdown levels and to allow LiDAR to be acquired prior to 10-year shoreline erosion inventory to assist with determination of sites to evaluate during the inventory.

4.2 Emergency Situations

Emergency situations are instances where there is imminent risk to human life, including a threat of fire hazard, mechanical failure, or power outage. In the event of an emergency, City Light will make efforts to avoid the spread of invasive non-native plant species and will communicate with appropriate agencies within 14 days, if these situations arise. In areas where emergency work creates potential opportunities for weed introduction, establishment, or spread, City Light will work to minimize those effects. Areas with ground disturbance from emergency activities will be monitored and treated as needed. Additionally, City Light will coordinate with their Cultural Resource Coordinator as expeditiously as possible.

4.3 Adaptive Management and Plan Review

Adaptive management will be applied to each implementation activity through monitoring using information gathered during City Light's relicensing study data as baseline. At five (5) year intervals, City Light will consult with the SLIC to evaluate monitoring information to determine if new erosion control measures, erosion monitoring methods, or changes to the Implementation Work Plan are warranted. During consultation the following topics will be included as a part of the adaptive management process: clarifying resource goals, objectives, and priorities, and relevant erosion control measures, trigger metrics, and monitoring methods.

City Light will report annually to the SLIC on the status of treatment activities, known erosion or deposition, monitoring, and other pertinent issues. The annual report will include a summary of the previous year's work, schedule of current year's work and anticipated work in the following

year. Annual work plan activities on locations on or affecting NPS lands and waters are subject to NPS approval, if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing and scope of the activities).

Every ten (10) years, City Light will file a report with FERC describing implementation, monitoring activities, and any proposed modifications to this Plan (including the Implementation Work Plan) based upon the results of monitoring and consultation with the SLIC.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS, before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

5.0 REFERENCES

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RESERVOIR EROSION MANAGEMENT AND MONITORING PLAN

ATTACHMENT A

RESERVOIR EROSION FIELD FORM

Skagit Hydroelectric Project Reservoir Erosion Field Form

Site ID _____ Date/Time _____

Reservoir _____ Surveyors _____

Location _____ Former Site ID _____

Erosion Type
- ❑ Undercut bank
- ❑ Slumping
- ❑ Raveling
- ❑ Rills/gullies
- ❑ Trampling
- ❑ _____

Seepage? Y / N

Shore Area Affected
- ❑ Shore above high water
- ❑ Drawdown zone
- ❑ _____

Dimensions of eroding area (ft)
- Shoreline length _____
- Bank height _____
- Dist. from shore _____
- Area (sq ft) _____
- Disturbed slope gradient (%) _____
- Undisturbed slope gradient (%) _____

Geology/Soils
- ❑ Bedrock
- ❑ Talus
- ❑ Colluvium
- ❑ Till
- ❑ Outwash
- ❑ Alluvial Fan
- ❑ Alluvium
- ❑ Fill
- ❑ _____

Piping? Y / N

Gleyed soils? Y / N

Evidence of erosion rate/activity
- Exposed roots/stump depth (ft) _____
- Fresh tree fall (#, decay class) _____
- Fresh soil _____
- Stabilized (rationale) _____

Vegetation

Type _____

Tree diameter (dbh): _____

Condition: heathy dead unhealthy beaver

Age _____

% Bare soil _____

Comments/Sketch

LWD: On Bank _____ In water _____

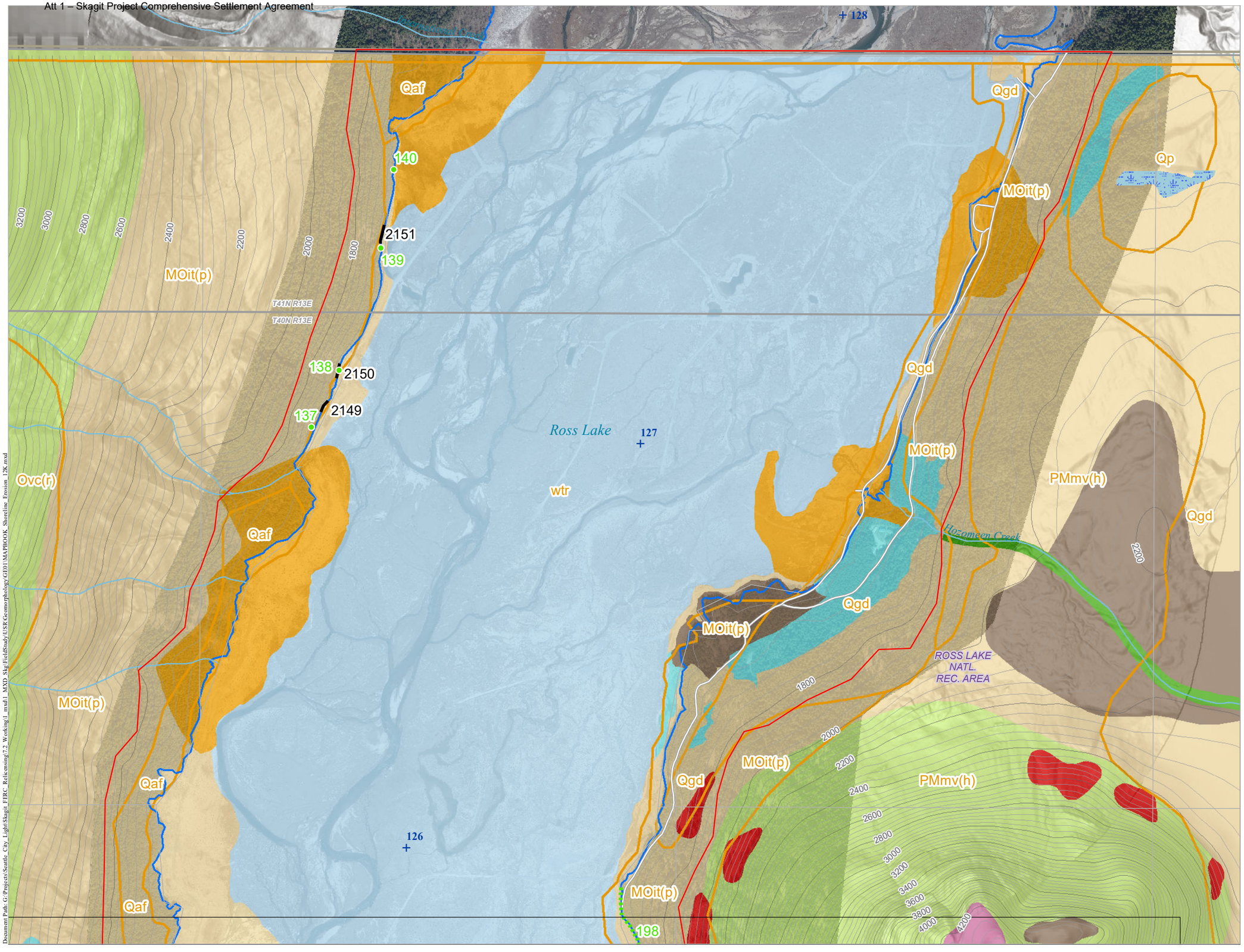
Percent Cover:	Trees	Shrub	Herb	Other
Disturbed	_____	_____	_____	_____
Undisturbed	_____	_____	_____	_____

Factors Affecting Erosion
- ❑ Reservoir fluctuations
- ❑ Wave action
- ❑ Recreation use
- ❑ Stream erosion
- ❑ Shoreline Development
- ❑ Road Runoff
- ❑ _____

RESERVOIR EROSION MANAGEMENT AND MONITORING PLAN

ATTACHMENT B

2021-2022 RESERVOIR SHORELINE EROSION SITES MAPBOOK



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GE-01 RESERVOIR SHORELINE EROSION STUDY ROSS LAKE SITES

- FERC Project Boundary
- Project River Miles (PRM)
- Bank Eroding (2022)
- Bank Eroding (2021)
- Partial Bank Length Eroding (2021)
- Bank Eroding (1990)
- Bank Eroding (1990)
- Normal Max Water Surface Elevation Area
- Geologic Unit Label

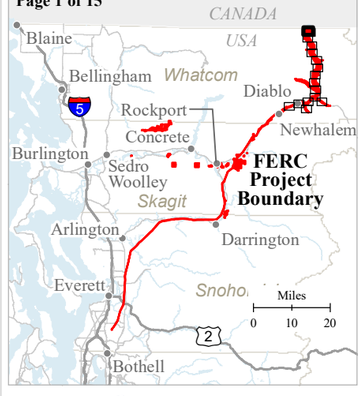
Landforms

- Alluvial Fan
- Bedrock Bench
- Debris Apron
- Debris Cone
- Floodplain
- Mass Movement
- Ridge
- Terrace
- Valley Bottom
- Valley Wall

N

0 540 1,080 Feet

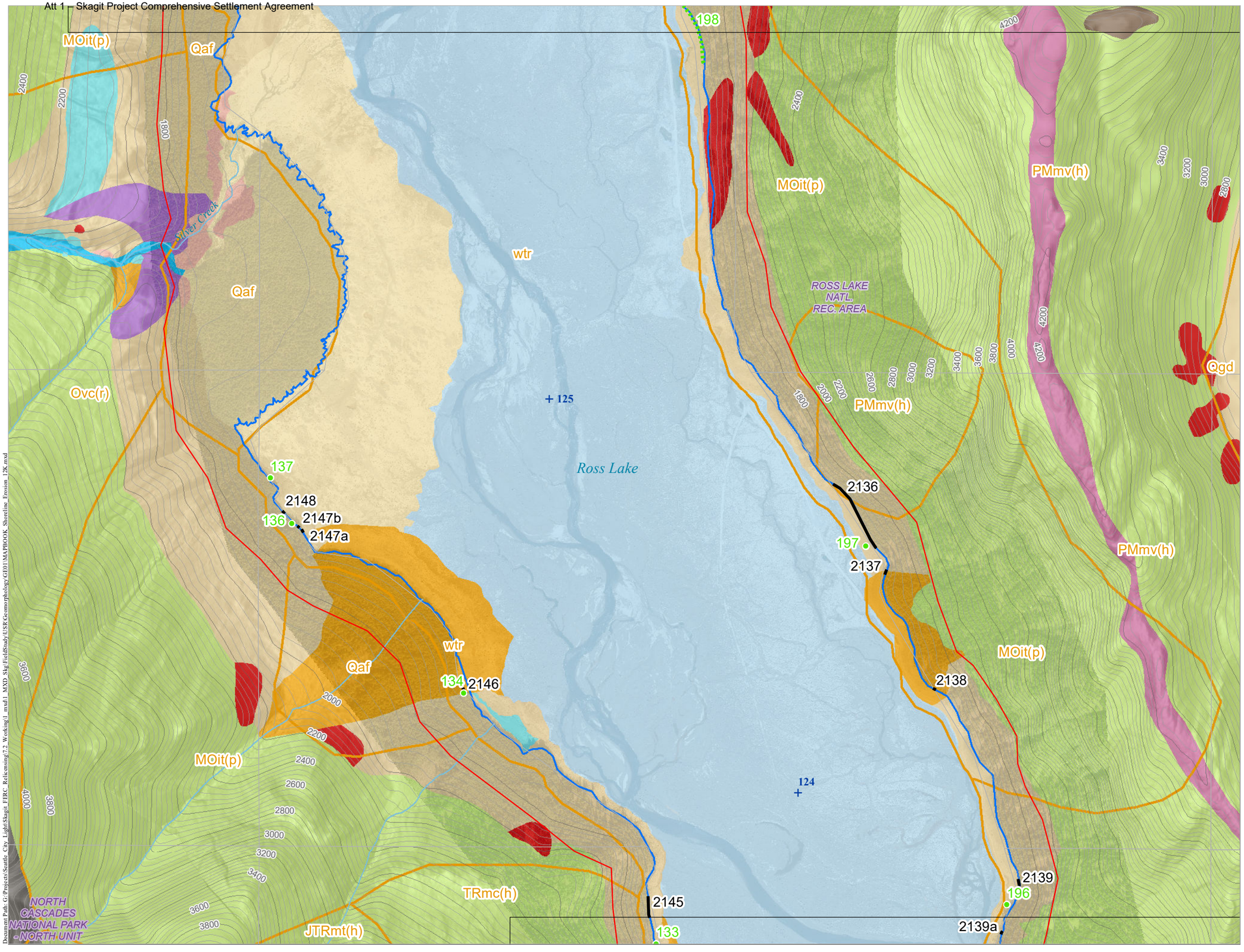
Page 1 of 15



Seattle City Light

SKAGIT RIVER HYDROELECTRIC PROJECT (FERC NO. 553)

Created on 9/6/2022 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: Hydrography - USGS (2019); NPS/USFS land ownership - BLM (2019); Roads - Washington DNR (2019).



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GE-01 RESERVOIR SHORELINE EROSION STUDY ROSS LAKE SITES

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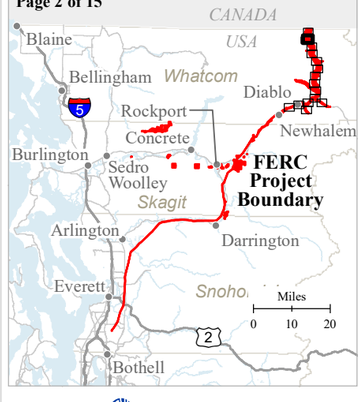

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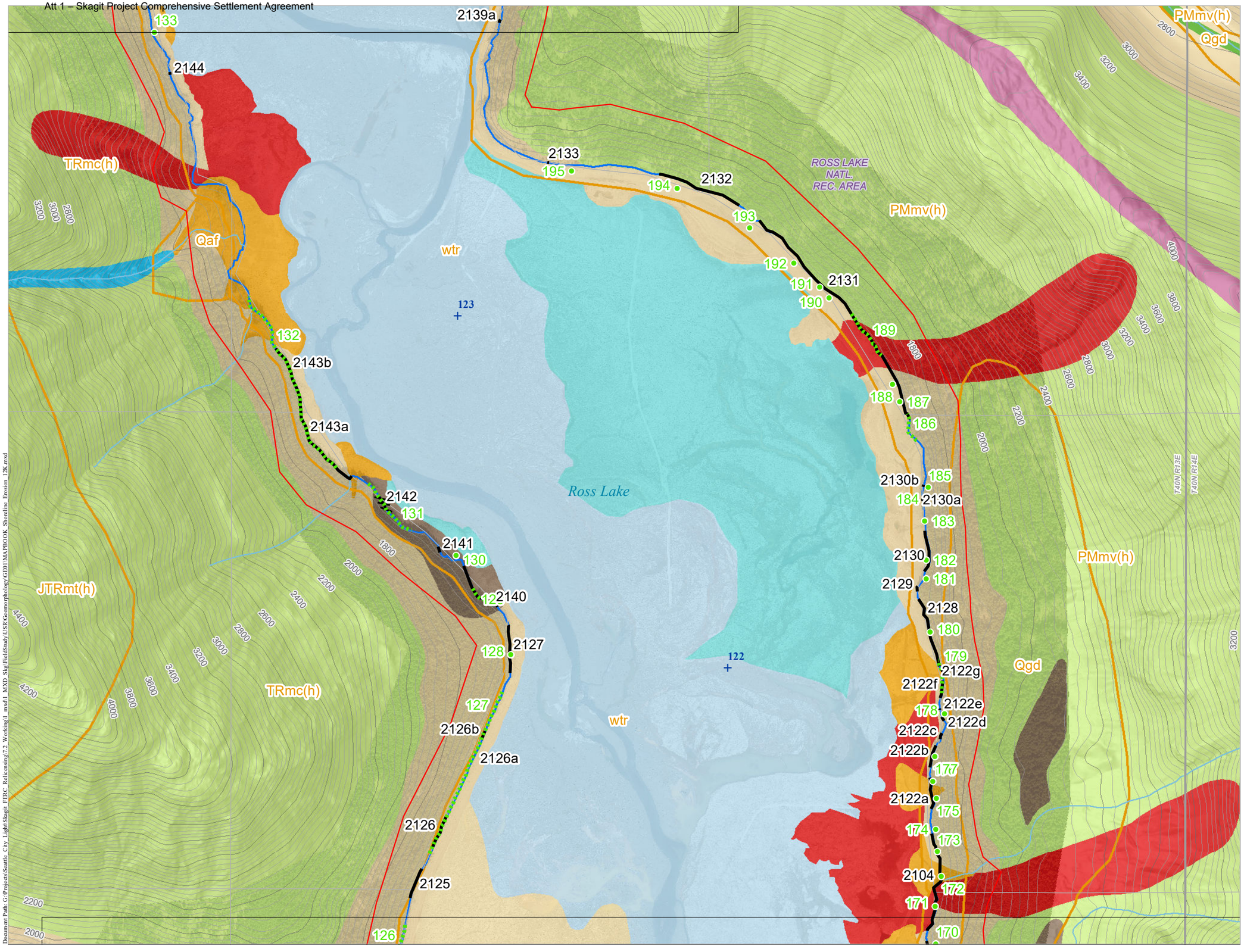

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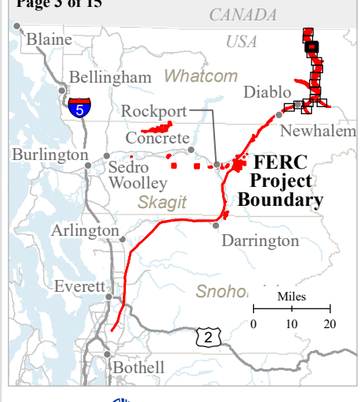

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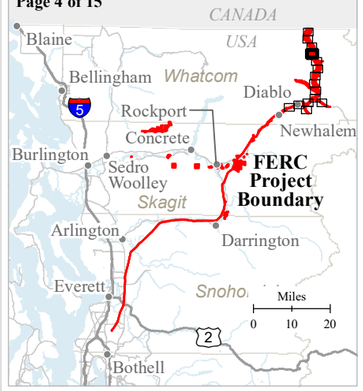

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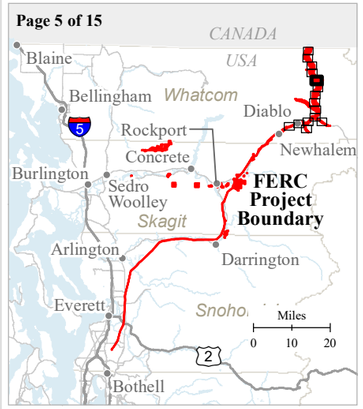

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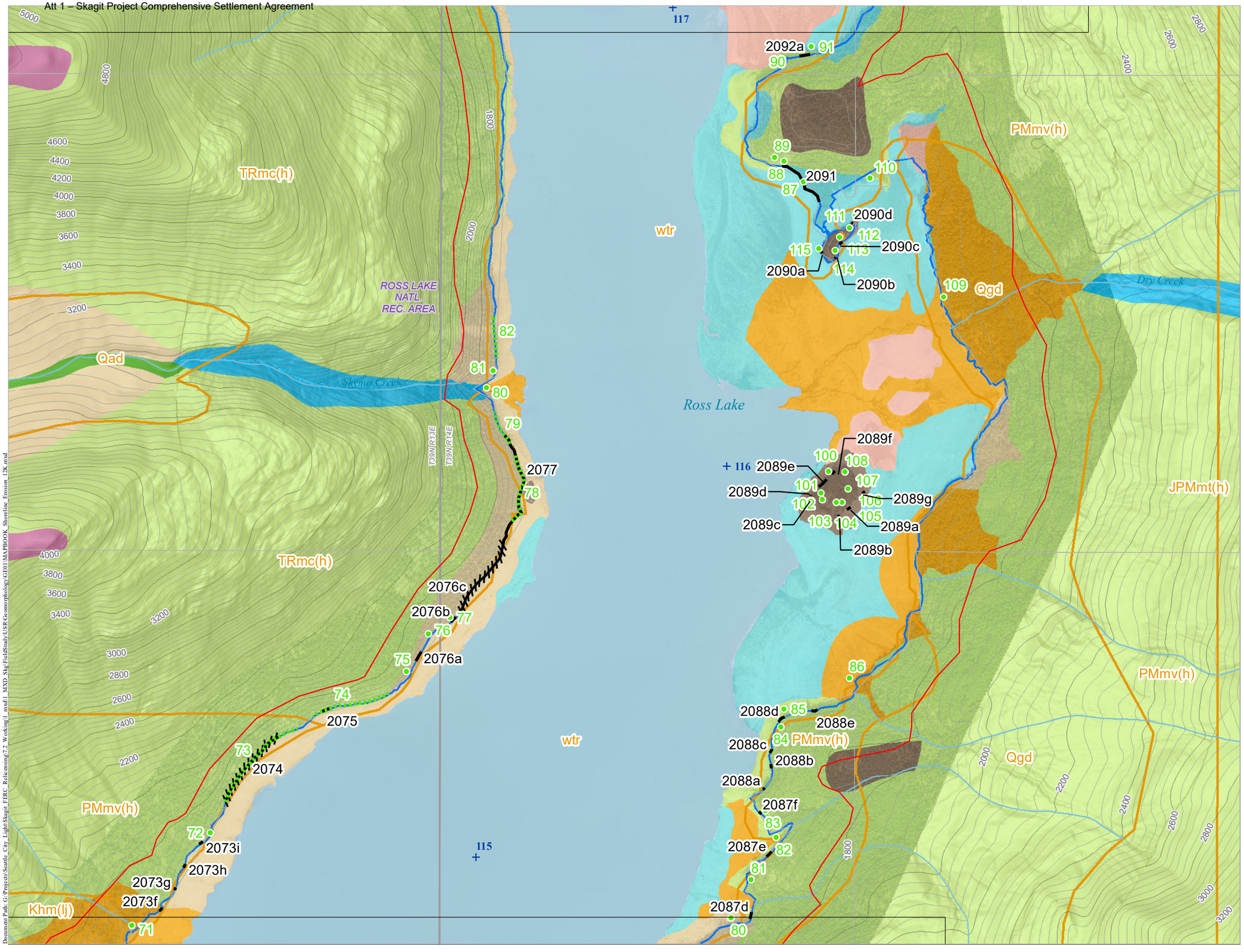

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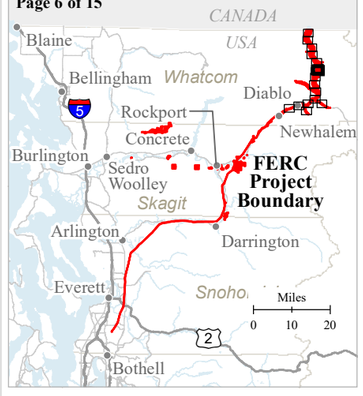

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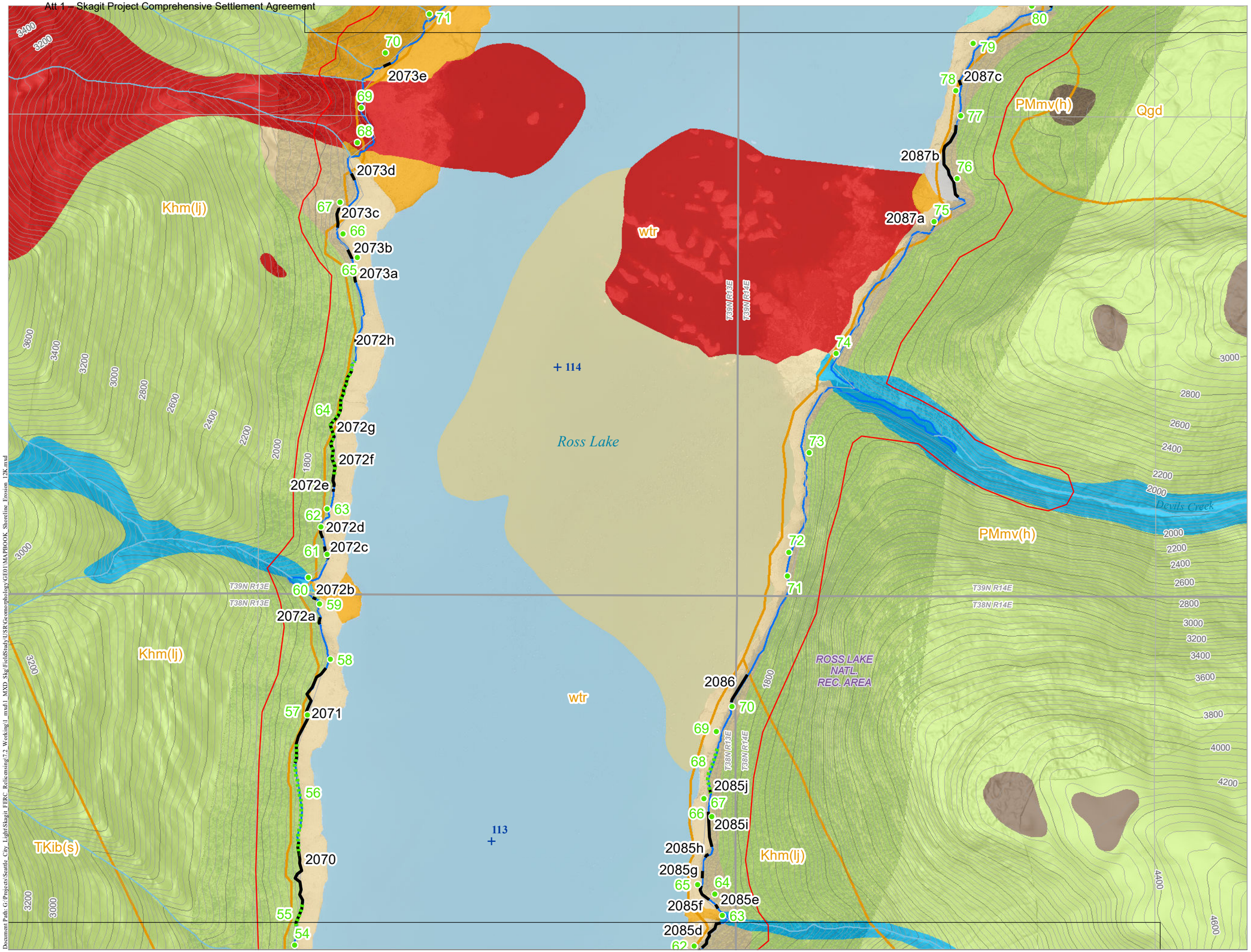

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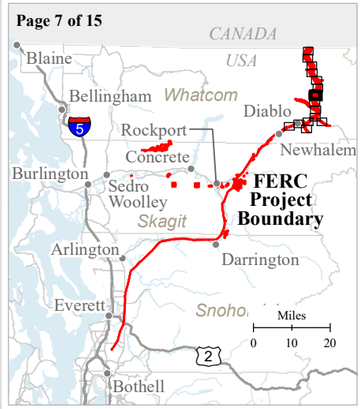

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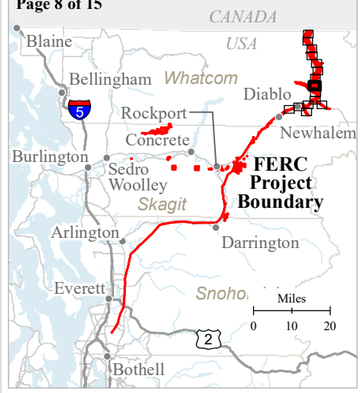

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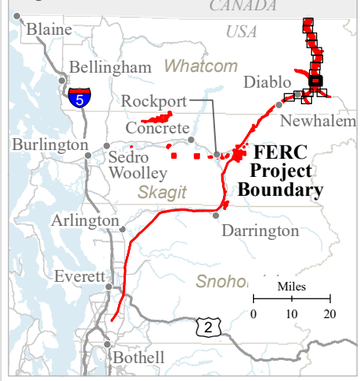

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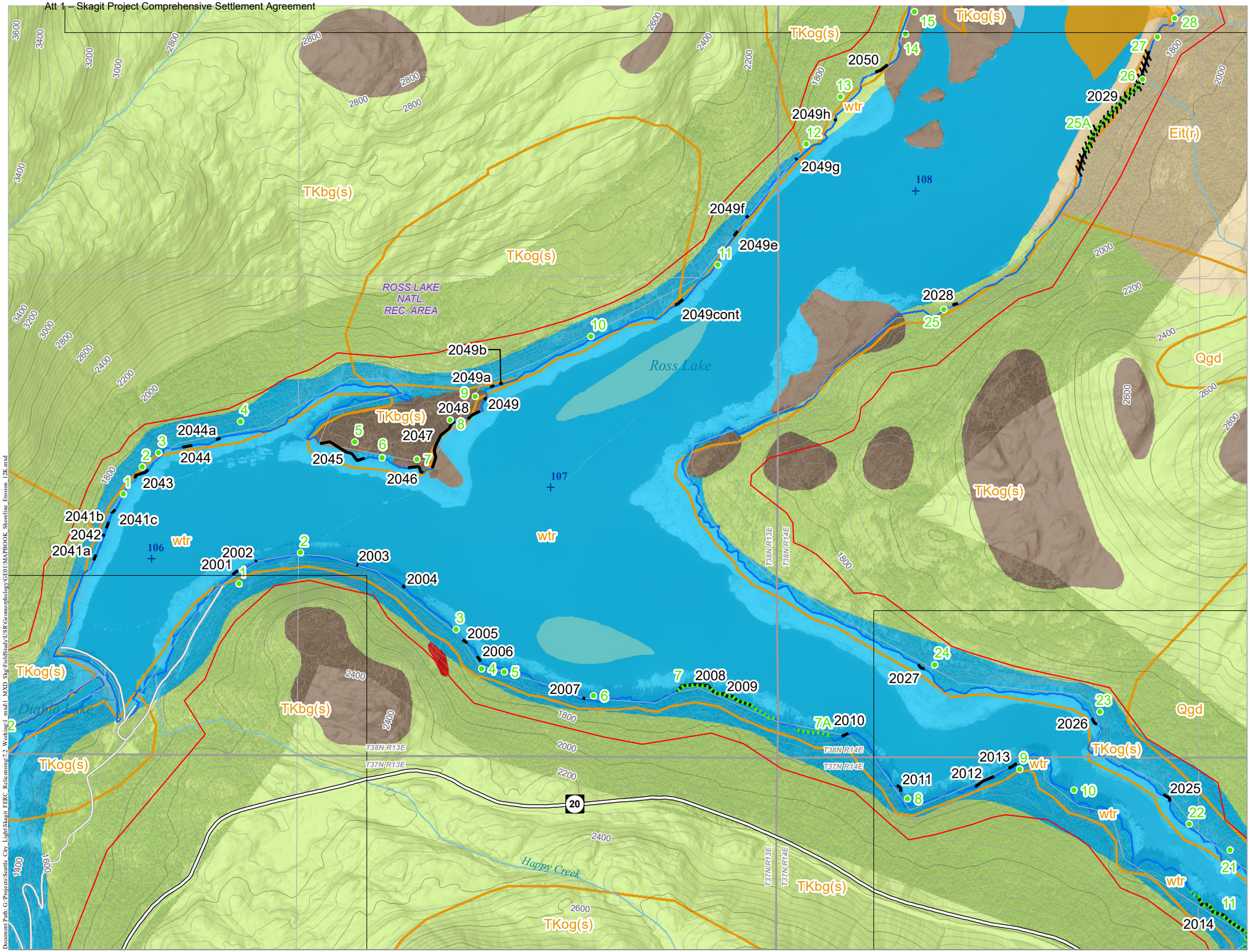

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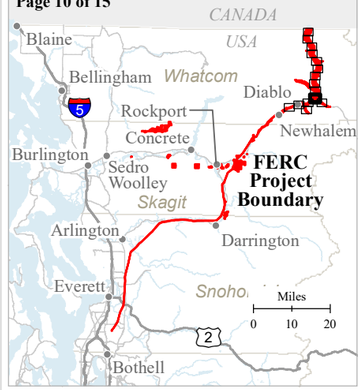

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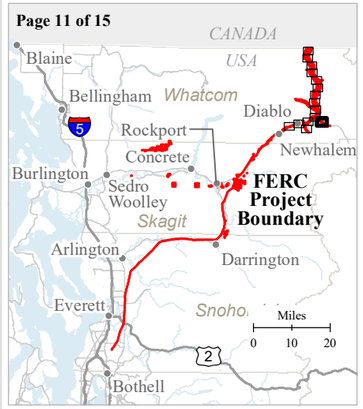

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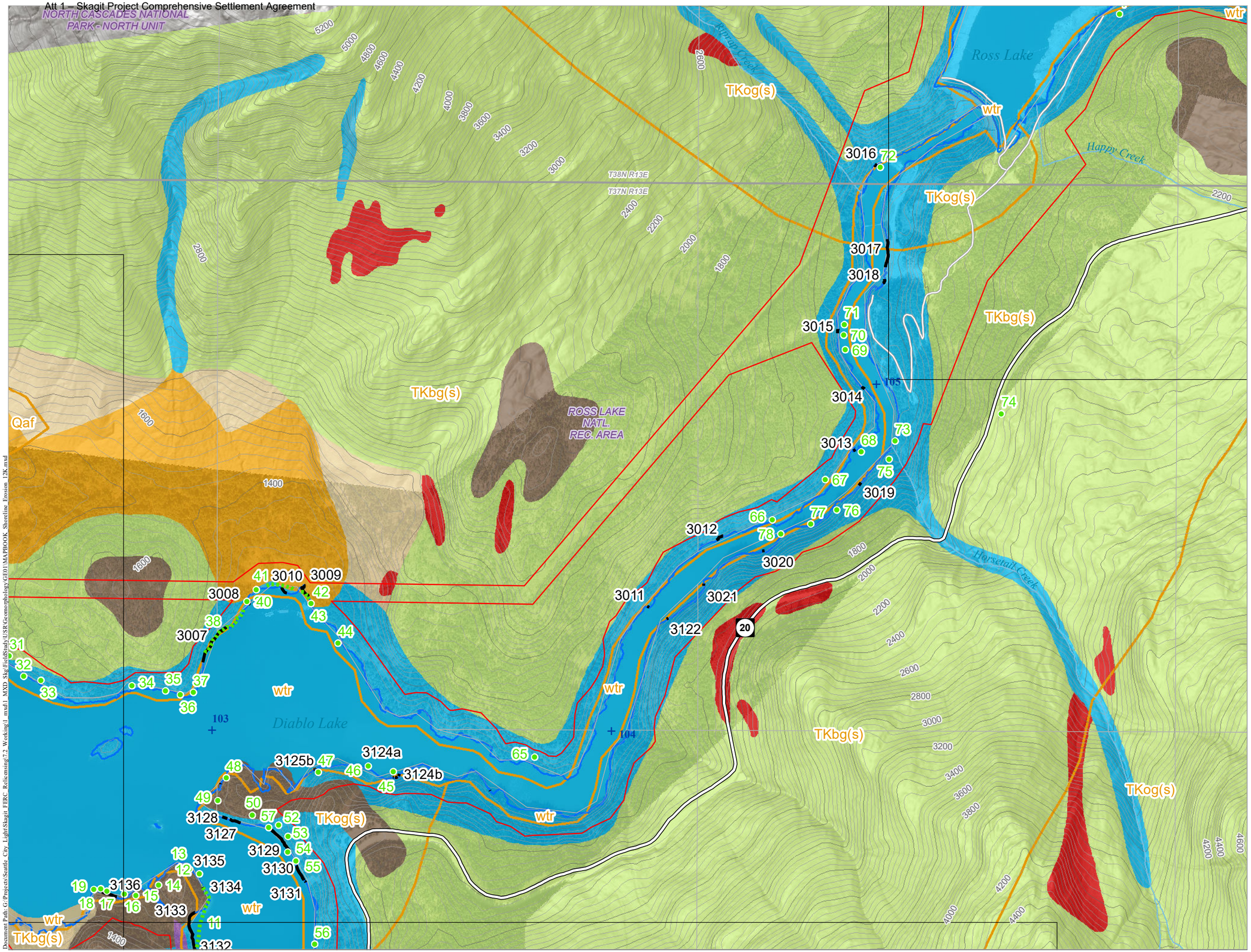

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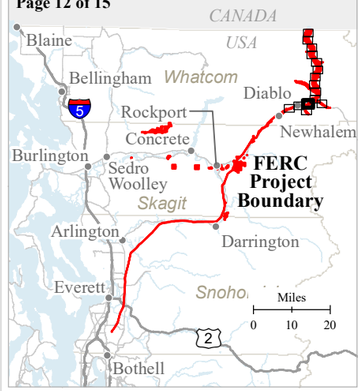

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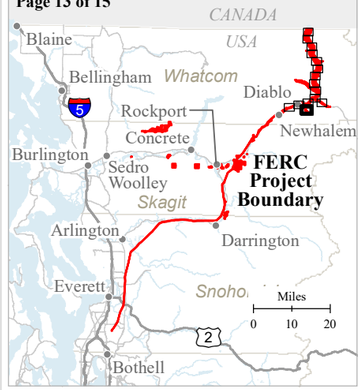

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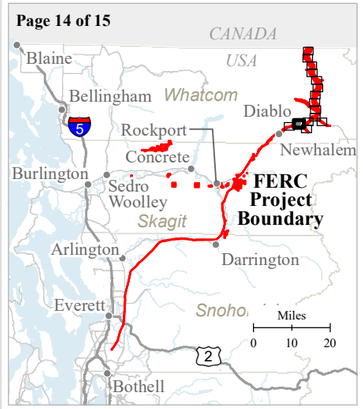

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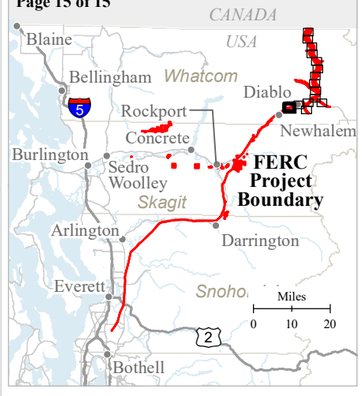

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ROADS, TRAILS, AND TRANSMISSION LINE RIGHT-OF-WAY EROSION MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

December 2025

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Attachment B	Project Route-related Bridges, Culverts, Route Issues, and Project Route-associated Mass Wasting identified as part of GE-02 Study

List of Acronyms and Abbreviations

ATV .....All-Terrain Vehicle
BMP .....Best Management Practice
CIG.....Climate Impacts Group
City Light.....Seattle City Light
Ecology .....Washington State Department of Ecology
FERC.....Federal Energy Regulatory Commission
HPMP.....Historic Properties Management Plan
O&M .....Operations and Maintenance
Project .....Skagit River Hydroelectric Project
REP .....Riverscape Ecosystem Plan
ROW .....Right-of-Way
SOP .....Standard Operating Procedure
SLIC .....Skagit License Implementation Committee
TESC.....Temporary Erosion and Sediment Control
WSDOT .....Washington State Department of Transportation

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Roads, Trails, and Transmission Line Right-of-Way (ROW) Erosion Management Plan for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) Project No. 553. This Roads, Trails, and Transmission Line ROW Erosion Management Plan describes procedures and best management practices (BMPs) for routine maintenance, construction, and decommissioning of roads and trails associated with Project operations, Project mitigation lands, and other areas of Project-related erosion concern along the transmission line ROW. The goal of this Roads, Trails, and Transmission Line ROW Erosion Management Plan is to minimize the extent of erosion due to Project operations where erosion affects terrestrial, aquatic, cultural, recreational resources, or Project infrastructure.

City Light will coordinate the efforts required under this Roads, Trails, and Transmission Line ROW Erosion Management Plan with other license article obligations, including other Project resource management plans included in the new license. City Light's other management plans and measures relevant to this Roads, Trails, and Transmission Line ROW Erosion Management Plan include:

- Riverscape Ecosystem Plan (REP);
- Fish and Wildlife Mitigation Lands Management Plan;
- Invasive Plants Management Plan; and
- Vegetation Management Plan.

Note that erosion-related concerns at culverts and stream crossings are included in this Roads, Trails, and Transmission Line ROW Erosion Management Plan; fish passage at stream crossing structures is addressed in the REP.

2.0 PURPOSE AND SCOPE OF THE PLAN

This Roads, Trails, and Transmission Line ROW Erosion Management Plan provides BMPs and procedures to guide City Light's actions related to potential areas of erosion at Project roads, trails, and within the transmission line ROW associated with Project operations and maintenance (O&M) under the New License. This Roads, Trails, and Transmission Line ROW Erosion Management Plan is subject to annual reporting and periodic five (5) year review and updates in consultation with the Skagit License Implementation Committee (SLIC).[1]

2.1 Goals and Objectives

This section presents goals and objectives for the ROW Erosion Management Plan. The primary goal of this Roads, Trails, and Transmission Line ROW Erosion Management Plan is to minimize the extent of erosion and erosion rates along the transmission line ROW and Project road/trail network due to Project operations where erosion and sedimentation are impacting habitat, aquatic resources, recreation sites, and cultural resources or where non-Project related activity results in erosion that impacts utility infrastructure.

The implementation actions included in this Roads, Trails, and Transmission Line ROW Erosion Management Plan are designed to meet the following objectives:

- Protect roads/trails and other associated infrastructure by minimizing potential erosion and sedimentation;
- Minimize habitat loss and impacts to other natural and cultural resources from effects of erosion and sedimentation;
- Repair any Project-related infrastructure (i.e., roads and culverts) that experiences natural or unnatural damage;
- Minimize sediment input to waterbodies;
- Restore[2] habitats impacted through Project-related erosion through soil bioengineering, seeding or planting with native compatible plant species as described in City Light's Vegetation Management Plan and control invasive exotic plants per City Light's Invasive Species Management Plan;
- Coordinate as needed with the erosion monitoring program contained in City Light's Historic Properties Management Plan; and
- Coordinate as needed with underlying and adjacent landowners to minimize non-Project related erosion by reducing unsanctioned access, trail building and use by all-terrain vehicles (ATVs) that is negatively impacting habitat, recreational sites, cultural resources and utility infrastructure.

[1] The SLIC includes entities that will consult regarding implementation and monitoring of this Roads, Trails, and Transmission Line ROW Erosion Management Plan and contribute to adaptive management decisions.

[2] City Light recognizes four major categories of activities along the restorative continuum: 1) reduced impacts; 2) remediation; 3) rehabilitation, and; 4) ecological restoration (Nelson et al. 2024). City Light will prioritize and design management actions to gain the greatest native ecosystem repair or recovery based on continued land- use, geographic location, and other constraints.

2.2 Geographic Area

The geographic scope of this Roads, Trails, and Transmission Line ROW Erosion Management Plan includes Project roads and trails associated with Project operations, fish and wildlife mitigation lands, and other areas of Project-related erosion concern along the transmission line ROW within the Project Boundary. This includes Project roads/trails and roads/trails on lands administered by NPS identified as shared use roads/trails that are necessary to access Project facilities within and outside of the Project Boundary identified in Attachment A. [Note: Attachment A will be added to this management plan once filed with FERC with the Amended FLA; this will be an updated version of Appendix H – Routes (roads and trail) used by Seattle City Light for Project purposes of the Skagit River Hydroelectric Project.]

2.3 Project Routes and Status

Information on Project Routes (roads and trails maintained by City Light and exclusively used by City Light for Project purposes) was collected during licensing studies and reported in the Final License Application. The GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line ROW Study report (City Light 2023) and associated Geographic Information System databases include 2021/2022 status of Project Routes, culverts, bridges, and drainage structures. There are approximately 40 miles of Project Routes (approximately 30 miles of roads and 10 miles of trails). A summary of Project culverts, bridges, and issues is included in Attachment B.

The 2021/2022 inventory documented the following Project Route conditions:

- Road/trail issues noted along Project Routes include one segment with failing culvert fill, five segments with slumping cut slopes, two segments with bank seepage, one segment with side cast berms, and four segments with ruts or potholes;
- The culvert inventory includes both stream crossing culverts and relief culverts (culverts that drain ditch water, but not streams). A total of 67 culverts were found on Project Routes; 38 stream culverts and 29 relief culverts. These include corrugated metal pipes, and high-density polyethylene, concrete, cast iron, wood stave, and half arch culverts;
- On Project Routes, ten culverts were found with substantial structural or functional issues; two of these are stream crossing culverts, and the remainder are relief culverts. The majority (67 percent) of culvert inlets were clear, but seven of the culverts have inlets over halfway blocked by debris or sediment. Outlet blockages were less common, with 84 percent of the culverts having no outlet blockage and less than one percent (two culvert outlets) over halfway blocked. Sixty-six percent of the culverts on Project Routes have no physical or functional issues. The most common issues are crushed inlets/outlets, rusted pipes, bent pipes, and catch basins full of sediment. See Attachment B of this Roads, Trails, and Transmission Line ROW Erosion Management Plan (Project Route-related Bridges, Culverts, Route Issues, and Project Route-associated Mass Wasting identified as part of GE-02 Study);
- Three bridges were included in the Project Route inventory, and no physical or functional issues were noted at bridge locations; and
- Approximately 1.7 miles of Project Routes were found that drain to streams, lakes or wetlands at 58 specific Drain Points. Of these 58 Project Route Drain Points, 33 drain directly to a

waterbody, 21 drain to the forest floor within 100 feet of a waterbody, and 4 are between 100 and 200 feet away from a waterbody. The majority of these Project Route segments drain to streams (43), three to lakes/ponds, and 12 to wetlands. The type of drainage structure at each Drain Point was noted and included culverts (38), bridges (1), fords (3), and out sloped roads close to waterbodies (16).

Maintenance and repairs to address these identified Project Route concerns will be prioritized as described in Section 3.3 of this Plan. Future assessment, monitoring, and inventories will be completed as part of the plan to identify and address any future Project Route or Project-related erosion concerns (see Section 4).

3.0 PLAN IMPLEMENTATION

Upon approval by FERC, this Roads, Trails, and Transmission Line ROW Erosion Management Plan will be implemented in consultation with the SLIC. Collaboration with agencies, Indian Tribes and Canadian First Nations, non-governmental organizations, landowners or managers, or other groups will be included for specific efforts, as appropriate.

City Light will implement erosion minimization measures for routine O&M and new construction and will incorporate additional measures if new data indicate they are necessary. Review of implementation effectiveness will be reported to the SLIC annually and formal reports will be submitted to FERC every five (5) years. Implementation of this Roads, Trails, and Transmission Line ROW Erosion Management Plan will include the following actions:

- Develop and implement specific BMPs and standard operating procedures (SOP) to supplement the BMPs included in this Roads, Trails, and Transmission Line ROW Erosion Management Plan for road and trail maintenance, including ditches, drainage structures, and roadside vegetation management;
- Train City Light staff to implement BMPs and Temporary Erosion and Sediment Control (TESC) procedures. Maintain a record of road maintenance activities, repairs, decommissioning, and construction activities to track road/erosion-related actions taken;
- Consult with the SLIC to prioritize erosion sites warranting treatment, site-specific road repairs, erosion and sediment controls, and habitat restoration/stewardship needed to minimize and mitigate impacts from roads at or near steep erodible slopes, wetlands, creeks, and streams;
- Install soil bioengineering treatments and plantings, where appropriate and as needed, to minimize and control erosion and improve habitat; and
- Identify roads or trails that are potentially causing erosion, sediment input into aquatic habitats, or degradation of native vegetation communities that could be minimized, including by moving, closing, or decommissioning the road or trail. Potential effects to cultural sites from Project-related erosion will be identified as described in City Light's HPMP so appropriate protections can be implemented. This may include routes that are not necessary for Project operations or are detrimental to nearby resources (e.g., steep erodible slopes, wetlands, creeks, and streams).

3.1 General Best Management Practices

While conducting all maintenance and construction activities, crews will follow these general BMPs as well as task-specific BMPs described in the following sections. Any updates to best available science and BMPs will be made during adaptive management reviews every five (5) years over the life of the New License, or as needed and proposed by the SLIC.

- Routine road work will be conducted when moisture and soil conditions are not likely to result in excessive erosion and/or soil movement, when possible;
- Minimize areas of vegetation and soil disturbance and soil hardening from construction or staging. After construction activities, disturbed areas will be rehabilitated;

- Rock, mulch, soil, and structural fill material brought to the site will be free of seeds or other plant parts that could result in the spread of weeds. Only material sources that are certified as weed free or inspected[3] by City Light will be used;
- When appropriate, structural fill will be constructed of granular, free-draining material containing no organic materials. Structural fill will be compacted in lifts to a firm, unyielding condition;
- Soils which were disturbed, compacted, or hardened for construction use and staging that are not part of the erosion control site will be restored through removal of placed material and native planting. If hardened areas cannot be restored, nearby areas will be restored or enhanced;
- Equipment, including tracked and wheeled vehicles, shovels/rakes, and footwear, will be cleaned to remove seeds and invasive species prior to moving to a new work area;
- All debris (tree limbs, stumps, and non-invasive brush) will be placed outside the roadway prism at locations selected in consultation with City Light terrestrial and fisheries staff. For roads near streams or other waterbodies, woody debris will be placed on the downhill side of the road at the toe of the road fill to trap sediment. Large woody debris should be placed perpendicular to the direction of runoff and made stable, when possible;
- No refueling of equipment will take place within 50 feet of streams or waterbodies and spill response kits will be on-site to be deployed if spilling occurs;
- Equipment will be checked daily for leaks and any necessary repairs will be completed prior to commencing work activities; and
- If there is an obstruction in ditch or culvert which is related to beaver activity, inform the appropriate land management agency (i.e., the NPS if within North Cascades National Park) prior to acting, unless emergency action is necessary.

3.2 Staff Training and Road Maintenance/Activity Log

City Light crews that conduct routine maintenance on roads and trails, as well as staff that work on repairs and major projects will be trained in BMPs and SOPs described in this Roads, Trails, and Transmission Line ROW Erosion Management Plan on an annual basis. Training will include a review of procedures as well as an explanation for the goals and objectives of the Plan and BMPs to facilitate a discussion with crews about their recommendations of ways to best meet the goals and objectives. Training will include Certified Erosion and Stormwater Control Lead training or equivalent for at least one crew member who will be available and who can provide guidance and oversight to other crew members.

A Road, Trail, and Erosion Maintenance/Activity Log will be established to track maintenance, repair, and inspections completed pertinent to this Roads, Trails, and Transmission Line ROW Erosion Management Plan. The Log will include:

- Date and location of activity.

[3] Certified weed-free is defined as having been inspected and certified not to contain propagative plant parts or seeds of noxious weeds. Some construction materials (e.g., gravel) may not be available as certified weed-free; if certified weed-free materials are not available, City Light will inspect material source prior to use, as practicable.

- Type of activity (e.g., inspection, maintenance, repair, major project).
- Additional relevant details of activity, such as heavy equipment if used.
- Types and quantities of material used, and source locations.
- Any follow-up maintenance, inspection, or repairs needed.
- Verify removal of temporarily placed materials, such as gravel or soil, and the disposition of those materials.

The Log will provide a tool to track locations that require frequent maintenance or repairs to help identify areas that may need to be included in a larger-scale fix and a record for reporting activities associated with this Roads, Trails, and Transmission Line ROW Erosion Management Plan as described below in Section 4.

3.3 Prioritization of Road/Trail and Transmission Line ROW Erosion Control Activities

Maintenance and repair needs along Project roads/trails, culverts, bridges, road-related mass wasting sites and Project-related erosion areas identified during license studies are included in Attachment B. These areas will be prioritized in consultation with the SLIC within one (1) year of license issuance.[4] Prioritization of culverts was performed during City Light's 2021 study efforts, but remaining prioritizations for other areas that may warrant treatment will require consultation with the SLIC. New or other identified erosion areas in need of treatments to reduce erosion/sedimentation repairs that are identified during routine inspections, re-inventories, or monitoring will be prioritized annually in consultation with the SLIC (see Section 4 of this Roads, Trails, and Transmission Line ROW Erosion Management Plan). Considerations for prioritization include:

- Protect infrastructure from damage.
- Restore fish passage at locations identified in and coordinated with the REP.[5]
- Creek and wetland connectivity in non-fish bearing streams.
- Herpetological crossing guidelines and recommendations.
- Repair or maintenance work to reduce sediment delivery to streams, waterbodies or wetlands from surface erosion and/or mass wasting associated with Project roads/trails or Project-related erosion.
- Repair or maintenance work to disconnect road/trail drainage from streams, waterbodies or wetlands.
- Repair, maintenance, relocation, or decommissioning of stream-adjacent parallel roads with an emphasis on reducing water and sediment delivery from the road to the stream/waterbody/wetland.

[4] This prioritization will include review of both Project roads and non-Project roads used for Project purposes on NPS lands.

[5] Culverts identified as fish barriers are being addressed as part of the REP.

- Repair or maintenance work on roads in locations that drain ditchwater onto the forest floor and not into a stream, waterbody or wetland.
- Repair or maintenance work which can be undertaken with the maximum operational efficiencies, getting the maximum amount of work done with available funds, and achieving the most improvement in resource protection as early as possible in the planning period.

3.4 Road and Trail Maintenance

This section describes BMPs that will be used for various types of maintenance City Light performs along Project roads or trails and non-Project roads on NPS lands used for Project purposes.

3.4.1 Routine Maintenance

Routine road and trail maintenance procedures will occur within the road or trail prism [6] and will include:

- Regrading roadways;
- Resurfacing or topping existing roads with aggregate;
- Repairing or filling potholes;
- Vegetation maintenance within the road prism (road surface, cut slope, and fillslope are included in the road prism) where necessary;
- Cleaning out existing ditches and culverts that have filled in with debris;
- Replacing damaged relief culverts if the culvert damage exacerbates road damage or stability;
- Installing water bars and/or other appropriate measures to minimize erosion of the road surface;
- Installing check dams in ditches to reduce erosion and sediment transport;
- Armoring ditches and/or culverts;
- Clearing debris from the roadway following mass wasting by hauling off to an appropriate location; and
- Snow plowing and storing snow within the shoreline buffer or pushing snow into the Skagit River[7] at designated locations (one snow dump is located in the town of Newhalem adjacent to the maintenance yard and one is along the upstream side of Ross Dam).

3.4.1.1 Grading

If possible, grade a road before the surface reaches severe stages of pothole formation, wash boarding, or it begins to pool water. Grade only as needed to maintain the surface drainage and keep the sub-grade from becoming saturated.

[6] The roadway prism is the limit of embankment or excavation work required to construct the roadway. This limit is further defined as the catch point of a cut or fill with the existing ground (Washington State Department of Transportation [WSDOT] 2021).

[7] City Light does not treat roadways with salt.

Grading BMPs

- Determine, and if possible, treat, the cause of rilling (e.g., too much water running down tread or erodible surfacing) potholes and wash boarding and fix the problem. The problem is usually water-related;
- Cut out potholes and wash boarding. Pull road surfacing back onto running surface. This reduces water penetration and sub-grade saturation. Long-term solutions include restoring the road crown, adding rock or other appropriate surface materials, adding culverts, and ditching to reduce water in the road prism;
- Remove berms except those needed to carry water away from unstable slopes and/or typed waters; and
- Maintain appropriate road surface shape/slope (i.e., crowned, out slope, or in slope) such that water does not accumulate on or travel down the road surface. If road surface rills parallel to direction of road, then it needs a crown, out slope or in slope to move water off of road surface.

Avoid the following practices:

- Unnecessary removal of all vegetation in functioning ditches;
- Undercutting the fill or cut slopes;
- Placing (a.k.a. wasting) sediment or debris onto steep slopes (over 50 percent) or slopes above streams or wetlands;
- Concentrating road runoff onto steep slopes;
- Side-casting debris off the side of roadway;
- Staging debris for removal at the edge of steep slopes;
- Expanding the road prism though construction of, or augmentation of, pull-outs/parking areas unless designated by engineer;
- Burying vegetation or slash in the road running surface or sub-grade; and
- Unauthorized use outside of the road prism (i.e., areas mowed for turnarounds or landing sites for maintenance materials).

3.4.1.2 Roadside Vegetation Maintenance

The purpose of roadside vegetation maintenance is to increase visibility, improve safety, control invasive weeds, and keep roots from interfering with the roadbed and ditches. Methods include chemical application, hand brushing, and mechanical brushing. Maintain roadside vegetation to provide adequate vehicle and equipment access and visibility. Do not over-clear areas (i.e., clear no more than 3 feet from edge of driving surface or 5 feet if needed for visibility around corners), particularly along straight stretches of road with generally good visibility. Refer to the Vegetation Management Plan and Invasive Species Management Plan when maintaining roadside vegetation.

Roadside Chemical[8] Application BMPs

- Find and mark the location of all surface waters and riparian and wetland management zones before applying roadside spray;
- Mix chemicals in upland areas away from all typed waters and wetlands;
- Prevent chemicals from entering any surface waters or wetlands and their buffers;
- Follow all label instructions;
- Know and follow regulations regarding chemical storage, handling, application, and disposal;
- Develop a contingency plan for spills, including clean-up procedures and proper notification. Keep this Roads, Trails, and Transmission Line ROW Erosion Management Plan on site during operations; and
- Apply chemicals during optimum weather conditions and optimum times for control of target vegetation.

Mechanical and Hand Brushing BMPs

- Limit clearing of native vegetation along roadways to a width that allows safety/sight distances and proper maintenance functions such as grading, trimming shoulders, pulling ditches, and cleaning headwalls; and
- Upon completion, remove all debris and/or slash generated during mechanical brushing that will interfere with proper function of ditches or culverts. Slash will be managed according to the Vegetation Management Plan.

3.4.1.3 Ditches

Ditches carry road runoff water to drainage structures.

Maintenance BMPs

- Inspect for dams or other blockages to minimize erosion in steep ditches where relief culverts are not possible;
- If possible, to retain ditch vegetation and maintain ditch function, do not remove ditch vegetation within 100 feet of water crossings. Vegetation filters sediment from ditch flow;
- Remove ditch vegetation in areas if it contributes to road maintenance issues, such as obstruction of flow;
- Clean ditches only when necessary to maintain drainage. This helps maintain ditch function during a major storm event while reducing erosion;
- Do not undercut the road cut slope;
- Match equipment with the type of maintenance work required. Excessive excavation can create potential sediment delivery or localized ditch/roadway collapse; and

[8] Additional information regarding chemical application is included in the City of Seattle's Pesticide Use Reduction Strategy (Undated).

- Place any excavated material in a stable location where it will not drain to streams or wetlands. Do not place on slopes greater than 20 percent (5H:1V) unless engineered or within 200 feet of a stream or wetland.

3.4.2 Minor Drainage Improvements (Not Stream Crossings)

This section describes procedures and BMPs for minor road improvements such as relief culverts and water bars. Any culvert replacement at a stream will be considered a Major Project (Section 3.6). When replacing relief culverts, use size and materials appropriately sized for future flows following WDFW guidelines, including climate change considerations.[9]

3.4.2.1 Relief Culverts

Relief culverts are structures that drain ditchwater away from road surfaces. They are not intended to carry streamflow, but ditches may intercept surfacing groundwater, particularly along cut slopes. Culverts will be inspected at least annually and after major storm events (over 10 -year recurrence interval) for inlet or outlet plugging, damage, and to ensure flow can be carried through the culvert. Maintenance and repairs will be scheduled as needed. If a relief culvert is scheduled for replacement, proper sizing to allow for current and potential future flows will be taken into account using a tool such as those available through the Climate Impacts Group (CIG) and/or WDFW 2023: https://cig.uw.edu/projects/climate-robust-culvert-design/[10] (Mauger et al. 2021).

Installation BMPs

- Do not direct culvert outfall onto steep (over 50 percent slope gradient) or unstable slopes unless evaluated by a licensed engineer or licensed geologist;
- If possible, culvert spacing should be a maximum of 500 feet apart. If the ditch drains seepage, slope instability, or wet areas decrease culvert spacing to minimize the amount of discharged concentrated water;
- Where practical, place the culvert on the natural slope of the land with the low end of the culvert at least 2 inches lower than the upper end. When impractical, keep the culvert grade at least 2 percent higher than the ditch grade;
- Skew the culvert so it directs water 30 to 45 degrees from perpendicular to road centerline;
- No skew is necessary on roads less than 3 percent grade or at a low point on the road profile;
- Backfill the culvert with appropriate compacted fill material; and
- Install energy dissipaters such as flumes, tees and/or down spouts on slopes where appropriate or where the outfall drains onto erosive material.

[9] See the WDFW's Incorporating Climate Change into the Design of Water Crossing Structures (2017); available online at: https://wdfw.wa.gov/sites/default/files/publications/01867/wdfw01867_0.pdf.

[10] Note that there will likely be updated culvert sizing/hydrology research through the term of the new license; the CIG reference is valid in 2023, but culvert sizing should follow best available science at the time of culvert replacement.

Maintenance BMPs

- Inspect and clean culverts at least annually and after storm events (10+ year recurrence interval storms);
- Check need for additional cross drains for springs, seeps, low spots in ditch lines, and areas where ditch line erosion is occurring;
- Mark relief culverts with posts so heavy equipment operators can see and protect them; and
- Remove brush within 3 feet from inlets and outlets to see problems and reduce the risk of blockage.

3.4.2.2 Water Bars

Water bars are constructed within the road surfacing to divert surface water directly across the road and fill slopes to the forest floor. They need maintenance grading to maintain their shape.

General Water Bar BMPs

- Install and maintain water bars at a gradient steep enough to provide self -cleaning drainage with minimal maintenance:
  - For roads/trails greater than 3 percent grade, skew at least 30 degrees from perpendicular to the centerline.
  - For roads/trails less than 3 percent grade or at the bottom of a dip, install water bars perpendicular to the centerline.
- Locate outflows on stable areas.
- Construct water bars into the cut slope to block the ditch. These act as "safety valves" for failed relief culverts. They work best as temporary measures on low traffic roads with an inadequate number of relief culverts.
- Armor water bars at potential scour points (outflows, trench bottoms) with rock or other energy dissipaters.

3.4.3 Route Stabilization

This section describes procedures and BMPs for small-scale route stabilization procedures such as stabilizing failing fill or cut slopes. Stabilization that includes the entire road prism will be considered a major project.

- Do not undercut the road cut slope;
- Match equipment with the type of maintenance work required. Excessive excavation will create potential sediment delivery or roadway collapse;
- For fill slope stabilization or removal of over-steepened fill slopes, conduct engineering evaluation and stabilize and/or revegetate fill slope following guidelines in City Light's Invasive Plants Management Plan;
- Compact road tread as appropriate for specific location;

- If road, cut slope, or fill slope failures continue at a specific location, develop a long-term engineering solution; this will be considered a major project;
- Place any excavated material in a stable location where it will not drain to streams or wetlands. Do not place on slopes greater than 20 percent (5H:1V) unless engineered or within 200 feet of a stream, waterbody, or wetland; and
- Cover and revegetate exposed soils and material in coordination with City Light's Vegetation Management Plan provisions.

3.5 Route Decommissioning

Selection and prioritization of roads/trails for decommissioning will be made in consultation with the SLIC based on access needs and the potential for road runoff/erosion/mass wasting to impact other resources. Once a road is chosen for decommissioning, the goal is to re-establish the natural drainage and vegetation and to leave the road prism in a condition that will not result in major erosion, damage to aquatic habitat, or public safety risks. Decommissioned roads do not require maintenance.

3.5.1 Prioritizing Roads for Decommissioning

Consider the following roads for decommissioning when access to City Light infrastructure is established or maintained via another route:

- Roads with chronic problems that require frequent maintenance (such as stream crossing failures or cut slope/fill slope failures);
- Stream adjacent parallel roads;
- Roads with long sections within a riparian or wetland area;
- Road crossings that alter stream or wetland hydrology; and
- Areas with uncontrollable erosion and/or sediment delivery to streams or wetlands.

3.5.2 Road Decommissioning BMPs

Remove side cast, human-made structures (i.e., road signs, reflectors, concrete barriers, pipes, etc.) and fill if failures have the potential to deliver sediment to a stream, waterbody, or wetland or pose a risk to public safety.

Place all excavated material against the cut slope or other stable location. Do not place in areas on the road surface that will allow water to pond. Material may need to be hauled off to an appropriate disposition or storage location.

On steep slopes with poorly-drained soils (e.g., glacial till), do not place excavated material on the road surface. This material may become saturated and unstable.

Remove water crossing structures and restore the natural flow of streams and/or wetlands. When removing water crossing structures:

- Re-establish the natural wetland or streambed as close to the original location as possible to match the up and downstream width and gradient characteristics. These may be good locations for wood placement protection, mitigation and enhancements (PMEs) as described in the REP;
- Place all excavated material in stable locations;
- Leave stream channels and side slopes at a stable angle; and
- Revegetate exposed soils consistent with City Light's Vegetation Management Plan.

Install low maintenance drainage structures. Provide for drainage by:

- Removing relief culverts and grading side slopes to a stable angle;
- Removing berms or punching holes in them so they drain to a stable location;
- Ripping or roughening the road surface to promote re-vegetation and re-vegetation with native material in consultation with City Light's Vegetation Management Plan; and
- Installing non-drivable water bars to intercept the ditch, direct outflow onto stable locations. Make sure water bars are appropriately skewed, at a spacing to disperse runoff and minimize erosion and sedimentation, and at natural drainage points.

3.6 Major Projects

Major projects involve substantial work (e.g., relocating a section of a Project Route or stream culvert replacements) and have the potential for short-term erosion associated with major ground-disturbing activities. A separate, site-specific Erosion and Sediment Control Plan will be developed for major projects that will include short-term erosion control during and immediately following construction activities, long-term revegetation/erosion control, and a site-specific erosion monitoring protocol and schedule. Revegetation plans will be developed in coordination with the Vegetation Management Plan. All construction projects will follow applicable BMPs to minimize erosion, control sediment, and protect natural and cultural resources and comply with any required permit conditions.

General Major Project BMPs

- Adhere to in-water work windows to minimize disturbance of aquatic organisms during vulnerable periods of their life histories.
- Stabilize all disturbed soils that have a potential to deliver sediment to typed waters. Stabilization methods include establishing vegetation and covering exposed soils with WoodStraw, bio-matting, straw, tree boughs, or hydro mulching, all of which will be certified weed-free or City Light inspected when possible;
- Waste soil (spoil) deposit areas should be located where material will not enter a stream or wetland. An area with stable, shallow slope topography is best suited for a spoil area. Compaction of spoil deposits reduces potential embankment failures, surface erosion, and helps fit material into waste areas;
- For best results, handle spoils when they are dry. Handling saturated material may require additional sediment controls (e.g., silt fence, berms, straw);

- Seed or plant disturbed soils with native plant species use specifications in the Invasive Plants Management Plan. Consider adding compost and/or mulch if the site has poor nutrient quality and/or organic content; and
- All new construction projects will be assessed for regulatory compliance (e.g., Endangered Species Act) and will follow BMPs outlined in the Avian Species Management Plan and Wildlife Protection and Enhancement Plan as well as the conditions of any permits to avoid or minimize effects.

3.6.1 Stream Crossings

This section describes procedures for replacing stream crossings. Stream crossing structures that require replacement may include culverts, bridges, fords, and hardened crossings. Each stream crossing that requires replacement shall be evaluated and an appropriate crossing design shall be developed by a team that includes an engineer, geomorphologist, fisheries scientist, and terrestrial ecologist. City Light will follow WDFW design guidelines or other applicable agency guidelines. Consultation regarding potential cultural resources effects will also be completed following City Light's HPMP. This Roads, Trails, and Transmission Line ROW Erosion Management Plan addresses replacement of most stream crossings, however, the selection and prioritization of replacement stream crossings for fish passage[11] is covered in the REP. Stream crossing replacements will require a separate, site-specific Erosion and Sediment Control Plan, but the following general BMPs should be followed.

Construction BMPs

Use the following BMPs during the construction of water crossing structures to minimize potential impacts to fish, fish habitat, water quality, and the riparian environment.

Project Site Preparation BMPs

- Prior to starting work in areas where the bank will be disturbed, install temporary erosion control measures such as a filter fabric fence or straw wattles to prevent sediment from entering the stream. During construction, cover erodible soils with a mulch or matting to prevent erosion, and slope erodible soils to route water into settling areas away from streams. Recommendations on the appropriate erosion source control measures can be found in the Department of Ecology's stormwater management manual for western Washington at http://www.ecy.wa.gov/programs/wq/stormwater/manual.html (Ecology 2019);
- Minimize clearing and ground disturbance limits associated with site access and construction to reduce disturbance of riparian vegetation, wetlands, and other sensitive channel features. Trimming and cutting is preferred to grubbing. Clearing limits for site disturbance will be clearly marked;
- Establish staging areas (for construction equipment storage, vehicle storage, fueling, servicing, hazardous material storage, etc.) in a location and manner that will prevent erosion and potential delivery of pollutants to surface waters. These sites will then be rehabilitated when the work is completed; and

[11] BMPs regarding fish are included in this Roads, Trails, and Transmission Line ROW Erosion Management Plan in the event fish are located in a stream not previously identified as fish-bearing.

- After completion of work, but before removing the temporary erosion control measures, remove sediment accumulated during the project from behind the erosion control measures and deposit it in a location where it cannot enter surface water, such as streams, rivers, lakes, wetlands, or damage a terrestrial resource.

Dewatering BMPs

Construction site dewatering is often necessary to ensure the protection of fish and aquatic habitat, as well as to meet water quality standards. Maintain clean water by diverting the stream before it enters the area of activity and return the flow to the channel downstream from the project.

- Passive gravity flow diversions are generally preferable to pumping. Pumps can be inefficient and unreliable but may be necessary in some cases; spill protection is needed with pumps to prevent petroleum products from entering surface water;
- Isolate the work area at both the upstream and downstream ends by placing cofferdams made of gravel filled bags, ecology blocks or a similar device and then diverting the flow around the work area before beginning any work in the channel;
- Cofferdams should be overlain with plastic or filter fabric on the upstream side to contain sediment. Accumulated silt and other sediment should be removed with the filter fabric upon completion of the project;
- If gravel bags are used as cofferdams, after project completion the bags can be slit to allow the gravel to disperse downstream, provided the gravel is rounded and clean (e.g., pea gravel) or native material from the site. Remove the bags and any associated debris from the site. If necessary, hand tools can be used to spread the gravel to the design specifications to ensure stream flow and fish passage is not impeded by the gravel;
- Discharge clean diverted water back into the channel downstream as close as possible to the project site to maintain flows for fish and reduce the length of stream that needs to be dewatered;
- Stream beds typically have substantial subsurface water flow which must be captured and removed from the construction site. This dirty water cannot be discharged directly into a stream. Install a sump within the work area for dewatering. Place pump outlets upland a sufficient distance from the stream channel or wetland to allow the natural vegetation to filter sediments from the water before it reaches the channel;
- Equip pumps used for dewatering the job site with screens to prevent injury or entrainment of fish;
- Ensure that the open area for all types of fish guards is a minimum of 27 percent and that the screened intake consists of a facility with enough surface area to ensure that the velocity through the screen is less than 0.4 feet per second;
- Keep the screen in place whenever water is withdrawn from the stream through the pump intake and maintain the screen to prevent injury or entrapment of juvenile fish;
- If pumps are used as the primary or secondary method of diverting flow around the isolated work area, plans should be in place for accessing additional backup pumps in the event of extremes in flow caused by weather or other factors. Once started, bypass pumps typically need to be run and monitored continuously through project completion; and

- Remove fish from the site prior to the start of construction using approved methods (e.g., fish herding with electrofishers).

Water Quality BMPs

- Establish a site-specific Spill Prevention and Erosion Control Plan prior to beginning work, that must be on-site during the job and prior to beginning work. Such a plan may include:
  - a site plan with a description of the methods of erosion/sediment control;
  - methods for confining, removing, and disposing of excess construction materials;
  - measures for washing and maintaining equipment;
  - a spill containment plan;
  - measures to reduce and recycle hazardous and non-hazardous wastes; and
  - measures to disconnect road surface and ditch water from all typed waters.
- Do not use wood that has been treated with creosote, pentachlorophenol, or Chemonite®/ ammoniacal copper zinc arsenate (ACZA) for any part of the structure, including pilings, beams, structural supports, and decking. These components must remain free of these toxic substances for the duration of their functional lives. Detailed information about preservative options can be found on the Western Wood Preservative Institute web site at http://wwpinstitute.org/.
- Ensure that no chemicals or any other toxic or harmful materials are allowed to enter or leach into the stream.
- Minimize sediment delivery to surface water.
- Dispose of all project waste material such as construction debris, silt, excess dirt, or overburden material above the limits of floodwater in an approved upland disposal site.
- Stop work if high flow conditions that may cause siltation are encountered during the project or if the cofferdams are compromised. Do not re-start work until high flows subside. Remove fish and re-establish isolation of work area as appropriate.
- Do not allow uncured concrete or concrete by-products to enter the stream at any time during construction. Completely seal all forms used for concrete to prevent uncured concrete from getting into the stream.
- Ensure that all materials and equipment used for construction, monitoring, and fish salvage are free of aquatic invasive species per City Light's Aquatic Invasive Species Management Plan. Decontaminate all materials and equipment so that no viable invasive species are transported to or from the job site.

Equipment Operation BMPs

- Where practical, based on project scale and site conditions, accomplish the work by hand or with hand-held tools to minimize disturbance. If conducting work by hand is not practical, use smallest equipment as practicable to prevent unnecessary soil disturbance or compaction;

- Where possible, operate equipment from the road, road shoulder, bridge, top of the bank, dry gravel bar, work platform, or similar out-of-water location. Work within a dewatered channel or a channel with diverted flow is acceptable with the use of BMPs. In -water equipment operation should be avoided, but where necessary it should be identified and addressed in the Spill Prevention and Erosion Control Plan;
- Check equipment daily for leaks and make any necessary repairs prior to commencing work activities along the stream. Ensure equipment is free of external petroleum-based products while working. Remove accumulations of soil or debris from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to working;
- Equipment crossings of the stream are discouraged and should be proposed only when and where necessary to complete a project or access a project site;
- Operate equipment in the stream channel only if the drive mechanisms do not enter the channel or when the work area is dry or within an area where the stream flow is bypassed; and
- Limit equipment use near the stream to specific access and work corridors to minimize disturbance to stream banks and vegetation. Service, refuel, and maintain equipment in an upland area to prevent contamination of surface waters. When practical, this service site should be located at least 200 feet from any receiving waters. Fueling areas should be equipped with sufficient spill containment supplies to prevent a spill from reaching typed waters.

Site Restoration BMPs

- Alteration or disturbance of the bank and vegetation should be limited to that necessary to construct the project. Trimming and cutting riparian vegetation is preferred to stump removal;
- Affected bed and bank areas should be restored to pre-project condition. This includes regrading and restoring banks and channel beds back to natural contours, removing unnecessary fill, controlling the potential for invasive species, loosening and roughening compacted soil, revegetating disturbed areas with native vegetation, and restoring wood loading in the channel consistent with the rest of the stream;
- Develop and implement a plan to save and re-use topsoil;
- Develop and implement a plan to place trees cut during the project, on the bank or in the stream to provide fish habitat and restore natural stream processes;
- Do not return stream flows to the project area until all in-channel work is completed, and the banks are adequately stabilized to minimize sediment delivery to the stream or stream channel;
- Remove all structures, materials or equipment from the site and dispose of all excess spoils and/or waste materials properly upon completion of the project;
- Restore the channel bed, bank, and shoreline areas to maximize sustainable ecological functions and infrastructure protection;
- Develop and implement a site restoration/revegetation plan in coordination with City Light's Vegetation Management Plan. The restoration plan should include replacing vegetation generally representative of the species and densities of adjacent undisturbed riparian vegetation and a native erosion control grass/forb seed mix immediately after construction to prevent

future erosion, stem the invasion of noxious weeds, and stabilize the soil on any disturbed areas;

- Monitor and maintain the plantings to assure that revegetation is in compliance with the revegetation plan; and
- Rehabilitate all staging areas and constructed pull-outs.

3.7 Emergency Maintenance

City Light will perform emergency road maintenance (e.g., following a major storm event) as needed to protect the road prism and reduce erosion and transport of sediment and water to streams. Following road stabilization and emergency maintenance, each site will be re -assessed to determine if additional measures are needed to minimize future repairs or erosion (e.g., replace an undersized culvert, stabilize an unstable slope) or if emergency measures should be replaced with longer-term solutions such as re-routing the road, replacing emergency erosion control with bioengineering methods, etc. The Road Log will help to identify sites that need chronic emergency repairs and may benefit from longer-term solutions. Construction BMPs including sediment and erosion controls will be applied to the extent possible, based on the nature and extent of the emergency.

3.8 Emergency Situations

Emergency situations are instances where there is imminent risk to human life, including a threat of fire hazard, mechanical failure, or power outage. In the event of an emergency situation, City Light will make efforts to avoid direct effects to natural or cultural resources and will communicate with appropriate agencies within 14 days if these situations arise that affect resources of concern and City Light will coordinate with their Cultural Resource Coordinator as expeditiously as possible.

4.0 IMPLEMENTATION TIMELINE

City Light will implement this Roads, Trails, and Transmission Line ROW Erosion Management Plan upon license issuance. Inventory, evaluation, and treatments will be implemented on a prioritized schedule, and treatments will be monitored to assess effectiveness (Table 4.0-1). The implementation timeline for treatments may be staggered to address avian or wildlife seasonal sensitivities, follow other permit requirements, address limitations of construction crew availability or other unknown constraints. Timelines and treatments will be modified as necessary to meet the goals of this Roads, Trails, and Transmission Line ROW Erosion Management Plan, including adherence to BMPs.

Table 4.0-1. Timeline of activities.

Timeline	Activity
Annually, and following storm events over a 10-year return interval, and as needed	Visual inspection of all roads, culverts, stream crossings and hydrologically connected road reaches or roads on steep slopes to identify immediate maintenance needs.
Years 1-2 following license issuance and annually as needed through the life of the license	Report to and consult with SLIC (consistent with the SLIC Governance Document) on previous year's activities and monitoring, and planned current and upcoming activities that are based on the implementation work plan and shared through the Annual Report (three year rolling plan (previous year activities, and two year rolling workplan)). Annual work plan activities and monitoring locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS in the Implementation Work Plan (including the specific location, timing, and scope of the activities). City Light will communicate emergency situations as soon as practical.
	Provide summary of road and trail maintenance, erosion-related activities in the transmission line ROW, and other pertinent issues. Provide monitoring results during years when data is collected.
	Train City Light staff to implement BMPs and Temporary Erosion and Sediment Control (TESC) procedures.
	Maintain a record of road maintenance activities, repairs, decommissioning, and construction activities to track road/erosion-related actions taken.
	Develop, and implement a plan subject to NPS approval to install and maintain gates for all powerline access roads to prevent non-authorized vehicle access on NPS lands.
Year 1 following license issuance	City Light will develop an Implementation Work Plan, in consultation with the SLIC and with approval from the NPS when actions have the potential to affect NPS lands and waters, to implement specific BMPs and standard operating procedures (SOP) to supplement the BMPs included in this Roads, Trails, and Transmission Line ROW Erosion Management Plan for road and trail maintenance, including ditches, drainage structures, and road brushing.
	Consult with the SLIC regarding proposed prioritization and implementation timeline for erosion areas warranting possible treatment.
	Consult with the SLIC regarding proposed treatments for high priority road repairs, erosion and sediment controls, and habitat restoration/stewardship needed to minimize and mitigate impacts from roads at or near creeks and streams.
	Consult with the SLIC regarding proposed site- and treatment-specific monitoring plans for high priority treatment locations.

Timeline	Activity
Years 1-3 following license issuance	Unless completed prior to the issuance of the New License, identify potential roads or trails that could be minimized, moved, closed, or decommissioned and develop a plan and schedule to complete the planned work. These may be routes that are not necessary for Project operations or are detrimental to nearby resources.
	Implement proposed treatments for high priority road repairs, erosion and sediment controls, and habitat restoration/stewardship needed to minimize and mitigate impacts from roads at or near creeks and streams.
	Collect additional data if needed to prioritize treatment locations or design treatments.
Every five (5) years following license issuance	Re-inventory of stream crossings, road conditions and associated drainage features.
	Consult with the SLIC regarding proposed prioritization and implementation timeline for remaining and new erosion areas warranting possible treatment.
	Consult with the SLIC regarding proposed treatments for remaining high-priority, moderate- or low-priority road repairs, erosion and sediment controls, and habitat restoration/stewardship needed to minimize and mitigate impacts from roads at or near creeks and streams. Include any new areas warranting treatments if identified during re-inventory.
	Consult with the SLIC regarding proposed site- and treatment-specific monitoring plans for remaining high-priority, moderate- or low- priority treatment locations.
	Submit a report to FERC describing implementation, monitoring activities, and any proposed modifications to the Roads, Trails, and Transmission Line ROW Erosion Management Plan based upon the results of monitoring and consultation with the SLIC.
For five (5) years following new construction	Review of new construction projects, including new erosion or sediment controls and revegetation.
Every ten (10) years following license issuance	Re-evaluate potential roads or trails that could be minimized, moved, closed or decommissioned every 10 years.

5.0 MONITORING AND REPORTING

This section describes the monitoring City Light will carry out to document progress towards Roads, Trails, and Transmission Line ROW Erosion Management Plan goals and objectives. Monitoring is an extension of City Light's protection and enhancement implementation and will use baseline information from City Light relicensing study efforts. The goals of monitoring are to document compliance, determine the effectiveness of protection measures and to inform adaptive management updates to this Roads, Trails, and Transmission Line ROW Erosion Management Plan. Monitoring efforts will be designed in relation to the size of the project and potential effects to resources.

5.1 Monitoring Procedures

Monitoring efforts under this Roads, Trails, and Transmission Line ROW Erosion Management Plan include regular inventory and condition survey of roads/trails and associated drainage features, review of new construction projects, erosion or sediment controls, and visual surveys of hydrologically connected road reaches following major (over 10-year return period) storm events as shown in Table 4.0-1 above.

Road re-inventory methods will be similar to those used for the original road inventory, with updated methods as needed in consultation with the SLIC.

Monitoring at new construction or erosion control locations will include:

- Visual observations and photograph(s) of the condition of erosion control treatment sites noting condition of erosion control features;
- For revegetation sites: visual estimation of percent bare ground to nearest 10 percent within the revegetation site; general notes on exposed roots, plant health (healthy vs. sick or dying vegetation); and estimate of percent native vegetation cover by species. Note if there are large areas with different vegetation health or erosion areas (e.g., over 500 square feet). Note presence of invasives (coordinate with City Light's Invasive Plants Management Plan); and
- Note and photograph any areas of ongoing erosion within the site (Global Positioning System [GPS] point, description, type, and cause of erosion).

5.2 Adaptive Management, Reporting, and Plan Review

City Light will report annually to the SLIC to summarize road and trail maintenance, erosion-related activities in the transmission line ROW, and monitoring results during years when data is collected, and other pertinent issues. Annual work plan activities and monitoring on locations on or affecting NPS lands and waters are subject to NPS approval, if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing and scope of the activities). Annual reports will utilize the Road, Trail, and Erosion Maintenance/Activity Log information described in Section 3.2 of this Roads, Trails, and Transmission Line ROW Erosion Management Plan. Every five (5) years, City Light will file a report with FERC describing implementation, monitoring activities, and any proposed modifications to the Roads, Trails, and

Transmission Line ROW Erosion Management Plan (including the Implementation Work Plan) based upon the results of monitoring and consultation with the SLIC.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS, before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

6.0 REFERENCES

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ROADS, TRAILS, AND TRANSMISSION LINE RIGHT-OF-WAY EROSION MANAGEMENT PLAN

ATTACHMENT A

ROUTES DATA TABLE AND MAPBOOK

Note: Attachment A will be added to this management plan once filed with FERC with the Amended FLA; this will be an updated version of Appendix H – Routes (roads and trail) used by Seattle City Light for Project purposes of the Skagit River Hydroelectric Project.

ROADS, TRAILS, AND TRANSMISSION LINE RIGHT-OF-WAY EROSION MANAGEMENT PLAN

ATTACHMENT B

PROJECT ROUTE-RELATED BRIDGES, CULVERTS, ROUTE ISSUES, AND PROJECT ROUTE-ASSOCIATED MASS WASTING IDENTIFIED AS PART OF GE-02 STUDY

This Attachment B to the Roads, Trails, and Transmission Line ROW Erosion Management Plan includes an inventory of Project Route-related Bridges, Culverts, Route Issues, and Project Route-associated Mass Wasting identified as part of City Light's GE-02 Study. These are included in this section to provide a list of Project Route features which have been assessed for issues which may warrant treatment. Some features do not warrant treatment at this time, but may be re-inventoried on a regularly scheduled basis to inform any new issues that may arise. Refer to mapbooks in attachments to the GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study (City Light 2023) for site locations.

Table 1. Project-Related Bridges and proposed treatment.

Bridge ID	Road Name	Purpose	Width(ft)	Span (ft)	Skew (degrees)	Issues	Treatment Measure
B1005	T-Line Sauk	Stream Crossing	15	24	0	Bridge failing	Remove bridge
B1012	Gorge Dam	Stream Crossing	18	225	90	None identified	None needed
B1021	Incline Lift	Gully	15	123	0	None identified	None needed

Table 2. Project-Related Culverts and 2021 Condition, prioritization and potential treatment methods for culverts which may warrant treatment.

Culvert ID	Type[1]	Purpose	Length (ft)	Diam (in)	Skew (deg)	Inlet	Inlet blockage	Inlet Plug Potential	Outlet Feature	Outlet blockage	Outlet Plug Potential	Physical issues	Function issues	Comments	Inlet Feature	Treatment Priority	Potential Treatment Method
C1228	CMP	Relief	0	12	61-90	Okay	76-100%	High	None	76-100%	High	Broken	CB full of sediment	legacy pipe	None	High	Replace culvert
C1291	Wood Staves	Relief	32	10	61-90	Okay	26-50%	None	None	76-100%	High	Broken	None	does not function	None	High	Replace culvert
C1200	HDPE	Relief	25	18	61-90	Okay	76-100%	High	None	26-50%	Medium	No problem	CB full of sediment	None	None	Moderate	Clear inlet/outlet
C1205	CMP	Relief	20	12	61-90	Okay	76-100%	High	None	None	None	No problem	None	None	None	Moderate	Clear inlet
C1175	CMP	Stream	18	36	61-90	Okay	None	None	None	1-25%	Low	Fill failing	Too short	None	None	High	Replace culvert in consultation with REP (fish passage culvert)
C1188	CMP	Relief	30	18	61-90	Okay	76-100%	High	Downspout	None	None	No problem	CB full of sediment	None	None	Moderate	Clear inlet
C1047	CMP	Relief	18	18	61-90	Okay	51-75%	Med	Downspout	None	None	Intake damage	None	None	None	Moderate	Clear inlet
C1048	CMP	Relief	18	18	61-90	Okay	76-100%	High	None	None	None	Intake damage	None	None	None	Moderate	Clear inlet
C1050	CMP	Stream	17	36	61-90	Okay	None	None	None	None	None	Corrosive rust w holes	Flow under/around	Fish Barrier, undermined and does not function	None	High	Replace culvert
C1082	HDPE	Relief	24	12	0-30	Okay	51-75%	High	None	26-50%	Medium	No problem	None	cross drain on crossroad to tower	None	Moderate	Clear inlet/outlet
C1023	CMP	Relief	16	18	46-60	Okay	26-50%	Med	None	26-50%	Medium	Partially crushed	None	None	None	Moderate	Clear inlet/outlet and monitor
C1024	CMP	Relief	22	18	0-30	Okay	None	High	None	1-25%	High	Partially crushed	None	Culvert serves ditch	None	Not applicable	Inspect periodically
C1025	Cast iron	Stream	16	12	61-90	Okay	None	High	None	None	High	No problem	None	None	Beaver Exclusion	Not applicable	Inspect periodically
C1026	Concrete	Stream	22	18	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1225A	CMP	Stream	40	72	61-90	Okay	None	None	Downspout	None	None	No problem	None	None	Other	Not applicable	Inspect periodically
C1226	HDPE	Relief	32	24	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1227	HDPE	Relief	30	24	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1229	HDPE	Relief	20	18	61-90	Okay	None	None	None	None	None	No problem	None	flared mouth	Other	Not applicable	Inspect periodically
C1221	HDPE	Stream	10	24	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1189	CMP	Stream	20	36	61-90	Okay	None	None	None	None	None	Corrosive rust	None	None	None	Not applicable	Inspect periodically
C1190	CMP	Stream	28	18	61-90	Okay	1-25%	Low	None	None	None	Partially crushed	None	None	None	Not applicable	Inspect periodically

Culvert ID	Type[1]	Purpose	Length (ft)	Diam (in)	Skew (deg)	Inlet	Inlet blockage	Inlet Plug Potential	Outlet Feature	Outlet blockage	Outlet Plug Potential	Physical issues	Function issues	Comments	Inlet Feature	Treatment Priority	Potential Treatment Method
C1191	CMP	Stream	30	24	61-90	Okay	1-25%	Low	None	None	None	Corrosive rust w holes	None	None	None	Not applicable	Inspect periodically
C1192	Cast iron	Stream	25	12	61-90	Okay	26-50%	Med	None	1-25%	Low	No problem	None	None	None	Not applicable	Inspect periodically
C1193	CMP	Stream	0	24	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1194	CMP	Stream	38	48	61-90	Okay	None	None	None	None	None	Partially crushed	None	None	None	Not applicable	Inspect periodically
C1195	CMP	Gully	22	36	61-90	Okay	None	None	None	None	None	Corrosive rust	None	None	None	Not applicable	Inspect periodically
C1196	CMP	Stream	30	36	0-30	Okay	1-25%	Low	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1197	CMP	Stream	30	36	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1198	HDPE	Stream	30	18	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1199	HDPE	Relief	72	36	46-60	Okay	None	None	None	None	None	No problem	None	seep in bank	None	Not applicable	Inspect periodically
C1201	CMP	Stream	40	36	61-90	Okay	None	None	None	None	None	Corrosive rust	None	None	None	Not applicable	Inspect periodically
C1202	CMP	Stream	30	84	61-90	Okay	None	None	None	None	None	Partially crushed	None	None	None	Not applicable	Inspect periodically
C1203	CMP	Stream	40	48	61-90	Okay	None	None	None	None	None	Bent	None	None	None	Not applicable	Inspect periodically
C1204	CMP	Stream	40	60	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1206	HDPE	Stream	27	48	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1207	CMP	Relief	20	24	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1215	CMP	Stream	29	96	61-90	Okay	None	None	Beaver Exclusion	None	None	No problem	None	None	Beaver Exclusion	Not applicable	Inspect periodically
C1216	Cast iron	Stream	40	12	61-90	Perched >1'	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1217	CMP	Stream	48	36	61-90	Okay	1-25%	Low	None	None	None	Corrosive rust	None	None	None	Not applicable	Inspect periodically
C1218	Half arch	Stream	55	108	61-90	Okay	None	None	Beaver Exclusion	None	None	No problem	None	None	Beaver Exclusion	Not applicable	Inspect periodically
C1169	CMP	Relief	21	24	61-90	Okay	26-50%	Med	None	26-50%	Medium	Partially crushed	None	6" of grade above. too shallow	None	Moderate	Clear inlet/outlet, add material to cover pipe
C1173	HDPE	Gully	30	12	61-90	Perched <1'	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically

Culvert ID	Type[1]	Purpose	Length (ft)	Diam (in)	Skew (deg)	Inlet	Inlet blockage	Inlet Plug Potential	Outlet Feature	Outlet blockage	Outlet Plug Potential	Physical issues	Function issues	Comments	Inlet Feature	Treatment Priority	Potential Treatment Method
C1174	CMP	Gully	30	18	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1182	CMP	Relief	20	18	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1185	CMP	Relief	40	18	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1186	CMP	Relief	21	12	61-90	Okay	None	None	Downspout	None	None	No problem	None	seepage uphill	None	Not applicable	Inspect periodically
C1187	CMP	Stream	55	36	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1306	CMP	Stream	22	24	61-90	Okay	None	None	None	1-25%	Medium	Corrosive rust	None	None	None	Not applicable	Inspect periodically
C1032	HDPE	Relief	30	18	61-90	Okay	26-50%	Med	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1038	HDPE	Relief	32	12	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1039	HDPE	Relief	30	24	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1045	CMP	Stream	35	18	46-60	Okay	1-25%	Low	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1046	CMP	Stream	18	18	61-90	Okay	1-25%	Low	None	None	None	No problem	None	sediment throughout	None	Not applicable	Inspect periodically
C1049	CMP	Stream	30	18	61-90	Okay	None	None	None	None	None	Corrosive rust w holes	None	None	None	Not applicable	Inspect periodically
C1051	CMP	Stream	16	18	61-90	Okay	None	None	None	1-25%	Low	No problem	None	None	None	Not applicable	Inspect periodically
C1052	HDPE	Relief	21	12	46-60	Okay	26-50%	Med	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1053	HDPE	Relief	28	12	61-90	Okay	1-25%	Low	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1064	Concrete	Stream	16	12	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1075	CMP	Stream	45	72	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1076	CMP	Stream	20	36	61-90	Okay	None	None	None	None	None	No problem	Neg slope	None	None	Not applicable	Inspect periodically
C1083	CMP	Stream	20	24	61-90	Okay	1-25%	Low	None	None	None	Corrosive rust	None	None	None	Not applicable	Inspect periodically
C1085	CMP	Stream	18	16	61-90	Okay	26-50%	Med	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1086	CMP	Gully	20	36	61-90	Okay	None	None	None	None	None	No problem	None	Dried up streambed. Possibly diverted	None	Not applicable	Inspect periodically

Culvert ID	Type[1]	Purpose	Length (ft)	Diam (in)	Skew (deg)	Inlet	Inlet blockage	Inlet Plug Potential	Outlet Feature	Outlet blockage	Outlet Plug Potential	Physical issues	Function issues	Comments	Inlet Feature	Treatment Priority	Potential Treatment Method
C1087	CMP	Stream	30	48	61-90	Okay	None	None	None	None	None	Corrosive rust w holes	None	None	None	Not applicable	Inspect periodically
C1091	CMP	Stream	236	46	61-90	Okay	None	None	None	None	None	Bent	too small	None	None	High	Replace with appropriately sized pipe as needed.
C1092	CMP	Stream	86	48	61-90	Perched <1'	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically
C1093	HDPE	Gully	42	36	61-90	Okay	None	None	None	None	None	No problem	None	None	None	Not applicable	Inspect periodically

Notes:
1 CMP – corrugated metal pipe; HDPE – high density polyethylene.
2 If known fish passage barrier, treatment will be designed and implemented through City Light's REP.

Table 3. Mass Wasting noted along Project Routes 2021 which may warrant treatment.

Site ID	Mass Wasting Type	Activity	Features	Failure Potential	Treatment Priority	Comments	Potential Future Failure Volume (Cu yd)	Potential Treatment Method
M1001	Shallow slide	Active	Scarps	High	Med	Pull back fill	100/yr	Mesh
M1002	Shallow slide	Active	Scarps	High	Low	Remove scarp	10/yr	Mesh
M1004	Shallow slide	Active	Raveling	High	High	None	35/yr	Revegetate
M1005	Shallow slide	Potential	Raveling	Medium	Low	None	21/yr	Revegetate
M1007	Shallow slide	Active	Raveling	High	High	Maintain toe	585-1000/yr	Maintain toe

RECREATION RESOURCE MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

November 2025

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List of Acronyms and Abbreviations

ABA .....Architectural Barriers Act
ADA .....Americans with Disabilities Act
ADASAD .....ADA Standards for Accessible Design
City Light .....Seattle City Light
CMA .....Cooperative Management Agreement
CoSD .....City of Seattle Datum
LC .....Learning Center
FERC .....Federal Energy Regulatory Commission
GIS .....Geographic Information System
HPMP .....Historic Properties Management Plan
I&E .....interpretation and education
LP .....licensing participants
NAVD 88 .....North American Vertical Datum of 1988
NEPA .....National Environmental Policy Act
NHPA .....National Historic Preservation Act
NPS .....National Park Service
O&M .....Operations and Maintenance
PME .....Protection, Mitigation, and Enhancement
Project .....Skagit River Hydroelectric Project
RD .....Recreation Days
RLNRA .....Ross Lake National Recreation Area
RRMP .....Recreation Resource Management Plan
SR .....State Route
SLIC .....Skagit License Implementation Committee
U.S.C. .....United Stated Code
USFWS .....U. S. Fish and Wildlife Service
USFS .....U.S. Forest Service
VUM Plan .....Visitor Use Management Plan
WDFW .....Washington Department of Fish and Wildlife
WSDOT .....Washington State Department of Transportation

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Recreation Resource Management Plan (RRMP) for the Skagit River Hydroelectric Project (Skagit Project or Project), Federal Energy Regulatory Commission (FERC) No. 553. The RRMP addresses City Light's recreation resource roles and responsibilities for the Project for the life of the new FERC license. The Recreation Plan defines a vision of the desired future condition for recreation resources, establishes long-term goals and objectives for managing recreation resources, identifies both site-specific actions and broader programmatic measures across the geographic scope of the Plan area, and describes monitoring and adaptive management.

City Light will coordinate the efforts required under the RRMP with other license article requirements and resource management plans included in the new license. In particular, the RRMP will be consistent with City Light's Historic Properties Management Plan (HPMP), which is being developed to comply with the National Historic Preservation Act (NHPA) and in consultation with Section 106 and the Cultural Resources Work Group for the new license. Specifically, resources with related guidance measures are designed to work in tandem to meet comprehensive management goals through the implementation of the suite of City Light's proposed resource protection, mitigation, and enhancement (PME) measures consistent with applicable National Park Service (NPS) and U.S. Forest Service (USFS) management plans.

1.1 Project Background

The Skagit River Project is located in northern Washington State, in the traditional territory of several Indian Tribes and Canadian First Nations. The Project crosses Whatcom, Skagit, and Snohomish counties, and consists of three power generating developments on the Skagit River (Ross, Diablo, and Gorge) and associated lands and facilities. The Project also includes two City Light-owned townsites (Newhalem and Diablo), the North Cascades Outdoor School Learning Center (LC), a variety of recreation facilities, and multiple parcels of fish and wildlife mitigation lands within the Skagit, Sauk, and South Fork Nooksack watersheds.

Project generating facilities are located entirely within Ross Lake National Recreation Area (RLNRA), which is administered by NPS as part of North Cascades National Park Service Complex. Congress established RLNRA in 1968 "[i]n order to provide for the public outdoor recreation use and enjoyment of portions of the Skagit River and Ross, Diablo, and Gorge Lakes, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters." The legislation maintains FERC's jurisdiction "in the lands and waters within the Skagit River Hydroelectric Project" (16 United Stated Code [U.S.C.] § 90d-4; Public Law 90-544, Sec. 505 dated October 2, 1968, as amended by Public Law 100-668, Sec. 202 dated November 16, 1988).

As part of a comprehensive PME program under a new FERC license, City Light prepared this RRMP in coordination with the licensing participants (LP). The RRMP evolved from recreation-related relicensing studies and analyses, in particular the RA-01 Recreation Use and Facility Assessment Report (City Light 2023a) and RA-05 Lower Skagit River Recreation Flow Study (City Light 2023b), and from settlement discussions between parties to the Settlement Agreement.

The programs and measures described in this RRMP will be implemented by City Light, in coordination with the Skagit License Implementation Committee (SLIC), under the new license.

2.0 PURPOSE AND SCOPE OF THE PLAN

The RRMP provides a management framework for the protection, mitigation, and enhancement of recreation resources and other resources affected by Project-related recreation and operations during the life of the new license. The RRMP represents a single "umbrella" package of PME measures for Project-related recreation resources and opportunities. The RRMP defines City Light's involvement, role, and responsibilities in implementing recreation resource components of the FERC license. More specifically, the RRMP is an implementation plan that will be used to monitor, design, construct, fund, operate, and maintain existing and proposed public recreation facilities and programs in the Project Boundary and Project vicinity. To achieve these purposes, the RRMP includes three implementation programs:

- Recreation Facility Capital Improvements Program
- Recreation Facility Operations and Maintenance Program
- Multi-Resource Interpretation and Education Program

Additionally, City Light will implement a Recreation Monitoring and Adaptive Management Program (See section 5.0) to address changes over time and to identify when future recreation facilities or changes in management tools may be needed.

The RRMP is specific to City Light's recreation resource role and responsibilities. It does not make management or resource commitments for LPs or members of the SLIC, such as the NPS, USFS, or other entities. The RRMP and its implementation programs include an adaptive management process—City Light and SLIC members will review the status of RRMP recreation implementation actions, analyze recreation use and other monitoring data, and plan for future actions accordingly.

2.1 Project Vision for the Visitor Experience

The Project vision will guide management of Project recreation resources. This vision will help guide City Light's development and implementation of recreation resource programs at the Project over the life of the new license. It is meant to be consistent with adjacent land management directives but at the same time reflects the requirements of a FERC-licensed hydroelectric project. As with other elements of the RRMP, the vision does not make resource or management commitments for underlying or adjacent federal or state land and resource managers. The implementation programs in the RRMP are designed to be consistent and compatible with this vision, including each location's unique natural and cultural setting and resources and statutory requirements, as well as the desired recreation experience and future conditions.

City Light, NPS, and USFS each contribute to the visitor experience in the area, and it is City Light's intention to partner with NPS and USFS to provide a unified visitor experience for Project area visitors. In January 2023, City Light and NPS met for a two-part visioning workshop to develop a shared vision for the visitor experience at the Skagit River Hydroelectric Project and RLNRA. Out of this workshop came the shared understanding that authentic visitor experiences in the Project area and RLNRA/North Cascades National Park Service Complex are grounded in the area's unique stories (cultural, natural, historic, modern), people (Indian Tribes and Canadian

First Nations, residents, local workers, educators, and current and future visitors), and sense of place (qualities, features, sensory, and seasons).

At the same time, City Light's overall mission as a municipal utility is to provide customers with affordable, reliable, and environmentally responsible energy services. Among the values that support this mission are environmental stewardship (a dedication to enhancing, protecting, and preserving the environment for future generations) and equitable community connections (being visibly and actively involved in the communities served by City Light, which includes the communities affected by the Project).

The proposed PMEs in this RRMP shall be developed and implemented through the lens of this vision.

2.2 Goals and Objectives

The RRMP facilitates appropriate recreation use and development in the Project area and preserves and enhances the Project vision and desired recreation experience. Through implementation of the RRMP, potential recreation-related impacts on other resources at the Project are minimized and managed. To help achieve this aim, the RRMP includes the following goals and objectives:

Goal 1: Avoid, minimize, or mitigate potential adverse effects on or from recreation resources at the Project.

- Objective 1a: To the extent feasible, locate, design, and manage recreation use at the Project to minimize potential adverse effects on other resources in the Project area (e.g., cultural, terrestrial, water quality, etc.).
- Objective 1b: Support and enhance traditional cultural practices by preventing damage to cultural resources and traditional cultural properties, providing for necessary privacy for Tribal members' exercise of cultural practices, and promoting Tribal members' access to cultural resources, traditional cultural properties, and important areas located on City Light owned property.
- Objective 1c: Minimize potential Project operational effects on recreation resources and opportunities by managing peak recreation season (Memorial Day–Labor Day) water surface level fluctuations to accommodate reservoir and shoreline access.
- Objective 1d: When possible, schedule recreation and hydroelectric facility operations and maintenance (O&M) activities to minimize potential adverse effects on recreation and public use at the Project.

Goal 2: Protect, mitigate, and/or enhance public recreation resources at the Project.

- Objective 2a: Provide a range of recreation opportunities that accommodates a diversity of visitor choices, experiences, and opportunities.
- Objective 2b: Provide and maintain developed recreation sites that accommodate current and potential future recreation needs at the Project.
- Objective 2c: Enhance and improve the condition of Project recreation sites and use areas by considering visitor use patterns, preferences, and needs.

- Objective 2d: Where feasible and appropriate, provide accessible (Americans with Disabilities Act [ADA] or Architectural Barriers Act [ABA] compliant) site features and recreation opportunities.
- Objective 2e: Where appropriate, provide multi-resource information and I&E opportunities that provide information on the area's natural and cultural resources, as well as the Project's hydroelectric facilities and operations.
- Objective 2f: Periodically monitor recreation use and impacts to identify changing visitor preferences and needs, provide continued high-quality recreation experiences, and ensure that potential impacts remain within acceptable limits.

Goal 3: Provide cost-effective and sustainable recreation facilities and activities.

- Objective 3a: When possible, coordinate recreation facility construction-related activities with other construction projects so as to potentially maximize construction efficiency and minimize the overall length of time of construction-related activities at the Project.
- Objective 3b: Design and provide public recreation facilities that will minimize both construction and long-term O&M costs.
- Objective 3c: Provide public recreation facilities that are responsive to visitor preferences and allow for future modifications, as visitor preferences may change over time.
- Objective 3d: Provide public recreation facilities that are responsive to changing environmental conditions, such as wildfires, weather patterns, and the impacts of climate change.

Goal 4: Provide for visitor safety, health, and security at the Project.

- Objective 4a: Provide routine O&M of Project recreation sites and use areas to ensure that facilities are fully functional per their specific design and safety guidelines.
- Objective 4b: Communicate to visitors potential hazards resulting from Project operations.
- Objective 4c: Provide public recreation facilities that are compatible with Project hydroelectric facilities and operations, provide safe access, and address security considerations.
- Objective 4d: Provide safe vehicle, watercraft, and/or pedestrian access to Project recreation facilities and use areas.
- Objective 4e: Educate the visiting public, including adequate warning signs, about security procedures at the Project through the Multi-Resource I&E Program.
- Objective 4f: Support visitor and resource protection actions, including emergency services, search and rescue, and law enforcement.

Goal 5: Ensure that people of all backgrounds feel welcome, comfortable, and able to access Project recreation facilities and use areas.

- Objective 5a: Provide recreation facilities and visitor information/education consistent with the City of Seattle's policies and priorities.

- Objective 5b: Seek out community partners to share their stories in the interest of showcasing diverse cultures, backgrounds, and life experiences.
- Objective 5c: Explore partnerships with community organizations to provide access opportunities in the Project area.

Goal 6: Manage Project recreation resources to be consistent with the statutory purposes for which the underlying and adjacent land management units were established and with the federal, state, and local land and resource management plans.

- Objective 6a: Provide recreation opportunities that are consistent with the statutory purposes for which administrative land units were established, and current federal, state, and local land and resource management plans, as amended, such as the NPS Ross Lake National Recreation Area General Management Plan, the USFS Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan, and the Skagit Wild and Scenic River System Management Plan.

2.3 Geographic Area

The geographic scope of the RRMP encompasses lands and waters within the FERC Project Boundary, as well as other adjacent lands and waters with a Project-related recreation nexus (i.e., areas where the Project directly induces and/or augments recreation opportunities and use). The RRMP organizes its recreation programs into five distinct geographic planning areas based on available recreation opportunities and management of relevant recreation resources over the life of the new license:

- Skagit River (Marblemount to Newhalem)
- Newhalem
- Gorge Lake
- Diablo Lake
- Ross Lake

2.4 Agencies with Land Management Authority

This section describes the federal agencies with land management authorities in the Project area, including relevant management plans and guidance.

Recreation facilities and use areas on federally managed lands will be designed and constructed to meet the respective land manager's facility construction standards and other design guidelines pertaining to the specific site and management direction. Recreation projects will be implemented in compliance with the requirements of the appropriate regulations of the NPS or USFS for activities on or affecting NPS or USFS lands, and all applicable federal, state, county, and municipal laws, ordinances, and regulations relevant to the area or operations on or directly affecting NPS or USFS lands, to the extent those laws, ordinances, or regulations are not preempted by federal law which apply at the time the project is proposed or scheduled.

City Light is responsible for funding and preparing any draft environmental analyses, compliance, and permitting for actions described in the RRMP subject to the laws, regulations, and policies in

force at the time individual actions are taken and approval by NPS or USFS, as applicable. City Light will refer to or rely upon applicable previous National Environmental Policy Act (NEPA) compliance documentation prepared by FERC, NPS, or USFS to the maximum extent possible to reduce unnecessary costs, duplication of effort, and delays in implementation.

To the extent required, projects proposed on federal land will be reviewed and approved by FERC, the agency that implements and enforces the terms of the Project License. City Light shall receive approval from the applicable land management agencies prior to implementing recreation projects on federal land and water. NEPA and other environmental and land use regulations, policies, and permits will be followed along with the relevant regulations and guidance of that agency. This will include review procedures for the protection of historic properties on federal land as described in the HPMP.

2.4.1 National Park Service

Project generating facilities are located entirely within RLNRA, which is administered by NPS as part of North Cascades National Park Service Complex. Congress established RLNRA in 1968 to provide for the "public outdoor recreation use and enjoyment of portions of the Skagit River and Ross, Diablo, and Gorge Lakes, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters." The legislation maintains FERC's jurisdiction "in the lands and waters within the Skagit River Hydroelectric Project" (16 United States Code [U.S.C.] § 90d-4; Public Law 90-544, Sec. 505 dated October 2, 1968, as amended by Public Law 100-668, Sec. 202 dated November 16, 1988).

RLNRA encompasses 116,877 acres, 19,699 acres (6 percent) are within the Project Boundary. Sixty percent of the land within the Project Boundary is managed by NPS.

2.4.2 U.S. Forest Service

The USFS has jurisdiction over most public lands outside of but adjacent to North Cascades National Park Service Complex, most notably Mt. Baker-Snoqualmie National Forest and Okanogan-Wenatchee National Forest. In addition, USFS has management jurisdiction over the Skagit River Wild and Scenic River System, located downstream of RLNRA. Of the 32,773 acres of land within the current Project Boundary, the USFS manages 33 acres (approximately 0.1 percent).

3.0 EXISTING RECREATION RESOURCES

This section summarizes existing Project and non-Project recreation facilities and use levels. The intent is to describe baseline recreation conditions in the Project area at the issuance of the new license.

3.1 Recreational Setting

The Skagit River Hydroelectric Project is in a remote area, with steep terrain and harsh winter conditions that both define and concentrate recreation opportunities. The Project reservoirs and surrounding area provide numerous recreational opportunities and receive a significant level of visitation, especially in the summer. State Route (SR) 20 is Washington state's northernmost highway traversing the Cascade Range and provides a popular route for travelers driving between eastern and western Washington. SR 20 is the primary access route into the Project area and is seasonally closed each year, usually from November until April.

The diversity of public recreation opportunities in the Project area reflects the administrative history of the area. Under the leadership of J.D. Ross, superintendent of City Light from 1911 to 1939, the Project enjoyed a national reputation as a showcase promoting hydroelectricity and municipal ownership of utilities prior to World War II. Each year thousands of tourists visited the upper Skagit to participate in two-day tours of the Project by rail and boat. Skagit Tours are a requirement of the current license and continue to this day. Currently, City Light operates and maintains several Project recreation and interpretive facilities at the Project, described in Section 3.2 below. Project recreation facilities are FERC-approved facilities and recreation opportunities that are required by the current Project license, and/or facilities owned and operated by City Light.

As described earlier, Congress established the RLNRA in 1968 "[i]n order to provide for the public outdoor recreation use and enjoyment of portions of the Skagit River and Ross, Diablo, and Gorge Lakes, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters." Today, NPS provides a wide variety of public recreation opportunities throughout RLNRA, including developed recreation facilities and campgrounds, trails, overlooks, backcountry camp sites, a visitor center, and boat launches. Additionally, NPS manages access to reservoir- and river-based activities.

3.2 Project Recreation Facilities

This section describes City Light's Project recreation facilities by geographic area (Table 3.2-1).

Table 3.2-1. Project recreation facilities covered in this Recreation Resource Management Plan (from west to east).

Resource Area	Land Management	Project Recreation Facility
Newhalem	Federal (NPS)	Ladder Creek Falls Trail and Gardens (0.4 mile)
	Federal (NPS)	Trail of the Cedars (0.3 mile)
	City Light	Gorge Powerhouse Parking Area
	City Light	Gorge Powerhouse Visitor Gallery
	City Light	Skagit Information Center
	City Light	Gorge Inn Museum
	City Light	Newhalem Picnic Sites
	City Light	Newhalem Main Street Parking Area
	City Light	Newhalem SR 20 Parking Area
	City Light	Newhalem Interpretive Displays (standalone)[1]
	City Light	Newhalem Playground
Gorge Lake	City Light	Ross Lodge Picnic Shelter
	City Light	Gorge Lake Boat Launch
	Federal (NPS)	Diablo Dam Trail[2]
Diablo Lake	Federal (NPS)	Skagit Tour Dock
	Federal (NPS)	Diablo Dam Parking Area
	Federal (NPS)	West Ferry Landing
	Federal (NPS)	East Ferry Landing
	Federal (NPS)	North Cascades Outdoor School Learning Center
	Federal (NPS)	Diablo Lake Trail[2]
Skagit River	Federal (USFS)	Marblemount Boat Launch[2]

1 Interpretive displays include: "The Iron Horse of the Skagit," "Automobiles Come to the Skagit," "The Meaning of Place," "Newhalem Company Town," "Spinning Waterwheel," "Temple of Power," and "Chinook Redd."

2 These recreation facilities are currently non-Project recreation facilities however; City Light proposes to include these facilities in the Project upon issuance of the new license.

3.2.1 Skagit River (Marblemount to Newhalem)

Currently there are no Project recreation facilities on the Skagit River from Marblemount to Newhalem. Marblemount Boat Launch, a recreation facility operated and maintained by USFS, is within the Project Boundary, but is not a Project recreation facility. City Light proposes to include Marblemount Boat Launch as a Project recreation facility upon issuance of the new license.

3.2.1.1 Marblemount Boat Launch

The Marblemount Boat Launch facility is located on the Skagit River, just upstream of the confluence with the Cascade River and about 12 miles downstream from Newhalem. The facility provides an unpaved boat launch, gravel parking area, a portable restroom building, and an information kiosk. In addition, the facility includes a 1.3-mile fishing access trail. The native

surface trail starts at the boat launch parking area and meanders along the Skagit River and Cascade River before terminating at an unpaved parking area along Cascade River Road. The fishing access trail is located outside the Project Boundary.

3.2.2 Newhalem Townsite

Newhalem is the last townsite for 70 miles for travelers headed east on SR 20. It is a popular stop for travelers and for visitors to RLNRA. The Newhalem townsite is owned by City Light and provides a number of visitor amenities and recreational facilities.

3.2.2.1 Parking Areas

The Newhalem townsite has three designated parking areas dispersed throughout the townsite, including on Main Street, along SR 20, and near the Gorge Powerhouse/Ladder Creek Falls Trail and Garden.

Main Street Parking Area

The Main Street parking area is located on Main Street in Newhalem. The facility provides a paved parking area with 24 striped parking spaces, including three accessible spaces. This parking area provides access to numerous Newhalem recreation facilities and buildings, including the Skagit Information Center, Gorge Inn Museum, Skagit General Store, and the picnic, playground, and interpretive displays (see below for descriptions). Overall, the parking area is in good condition but does not meet current accessibility standards (City Light 2023a).

There are seven interpretive displays dispersed throughout the Main Street area. The interpretive displays are named: The Iron Horse of the Skagit; Automobiles Come to the Skagit; The Meaning of Place; Newhalem Company Town; Spinning Waterwheel; Temple of Power; and Chinook Redd. Overall, the interpretive displays are in good condition but do not meet current accessibility standards (City Light 2023a).

A playground structure is located off Main Street, which provides multiple play structures and equipment. Overall, the playground equipment is in good condition but does not meet current accessibility standards (City Light 2023a).

SR 20 Parking Area

The SR 20 gravel parking area is located on the north side of SR 20 in Newhalem. The facility provides a gravel parking area for 30 single vehicles, including 2 accessible spaces, as well as an area for overflow recreational vehicle and trailer parking (since these types of vehicles are not permitted on Main Street in Newhalem). The facility also has trash/dumpster facilities and two dual 30-amp and 70-amp electric vehicle charging stations. Overall, the parking area facilities are in good condition but do not meet current accessibility standards (City Light 2023a).

Gorge Powerhouse Parking Area

The Gorge Powerhouse parking area is located at the east end of Newhalem along the Skagit River. The parking area consists of a gravel parking area and interpretive displays. The parking area also serves as the trailhead parking for the adjacent Ladder Creek Falls Trail and Garden. Overall, the

parking area is in good condition but does not meet current accessibility standards (City Light 2023a).

3.2.2.2 Picnic Sites

There are 17 picnic sites dispersed throughout the Newhalem townsite along Main Street, SR 20, and near the start of the Trail of the Cedars. Each picnic site consists of a picnic table; some are connected to the SR 20 gravel parking area via an access route. Overall, the picnic sites are in good condition but do not meet current accessibility standards (City Light 2023a).

3.2.2.3 Recreational Trails

Ladder Creek Falls Trail and Garden

Ladder Creek Falls Trail and Garden is located on federal land administered by NPS within the Project Boundary. The Ladder Creek Falls Trail is a 0.3-mile loop trail that leads to Ladder Creek Falls (a dramatic series of waterfalls in a narrow canyon) and winds along the creek and through a garden developed on the adjacent hillside. The trail includes four interpretive panels, three wooden benches, and colored lighting that illuminates the falls and surrounding features at night. The facility is open year-round and managed by City Light. The trail and garden were first developed in the mid-late 1920s by City Light as a tourist attraction. At the time, the garden featured exotic plants collected by J.D. Ross, outdoor lighting, and amplified music. In 2009, City Light refurbished the trail and lights and added several interpretive panels. Currently, colored light-emitting diode lights illuminate the falls from dusk to 11 pm each night. The trail does not have a designated trailhead; instead, visitors start in the Gorge Powerhouse parking area and follow a directional sign. The recreational facilities are in good condition; however, the trail does not meet accessibility standards and does not have a trail condition sign that describes the level of difficulty, trail conditions, and general accessibility constraints or obstacles (City Light 2023a).

Trail of the Cedars

This 0.4-mile-long interpretive trail is located within the Project Boundary on federal land administered by NPS and provides pedestrian access from Newhalem and links with a NPS trail that leads to Newhalem Campground downstream of Newhalem. The trail begins at the suspension bridge at the end of Main Street in Newhalem, crosses the river, and then loops through the forest and along the river returning to the suspension bridge. Interpretive signs along the trail focus on the plants and natural history in the area. The Trail of the Cedars is open year-round and portions of it comply with outdoor accessibility guidelines for trails. The facility does not have a designated trailhead; instead, visitors utilize the general parking areas in Newhalem.

The trail is a compacted, gravel surface trail ranging from 3 to 6 feet in width. A total of 28 interpretive displays are dispersed along the trail. The displays generally consist of synthetic panels with metal frames on metal posts unless affixed to a structure. The displays are either situated along the edge of the trail or at the Newhalem Creek Powerhouse building. The trail has a few accessibility constraints, the interpretive signs along the trail are outdated and do not meet accessibility standards and the trail does not have a trail condition sign that describes the level of difficulty, trail conditions, and general accessibility constraints or obstacles (City Light 2023a).

3.2.2.4 Skagit Information Center

The Skagit Information Center is located just off SR 20 on Main Street in Newhalem. The facility includes restrooms, a breezeway with cases for maps, a large room with interpretive exhibits on Project history and information on the natural and cultural resources of the North Cascades, a retail store with maps and books, and outdoor exhibits including a hydropower turbine, a sidewalk scaled mural of the Project, and a sculpture of a salmon redd by the artist Tom Jay. In recent years, the center has been staffed by employees from City Light, NPS, and North Cascades Institute from Memorial Day weekend into September. At the facility, visitors may obtain a free pamphlet with a self-guided walking tour of Newhalem if they wish to explore the historical features of the townsite at their own pace. The facility is owned and managed by City Light.

3.2.2.5 Gorge Powerhouse Visitor Gallery

The visitor gallery was added to Gorge Powerhouse in 1949 when that structure was expanded. The gallery is located above the powerhouse floor and has large glass windows that provide visitors with a view of the generators and other equipment on the generator floor below. Interpretive exhibits installed in 2016 provide information around four themes, including how hydroelectricity is generated, the history of the Project, Project operations, and environmental programs included in the current Project license. The visitor gallery is open to the public daily from May through October. The facility is owned and managed by City Light.

3.2.2.6 Gorge Inn Museum

The Gorge Inn Museum is in the front of the Gorge Inn on the south end of Main Street in Newhalem. The Gorge Inn, constructed in 1920, is one of the oldest buildings remaining at the Project and served as the cookhouse for City Light crews and visitors until sometime in the 1970s. The museum presents a social history of the Upper Skagit River Valley and the Skagit River Project, including Indian Tribe and Canadian First Nation use of the area; Newhalem town life over the years; and the role of J.D. Ross, the long-time superintendent and "Father of City Light" who conceived of and drove the construction of the Project. The Gorge Inn, renovated in 2010, primarily serves meals to City Light staff and contractors who are working at the Project, but during the Skagit Tours season, the Gorge Inn has also recently offered the Dam Good Chicken Dinner to the public two nights per week.

3.2.3 Gorge Lake

The 4.5-mile-long Gorge Lake is largely undeveloped due to the steep topography of the shoreline and resulting access constraints. SR 20 parallels almost the entire lake on the north side and crosses it at the upper end near the Townsite of Diablo. There are two developed Project recreation facilities associated with Gorge Lake -- a boat launch and picnic shelter.

3.2.3.1 Gorge Lake Boat Launch

The Gorge Lake Boat Launch is located adjacent to Gorge Lake Campground. The facility consists of a single-lane concrete boat launch ramp, floating dock, gravel parking area, an information kiosk, and two picnic sites. The boat ramp and dock are on City Light land and used by City Light when boat access to Gorge Lake is needed. The facility is owned and managed by City Light. Overall, the boat launch facilities are in good condition but do not meet current accessibility

standards (City Light 2023a). The adjacent Gorge Lake Campground, consisting of eight campsites, is owned and maintained by NPS.

The Gorge Lake Boat Launch ramp is usable by trailered boats down to an elevation of 878 feet North American Vertical Datum of 1988 (NAVD 88; 871.5 feet City of Seattle Datum [CoSD]) (City Light 2023a). For the period of record from 1983 to 2021, the boat ramp was usable 66 percent of the year and 65 percent of the peak season (July and August), on average. The Gorge Lake Boat Launch is located in a cove on the north side of Gorge Lake where gravel is deposited at the outlet to the boat launch cove, which impedes many large boats from using the launch, particularly when Gorge Lake levels are low; however, below 878 feet NAVD 88 (approximately 871.5 feet CoSD), the launch ramp remains usable by non-motorized watercraft and other watercraft not requiring a trailer.

3.2.3.2 Ross Lodge Picnic Shelter

The Ross Lodge Picnic Shelter is in the Hollywood section of the Diablo townsite adjacent to Ross Lodge. The picnic shelter consists of roadside parking and a picnic shelter with picnic tables. The facility is owned and managed by City Light. Overall, the picnic shelter is in good condition but does not meet current accessibility standards (City Light 2023a). City Light will provide signage per the interpretative sign plan.

3.2.3.3 Diablo Dam Trail

Currently, the Diablo Dam Trail, a recreation trail operated and maintained by the NPS, is within the Project Boundary, but is not a Project recreation facility. City Light proposes to include Diablo Dam Trail as a Project recreation facility upon issuance of the new license.

The 0.5-mile-long, native surface Diablo Dam Trail originates in the Reflector Bar section of the Diablo Townsite and was originally constructed to provide a means of reaching Diablo Dam if other access (i.e., road and helicopter) was unavailable. The Reflector Bar section is on federal land administered by NPS. A trail sign indicates the start of the trail off Diablo Street.

3.2.4 Diablo Lake

The 4.5-mile-long Diablo Lake, with several developed recreation facilities on the shoreline and direct access from SR 20, is the most publicly accessible of the three Project reservoirs. All recreation facilities along the Diablo Lake shoreline are within the Project Boundary and RLNRA, unless otherwise stated. Recreation opportunities include water sports, camping, hiking, angling, education, and boat tours. Recreation facilities and services at Diablo Lake include North Cascades Outdoor School LC, boat tours and ferry service, docks and ferry landings, a boat launch, campgrounds, boat-in camps, and trails.

3.2.4.1 North Cascades Outdoor School Learning Center (LC)

The LC, which opened in 2005, is located within RLNRA on NPS administered lands. The LC has 16 buildings including multimedia classrooms, a research library, aquatic and terrestrial labs, overnight lodging for up to 92 participants, staff housing, dining hall with a recycling and composting center, and a maintenance building (LC Facilities). The LC Facilities also include outdoor facilities (including an amphitheater, learning shelters, various trails and paths, and a

dock). City Light owns the LC buildings and operates the LC as required by the current FERC License.

City Light shall work with NPS to develop a ten-year work plan to be implemented at license issuance that will include similar programs to those that are currently implemented at the LC with adjustments made where needed to meet the objectives of City Light and NPS. The 10-year work plan will be approved by City Light and the NPS prior to filing with the Commission.

City Light will maintain LC facilities to continue to meet accessibility standards.

3.2.4.2 LC Parking Area

The LC parking area is located at the end of Diablo Dam Road at the entrance to the LC, but outside the controlled access of the main LC campus. This parking area provides public access to Diablo Lake (outside the LC) and to the adjacent non-Project Diablo Lake Trail. The LC parking area facility consists of two unmarked gravel parking areas with two accessible parking spaces. The LC parking area also includes trash facilities (i.e., dumpsters) and an information board. The facility is managed by NPS. Overall, the facility is in good condition and does not meet current accessibility standards with only a few elements meeting the standards (i.e., trash facilities) (City Light 2023a).

3.2.4.3 Skagit Tour Dock

The Skagit Tour Dock is on the north shore at the west end of Diablo Lake, near Diablo Dam. The dock is accessible by road from Diablo Dam Road. It is used for Skagit Tours which are offered by City Light during the summer months. The facility consists of three paved/striped parking spaces and unmarked roadside gravel parking, a 24-foot by 48-foot staging area shelter with eight benches and two information boards, and a recently replaced 24-foot by 48-foot boat dock with a 40-foot gangway with handrail. The facility is owned and managed by City Light. Overall, the tour dock is in fair-to-good condition with an aging parking area surface and does not meet current accessibility standards (City Light 2023a). The current tour boat is the Alice Ross IV, which has a capacity of 45 passengers.

3.2.4.4 Diablo Dam Parking Area

The Diablo Dam Parking Area is located on the north side of Diablo Dam. The facility consists of a flush restroom building, a paved parking area with three striped spaces, and an informal roadside parking area for up to three vehicles. Visitors may park here to view or walk across the dam. The facility is owned and managed by City Light. Overall, the parking area and restroom are in good condition and do not meet current accessibility standards (City Light 2023a).

3.2.4.5 Ferry Landings and Boat

West Ferry Landing

The West Ferry Landing is on the north shore at the west end of Diablo Lake, along Diablo Dam Road. It is used exclusively for embarking and disembarking the Diablo Ferry, a service managed by City Light, which provides boat transportation to the East Ferry Landing, and ultimately Ross Lake, via the Ross Haul Road. The ferry generally operates from June through the end of October. City Light provides the ferry service between the West and East Ferry Landings. The facility

consists of 32 paved/striped parking spaces, a 24-foot by 48-foot boat dock with a 40-foot gangway with handrail. The access route includes concrete steps, two parking signs, and an information board. The facility is owned and managed by City Light. Overall, the ferry landing is in good condition and does not meet current accessibility standards (City Light 2023a).

East Ferry Landing

The eastern terminal for the Diablo Lake Ferry is the East Ferry Landing, which is on the south shore at the east end of Diablo Lake, only accessible by boat or trail. An accessible canoe/kayak dock is attached to the East Ferry Landing dock, providing access for visitors who wish to shuttle non-motorized watercraft to and from Ross Lake via the Ross Haul Road. Visitors may walk between the East Ferry Landing and Ross Lake via the Ross Haul Road or be transported by a shuttle operated by Ross Lake Resort. Both the ferry landing and the canoe/kayak dock are owned and managed by City Light. The ferry landing consists of a 32-foot by 60-foot boat dock with a 30-foot gangway with handrail and an information board. At lower water levels, the slope of the gangway may exceed the requisite slopes and affect the accessibility of the boat dock. Overall, the ferry landing is in good condition and does not meet current accessibility standards (City Light 2023a). The current ferry boat is the Cascadian, which has a capacity of 42 passengers.

3.2.4.6 Diablo Lake Trail

Currently, the Diablo Lake Trail, a recreation trail operated and maintained by the NPS, is not a Project recreation facility and is located mostly outside the Project Boundary. City Light proposes to include Diablo Lake Trail as a Project recreation facility upon issuance of the new license.

The 3.8-mile-long Diablo Lake Trail starts at the LC parking area and provides access to the upstream end of Diablo Lake and Ross Lake in the Ross Powerhouse and Ross Dam area. The trailhead parking area is part of the LC parking area. The native surface trail ascends approximately 1,400 ft in the first 2.5 miles to a ridge that overlooks Diablo Lake before descending steeply in the final mile to a bridge over Diablo Lake that connects to Ross Powerhouse and the Ross Dam area.

3.2.5 Ross Lake

There are no Project recreation facilities on Ross Lake.

3.3 Non-Project Recreation Facilities Within or Adjacent to the Project Boundary

The NPS operates and maintains the majority of recreation facilities within the Project Boundary. On Ross Lake, there are 19 boat-in camps, of which 12 have docks. At Hozomeen, the only vehicle-accessed shoreline on Ross Lake, the NPS maintains two boat ramps and two docks. Additionally, at Hozomeen, there are two campgrounds, Winnebago Flats and Hozomeen. Near the downstream end of Ross Lake is Ross Lake Resort, which is a private resort with 14 cabins and a large, full-service dock. Ross Lake Resort is a floating resort operating under a concession contract from NPS with one way to access provided by Seattle City Light via a ferry service.

Several NPS trails pass through the Project Boundary along Ross Lake. The main trails in the area include East Bank, Hozomeen Lake, Lightning Creek, Desolation Peak, Ross Dam, and Happy Panther.

On Diablo Lake, NPS operates Colonial Creek Campground on Thunder Arm and three boat-in camps (each with a dock) along the reservoir shoreline. Trailheads for Thunder Knob and Thunder Creek trails are located in Colonial Creek Campground, while the trailhead for Diablo Lake Trail is located at the LC Parking Area along the north shoreline of Diablo Lake. NPS also operates and maintains the popular Diablo Lake Overlook.

Development on Gorge Lake is limited due to the relatively small size of the reservoir and steepness of the canyon walls. However, NPS operates and maintains Gorge Lake Campground near Diablo townsite, as well as trailheads for Stetattle Creek and Sourdough Mountain trails. Additionally, NPS operates and maintains Gorge Creek Overlook.

Downstream of Newhalem townsite, NPS operates and maintains three campgrounds (Newhalem Creek, Goodell Creek and Lower Goodell Group) and three day-use sites on the Skagit River (Goodell Creek Boat Launch, Damnation Creek Boat-in Picnic Site, and Copper Creek Boat Access Site). In Marblemount, USFS operates and maintains the Marblemount Boat Launch on the Skagit River.

3.4 Existing Recreation Use Levels

3.4.1 Overall Project Recreation Use

The estimated Project recreation use totaled 83,792 Recreation Days[1] (RD), with most of the use occurring at Diablo Lake (53,442 RDs or 64 percent of the total Project use) and Newhalem (29,545 RDs or 35 percent of the total Project use) (Table 3.4-1). Peak season use (54,961 RDs or 66 percent of total Project use) was nearly double the off-peak season (28,830 RDs or 34 percent of total Project use). Most peak season use occurred at Diablo and Gorge lakes. Day use is the primary recreation use type, accounting for 98 percent of the total Project use. The only Project overnight use occurs as part of the LC programs at Diablo Lake.

Table 3.4-1. Summary of 2022 Project recreation use in Recreation Days by season.

	Project Use Estimate in RDs								
	Overall (May-Oct)			Peak Season (Jul-Aug)			Off-Peak Season (May-Jun, Sep-Oct)		
Resource Area	Overnight	Day Use	Total	Overnight	Day Use	Total	Overnight	Day Use	Total
Ross Lake	--	--	--	--	--	--	--	--	--
Diablo Lake	1,888	51,553	53,442	512	33,817	34,329	1,377	17,736	19,113
Gorge Lake	--	805	805	--	501	501	--	303	303
Newhalem townsite	--	29,545	29,545	--	20,131	20,131	--	9,414	9,414
Skagit River	--	--	--	--	--	--	--	--	--
Total	**1,888**	**81,903**	**83,792**	**512**	**54,449**	**54,961**	**1,377**	**27,453**	**28,830**

[1] A Recreation Day (RD) is defined by FERC as each visit by a person to a development for recreational purposes during any portion of a 24-hour period.

3.4.2 Project Trail Use

Project trail use occurs at Ladder Creek Falls Trail and Trail of the Cedars in Newhalem. In 2022, Project trail use totaled 41,073 users. Refer to Table 3.4-2 below for a detailed summary of 2022 Project trail use.

Table 3.4-2. Summary of 2022 Project trail use by month (May-October).

Project Trail	Total Daily Users (2022)						Total
	May	Jun	Jul	Aug	Sep	Oct	
Ladder Creek Falls Trail	1,572	4,436	6,566	4,687	3,098	1,323	**21,682**
Trail of the Cedars	1,633	3,519	5,977	4,239	2,935	1,088	**19,391**
Total	**3,205**	**7,955**	**12,543**	**8,926**	**6,033**	**2,411**	**41,073**

3.4.3 Average Developed Facility Occupancy Levels (Peak Season)

In 2022, average picnic site occupancy levels at the two Project picnic areas were low and as a result the projected average occupancy levels by 2060 also remain low, at 5 and 14 percent overall during the peak season at Ross Lodge Picnic Shelter and in Newhalem, respectively (Table 3.4-3). The highest use on weekend days is not projected to exceed 21 percent by 2060.

Table 3.4-3. Current and projected developed picnic and parking area average occupancy at Project recreation facilities.

Developed Facility Type	Project Facility	Type of Day	2022 Percent Occupancy	Average Percent Occupancy Projections			
				2030	2040	2050	2060
Picnic Sites	Ross Lodge Picnic Shelter (3 picnic sites)	**Overall**	**3%**	**4%**	**4%**	**4%**	**5%**
		Weekday	0%	0%	0%	0%	0%
		Weekend	6%	8%	9%	9%	10%
		Holiday	0%	0%	0%	0%	0%
	Newhalem Parking Areas (17 picnic sites)	**Overall**	**9%**	**11%**	**13%**	**13%**	**14%**
		Weekday	6%	8%	10%	10%	10%
		Weekend	13%	16%	19%	19%	21%
		Holiday	2%	3%	3%	3%	4%
Parking Areas	LC Parking Area (90 parking spaces)	**Overall**	**34%**	**45%**	**50%**	**54%**	**59%**
		Weekday	28%	36%	40%	44%	48%
		Weekend	39%	51%	56%	62%	67%
		Holiday	43%	56%	62%	67%	74%
	West Ferry Landing (32 parking spaces)	**Overall**	**63%**	**80%**	**88%**	**97%**	**108%**
		Weekday	64%	81%	89%	98%	109%
		Weekend	64%	81%	89%	98%	109%
		Holiday	58%	74%	81%	90%	100%
	Gorge Lake Boat Launch (12 parking spaces)	**Overall**	**5%**	**6%**	**6%**	**7%**	**7%**
		Weekday	4%	6%	6%	7%	7%
		Weekend	5%	7%	8%	8%	9%
		Holiday	1%	1%	1%	2%	2%
	Newhalem Main Street Parking Area (24 parking spaces)	**Overall**	**44%**	**56%**	**62%**	**69%**	**76%**
		Weekday	44%	57%	63%	69%	77%
		Weekend	45%	58%	64%	70%	78%
		Holiday	38%	49%	54%	60%	66%
	Gorge Powerhouse Parking Area (14 parking spaces)	**Overall**	**26%**	**34%**	**38%**	**41%**	**45%**
		Weekday	15%	19%	21%	23%	26%
		Weekend	37%	48%	53%	57%	63%
		Holiday	29%	38%	42%	46%	50%

At Project recreation facility parking areas, the 2022 peak season average occupancy ranged from 5 to 63 percent overall and from 5 to 64 percent on weekends (Table 3.4-3). The 2022 average occupancy levels were highest at the West Ferry Landing (63 percent overall and 64 percent on weekends/holidays). Three Project parking areas had moderate average occupancy levels, including the Newhalem Main Street parking area (44 percent overall and 45 percent on weekend days), LC Parking Area (34 percent overall and 51 percent on weekend days), and Gorge Powerhouse Parking Area (26 percent overall and 37 percent on weekend days). The Gorge Lake Boat Launch parking area had the lowest average occupancy levels in 2022 (5 percent overall and on weekend days).

By 2060, the average occupancy levels are projected to exceed full capacity only at the West Ferry Landing (108 percent overall and 109 percent on weekend/holiday days) (Table 3.4-3). The

remaining three Project parking areas are projected to be well below full capacity overall and on weekend days by 2060.

The West Ferry Landing is a longer-term parking area as it provides visitors access to the ferry service which often transports visitors to the Ross Lake area for extended trips (i.e., multiple days). In contrast, the Newhalem Main Street and Gorge Powerhouse parking areas are generally a short-term parking location, whereby visitors are stopping to gather information or use as a rest stop. Therefore, there is a much higher rate of vehicle turnover at the Newhalem parking areas versus the West Ferry Landing.

RLNRA Visitation

Visitation to RLNRA sites was 971,173 visitors in 2024. Over the last decade, visitation has increased 38 percent and recreational use continues to trend upward. See the Recreation study reports RA-01 and RA-05 for information on recreation visitation at RLNRA facilities along the Project reservoirs and downstream on the Skagit River.

4.0 RECREATION RESOURCE PROGRAMS

City Light, in coordination with LPs, prepared the suite of recreation-related PME measures included in this RRMP. The measures evolved from recreation-related relicensing studies and analyses, in particular the RA-01 Recreation Use and Facility Assessment Report (City Light 2023a) and RA-05 Lower Skagit River Recreation Flow Study (City Light 2023b), and from settlement discussions between parties to the Settlement Agreement. The measures described in this section will be implemented by City Light, in partnership with the NPS and USFS, over the course of the life of the new license, and consist of three program areas:

- Recreation Facility Capital Improvements Program
- Recreation Facility Operations and Maintenance Program
- Multi-Resource Interpretation and Education Program

4.1 Recreation Facility Capital Improvements Program

The Recreation Facility Capital Improvements Program focuses on recreation facility development and includes descriptions for recreation facility development measures that will help meet current and anticipated future recreation needs at the Project. Most of these measures are modifications or enhancements to existing Project recreation facilities with select measures to develop new Project recreation facilities and use areas. The program includes general accessibility and recreation site design guidelines that will be used during the design and construction phases of new and/or enhanced recreation sites.

4.1.1 Visitor Use and Frontcountry Management Plan

During the development of this RRMP, NPS began the development of a Visitor Use and Frontcountry Management Plan (VUM Plan) in coordination with affected Indian Tribes and Canadian First Nations, City Light, several LPs, and the public to improve on-the-ground conditions and provide safer, more accessible and diverse visitor experiences. The purpose of this plan is to shift management of Ross Lake NRA from reactive responses to long-term, sustainable management strategies that are resilient and responsive to rapidly changing conditions and dynamic management challenges.

The VUM Plan updates the management guidance for RLNRA and other frontcountry areas along SR 20 and amends and clarifies the 2012 RLNRA General Management Plan. The VUM Plan will identify strategies to address a wide range of issues associated with changing conditions such as impacts to resources conditions due to increased fires, flooding, number of visitors, and decreased reservoir and staffing levels to maintain or improve quality access to the park in the near- and long-term. The following plan objectives guide the development of the plan elements and action alternatives:

- Address parking and roadway congestion and minimize safety hazards to visitors, particularly during summer peak season.
- Identify visitor capacities for non-wilderness areas and address facility demand on busy summer days along Highway 20 at key sites.

- Maintain existing and new, safe, and acceptable forms of visitor use.
- Identify alternative and new camping opportunities within the park for visitors.
- Create private and meaningful spaces and times for Tribes and traditional associated groups to engage in traditional practices within the park.
- Define the character of the park and set clear visitor expectations.

When the VUM Plan is complete (scheduled for Summer 2026) City Light and NPS in consultation with the SLIC will confer to determine if the RRMP will be revised based upon the VUM Plan recommendations. If actions identified in the RRMP are not recommended in the VUM Plan, City Light will implement other approved VUM Plan measures to substitute projects of a similar scope, schedule, and budget. Any updates or amendments to the RRMP will be completed in consultation with the SLIC and subject to the approval of NPS (and USFS as it relates to lands and/or waters of the national forest).

4.1.2 Accessibility

"Universal Design" and "Universal Access" are encouraged at FERC-licensed hydroelectric projects. Universal Design typically refers to facilities, sites, and other features that are usable for all people, not just those with disabilities. City Light will consider Universal Design during the design phase of recreation facility capital improvements but will generally rely on applicable accessibility guidelines for City Light lands and federal lands. The current applicable standards include the 2010 Americans with Disabilities Act (ADA) Standards for Accessible Design (ADASAD) for public accommodations on City Light lands (U.S. Department of Justice 2010), and the 2015 Architectural Barriers Act (ABA) standards on federal lands (U.S. Access Board 2015). Additionally, City Light will refer to the ABA Guidelines for guidance for trails, picnic facilities, and other recreation facility guidance for public accommodations on City Light lands not covered under ADASAD. On NPS lands, City Light will also refer to the International Building Code.

In general, the outdoor recreation facilities described in this RRMP will meet the appropriate accessibility guidelines and City Light policies and priorities unless they meet one of the following criteria:

- Compliance would cause substantial harm to other resources or the unique characteristics of the site.
- Compliance would substantially change the setting or purpose of the site and not be consistent with the applicable land management plan.
- Compliance would require construction or materials that are prohibited by federal, state, or local law.
- Compliance would be impractical because of topography or prevailing construction practices.

4.1.3 Design Guidelines

During the design phase for Project recreational facility capital improvements, City Light will use appropriate design guidelines to ensure renovations and new construction enhance or retain the desired aesthetic character and historic integrity of the area. For facilities on or affecting lands and

waters managed by NPS and USFS, those federal agencies will retain final approval of facility design.

4.1.4 Planned Recreation Facility Capital Improvements

The RRMP organizes the planned recreation facility capital improvements into five distinct geographic planning areas from east to west based on available recreation opportunities and management of relevant recreation resources over the life of the new license:

- Skagit River (Marblemount to Newhalem)
- Newhalem
- Gorge Lake
- Diablo Lake
- Ross Lake

In this section, City Light proposes capital improvements at some non-Project recreation facilities. These improvements are one-time capital improvements to NPS or USFS owned facilities. Any improvements shall be owned by NPS or USFS (as applicable). These improvements do not include ongoing operation and maintenance activities or other responsibilities at these non-Project recreation facilities.

4.1.4.1 The Skagit River from Marblemount to Newhalem

Marblemount Boat Launch[2]

- Improve, operate, and maintain the Marblemount Boat Launch facility, including adding permanent toilets, picnic sites and shelter, improving the road and delineating parking area, hardening and improving boat ramp, adding lighting and security cameras, and replacing deteriorated signs.
- Upgrade and maintain the Marblemount Boat Launch fishing access trail to current accessibility standards, including designing, installing, and maintaining interpretive signs and day-use/picnic sites along the trail (Appendix A). The upgrade of the existing trail will include a re-alignment to a loop trail that starts and ends at the Marblemount Boat Launch facility parking area, which will improve visitors' parking, use, and experience on the trail. The upgrades may also include decommissioning the secondary parking area further along Cascade River Road as well as the trail segment between the secondary parking area and Cascade River.

Copper Creek Boat Access Site (Non-Project Recreation Facility)

- Subject to consultation with the Tribes and with NPS approval, City Light will improve accessibility and upgrade the Copper Creek Boat Access Site to include parking, vessel

[2] To the extent FERC finds that PME measures proposed in the Wild and Scenic Rivers corridor are unenforceable pursuant to Section 7(a) of the Wild and Scenic Rivers Act, 16 U.S.C. § 1278(a), and does not include the measures in the new license, City Light commits to implement such PME measures pursuant to the Comprehensive Settlement Agreement.

loading, and picnic areas; make site design improvements to manage visitor and traffic flow; and reduce congestion and conflicts between users.

- Parking: Improve the accessible parking space and add an accessible parking space near the raft launch and picnic area.
- Picnic Facilities: Improve surfaces and add accessible tables and trash cans.
- Routes: Reduce thresholds on surface transitions and improve slopes to the restroom.
- Restroom: Improve the accessible features in the vault toilet.

Goodell Creek Boat Launch (Non-Project Recreation Facility)

- Subject to consultation with the Tribes and with NPS approval, City Light will upgrade the Goodell Creek Boat Launch to include parking, vessel loading, and picnic areas; improve accessibility; and make site design improvements to manage visitor and traffic flow and reduce congestion and conflicts between users.
  - Parking: Improve the accessible parking space and add an accessible parking space near the raft launch and picnic area.
  - Picnic Facilities: Improve surfaces and add accessible tables and trash cans.
  - Routes: Reduce thresholds on surface transitions and improve slopes to the restroom.
  - Restroom: Improve the accessible features in the vault toilet.

4.1.4.2 Newhalem

Main Street and SR 20 Parking Areas

- Potential conversion of Main Street to a pedestrian setting, which may require expanding and reorganizing the parking in Newhalem, including the SR 20 parking area, Gorge Powerhouse parking area, and potentially other areas, which may be informed by the VUM Plan.
- Coordinate with the Washington State Department of Transportation (WSDOT) in an attempt to enhance SR 20 pedestrian and vehicle traffic management between the SR 20 parking area and Main Street (e.g., crosswalks, stoplights, turning lanes, etc.). City Light recognizes that measures in the SR 20 right-of-way are beyond City Light's control (and within WSDOT's responsibility) but City Light will work with WSDOT to determine if enhancements are possible.
- Provide enhanced visitor information and I&E facilities throughout Newhalem consistent with the Project's Multi-Resource I&E Program.

Gorge Powerhouse Parking Area

- Reorganize the parking area at Gorge Powerhouse to provide: (1) improved parking; (2) enhanced visitor information for Newhalem recreation opportunities and the Project as a whole; and (3) expanded I&E information.

Newhalem Picnic Sites and Standalone Interpretive Displays

- Reorganize the picnic sites and interpretive displays based on the final reorganization of the Newhalem parking areas.
- Improve the picnic sites and interpretive displays to meet current accessibility standards.

Newhalem-area Trails

Ladder Creek Falls Trail and Garden

- Provide improved connectivity from the parking area(s) to the Ladder Creek Falls Trail and Garden area including pathways and signage/wayfinding.
- Rehabilitate the pedestrian bridge over the Skagit River.
- Replace interpretive signage with NPS approval.
- Remove non-native species and replant with native species.

Trail of the Cedars

- Address the trail's accessibility constraints in collaboration with Indian Tribes and NPS and replace and update the I&E displays throughout the trail, including accessibility, with NPS approval.

Linking Trail (Non-Project Trail)

- Address the trail's surface and signage accessibility constraints in collaboration with Indian Tribes and NPS, and replace and update the signage throughout the trail, including accessibility, with NPS approval.

4.1.4.3 Gorge Lake

Gorge Lake Boat Launch

- Develop a new day-use area with picnic sites and enhanced signage at the Gorge Lake Boat Launch with NPS approval. The improvements will be designed and implemented in conjunction with the Stetattle Creek Dredging and Gorge Wetland Projects and will be consistent with the VUM Plan.

Gorge Lake Campground (Non-Project Facility)

- Convert the campground to a day-use area or modify one campsite to be fully accessible. The conversion will be designed and implemented in conjunction with the Stetattle Creek Dredging and Gorge Wetland Projects and consistent with the VUM Plan.

Diablo Dam Trail

- Improve trailhead signage at the Diablo Dam Trail with NPS approval.

Gorge Creek Falls Overlook (Non-Project Facility)

- Restore the paved portion of the Gorge Creek Falls Overlook Trail to meet current accessibility standards, including providing updated trail conditions signage, and treat vegetation to restore views along the trail with NPS approval.

4.1.4.4 Diablo Lake

Marine Facilities

- Develop a City Light marine facilities plan for Diablo Lake which will include a tour dock, ferry docks, boathouses, dry dock, and parking and other amenities associated with use of the Project shoreline facilities, including Diablo Dam and the LC parking lot, and pedestrian safety. This proposal includes construction of a new tour dock on the shoreline of Diablo Lake near the LC, contingent on the final marine facilities plan. The marine facilities plan will be informed by the VUM Plan and is subject to review and approval by the NPS prior to filing with FERC. City Light will develop this plan and file it with FERC within 2 years of license issuance.

North Cascades Outdoor School Learning Center (LC)

Construction of the LC was completed by City Light in 2005. The buildings and facilities are in a remote location with harsh environmental conditions. As the buildings age, City Light will maintain the LC for the duration of NPS approved operations under the new license to ensure that all facilities are operating in a way to successfully implement LC programs and operations. All furnishings, vehicles, watercraft, equipment, materials, and supplies at the LC are the property of the current operator.

Capital Improvement Support

In addition to these planned improvements, City Light recognizes that maintaining the LC will require periodic evaluations to identify needed improvements of facilities. City Light will file a Capital Improvement Report with FERC within two (2) years of license issuance and every six (6) years thereafter. The report will provide an assessment of existing LC facilities and infrastructure and will identify the capital improvements necessary to meet existing and future program needs. These may include infrastructure enhancements or major maintenance projects (e.g., roofing, heating system, structural foundations, exterior building envelope). The Capital Improvement Report will include a schedule for making the improvements, estimated budget, and timing for additional periodic assessments. All proposed capital improvements will be subject to appropriate environmental review to address site specific impacts of such improvements.

In its Capital Improvement Report, except for regular and recurring facilities management activities, City Light is required to obtain NPS approval and will seek FERC authorization for major improvements at the LC. City Light will also obtain NPS approval for any projects that involve ground, resource, access, or aesthetic disturbing activities. Upon FERC and NPS approval of such projects, City Light will implement the improvements consistent with the schedule identified in the report.

Maintenance Support

Major and minor maintenance responsibilities will be defined in the LC Facilities Management Plan to be reviewed annually. City Light will be responsible for major maintenance and rehabilitation of facilities, infrastructure, and on-campus trails, including utilities needed for the operation of the LC (e.g., electric power supply, fire safety systems). City Light will coordinate annually with NPS on water and sewer operations and maintenance, as well as snow, rock, and tree removal. Selected maintenance activities may be contracted by City Light.

North Shoreline

- Consistent with the VUM Plan, improve management of parking and visitor use along the north shoreline of Diablo Lake which may include infrastructure enhancements (e.g., gates, designated parking, and signage).

LC Shoreline Parking Area

- Consistent with the VUM Plan, reconfigure the LC parking area, install safety measures along the shoreline, provide portable restroom facilities, and install NPS-approved signage.

Diablo Lake Trail

- Improve trailhead signage at the Diablo Lake Trail.

Diablo Lake Ferry and Portage Route to Ross Lake

Ferry

- Continue providing a ferry service (with a minimum vessel capacity of 30 passengers per trip) between the West and East Ferry Landings, including providing two scheduled public ferry runs (7 days per week) to Ross Lake across Diablo Lake during the peak season (Memorial Day to Labor Day). In addition, as required by NPS Section 4(e) Condition [X] filed with the Commission on [X Date],[3] the License will obtain a 10-year Cooperative Management Agreement (or similar intergovernmental instrument) to address the Park's regulatory requirements for the ferry and will renew that CMA every ten years for the term of the License (and any annual license) to ensure continued consistency with NPS regulatory requirements. The type of intergovernmental instrument may change based on the regulations and laws governing NPS lands and waters.

West Ferry Landing

- Implement accessibility improvements at the West Ferry Landing, including parking, access to the landing, and the landing itself.
- Coordinate design with NPS and install visitor information kiosk in the parking area to provide information on scheduled ferry run times and other ferry updates.

[3] Condition number(s) and date will be populated in future versions of this RRMP.

East Ferry Landing

- Implement accessibility improvements at the East Ferry Landing, including parking, access to the landing, and the landing itself.

Ross Lake Landing

- Add a gangway to the boat dock to support increased accessibility to the extent practicable within site constraints.
- Add an accessible kayak launch.

Diablo Dam Parking Area

- Install visitor information and I&E signage with NPS approval.

Colonial Creek Campground Area (Non-Project Recreation Facility)

- Consistent with the VUM Plan, design and construct a day-use area along the Diablo shoreline in the north loop near Colonial Creek. The area shall be limited to up to 4 shade structures, 12 picnic tables, trash receptacles, bear boxes, and native plants and landscaping.
- Design and modify two campsites at the Colonial Creek Campground to be fully accessible.

Diablo Lake Overlook (Non-Project Recreation Facility)

- Consistent with the VUM Plan, design and construct with NPS approval accessible improvements at Diablo Lake Overlook. The site will include 4 to 6 picnic tables, trash receptacles, bear boxes, trash cans, and native plants and landscaping. Accessibility improvements may include but are not limited to:

    - Parking: Improve the parking stall and access aisle slopes and signage.
    - Routes: Improve the slopes on both paved and natural surfaces between accessible parking locations and the restroom, picnic, and interpretive site elements.
    - Restrooms: Improve the restroom, including signage, clear space, and the location of the sanitizer dispenser.
    - Picnic Area: Improve the picnic tables and their placement, the operation of and access to the trash and recycling receptacles, and the clear space for benches.
    - Interpretation: Improve waysides for contrast and allow for a forward approach and knee clearance under units.

4.1.4.5 Ross Lake

Ruby Creek Trail (Non-Project Recreation Facility)

- Design and replace USFS bridge on Ruby Creek Trail.

Big Beaver Boat-in Camp (Non-Project Recreation Facility)

- Enhance the Big Beaver boat-in camp for accessibility, as feasible, including providing two accessible campsites, improving access routes from the dock, and improving accessibility at the existing restroom building.

4.2 Recreation Facility Operations and Maintenance Program

City Light will be responsible for routine O&M at Project recreation facilities and use areas identified in this Management Plan. Specifically, City Light will be responsible for scheduling and performing all necessary O&M (e.g., staffing, equipment, materials, management, implementation, etc.) at the recreation facilities and use areas identified in Section 3.2.

City Light staff (and/or contractors) will perform routine O&M at Project recreation sites in accordance with applicable NPS and USFS facility maintenance standards and frequencies . For Project recreation sites located on land administered by the NPS, City Light's O&M standards and frequencies will be consistent with applicable NPS standards. For the Marblemount Boat Launch and fishing access trail, City Light's O&M standards and frequencies will be consistent with applicable USFS O&M standards. O&M standards and frequencies will be reviewed and may be revised, if needed (in particular to acknowledge changes to applicable O&M standards) during the license term.

4.3 Multi-Resource Interpretation and Education Program

City Light, with input from the SLIC, will develop a Multi-Resource I&E Program within the Project area during the new license term. The purpose of the I&E Program is to provide enhanced experiences for visitors, encourage participation in multi-resource protection measures by visitors, and promote cooperative, safe behaviors to benefit all Project area resources and visitors. The focus of the I&E Program is primarily on Project area resources, although it may contain broader, regional themes and messages. The I&E Program will identify media, sites, and services to be provided during the new license term, including but not necessarily limited to an Interpretation and Education Sign Plan, Skagit Tours, Skagit Information Center, and North Cascades Outdoor School LC.

4.3.1 Interpretation and Education Sign Plan

City Light will develop an interpretation and education (I&E) sign plan and install new signage to provide enhanced and consistent information, wayfinding, and interpretation for Project area visitors at Project recreation facilities and use areas. The City Light sign plan will be developed once the NPS sign plan for RLNRA is complete in order to provide consistent and integrated I&E messaging at Project and NPS RLNRA recreation sites. The I&E sign plan will be developed in consultation with Indian Tribes, NPS, USFS, and other stakeholders, and approved by the NPS for areas on or affecting NPS lands, waters, and resources. According to Tribal recommendations, place names and other vocabulary in Lushootseed will be included. Signage may consist of traditional static signage as well as new technologies and high-tech enhancements (e.g., electronic, real-time signage, self-guided digital tours and information) dependent on support infrastructure (e.g., communications, electricity). Signage will be evaluated every 5 years for condition and content and updated as needed as part of City Light's O&M program.

4.3.2 Skagit Tours

City Light will continue to provide Skagit Tours. Prior to continuing the Skagit Tours in the new license, City Light will obtain authorization and approval from the NPS through a cooperative management agreement (or similar intergovernmental instrument) for services provided on or affecting NPS lands and waters including Skagit Tours. The authorization and approval mechanism will be reviewed every ten years; the instrument may change based on regulations and laws governing NPS lands and waters.

4.3.3 Skagit Information Center

City Light will continue to operate the Skagit Information Center. Additionally, City Light will perform an internal redesign of the space, including the utilization of space and an update to the interpretive exhibits.

4.3.4 North Cascades Outdoor School Learning Center (LC)

As a part of the RRMP, the operation of the LC by City Light will meet the educational objectives of City Light and NPS by enhancing public awareness, understanding, and appreciation of the resources of the North Cascades, including RLNRA. The objectives will ensure all lands and buildings occupied by the LC are: (1) dedicated to educational purposes and related activities that support that purpose; (2) learner-centered and provide place-based materials, programs, and activities that achieve specific learning objectives as identified in a curriculum for education programs and in the course outline for learning programs; (3) serve broad audiences and prioritize audiences most impacted by the Project; and (4) adaptively managed to meet mutual goals and objectives of City Light and NPS.

As required by the NPS Section 4(e) Condition [X] filed with the Commission on [X date][4], City Light shall work with NPS to develop a 10-year Work Plan to be implemented at license issuance. In consultation with NPS, City Light will include in the ten-year work plan the following learning programs, or programs similar to these, that are currently implemented at the LC such as Mountain School, Youth Leadership Adventures, and adult and family programs. The 10-year work plan will be approved by City Light and the NPS prior to filing with the Commission.

As required by NPS Section 4(e) Condition [X],[4] City Light will obtain a 10-year Cooperative Management Agreement (or similar intergovernmental instrument) to address the Park's regulatory requirements for the LC and will renew that CMA periodically (as specified in the CMA) for the term of the License (and any annual license) to ensure continued consistency with NPS regulatory requirements. NPS and City Light expect that the CMA will be developed prior to license issuance and signed by NPS and City Light upon license issuance.

Through an off-license agreement and as authorized by the NPS in a CMA, City Light shall identify and select an operator to implement approved educational and non-educational programming at the LC. City Light will administer LC programs, operations, and maintenance with the selected operator through a 10-Year Operating Agreement.

[4] Condition number(s) and date will be populated in future versions of this RRMP.

LC programs will continue to balance the needs of multiple stakeholders as referenced above. LC education programs have evolved over time to meet the specific curricular needs of school districts that participate in and fund the programs. LC education programs will be adaptively managed to be responsive to the school districts most impacted by the Project and participants that fund the programs through tuition and financial support.

City Light will provide a portion of the funding for program implementation; the operator will be expected to generate the additional funding needed. The operator will provide the majority of funding for the LC programs and operations through earned program income (including fee- based activities on the LC Facilities), which will be authorized by NPS through the CMA, along with other grants, donations, and revenue. The net revenue collected by any NPS authorized services on NPS lands and waters shall be directed exclusively toward implementation of educational programming at the LC. The operator will include verification of this requirement in the annual report.

4.3.4.1 Program and Operations Support

City Light will ensure there are sufficient resources to maintain LC buildings and campus consistent with the obligations identified in the FERC license.

4.3.4.2 Administrative Use and Closures

City Light and NPS will jointly approve LC Facility use for non-educational purposes. NPS retains its authority to administratively close the LC consistent with NPS laws, regulations, and policies. When closures are not related to an emergency, NPS will inform City Light and its operator prior to the closure to minimize impacts to programming. City Light will file a notice of closure with FERC for each administrative closure.

4.4 Implementation Schedule

City Light will implement the capital improvements outlined in Section 4.3 according to the schedule in Table 4.4-1 below. The following implementation schedule may be modified depending upon the information in the NPS' VUM Plan once completed.

[Note to Settlement Parties: City Light will include an implementation schedule when the RRMP is submitted to FERC.]

5.0 MONITORING AND REPORTING

This section defines monitoring responsibilities and reporting for Project recreation facilities and opportunities.

Recreation monitoring is an integral part of the RRMP. It is a tool used to address changes over time and to identify when future recreation facilities or changes in management tools may be needed. Periodic monitoring will be collected, analyzed, and then discussed with the SLIC at annual SLIC meetings and scheduled in the rolling five-year implementation schedule. The results of the monitoring process will be used to make informed decisions about how best to manage Project recreation resources.

To the extent feasible, City Light will coordinate its monitoring efforts with NPS and USFS monitoring efforts, which may result in a more efficient monitoring process and allow Project-specific data to be compared with other non-Project data. City Light will share all applicable data and results from the monitoring process with the SLIC.

5.1 Monitoring Program

The Recreation Monitoring Program relies on two types of indicators: (1) Facility Occupancy and (2) Visitor Surveys. Each of these indicators, including their frequency, is described below. The proposed frequency and types of monitoring indicators may be modified based on the final implementation schedule of the PMEs.

5.1.1 Facility Occupancy

Every ten (10) years, City Light will collect current recreation use data at Project recreation facilities and non-Project facilities in and adjacent to the boundary along the reservoirs and river on NPS lands via observations/spot counts. City Light will use this data to develop an estimate of Project recreation occupancy. The study methodology will be similar to RA-01 to enable evaluation of data trends over time.

5.1.2 Visitor Surveys

Every ten (10) years, City Light will conduct focused visitor surveys to gather information on visitor activities, satisfaction levels with facilities, crowding, and user conflicts at Project recreation facilities and non-Project facilities in and adjacent to the boundary along the reservoirs and river within RLNRA. The study methodology will be similar to RA-01 to enable evaluation of data trends over time.

5.2 Plan Updates

Every ten (10) years, City Light, through the process of gathering and synthesizing new and existing information, will consult with the SLIC to assess the need to update the RRMP, and will revise the plan as needed pursuant to Section 5.4. RRMP revisions are subject to approval by the NPS for areas on or affecting NPS lands and waters.

5.3 Reporting Schedule

5.3.1 SLIC Reports

City Light will report annually to the SLIC on the status of RRMP implementation activities through an Annual Report that will describe the previous year's work and a two-year rolling Work Plan. Work Plan activities on locations on or affecting NPS lands and waters are subject to NPS approval, if not previously approved by NPS through the Implementation Work Plan (including the specific location, timing and scope of the activities). Every five (5) years, City Light will file a report with FERC describing implementation, monitoring activities, and any proposed modifications to the RRMP based upon the results of monitoring and consultation with the SLIC.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS, before filing such proposed modification with the Commission for approval. When a plan modification affects an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the ten-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements or new NPS or FS management plan directly related to the Plan.

5.3.2 LC Annual Report

City Light will prepare and file an Annual LC Report with FERC, with the Operator providing any needed input. The report will summarize the LC programs and activities for the preceding calendar year, as well as any completed or in progress maintenance and capital projects. The Annual Report will be reviewed by NPS prior to filing with FERC. The Annual Report will include the following:

- Status of how LC programs, activities, and events, including audiences, outcomes, and risk management, are achieving the Program Goals;
- Summary of programs offered;
- Maintenance activities completed;

- Capital projects planned, initiated, or completed; and
- Summary of expenditures for the LC.

5.4 LC Program Advisory Committee

Within six (6) months of license issuance, City Light will convene the LC Program Advisory Committee to advise City Light of its implementation of this Plan as it relates to the LC. City Light will chair committee meetings and consult with the LC Program Advisory Committee regarding LC programs, audiences, community engagement, and partnerships to ensure the participants' interests are reflected in LC programming. City Light may delegate the responsibility to chair meetings of the LC Program Advisory Committee.

City Light will invite the Upper Skagit Indian Tribe, Swinomish Indian Tribal Community, Sauk-Suiattle Indian Tribe, Nlaka'pamux Nation Tribal Council, USFS, North Cascades Conservation Council (NCCC), Skagit Environmental Endowment Commission (SEEC), National Parks and Conservation Association (NPCA), Skagit Fisheries Enhancement Group, and Whatcom and Skagit county school districts to participate on the LC Program Advisory Committee. Other parties may be invited at the discretion of the LC Program Advisory Committee. During the first year, the LC Program Advisory Committee will define membership in such a way that preserves the opportunity for additional Indian Tribes and Canadian First Nations to participate throughout the license period. The LC Program Advisory Committee will meet annually for the first three years of the license and then on a schedule to be determined by the members.

6.0 REFERENCES

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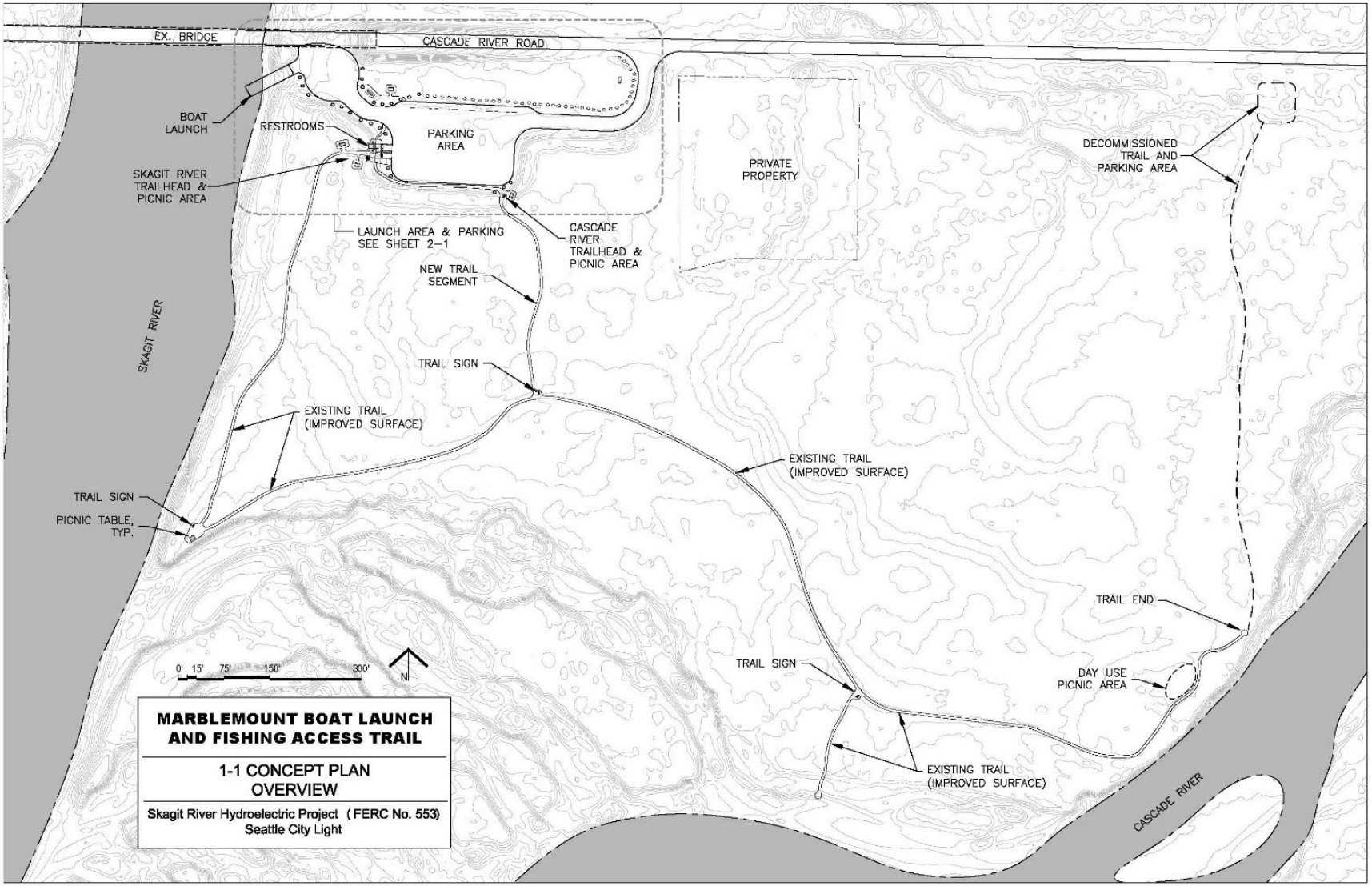
RECREATION RESOURCE MANAGEMENT PLAN

APPENDIX A

CONCEPT PLAN DRAWINGS FOR THE MARBLEMOUNT BOAT LAUNCH AND FISHING ACCESS TRAIL IMPROVEMENTS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BOAT LAUNCH
RESTROOMS
PARKING AREA
SKAGIT RIVER TRAILHEAD & PICNIC AREA
PRIVATE PROPERTY
DECOMMISSIONED TRAIL AND PARKING AREA
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CASCADE RIVER TRAILHEAD & PICNIC AREA
NEW TRAIL SEGMENT
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MARBLEMOUNT BOAT LAUNCH AND FISHING ACCESS TRAIL
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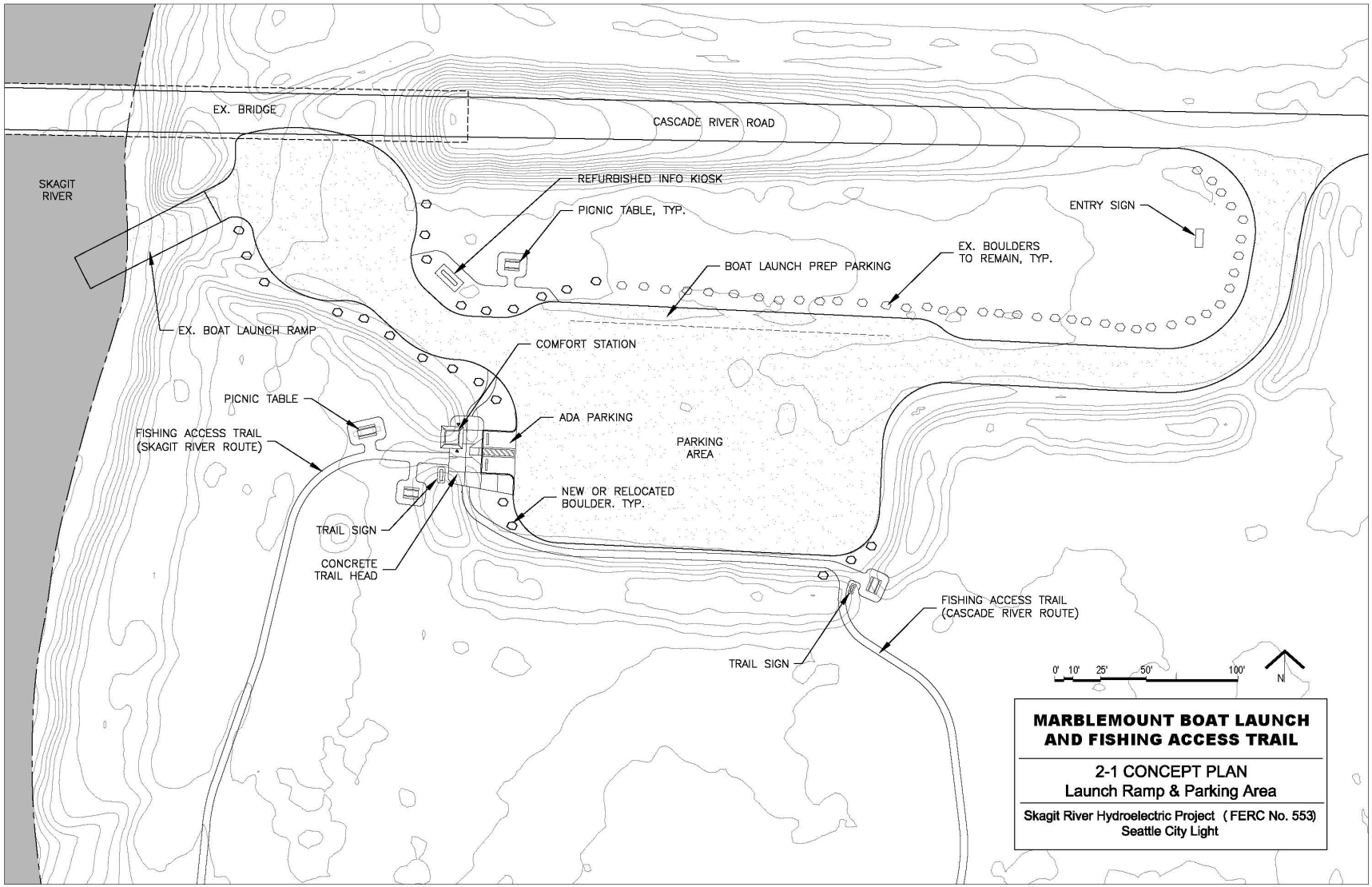
Skagit River Hydroelectric Project (FERC No. 553)
Seattle City Light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ENTRY SIGN
EX. BOULDERS TO REMAIN, TYP.
BOAT LAUNCH PREP PARKING
EX. BOAT LAUNCH RAMP
COMFORT STATION
PICNIC TABLE
ADA PARKING
FISHING ACCESS TRAIL (SKAGIT RIVER ROUTE)
PARKING AREA
NEW OR RELOCATED BOULDER. TYP.
TRAIL SIGN
CONCRETE TRAIL HEAD
FISHING ACCESS TRAIL (CASCADE RIVER ROUTE)
TRAIL SIGN
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MARBLEMOUNT BOAT LAUNCH AND FISHING ACCESS TRAIL
2-1 CONCEPT PLAN
Launch Ramp & Parking Area
Skagit River Hydroelectric Project (FERC No. 553)
Seattle City Light

WATER QUALITY MONITORING AND DATA MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT FERC NO. 553

Seattle City Light

December 2025

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Appendix A Draft Total Dissolved Gas Monitoring Plan and Compliance Schedule

List of Acronyms and Abbreviations

BMI.....benthic macroinvertebrate
CFR.....Code of Federal Regulations
cfs.....cubic feet per second
City Light.....Seattle City Light
CWA .....Clean Water Act
EMAMP.....Ecosystem Monitoring and Adaptive Management Program
EPA.....Environmental Protection Agency
EPT .....Ephemeroptera/Plecoptera/Trichoptera
ESA.....Endangered Species Act
FERC.....Federal Energy Regulatory Commission
FPA .....Federal Power Act
ft.....foot/feet
FWCA.....Fish and Wildlife Coordination Act
LP.....licensing participant
mg/L.....milligram per liter
MSA.....Magnuson-Stevens Fishery Conservation and Management Act
NPS .....National Park Service
NYSDEC.....New York State Department of Environmental Conservation
ºC.....degrees Celsius
PME .....protection, mitigation and enhancement
PRM.....Project River Mile
Project .....Skagit River Hydroelectric Project
QAPP .....Quality Assurance Project Plan
RM .....river mile
SLIC.....Skagit License Implementation Committee
SOP .....Standard Operating Procedure
TDG .....total dissolved gas
TSS.....total suspended solids
USGS .....U.S. Geological Survey

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Water Quality Monitoring and Data Management Plan (WQMDMP) for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) No. 553. The WQMDMP describes water quality monitoring that City Light will implement during the New License and dissemination of data (i.e., both data collected during the New License term and existing data collected by City Light during and outside the Project relicensing process).

In addition, appended to this WQMDMP is a draft Total Dissolved Gas (TDG) Compliance Schedule and Attainment Plan (Appendix A). The Settlement Agreement also includes the Settlement Parties' understanding of anticipated Project-specific conditions to be included in the Clean Water Act (CWA) Section 401 Water Quality Certification (Appendix 21 to the Settlement Agreement).

2.0 PURPOSE AND SCOPE OF THE PLAN

2.1 Goals and Objectives

The goals of this WQMDMP are to monitor and document water quality conditions to ensure Project operations comply with Washington State water quality standards, and that water quality conditions support ESA-listed species and designated critical habitat and non-listed Skagit River salmon and steelhead and essential fish habitat (EFH). The objectives of the WQMDMP are to establish science-based protocols for monitoring water quality during the term of the New License, which will be used to (1) evaluate compliance with Washington State water quality standards; (2) inform the evaluation of Project effects on temperature and subsequent effects on stream productivity; and (3) to inform actions implemented under the Ecosystem Monitoring and Adaptive Management Program (EMAMP) or through water quality compliance measures that address water quality impairments. Additionally, the WQMDMP will provide for the curation, storage, and dissemination of water quality data so that Federal and State Regulators have the best available information to support their decision-making throughout the term of the New License and facilitate the participation of other interested Parties in implementation of this WQMDMP. All monitoring will be implemented pursuant to an Ecology-approved Quality Assurance Project Plan (QAPP).

Specific objectives are:

- Provide Ecology with sufficient information to demonstrate that the Project meets Washington State water quality standards, and if/where not identifies compliance schedules and mechanisms for achieving attainment.
- Provide the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and National Park Service (collectively, Services) with sufficient information to demonstrate that Project operations comply with License conditions established under the Endangered Species Act (ESA), Fish and Wildlife Coordination Act (FWCA), National Park Service Organic Act, and the Magnuson-Stevens Fishery Conservation and Management Act (MSA).
- Monitor key water quality parameters at index locations to allow for assessment of Project protection, mitigation and enhancement (PME) measures implemented under the new Project license term, by comparing monitoring results to the baseline established by extensive sampling conducted for relicensing and other City Light datasets (City Light 2023a).
- Describe the approach to water quality data management, including the structure and function of the proposed water quality database.
- Provide datasets to inform long-term adaptive management as part of the EMAMP.
- Provide a process to periodically review and update this WQMDMP, taking into account technological improvements in water quality sampling and data transmission.

2.2 Scope of the Plan

The spatial scope of water quality monitoring will extend from the three Project reservoirs, Ross, (within the U.S.), Diablo, and Gorge lakes, through the Gorge Reach, and to the Skagit River at Project River Mile (PRM) 54.5.

City Light shall monitor the following water quality parameters during the term of the New License:

- temperature;
- TDG;
- turbidity;
- dissolved oxygen;
- nutrients and productivity;
- total suspended solids (TSS); and
- benthic macroinvertebrates (BMI).

The spatial and temporal scope of sampling constitutes a representative monitoring program that will allow for the detection and assessment of changes to water quality resulting from City Light's implementation of the New License. Results from this monitoring will be annually reviewed by the SLIC to inform how the Project is meeting requirements under the CWA, ESA and MSA.

BMI communities are important prey resources for fish and can act as indicators of cumulative changes in environmental conditions over time. At the request of licensing participants (LP), City Light conducted comprehensive BMI and invertebrate drift sampling in the Project vicinity, including longitudinal sampling in the Skagit River downstream of the Project, and sampling in the lower Sauk River. Data from this effort will serve as a baseline, to which future data can be compared.

City Light has developed a database to store and manage information it has collected within and outside the relicensing process. This tool, which has the capacity to be expanded to accommodate large datasets for a range of variables, will be used during the New License term to house, query, analyze, and report on water quality data to summarize ongoing information gathering and support the EMAMP. This database will be available to the public with data uploaded to the database a minimum of twice annually.

2.3 Jurisdiction and Regulatory Requirements

The relicensing of non-federal hydroelectric projects by FERC is considered a federal undertaking (36 Code of Federal Regulation [CFR] § 800.16[y]). As such, a license for the Project is subject to regulatory requirements under the Federal Power Act (FPA) and other applicable statutes. The major regulatory and statutory requirements relevant to water quality include a range of authorities under the FPA and, as noted above, compliance with Section 401 of the CWA. Under Section 401, a license applicant must obtain certification from Ecology that verifies Project compliance with the CWA. Certification conditions typically include requirements to monitor water quality throughout the term of a new Project license, pursuant to an Ecology-approved QAPP. For hydropower projects, certification conditions also require compliance schedules and associated attainment plans for parameters that cannot be met upon license issuance. Compliance with the ESA and MSA is also required.

3.0 PLAN IMPLEMENTATION AND RESOURCE MANAGEMENT PROGRAMS

3.1 Water Quality Monitoring Program

City Light shall monitor the parameters identified in the following subsections. Monitoring shall occur at the frequencies described below or as defined in the attached appendices, the CWA 401 Water Quality Certification, and the relevant QAPP. Monitoring shall continue throughout the term of the New License, unless City Light, in consultation with the SLIC and subject to any required agency approvals, including Ecology, determines that monitoring frequencies and/or methodologies should be modified or discontinued. This evaluation will be considered at the SLIC annual meeting.

The following sections describe the rationale for the variables selected and the spatial and temporal scopes associated with those variables.

3.1.1 Temperature

City Light shall monitor water temperature continuously at 30 minute intervals at the index locations identified below. Locations were selected to provide a representative set of sampling sites that will be sufficient for detecting potential changes in water quality linked to Project operation and/or background environmental phenomena (potentially including, over the long term, climate change). In most cases, monitoring sites included in this WQMDMP correspond to locations where City Light has already collected data, which will allow for comparisons of data collected at the same locations over time. Alphanumeric designations in parentheses are site names assigned during Project relicensing and carried over in this WQMDMP.

The reservoir forebays were selected to provide temperature measurements over a range of depths and document any changes to thermal stratification. The site in Ross Lake at the international border and in major tributaries will provide a record of temperatures at the primary inflow to Ross Lake, and mid-Ross-Reservoir monitoring will inform the temporal extent and thermal intensity of reservoir stratification. Sites in the Gorge Reach will allow for assessment of potential temperature changes associated with the minimum instream flow release in the Gorge Reach.

Sites in the Skagit River downstream of the Project are spread out longitudinally in well mixed locations to assess river-wide patterns and potential changes in the rate at which Project effects attenuate with increasing distance downstream. In addition to the mainstem sites, temperature will be monitored in side channel and off-channel areas. The off-channel sites selected for this WQDMP represent areas where summer water temperatures diverge from those of the Skagit River mainstem.

Subject to site-specific physical constraints, continuous year-round water temperature locations will include:

- Skagit River at International Border (TRIB1): continuous temperature measurement at a target depth of 3 ft from the surface of the river channel in the reservoir.
- Inflow from the four (4) largest tributary streams in the United States (Little Beaver, Lightning, Big Beaver, and Ruby Creeks): within one mile of the confluence with Ross Reservoir at full

pool temperature measurements in well mixed locations.

- Ross Lake mid-reservoir at Skymo station: continuous temperature measurements at a target depth of 3 ft from the surface.
- Ross Lake forebay at the boathouse (southeastern corner of boathouse, approximately 150 ft from dam face and 250 ft from intake): continuous temperature measurements along a vertical profile, with measurements taken at 2 ft, 12 ft, 25 ft, 50 ft, and then at 25-ft intervals to a depth of 200 ft.
- Ross Powerhouse outflow: continuous temperature measurements.
- Thunder Creek/Arm: under the Hwy 20 Bridge over Thunder Arm, and at the Thunder Arm log boom, both well mixed locations .
- Diablo Lake forebay (continued measurement at existing City Light profile location—approximately 150 ft upstream of dam face in middle of dam): continuous temperature measurements along a vertical profile, with measurements taken at 2 ft and then at 10-ft intervals from 10 ft to 85 ft.
- Diablo Powerhouse outflow: continuous temperature measurements.
- Gorge Lake forebay (continued measurement at existing City Light profile location, along outer forebay logboom): continuous temperature measurements along a vertical profile, with measurements taken at 2 ft and then at 10-ft intervals from 10 ft to 80 ft.
- Gorge Reach below Gorge Dam plunge pool (BYPASS1, below bridge leading to dam): continuous temperature measurement at a well-mixed location with a target depth of 3 ft.
- Gorge Reach 0.6 miles upstream of Gorge Powerhouse (BYPASS3): continuous temperature measurement at a well-mixed location with a target depth of 3 ft.
- Skagit River side channels (Park Slough, 91.4-L) near PRM 91.4: continuous temperature measurement at a location that is representative of average habitat conditions.
- Skagit River at PRM 91.6 (SKAGIT2): continuous temperature measurement at a target depth of 3 ft.
- Skagit River side channels near PRM 91.0 (Aggregate Ponds, 91.0-R1): continuous temperature measurement at a location that is representative of average habitat conditions.
- Skagit River at PRM 83.5 above Bacon Creek and in Bacon Creek above its confluence: continuous temperature measurement at a target depth of 3 ft.
- Skagit River at PRM 78.2 above the Cascade River and in the Cascade River above its confluence: continuous temperature measurement at a target depth of 3 ft.
- Skagit River at PRM 75.6 (SKAGIT4): continuous temperature measurement at a target depth of 3 ft.
- Skagit River side channel near PRM 75.6 (SKAGIT4SC): continuous temperature measurement at a target depth of 3 ft.
- Illabot Slough at approximately PRM 72.8: continuous temperature measurement at a target depth of 3 ft.
- Johnson Side Channel at approximately PRM 68.5: continuous temperature measurement at a

target depth of 3 ft.

- Skagit River at PRM 60.8 (SKAGIT6): continuous temperature measurement at a target depth of 3 ft.
- Skagit River at PRM 54.5 (SKAGIT7): continuous temperature measurement at a target depth of 1 meter (3 ft).

3.1.2 Total Dissolved Gas

TDG concentrations exceeded Ecology's criterion of 110 percent saturation at four locations in the Project vicinity during monitoring conducted for relicensing, including at: (1) the upper end of Gorge Lake as the result of air admission during periods of low flow/generation at the Diablo Powerhouse; (2) throughout Gorge Lake as the result of spill at Diablo Dam; (3) in the Gorge Reach as the result of spill at Gorge Dam, and (4) at the Gorge Powerhouse outflow.[1] Proposed measures (e.g., Gorge Reach minimum instream flows, updated flow management program below Gorge Powerhouse, Ross Lake Summer Variable Reservoir Operations Zone, modifications to the Flood Risk Management operations, etc.) are anticipated to result in changed conditions in the Project vicinity, including areas where TDG has been documented to exceed Ecology's numeric criteria. Appendix A to this WQMDMP includes City Light's Draft TDG Compliance Schedule and associated Attainment Plan.

3.1.3 Dissolved Oxygen

Dissolved oxygen profiles will be measured once per month over a continuous 24-hour period from June through November in the Ross Lake, Diablo Lake, and Gorge Lake forebays and an additional station in mid-Ross Lake (see below) for at least the first five (5) years following license issuance and for three (3) years following any subsequent modifications to Project operations until City Light, in consultation with the SLIC and approval by Ecology, agree to cease monitoring. Monitoring will be conducted in Ross and Diablo lakes because dissolved oxygen concentrations fall below 10 milligram per liter (mg/L) in the warmer months at times in Ross Lake. City Light will conduct monitoring in these reservoirs to track potential shifts that could occur as the result of possible future operational changes. Although dissolved oxygen concentrations in Gorge Lake exceed 10 mg/L throughout the year, City Light proposes to monitor at this location to extend the existing database into the future and detect and unforeseen changes.

Dissolved oxygen will be measured with sondes over a continuous 24-hour period monthly from June through November positioned at three depths, in the epilimnion (approximately the upper 15 ft of the water column), metalimnion (approximately mid-depth of the water column), and hypolimnion (within about 15 ft of the reservoir bottom).

Sites in the Gorge Reach allow for assessment of potential changes in dissolved oxygen concentrations resulting from the minimum instream flow release in the Gorge Reach. Dissolved oxygen will be measured continuously from June through November in the Gorge Reach.

Measured dissolved oxygen concentrations in the Skagit River have consistently been at or above 95 percent saturation, and usually above 100 percent saturation. Dissolved oxygen will also be

[1] TDG exceedances at this location only occurred when there was spill over Diablo Dam; this is not a normal occurrence at this site.

monitored continuously from June through November in multiple side channel and off-channel areas where temperature is being measured (see below) to assess the extent that dissolved oxygen saturation and temperatures are correlated in these areas, particularly off-channel areas where summer water temperatures diverge from those of the Skagit River mainstem, at times exceeding 20 ºC. After measuring dissolved oxygen at these sites for at least the first five (5) years following license issuance, City Light, in consultation with the SLIC, may request approval from Ecology to cease monitoring.

- Ross Lake forebay log boom (ROSS12): Dissolved oxygen will be measured continuously with sondes over a 24-hour period monthly from June through November positioned at three depths: in the epilimnion (approximately the upper 15 ft of the water column), metalimnion (approximately mid-depth of the water column), and hypolimnion (within about 15 ft within 5 meters the reservoir bottom. Precise interpretation of sampling depths within these strata is determined in the field by dropping a sonde through the water column at 2m intervals and plotting the temperature profile on the day of sonde deployment.
- Ross Lake mid-reservoir at Skymo station: June through November in the epilimnion (upper 15 ft of the water column), metalimnion (approximately mid-depth of the water column), and hypolimnion (within about 15 ft of the reservoir bottom) to detect the potential development of low-oxygen zones.
- Diablo Dam forebay (DIABLO2): monthly from June through November in the epilimnion (upper 15 ft of the water column), metalimnion (approximately mid-depth of the water column), and hypolimnion (within about 15 ft of the reservoir bottom).
- Gorge Dam forebay (GORGE2): monthly from June through November in the epilimnion (upper 15 ft of the water column), metalimnion (approximately mid-depth of the water column), and hypolimnion (within about 15 ft of the reservoir bottom).
- Gorge Reach below Gorge Dam plunge pool (BYPASS1): continuous (30-minute interval) dissolved oxygen measurement with a single sonde at a depth of 3 ft from June through November (the season when higher temperatures could influence dissolved oxygen concentrations).
- Gorge Reach 0.6 miles upstream of Gorge Powerhouse (BYPASS3): continuous (30-minute interval) dissolved oxygen measurement with a single sonde at a depth of 3 ft from June through November (the season when higher temperatures could influence dissolved oxygen concentrations).
- Skagit River side channel near PRM 90.0 (SKAGIT2SC): continuous (30-minute interval) dissolved oxygen measurement with a single sonde at a depth of 3 ft from June through October (the season when higher temperatures could influence dissolved oxygen concentrations); actual depth may vary, contingent upon flows and site conditions.
- Skagit River side channel near PRM 75.6 (SKAGIT4SC): continuous (30-minute interval) dissolved oxygen measurement with a single sonde at a depth of 3 ft from June through November (the season when higher temperatures could influence dissolved oxygen concentrations); actual depth may vary, contingent upon flows and site conditions.
- Illabot Slough at approximately PRM 72.8: continuous (30-minute interval) dissolved oxygen measurement with a single sonde at a depth of 3 ft from June through November (the season

when higher temperatures could influence dissolved oxygen concentrations); actual depth may vary, contingent upon flows and site conditions.

- Johnson Side Channel at approximately PRM 68.5: continuous (30-minute interval) dissolved oxygen measurement with a single sonde at a depth of 3 ft from June through November (the season when higher temperatures could influence dissolved oxygen concentrations); actual depth may vary, contingent upon flows and site conditions.

3.1.4 Nutrients and Productivity

Nutrients and chlorophyll *a*/pheophytin *a* will be measured monthly from May through one week after the breakdown of reservoir stratification (fall turnover), at the locations shown below. After monitoring for at least the first five (5) years following license issuance and then for three (3) years after any subsequent modifications to Project operations, City Light, in consultation with the SLIC, may request approval from Ecology to cease monitoring. Considerations will include whether the years in which the monitoring was conducted are representative with regard to ambient conditions and flow volumes. Nutrients to be monitored include total Kjeldahl nitrogen, ammonium, nitrite-nitrate, total phosphorus, and orthophosphate. The locations and timeframe (May-fall turnover) selected correspond to those observed when collecting nutrient and productivity data for the development and calibration of the CE-QUAL-W2 model.

- Ross Dam forebay (ROSS12): Nutrients and chlorophyll *a*/pheophytin *a* grab samples will be collected monthly from May through fall turnover in the epilimnion (upper 15 ft of the water column), metalimnion (approximately mid-depth of the water column), and hypolimnion (within about 15 ft of the reservoir bottom).
- Diablo Dam Forebay (DIABLO2): Nutrients and chlorophyll *a*/pheophytin *a* grab samples will be collected monthly from May through fall turnover in the epilimnion (upper 15 ft of the water column), metalimnion (approximately mid-depth of the water column), and hypolimnion (within about 15 ft of the reservoir bottom).
- Gorge Lake forebay (GORGE7): Nutrients and chlorophyll *a*/pheophytin *a* grab samples will be collected monthly from May through fall turnover in the epilimnion (upper 15 ft of the water column), metalimnion (approximately mid-depth of the water column), and hypolimnion (within about 15 ft of the reservoir bottom).
- Skagit River above Alma Creek (SKAGIT3) (PRM 85.9): Nutrients and chlorophyll *a*/pheophytin *a* grab samples will be collected monthly from May through fall turnover at a depth of 3 ft.
- Skagit River upstream of the Sauk River (SKAGIT5) (PRM 69.3): Nutrients and chlorophyll *a*/pheophytin *a* grab samples will be collected monthly from May through fall turnover at a depth of 3 ft.
- Skagit River near Concrete (SKAGIT7) (PRM 54.5): Nutrients and chlorophyll *a*/pheophytin *a* grab samples will be collected monthly from May through fall turnover at a depth of 3 ft.
- Sauk River Upstream of Suiattle River at RM 13.2: Nutrients and chlorophyll *a*/pheophytin *a* grab samples will be collected monthly from May through fall turnover at a depth of 3 ft.

3.1.5 Turbidity and TSS

To address the remaining uncertainties at Ross Lake tributary mouths or where paired upstream data were not available, City Light is proposing to collect four additional turbidity sampling events at the following locations during drawdown conditions between fall and spring spread out over two different years prior to license issuance:

- At tributary locations where the upstream locations are accessible, samples will be collected at an upstream location within the tributary above the reservoir pool and at a location 150 feet from the mouth within the reservoir. It is anticipated that this sampling design would be feasible at Big Beaver Creek, Lightning Creek, Dry Creek, and May Creek where elevated measurements were noted during the past sampling efforts.
- At the Skagit River at International Border and at Ruby Creek, the upstream locations above full pool are typically inaccessible. Therefore, City Light proposes to collect one sample at the upstream most accessible location within Ruby Creek or at the International Border, and another paired sample approximately 150 feet downstream of the corresponding upstream sample.

Results from this early action monitoring will inform future monitoring under the New License. In the absence of this information, monitoring under the New License is proposed as follows below. Frequencies and locations for monitoring under the New License may be adjusted through consultation with the SLIC and Ecology approval following review of early action monitoring data. Hence, locations discussed below should be considered presumptive.

City Light shall collect turbidity data to determine compliance with turbidity WQS, and will also collect TSS data to further evaluate their correlation. The turbidity and TSS monitoring shall be conducted when Ross Reservoir is below full pool at or near the international border, at select Ross Lake tributary mouths, in the pelagic zone of Ross Lake, and along the Ross Lake shoreline during summer. To assess the relationship between turbidity and flow in major tributaries to Ross Lake, turbidity measurements will be made at the following locations until City Light, in consultation with the SLIC and approval by Ecology, agree to cease monitoring:

- The confluence of Skagit River and Ross Reservoir near the International Border: At this location, a continuous monitoring sonde is proposed for deployment on a float to allow for measurements during the complete drawdown cycle when boat access is not possible.
- Twice annually during drawdown conditions (fall and spring) 150 ft from the confluences of:
  - Little Beaver Creek.
  - Big Beaver Creek.
  - Ruby Creek.
  - Lightening Creek.
  - May Creek.
- Per the early action monitoring program, for accessible tributaries, City Light will also sample the tributaries above full pool on the same date.

To expand the dataset for the pelagic zone of Ross Lake—and compare conditions in the main body of the reservoir to those in the tributaries—continuous turbidity monitoring and monthly TSS grab samples will be collected for at least five (5) years at the following locations (monitoring sites during relicensing studies) and continuing until City Light, in consultation with the SLIC and subject to approvals from Ecology, determines that further monitoring is unnecessary:

- Little Beaver (ROSS3): April-June and November-March (weather and reservoir conditions permitting, winter samples may also be collected).
- Skymo (ROSS2): April-June and November-March- (weather and reservoir conditions permitting, winter samples may also be collected).
- Pumpkin Mountain (ROSS1): Year-round To assess the effects of the Proposed Action on water clarity (i.e., light penetration) in the littoral zone of Ross Lake, City Light shall collect near-shore turbidity and TSS data along three 400-m shoreline transects in the same three Ross Lake regions monitored in the FA-01a Water Quality Monitoring Study (Hozomeen, Desolation, and Ruby; City Light 2023a). Samples will be collected along shorelines with appropriate erosive features, three feet from the edge of water along each transect. A sample will be collected every 100 meters; thus, five shoreline measurements will be acquired along each transect during each sampling event when including a sample from the start of each transect. Equivalent samples will be collected from a boat-deployed or autonomous underwater vehicle-deployed sonde 150 ft from the shoreline, parallel to the shoreline sample locations. City Light will attempt to conduct sampling to capture variable conditions (wind, rain) during drawdown, once in the fall and again in the spring (early drawdown [fall] and late drawdown [spring]), focusing on areas when specific erosional features would be exposed. Sampling would be conducted for the first three years following license issuance (six times total).

3.1.6 Benthic Macroinvertebrates

3.1.6.1 Project Reservoirs

To monitor potential changes in reservoir BMI communities following implementation of the New License, seasonal PONAR grab samples will be collected in the lentic zones of Ross, Diablo, and Gorge lakes, as well as at side channel and off-channel habitats downstream of the Project, at the approximate locations identified below. Samples will be collected every six weeks from May through October (4 times per sampling year). If, during the course of the New License, the duration of the invertebrate growing season increases due to changing climactic conditions, the duration of the sampling may need to be expanded. Samples will be collected according to procedures described in *Minimum Requirements for the Collection of Freshwater Benthic Macroinvertebrates in Streams and Rivers (Ecology Pub. 22-03-213).* All PONAR samples will be collected in replicate (i.e., two samples at each combination of location and time).

- Ross Lake near Hozomeen, upper varial zone: Every 6 weeks, May – Oct (4 times per year).
- Ross Lake near Hozomeen, lower varial zone: Every 6 weeks, May – Oct (4 times per year).
- Ross Lake near Hozomeen, permanently inundated zone: Every 6 weeks, May – Oct (4 times per year).
- Ross Lake at Pumpkin Mountain, upper varial zone: Every 6 weeks, May – Oct (4 times per year).

- Ross Lake at Pumpkin Mountain, lower varial zone: Every 6 weeks, May – Oct (4 times per year).
- Ross Lake at Pumpkin Mountain, permanently inundated zone: Every 6 weeks, May – Oct (4 times per year).
- Diablo Lake Main Basin, permanently inundated zone: Every 6 weeks, May – Oct (4 times per year).
- Diablo Lake Skagit Arm, permanently inundated zone: Every 6 weeks, May – Oct (4 times per year).
- Gorge Lake Reflector Bar, permanently inundated zone: Every 6 weeks, May – Oct (4 times per year).
- Gorge Lake Stetattle Creek confluence, permanently inundated zone: Every 6 weeks, May – Oct (4 times per year).

3.1.6.2 Skagit and Sauk Rivers

City Light shall sample BMI at multiple locations in the Skagit River and one site in the Sauk River (all sampled during relicensing). Sampling will be conducted once in July and once in September at three times, i.e., five (5), ten (10), and fifteen (15) years after issuance of the new Project license (a total of six sampling events at each sampling location). BMI samples will be collected and processed according to relevant field sampling, preservation, data reporting, records management, and quality assurance and quality control methods described in Ecology's Standard Operating Procedure (SOP) EAP073. Samples will be collected with a D-frame kicknet (with an area of 1 ft^2) over a site length of 2 bankfull widths or more. Eight 1-ft^2 kicknet samples will be taken in multiple riffles at each location during a given sampling period to obtain a single 8-ft^2 composite sample.

Data collected at these sites in the future will be compared to baseline data collected during the relicensing from similar physical habitats. Metrics to be computed and compared to the baseline include, at a minimum, density, taxa richness, percent Ephemeroptera/Plecoptera/Trichoptera (EPT)[2] taxa, functional group composition, and taxonomic completeness.

- Skagit River at PRM 94.0 (Above Newhalem Creek): BMI sampling will be conducted twice per sampling year, once in July and once in September, per Ecology protocol.
- Skagit River at PRM 92.0 (Above the Aggregate Ponds): BMI sampling will be conducted twice per sampling year, once in July and once in September, per Ecology protocol, or at Skagit River at PRM 91.6 (SKAGIT2X): BMI sampling will be conducted twice per sampling year (i.e., 5, 10, 15 years after license issuance), once in July and once in September, per Ecology protocol.
- Skagit River at PRM 75.6 (SKAGIT4X): BMI sampling will be conducted twice per sampling year (i.e., 5, 10, 15 years after license issuance), once in July and once in September, per Ecology protocol.
- Skagit River at PRM 60.8 (SKAGIT6X): BMI sampling will be conducted twice per sampling

[2] Ephemeroptera - mayflies; Plecoptera - stoneflies; Trichoptera - caddisflies.

year (i.e., 5, 10, 15 years after license issuance), once in July and once in September, per Ecology protocol.

- Skagit River at PRM 54.5 (SKAGIT7X): BMI sampling will be conducted twice per sampling year (i.e., 5, 10, 15 years after license issuance), once in July and once in September, per Ecology protocol.
- Sauk River at RM 13.2 (SAUK2): BMI sampling will be conducted twice per sampling year (i.e., 5, 10, 15 years after license issuance), once in July and once in September, per Ecology protocol.

3.2 Data Management Program

As described above, the proposed data management program includes: (1) the process and tools associated with the entry, organization, and storage of water quality data; and (2) tools to provide data to inform long-term adaptive management as part of City Light's proposed EMAMP.

3.2.1 Database Development and Application

City Light has developed a database to store and manage information collected by it and other entities within and outside (e.g., already established thermistor chains in reservoir forebays) the relicensing process. This tool, which has the capacity to be expanded to accommodate large datasets for a range or variables, will be used during the New License term to house, query, analyze, and report on water quality data and support adaptive management (see below). City Light will establish a user portal, through which other parties will be able to access both raw data files and data certified reliable following screening for quality assurance under the relevant QAPP.

The database currently in use, and to be used during implementation of the New License, already contains more than 1,000 files housing data collected by City Light and its contractors, as well as the National Park Service (NPS) and U.S. Geological Survey (USGS), between 2001 and 2022. Data are organized by waterbody (i.e., Ross Lake, Diablo Lake, Gorge Lake, and the Skagit River), with data from tributaries grouped with their downstream waterbodies (e.g., data from Thunder Creek, a tributary to Diablo Lake, can be accessed by specifying Diablo Lake as the primary waterbody). Once a waterbody is selected, the user can access data for a site or sites within the water body, select start and end dates of interest, and preview the first 20 records from a specified search before downloading data. Downloaded results generate a newly-created .csv file that contains data that conform to the search parameters.

4.0 SCHEDULE AND REPORTING

4.1 Implementation and Monitoring Schedule

Except for the early action efforts identified in Section 3.1.5, implementation of the WQMDMP will begin upon license issuance and continue through the New License. The schedule for specific measures is shown in Table 4.1-1.

Table 4.1-1. Implementation schedule for WQMDMP measures.

Measure	Timing and Frequency
Temperature Monitoring	Continuously upon license issuance, for the duration of the New License.
Total Dissolved Gas (TDG)	According to a draft schedule described in Appendix A of this WQMDMP.
Dissolved Oxygen	Project reservoirs: upon license issuance, once per month from June through November. Gorge Reach: continuously upon license issuance from June through November. Skagit River side channels: continuously upon license issuance from June through November.
Nutrients and Productivity	Upon license issuance, monthly from May through one week after fall turnover.
Turbidity and Total Suspended Solids (TSS)	Ross Lake tributary mouths: continuously upon license issuance. Ross Lake open-water sites: upon license issuance, once per month from April through October. Ross Lake lakeshore transects: upon license issuance, twice annually (once during fall drawdown and once during spring drawdown).
Benthic Macroinvertebrates (BMI)	Ross Lake PONAR sampling: Every six weeks from May through October (4 times per sampling year), three (3), six (6), and nine (9) years following implementation of proposed operations. Skagit River benthic sampling: June and September (twice per sampling year), five (5), ten (10), and fifteen (15) years after license issuance.
Data Management Program	Upon license issuance, updated quarterly for the duration of the New License.

4.2 Reporting Schedule

City Light anticipates that water quality data will be downloaded/entered into the database on a quarterly basis. Verbal updates on observed patterns or trends of interest will be provided to the SLIC during ongoing Work Group meetings. Written reports will be provided to the SLIC and filed with FERC annually during the first quarter of each year to document compliance with the WQMDMP and to summarize the analysis of monitoring results from the preceding year.

5.0 REFERENCES

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WATER QUALITY MONITORING AND DATA MANAGEMENT PLAN

APPENDIX A

DRAFT TOTAL DISSOLVED GAS MONITORING PLAN AND COMPLIANCE SCHEDULE

DRAFT TOTAL DISSOLVED GAS MONITORING PLAN AND COMPLIANCE SCHEDULE

SKAGIT RIVER HYDROELECTRIC PROJECT FERC NO. 553

Seattle City Light

November 2025

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Attachment A 7Q10 Calculation Memo

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1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) draft Total Dissolved Gas (TDG) Monitoring Plan and Compliance Schedule for the Skagit River Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) No. 553. This Plan describes TDG monitoring, assessment, and next steps for TDG attainment and management during the new Project license term. This Plan will be finalized in cooperation with Ecology during the 401 application process.

1.1 Background

City Light is the licensee of the existing 700-megawatt (MW) Project. The Project is located in Whatcom, Skagit, and Snohomish counties, Washington. The Project is located in the upper Skagit River watershed in the middle of the Ross Lake National Recreation Area (RLNRA) in the North Cascades National Park Complex[1] and consists of three power generating developments on the Skagit River – Ross, Diablo, and Gorge – and associated lands and facilities. The Project was originally licensed in 1927 by the FERC's predecessor agency, the Federal Power Commission. The Project was developed over a 42-year period, beginning with construction of Gorge Powerhouse and a timber-crib dam in 1919, and finishing with the completion of the existing concrete-arch dam at the Gorge Development in 1961. The final phase of the Project, construction of High Ross dam, was suspended in 1984 with the signing of the High Ross Treaty between the United States and Canada. Approximately one mile of Ross Lake, the upper-most Project reservoir, is in British Columbia and is part of the Skagit Valley Provincial Park. The roughly 60-mile stretch of the Skagit River several miles downstream of the Project is designated as a Wild and Scenic River and is managed by the U.S. Forest Service (USFS).

The Skagit River ecosystem supports important runs of anadromous fish that are key to the cultural, spiritual, and economic health of Indian Tribes and other residents. The three Skagit generating developments are hydraulically coordinated to act as a single project and supply approximately 20 percent of City Light's power requirements. The operational priorities for the Project are: (1) flood risk management; (2) downstream fish protection; (3) recreation; and (4) power production. The Project also plays an important role in the regional energy market by integrating renewable resources and providing generation reserves.

1.1.1 Overview of Purpose, Need, and Scope for Monitoring Plan and Compliance Schedule

In support of City Light's CWA Section 401 application, this monitoring plan and compliance schedule outlines how City Light intends to:

- Further characterize how Project operations, under baseline and new FERC license conditions, may generate elevated TDG.
- Address TDG exceedances in compliance with regulatory requirements.

[1] The North Cascades National Park Complex was established in 1968, after all three Project developments began operations.

City Light has previously monitored TDG in the Project Area under current flow-management conditions to assess baseline conditions in support of the relicensing process (FA-01a Water Quality Monitoring Study). Elevated TDG was observed to occur during spill events at Project facilities, and TDG was also discovered to be nominally elevated in Gorge Reservoir during the rare use of an air entrainment system at Diablo powerhouse (See Section 2.5.2.2 of City Light's Technical Summary of Physical Water Quality Parameters document submitted to Ecology in support of the 401 water quality certification application). These studies were useful in providing TDG data under current operations however, there remains a need for additional baseline data as well as characterization of TDG conditions that may be generated from spill-generated process flow commitments under a new license. Results of this monitoring will inform the need for future TDG management actions.

1.2 Regulatory Context

The relicensing of non-federal hydroelectric projects by FERC is considered a federal undertaking (36 CFR § 800.16(y)). As such, a license for the Project is subject to regulatory requirements under the Federal Power Act (FPA) and other applicable statutes.

Under Section 401 of the Clean Water Act of 1977 (CWA), a License Applicant for a project that may result in a discharge into navigable waters of the United States must obtain certification from the jurisdiction in which the project discharges that the project meets water quality standards. In Washington State, the Department of Ecology (Ecology) is responsible for issuing the Section 401 Water Quality Certification (401 Certification) that verifies Project compliance with applicable water quality requirements. 401 Certification conditions typically include requirements to monitor water quality throughout the term of a new Project license, pursuant to an Ecology-approved Quality Assurance Project Plan. For hydropower projects that do not demonstrate full compliance, the Washington State Surface Water Quality Standards allow certification conditions to be met subsequent to license issuance in accordance with approved compliance schedules and associated parameter-specific attainment plans.

Consistent with these requirements, City Light will file an application for water quality certification with the Washington Department of Ecology (Ecology) and formally requesting certification for the Project under Section 401 of the CWA. City Light has consulted with Ecology throughout the relicensing process regarding the design and implementation of water quality studies needed to support its application for water quality certification. This TDG Monitoring Plan and Compliance Schedule is the result of consultation with Ecology, which is ongoing as City Light prepares its application. The consultation identified that each development within the Project will require additional TDG characterization under existing (baseline) conditions and an evaluation of how TDG generation may change under the new license conditions. The consultation also identified the need to develop and submit an attainment plan in accordance with WAC 173-201A-510(5) for existing TDG exceedances observed at the Project under current operations within one year of license issuance.

1.2.1 Compliance with WQS for TDG

Under WAC 173-201A-200, TDG shall not exceed 110 percent of saturation. This TDG criteria does not apply when the stream flow exceeds the seven-day, 10-year frequency flood (7Q10).

No 7Q10 has previously been established for the Project. City Light has developed a 7Q10 analysis for Ecology approval for the Skagit River as part of the Section 401 certification process. Flows below this newly established 7Q10 will be subject to the 110 percent saturation criteria.

City Light's calculation of 7Q10 for the Project is attached to this document (Attachment A).

2.0 GENERAL PROJECT DESCRIPTION

2.1 Geographic Setting and History of Operations

At nearly 23 miles long, Ross Lake is the largest reservoir in western Washington. The reservoir has a surface area of 11,680 acres and a storage volume of 1,435,000 acre-feet at the normal maximum water surface elevation of 1,608.76 feet North American Vertical Datum 1988 (NAVD 88) (1,602.5 feet City of Seattle Datum (CoSD)].[2] Between 1991 and 2018, the average low water surface elevation ranged from 1,453.36 feet NAVD 88 (1,467.1 feet CoSD) (in April) to 1,591.06 feet NAVD 88 (1,584.8 feet CoSD) (in August). Ross Lake has a detention time of 189.4 days (Connor 2019). Ross Lake is the primary storage reservoir for the Project and is drawn down in winter to capture water from spring runoff and to provide downstream flood control. City Light typically begins drawing down the reservoir shortly after Labor Day.

As past monitoring has shown (See Section 2.5 of City Light's Technical Summary of Physical Water Quality Parameters, submitted to Ecology in support of this 401 water quality certification application), spill is the primary mechanism through which TDG can become elevated depending on the volume and duration of the spill. Spills at Ross Dam, however, are very infrequent due to the reservoir's large storage capacity. Spills at Ross Dam are typically associated with gate testing, are of short duration, and average only a few cubic feet per second (cfs; Table 2-1). Thus, monitoring of spill from Ross dam is a recognized data gap. From 2014–2018, Ross Dam spilled 20 times. Eleven of these spills occurred in August 2015 during the Goodell Creek Wildfire, which disrupted Project operations and transmission. In 2014, 2016, 2017, and 2018, average spills ranged from <1–5 cfs per day. Average spills were higher (i.e., 1,540 cfs) in 2015 because the fire disrupted operations. Over the five years 2017 through 2021, Ross Dam spilled 55 times; 8 of these occurred between October 28 and November 9, 2020 and were associated with two units being offline and a high inflow event on November 5, 2020. Another 33 days of spill occurred in the fall of 2021 corresponding to a high inflow event.

Table 2-1. Ross Dam spill events (2017-2021).

Year	Number of Days with Spill	Average Flow per Spill Day (cfs)
2017	1	<1
2018	2	<1
2019	0	0
2020	12	2,147
2021	40	3,872
2022	3	<1
2023	14	1,331

Diablo Lake has a surface area of approximately 770 acres and gross storage of 50,000 acre-feet at a normal maximum water surface elevation of 1,211.36 feet NAVD 88 (1,205 feet CoSD). During summer, the reservoir's major tributary, Thunder Creek, carries a heavy load of very fine, suspended glacier-generated sediment, also known as glacial flour, which gives the lake a notable

[2] City Light is in the process of converting Project information from its older vertical elevation datum (CoSD) to the more current and standardized elevation datum (NAVD 88). As such, elevations are provided relative to both data throughout this document.

turquoise color. Diablo Lake has a detention time of 9.4 days (Connor 2019). The primary function of the Diablo Development is to reregulate flows between the Ross and Gorge developments. The reservoir typically fluctuates 4-5 feet daily, although drawdowns of 10-12 feet occur occasionally, as needed for construction projects or maintenance.

Because of its role as a reregulation facility, Diablo Dam spills more frequently than any of the other Project facilities (Table 2-2). Spills typically occur during periods of high runoff, particularly during the spring or early summer. However, Diablo Dam also spills when units are off-line at the Diablo Powerhouse or when more water is needed to meet flow requirements downstream of Gorge Powerhouse. Under typical operations, represented by 2019, 2020, and 2021, Diablo Dam spills an average of 62 days per year. However, in years when unit maintenance occurs at Diablo Powerhouse, such as 2017 and 2018, spill events are significantly more frequent and of longer duration but lower in magnitude. In 2022, a long spill from Diablo was required to address an emergency closure of one of the penstocks, resulting in TDG exceedances in Gorge Lake and below Gorge Dam (City Light, 2023c).

Table 2-2. Diablo Dam spill events (2017-2021).

Year	Number of Days with Spill	Average Flow per Spill Day (cfs)
2017	224	1,364
2018	274	1,393
2019	80	1,482
2020	60	2,474
2021	46	5,149[1]
2022	141	2,828
2023	30	975

1 Higher than average spill volumes occurred in fall of 2021 due to a high inflow event that led to spill at all three project facilities.

Gorge Lake is 4.5 miles long. At the normal maximum water surface elevation of 881.51 feet NAVD 88 (875 feet CoSD), the reservoir has a surface area of 240 acres and gross storage of 8,500 acre-feet. Gorge Lake has a detention time of 0.8 days (Conner 2019). Because of Gorge Lake's relatively low storage volume, unplanned spills at the dam can occur any time inflow exceeds generation capacity. The reach of the Skagit River between Gorge Dam and Powerhouse is referred to as the Gorge Reach[3] and is approximately 2.5 miles long. Water from Gorge Lake is spilled into the Gorge Reach if flows through Gorge Powerhouse are insufficient to meet downstream flow requirements specified under the 2013 Revised Fisheries Settlement Agreement (FSA) for salmon or steelhead spawning or rearing. Flows from the Gorge Development are critical for fish production and protection in the Skagit River downstream of Gorge Powerhouse.

Over the five-year period 2017 through 2021, Gorge Dam has spilled between 9 and 56 days annually into the Gorge Reach, with an average flow of 2,570 cfs (Table 2-3). Spills over the last 23 years have primarily occurred from June through August (Figure 2-1). City Light flow and spill records indicate that the median spill volume between 1997 and 2021 was approximately 1,750 cfs (Figure 2-2). Under the current Project license, City Light is not required to release any flow

3 The Gorge Reach was previously called the Gorge Bypass Reach in other relicensing documents.

into the Gorge Reach (FERC 1995), and flows in the reach are limited to accretion flow, spill-gate seepage, tributary input, and precipitation runoff, except when water is being spilled at Gorge Dam. A minimum flow will be established under the new license such that new baseline TDG conditions will prevail. Notwithstanding this data gap, the reach will continue to support bypass spill flows, and monitoring during the FA-01a Water Quality Monitoring Study demonstrated spills above approximately 4,000 cfs into the Gorge Reach can result in exceedance of the 110% saturation TDG criterion (See Section 2.5.3.2 of Technical Summary of Physical Water Quality Parameters, including Figure 2.5-5).

Table 2-3. Gorge Dam spill events (2017-2021).

Year	Number of Days with Spill	Average Flow per Spill Day (cfs)
2017	37	2,006
2018	42	2,934
2019	9	589
2020	20	1,374
2021	56	5,946[1]
2022	62	1,159
2023	11	759

1 Higher than average spill volumes occurred in fall of 2021 due to a high inflow event that led to spill at all three project facilities.

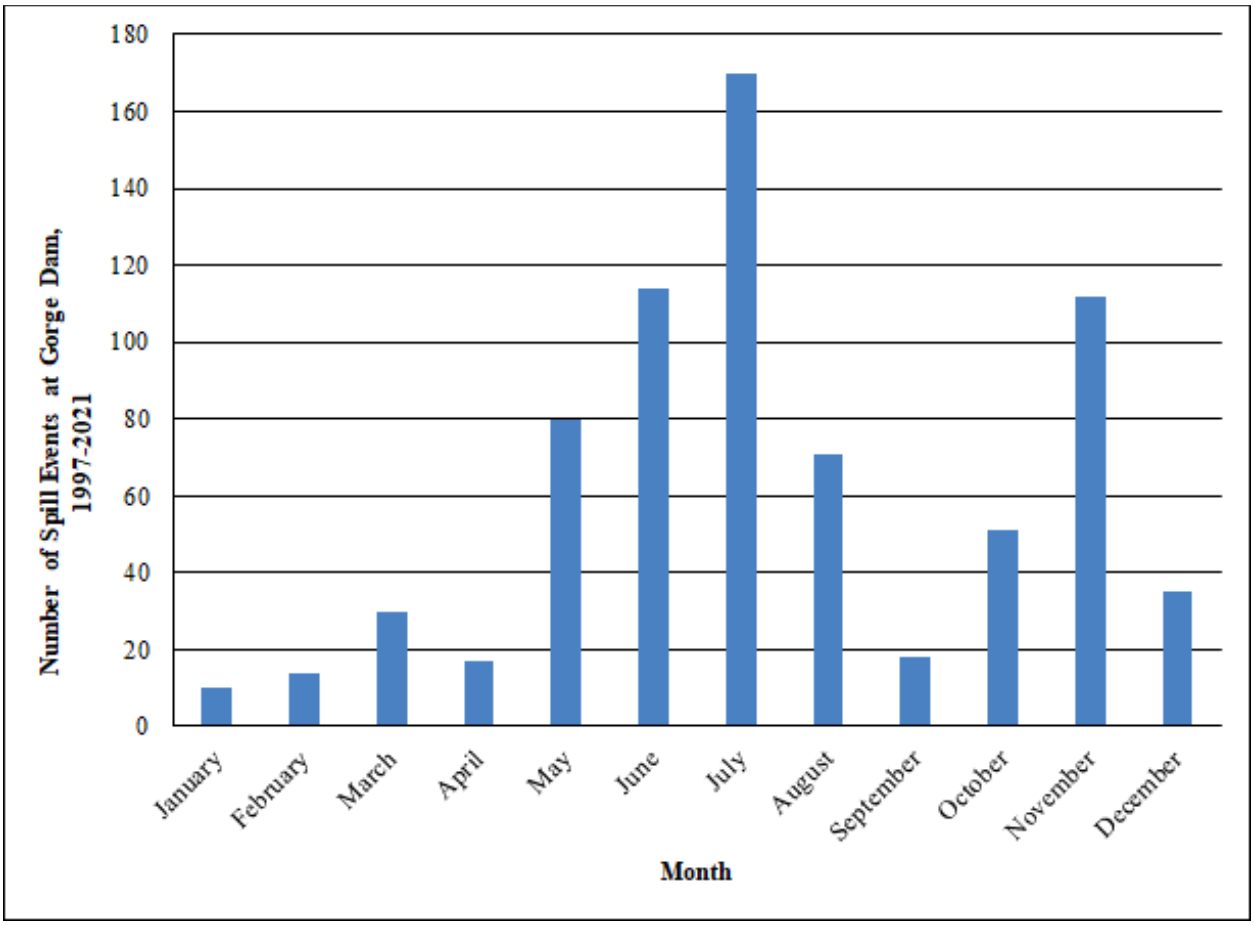

Figure 2-1. Monthly spill events at Gorge Dam (1997–2021).

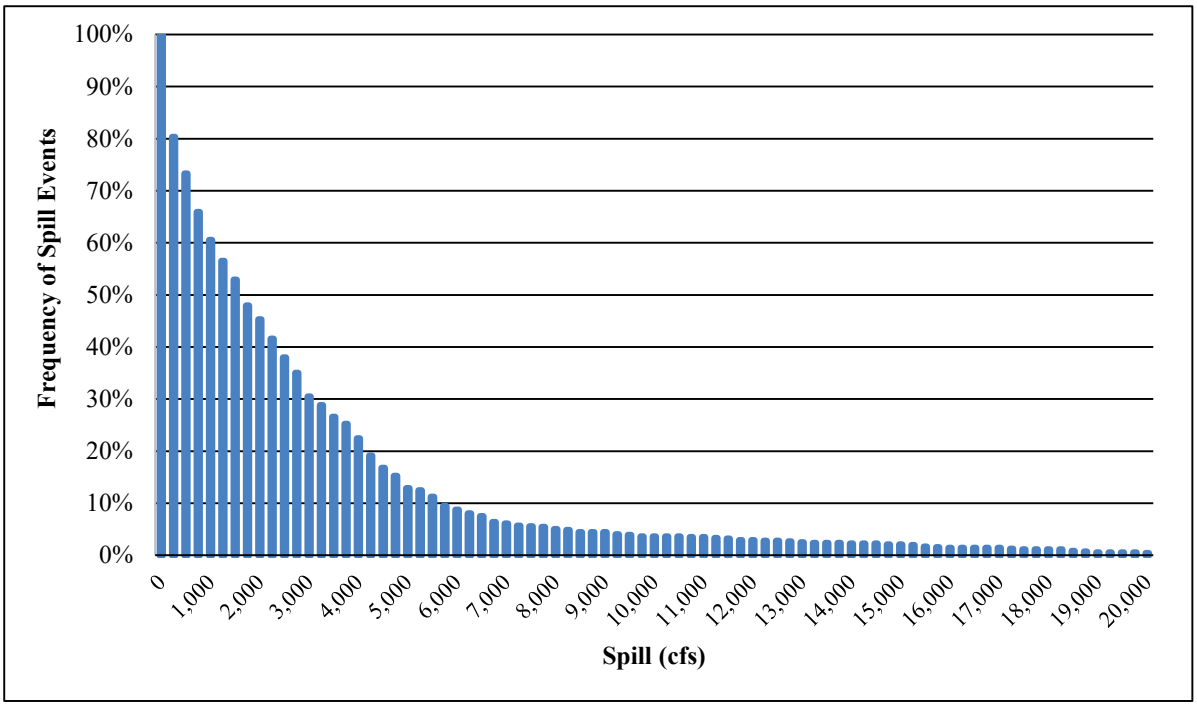

Figure 2-2. Frequency distribution of spill volume at Gorge Dam (1997–2021).

From 1991 through 2012, flow releases to the mainstem Skagit River downstream of Gorge Powerhouse were dictated by the current Project license (FERC 1995), which fully incorporates the measures included in the Flow Plan of the FSA (City Light 1991). The primary purpose of the Flow Plan is to minimize the effects of Project operations on salmonids by providing spawning flows and protecting redds, fry, and yearlings. The Project license was amended in 2013 to incorporate a Revised FSA Flow Plan (City Light 2011) that included four measures City Light had been implementing voluntarily since 1995 to further reduce Project effects on steelhead and salmon. The Revised FSA Flow Plan, as amended, is described in Section 3.5.2 of the Pre-Application Document (PAD).

2.2 Project Operations Under a New FERC License

Changes in Project operations under the new license have the potential to modify TDG production within the Project area. The proposed flow regime for the Project includes modifications to operations that will affect reservoir elevations and flows from Ross Lake downstream to the Skagit River below the Project. These changes represent key changes in operations that require ongoing monitoring and a recharacterization of baseline conditions. At Ross Lake, City Light will operate within the Summer Variable Reservoir Operations Zone and make modifications in accordance with the Flood Risk Management Operations. No significant changes are proposed to reservoir elevations in Diablo Lake or Gorge Lake.

The proposed flow regime in the Skagit River under the new FERC license is based on requirements in the FSA. The Flow Management Proposal (FMP) contained within the proposed Riverscape Ecosystem Plan (REP), describes flow measures developed to minimize the effects of Project operations on salmon and steelhead and enhance mainstem, side channel, and off-channel habitat downstream of Gorge Powerhouse. The FMP proposes flow measures that are tailored to

be protective for specific life stages of each species by (1) establishing instantaneous minimum flows, (2) limiting downramping to specific rates and times, and (3) limiting maximum daily average flows during spawning periods. Modifications to project operations that necessitate ongoing monitoring to establish a new TDG baseline include the establishment of minimum instream flows in the Gorge Reach and the release of side and off-channel connectivity and process flows.

A minimum instream flow for the Gorge Reach of 250 cfs will be required in the 401 Certification, and City Light anticipates these flows will be ensured via a low flow control structure installed at Gorge Dam. As noted, water releases from the Gorge Dam spillway more than the minimum instream flow will continue to be routed through the Gorge Reach during maintenance or emergency shutdown periods, and when reservoir inflows exceed the capacity of the Gorge Powerhouse.

Appendix N of the Riverscape Ecosystem Plan describes City Light's Proposal to Develop a Process Flows Adaptive Management Plan (Process Flows AMP). The goals of the Process Flows AMP, once finalized, shall be consistent with other ecosystem goals and objectives included in the comprehensive settlement agreement including: (1) mainstem Skagit River connectivity to side channel and off-channel areas to be utilized for fish habitat; (2) gravel quality resulting in increased spawning, incubation, and rearing; (3) geomorphic processes that mobilize sediment; and (4) upstream and downstream migration of anadromous fish. Further, the Settlement Parties agree that the Process Flows AMP will be coordinated with the implementation of the Fish Passage Program. These ecosystem goals and objectives may be modified by the SLIC during early implementation of the Process Flow AMP planning process.

The sections below describe City Light's proposed minimum Process Flow releases based upon input from Ecology. City Light anticipates that the CWA 401 Water Quality Certification will be conditioned upon providing the minimum process flow requirements specified in below.

2.2.1 Side Channel and Off-Channel Connectivity Flows

City Light will release, at a minimum, side and off-channel connectivity flows of 12,200 cfs as measured at the Newhalem Gage for a period of 24 hours no less than once every 24 months. In addition, City Light will provide for, at a minimum, two (2) discrete releases of side and off-channel flows of 7,521 cfs, as measured at the Newhalem Gage, for a period of 24 hours for each release, during the periods of December 1 through February 15 and May 1 through June 30. Additional details are provided in the Process Flows AMP (Appendix N).

2.2.2 Mainstem Flushing Flows

City Light will provide for, at a minimum, three (3) discrete releases of mainstem flushing flows of 4,620 cfs as measured at the Newhalem Gage for a period of 6-12 hours for each release, during the periods of February 20 through April 20, September 1 through September 30, and October 5 through November 30, each year. Additional details are provided in the Process Flows AMP (Appendix N).

2.2.3 Channel Maintenance Flows

As described in Section 4 of the Process Flows AMP, City Light will consult with the SLIC to

achieve the intended outcomes of a channel maintenance flow releases of up to 26,400 cfs. City Light commits to implementing channel maintenance flows, the timing, duration, frequency, and flow magnitude will be based upon the results of the development of the Process Flows AMP. Channel maintenance flow releases will be subject to the conditions described in Section 3.3 below and the planning, coordination and testing described in Section 4 of the Process Flows AMP.

In the event that the results of the development of the Process Flows AMP find that channel maintenance flows are not achievable, City Light, in consultation with the SLIC, shall evaluate implementing additional side channel and off-channel connectivity flows, prioritization of funding from FA-LA-03 Skagit River Mainstem Habitat Funding Obligation and/or FA LA-07 Skagit River Limiting Factors Habitat Enhancement Program through a Science-based Decision-Making Framework, or other Channel Maintenance Flow actions (such as, but not limited to a delayed release, as determined in consultation with the SLIC, in an effort to achieve similar function.

If after the first ten year process flow plan has been implemented and it is determined that the magnitude and/or duration of the channel maintenance flow did not meet the intended objectives and ecological function of a channel maintenance flow, City Light and the SLIC, using a Science-based Decision-Making Framework, will identify a new channel maintenance flow proposal, implement additional side channel and off-channel connectivity flows, or recommend physical habitat projects to be prioritized and implemented using funding from the FA-LA-03 Skagit River Mainstem Habitat Funding Obligation and/or the FA LA-07 Skagit River Limiting Factors Habitat Enhancement Program.

2.2.4 Conditions for Process Flow Releases

City Light will coordinate with the SLIC to release Process Flows under the following conditions:

- City Light's process flows releases are subject to having adequate runoff to refill Ross Lake in order to maintain its ability to provide for anadromous fisheries protection flows, recreation reservoir level, and firm power generation[4] needs.
- City Light's process flow releases will be planned to avoid flooding (to the extent possible) of the Skagit River, which is currently defined[5] for purposes of this protection, mitigation and enhancement (PME) measure as exceeding the National Weather Service threshold of 28 feet (approximately 62,500 cfs) at the USGS Skagit River flow gaging station near Concrete, Washington.
- City Light's process flow releases are subject to complying with dam safety requirements and other regulatory conditions (e.g., Section 401 Water Quality Certificate conditions and water quality standards).
- The magnitude, duration, timing, and frequency of the process flow components may be achieved through any combination of controlled and uncontrolled flow releases (i.e., Gorge Powerhouse discharge, Gorge Dam spill, and accretion flow).

[4] Firm power generation means the minimum amount of power which City Light is obligated to provide from a combination of generation and contract resources for the use of its customers.

[5] Release of process flows may identify flooding considerations beyond the criteria listed above. If such instances are identified, this provision may be modified accordingly in consultation with the SLIC.

- City Light's process flow releases will not be subject to the FMP down-ramp requirements. City Light will implement an interim down-ramp rate of 3,000 cfs/hour or less for Process Flow releases above 12,200. City Light will implement an interim down-ramp rate of 2,000 cfs/hour or less for process flow release between 4,480 and 12,200 cfs. Modification to the down-ramp rate for process flows will be adaptively managed in consultation with the SLIC and approval from Ecology.

3.0 OVERVIEW OF AVAILABLE INFORMATION AND ACTIVITIES

3.1 Overview of Water Quality Study and TDG Monitoring Activities

The FA-01a Water Quality Monitoring Study (WQ Monitoring Study) was conducted in support of the relicensing process, as identified in the Revised Study Plan (RSP) as modified by the "Notice of Certain Agreements on Study Plans for the Skagit Relicensing" (June 9, 2021 Notice)[6] and FERC's Study Plan Determination (SPD; filed July 16, 2021). Results from the WQ Monitoring Study were presented in the Initial Study Report (ISR; City Light 2022, filed March 8, 2022), the Updated Study Report (USR; City Light 2023a), and the USR Addendum (City Light 2024b).

As part of the WQ Monitoring Study, TDG was one of many water quality parameters that were monitored over a two-year period (June 2021 through May 2023) in the Project Area and Project Vicinity. TDG was monitored continuously at six locations: two in Gorge Lake (GORGE3 and 4), three in the Gorge Reach (BYPASS1, 2, and 3), and one downstream of Gorge Powerhouse (PHOUSE1; Figure 3-1). In addition to continuous monitoring, City Light also conducted episodic monitoring during spill events downstream of Gorge Dam at five locations: (1) Gorge Dam Access Bridge (BYPASS4), (2) Gorge Powerhouse Access Bridge (BYPASS5); and (3) three locations in the Skagit River downstream of Gorge Powerhouse: Ladder Creek Bridge (LADDER1), the suspension bridge to Trail of the Cedars (CEDARS1), and the bridge to Newhalem Campground (NEWCG1; Figure 3-1).

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

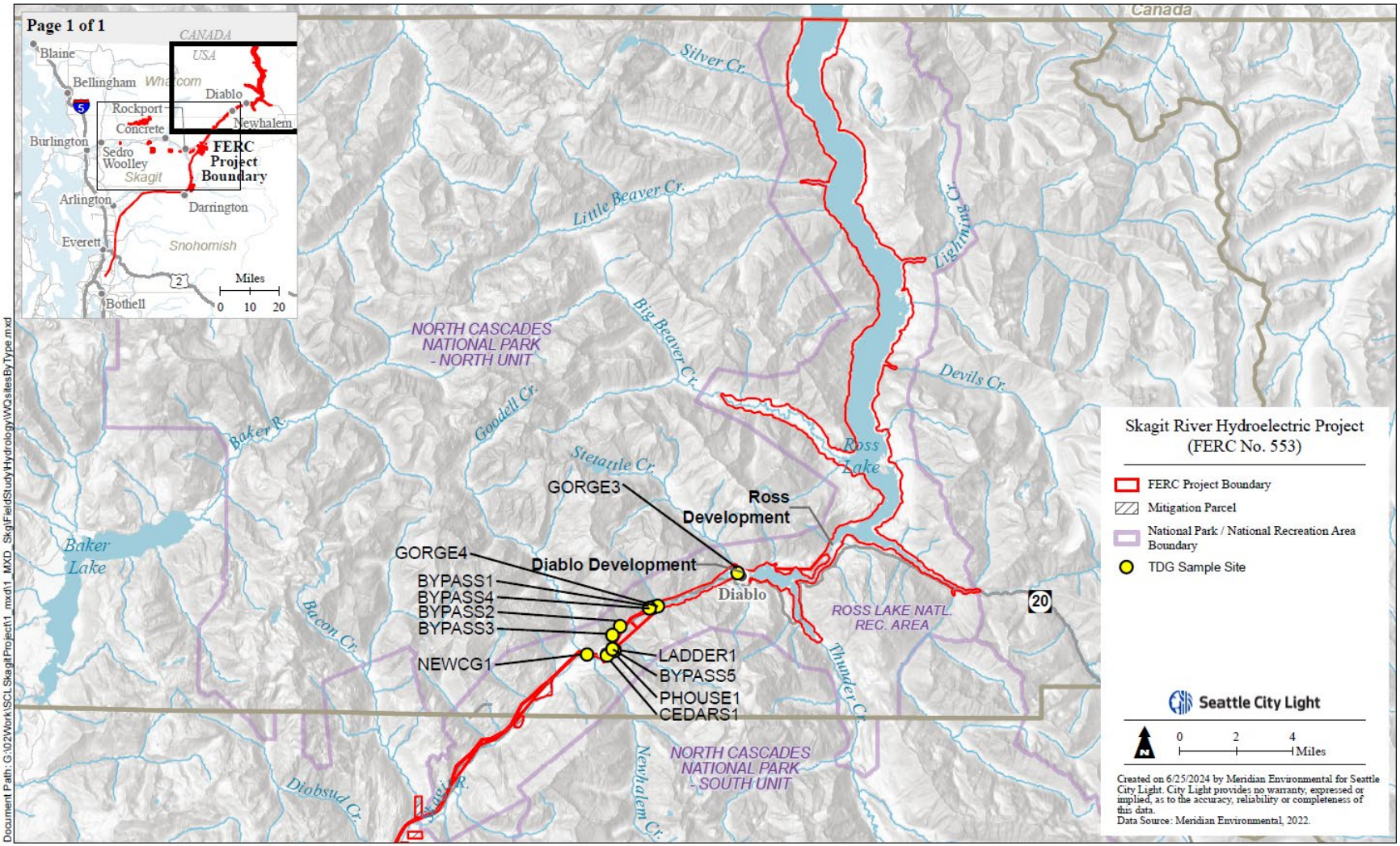

Figure 3-1. **TDG monitoring locations in Ross, Diablo, and Gorge reservoirs, the Gorge Reach, Gorge Powerhouse, and mainstem Skagit River.**

3.2 Synthesis of TDG Monitoring

TDG monitoring during relicensing documented two mechanisms by which elevated TDG (greater than 110 percent) may be created within Project: spill at Project dams, and operation of a turbine air admission system at Diablo powerhouse to improve operational performance during periods of reduced generation (Tables 3-1 and 3-2; City Light 2024b).

Table 3-1. Total dissolved gas exceedances and distance from gas generating activity observed during monitoring (sites ordered upstream to downstream).

Location	Sample Identification	Approximate Lat./Lon.	TDG Exceedances Observed (Distance from Gas Generating Activity)		
			Diablo Dam Spill	Diablo Powerhouse Operation	Gorge Dam Spill
Gorge Lake					
Below the Diablo Powerhouse Outflow	GORGE3	48.71188/ -121.14317	Yes (≈ 0.8 miles)	Yes (≈ 550 feet)	N/A
Gorge Dam Forebay	GORGE4	48.69777/ -121.20672	Yes (≈ 4.5 miles)	No	N/A
Gorge Reach					
Below Gorge Dam in plunge pool	BYPASS1	48.69783/ -121.20898	No	No	Yes (≈ 300 feet)
Gorge Dam access bridge	BYPASS4	48.6966169/ -121.2131147	N/A[1]	N/A[1]	Yes (≈ 0.2 miles)
≈ 1.5 miles above Gorge Powerhouse	BYPASS2	48.69030/ -121.22680	No	No	N/A[2]
≈ 0.6 miles above Gorge Powerhouse	BYPASS3	48.68415/ -121.24216	No	No	Yes (≈ 2.3 miles)
Gorge Powerhouse access bridge	BYPASS5	48.6757123/ -121.2416487	N/A[1]	N/A[1]	No
Skagit River Downstream of Gorge Powerhouse					
Ladder Creek Falls Bridge	LADDER1	48.67507/ -121.24010	N/A[1]	N/A[1]	No
Immediately below Gorge Powerhouse, right bank	PHOUSE1	48.67520/ -121.24052	Yes (≈ 7.4 miles)	No	Yes[3] (≈ 2.9 miles)
Bridge to Trail of the Cedars	CEDARS1	48.67153/ -12124600	N/A[1]	N/A[1]	No
Bridge at Newhalem Campground	NEWCG1	48.67238/ -12126104	N/A[1]	N/A[1]	No

1 TDG monitoring at BYPASS4, BYPASS5, LADDER1, CEDARS1, and NEWCG1 occurred only when spill was anticipated at Gorge Dam.

2 No spill occurred at Gorge Dam during TDG monitoring at BYPASS2.

3 No TDG exceedances were observed at PHOUSE1 when spill occurred at only Gorge Dam. TDG exceedances were observed at PHOUSE1 when spill occurred at both Diablo and Gorge Dams.

Table 3-2. Project activities at time of TDG exceedances downstream of Gorge Dam during FA-01a TDG Monitoring (2021-2023).

Site ID	Total # of Measurements	# of Measurements during Spill Events	# of Exceedances	% in Compliance	No. of Exceedances during Specific Project Activities					
					Diablo Spill (Trash Rack Repairs)[1]	Diablo Spill	Diablo and Gorge Spill	Gorge Spill	Diablo Air Admission System Operation	Normal Operations without Spill
BYPASS1	11,980	4,321	84	99%	0	0	78	0	0	6[2]
BYPASS4	33	33	27	18%	0	0	27	0	0	0
BYPASS2	3,470	3	0	100%	0	0	0	0	0	0
BYPASS3	11,065	4,151	152	99%	0	0	143	9	0	0
BYPASS5	30	30	0	100%	0	0	0	0	0	0
PHOUSE1	23,786	7,572	3,778	84%	3,083	62	368	1	0	370[3]
LADDER1	115	15	0	100%	0	0	0	0	0	0
CEDARS1	124	15	0	100%	0	0	0	0	0	0
NEWCG1	106	12	0	100%	0	0	0	0	0	0

1 Diablo Spill during track rack repairs identified as January 24, 2022 through April 16, 2022.
2 Exceedances do not correlate to known causes of elevated TDG.
3 Gate height at USGS Newhalem Gage were near but not below point where compensation depth was not reached, or exceedances do not correlate to known causes of elevated TDG.

Within Gorge Lake, data collected to date suggest that effects of the air admission system operating on the Diablo turbines may cause exceedances in the immediate area, as measured at the GORGE3 monitoring site at Reflector Bar approximately 550 feet away. However, in contrast to spill at Diablo Dam, elevated TDG resulting from air admission was not observed down-reservoir at the Gorge Dam forebay (GORGE4, approximately 4.5 miles downstream) or downstream of Gorge Powerhouse (PHOUSE1, approximately 7.4 miles downstream; Tables 3-1 and 3-2). Spill-generated gas, such as during the extended unscheduled plant outage for emergency repairs that began in late January 2022 at Diablo Dam, caused elevated TDG at both the upper Gorge Lake and Gorge Dam forebay monitoring locations as well as at the Gorge Powerhouse. Levels dropped quickly when the Diablo Powerhouse resumed operation and spill ceased in mid-April 2022.

Monitoring conducted by City Light also documented spill-related TDG exceedances in the Gorge Reach as a result of spill at Gorge Dam (Tables 3-1 and 3-2). TDG values at BYPASS1 (uppermost site at the Gorge Dam plunge pool) reached 124 percent saturation during the approximately 7,300 cfs spill event at Gorge Dam in late June 2021. TDG levels at PHOUSE1 exceeded 110 percent during periods when spill occurred at both Diablo and Gorge Dams while TDG remained below 110 percent when spill occurred only at Gorge Dam.

To evaluate the extent of elevated TDG downstream of Gorge Powerhouse, City Light conducted episodic monitoring during spill events downstream of Gorge Dam at five locations: BYPASS4, BYPASS5, LADDER1, CEDARS1, NEWCG1. TDG exceeded 110 percent saturation at the Gorge Dam Access Bridge (BYPASS4) in July 2022 during a spill of 5,400 cfs but remained below 110 percent saturation in the Skagit River downstream of Gorge Powerhouse (LADDER1 and CEDARS1) during this same event.

3.3 Uncertainties and Data Needs

As shown in Table 3-1 and described above, sampling at limited locations within the Project Area has documented TDG exceedances of Ecology's numeric criteria during spill events at Project Dams, during operation of the turbine air admission system at Diablo powerhouse, during emergency events, and on more limited occasions during routine spill at Diablo Dam. Based on the limited sampling area and anticipated changes to Project operations under a new FERC license (described in Section 2.2), City Light is proposing sampling sites that will expand the sample area, target areas of previous exceedances, target additional areas where spills may be expected, collect TDG data relating to new flows in the Gorge Reach, and collect TDG data at appropriate locations across the range of expected flows in order to characterize baseline conditions.

These data would then inform an assessment of whether TDG exceedances over numeric criteria occur under the new FERC license.

4.0 MONITORING PLAN

4.1 TDG Monitoring to Establish Baseline Conditions

4.1.1 Monitoring Locations

In order to establish baseline conditions under the flow regime of the new FERC license, TDG will be monitored at the nine locations presented in Table 4-1 and Figure 4-1. These locations are positioned in well-mixed locations where the appropriate compensation depth for monitoring can be achieved with minimal turbulence, per Ecology guidance. They also provide a suitable longitudinal (i.e., upstream to downstream) assessment of TDG conditions through the Project, and are safely accessible for deployment during spill conditions.

Table 4-1. Total Dissolved Gas Monitoring Study sampling sites and purpose by location (sites ordered upstream to downstream).

Location	Sample Identification	Approximate Lat./Lon.	Purpose
Diablo Lake			
Upstream end near Ferry Landing	FERRY	48.72352/ -121.07220	Short-term continuous monitoring before, during, and after spill events
Diablo Dam Forebay	DIABLO2	48.71489/ -121.13171	Short-term continuous monitoring before, during, and after spill events
Gorge Lake			
Below the Diablo Powerhouse Outflow upstream from Stetattle	GORGE8	48.71656/ -121.14688	Short-term continuous monitoring before, during, and after spill events; Diablo Powerhouse assessment
Gorge Dam Forebay	GORGE4	48.69777/ -121.20672	Short-term continuous monitoring before, during, and after spill events
Gorge Reach			
Gorge Dam access bridge	BYPASS4	48.6966169/ -121.2131147	Short-term continuous monitoring before, during, and after spill events
≈ 0.6 miles above Gorge Powerhouse	BYPASS3	48.68415/ -121.24216	Short-term continuous monitoring before, during, and after spill events
Skagit River Downstream of Gorge Powerhouse			
Bridge to Trail of the Cedars	CEDARS1	48.67153/ -12124600	Continuous baseline monitoring, including during spill events
Bridge at Newhalem Campground	NEWCG1	48.67238/ -12126104	Short-term continuous monitoring before, during, and after spill events greater than 10,000 cfs

Location	Sample Identification	Approximate Lat./Lon.	Purpose
PRM 85.9	SKAGIT3	48.60422/ -121.35973	Short-term continuous monitoring before, during, and after spill events greater than 10,000 cfs

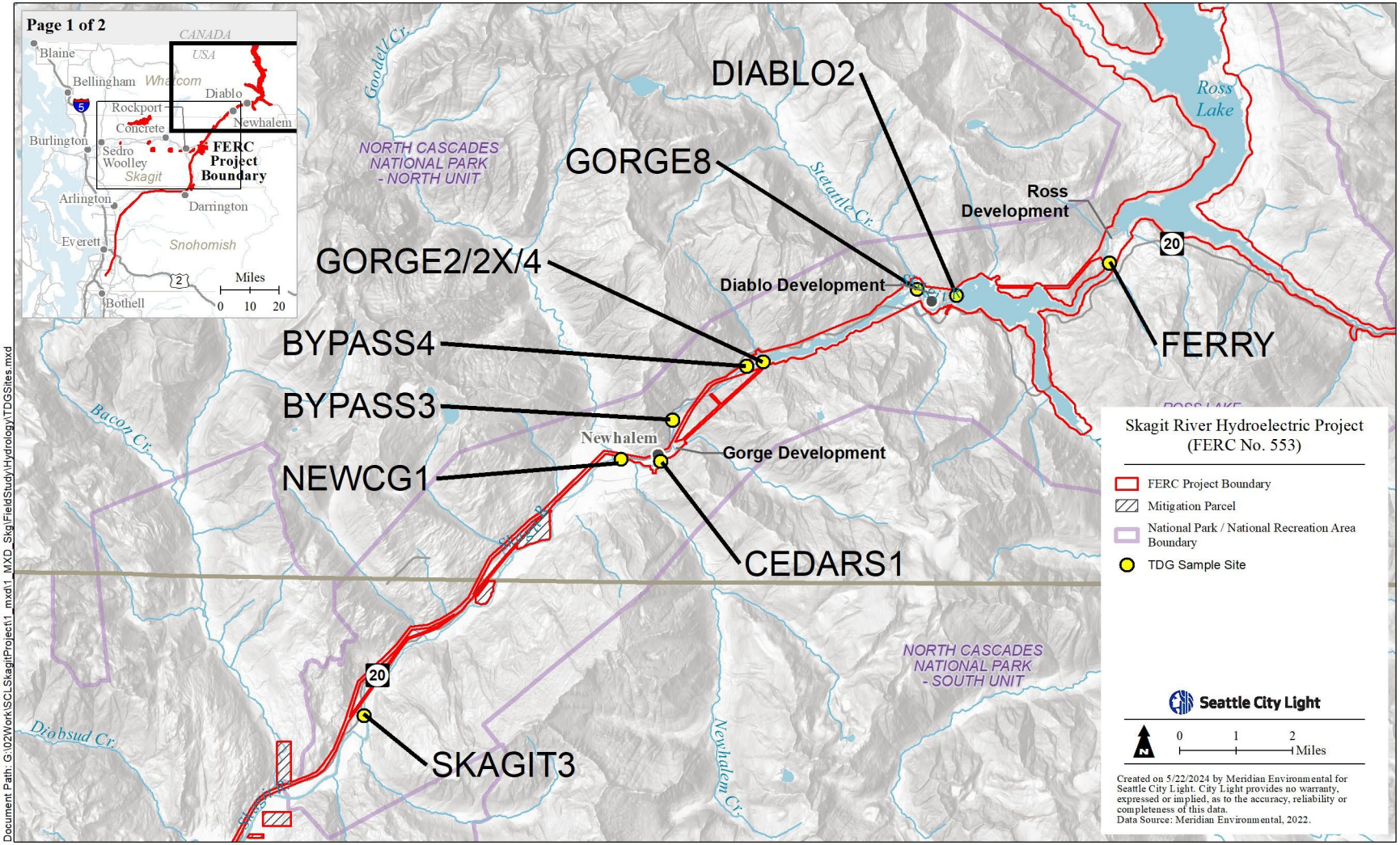

Figure 4-1. Map of proposed total dissolved gas monitoring locations in the Skagit River.

4.1.2 Duration and Frequency

Continuous Monitoring

To monitor baseline conditions downstream of the Project, TDG (percent saturation) will be measured continuously below the compensation depth[7] at 30-minute intervals using a Hydrolab® multiparameter sonde or equivalent equipment. Measurements will be made at the Bridge to Trail of the Cedars (CEDARS1), located near the USGS Newhalem Gage (USGS 12178000). Monitoring deployments will center around the anticipated spill season during the implementation of the new FERC license flow regime in order to capture all flow conditions. Channel maintenance flows will be released at a frequency of between 2 and 5 years, therefore all flow conditions at the USGS Newhalem Gage will be captured within a maximum of 5 years of monitoring. Sampling continuously at CEDARS1 will allow for the opportunistic measurement of TDG under spill conditions as they occur.

Spill Events at Diablo and Ross

For all locations in Diablo and Gorge Lakes, TDG monitoring will include opportunistic short-term continuous deployment of a Hydrolab® multiparameter sonde or equivalent equipment to measure TDG continuously (15-minute interval) when TDG may be elevated during spill at Project facilities. City Light will attempt to forecast periods when spill is anticipated at each dam and deploy instrumentation accordingly. When possible, data sondes will be deployed two days prior to the spill event and continue to monitor until two days after the spill event to capture TDG during baseline, spill, and down-ramping conditions.

Spills over Ross Dam are rare, so measurements may be infrequent. TDG will be monitored at FERRY and DIABLO2 when spill events are greater than or equal to 1,000 cfs.

Diablo Dam spills more frequently than Ross Dam and can occur any time inflow to the reservoir exceeds plant capacity, typically during periods of high runoff. City Light will monitor TDG at GORGE8 and GORGE4 during a minimum of one spill event each with an average flow of less than 1,000 cfs (low), 1,000 to 2,000 cfs (medium), and greater than 2,000 cfs (high) (Table 4-2). Monitoring during down-ramping of medium and high flow spill events will also include a characterization of TDG at lower spill volumes. Spills at Diablo Dam with volumes greater than 2,000 cfs are infrequent.

Table 4-2. TDG monitoring locations during Diablo Dam spill events.

Spill Volume	Monitoring Locations	Number of Monitoring Events	Monitoring Frequency
≤1,000	GORGE8, GORGE4	3	Once, and during down-ramping of two monitored spill volumes > 1,000 cfs (1,001-2,000, >2,000)
1,001 - 2,000	GORGE8, GORGE4	2	Once, and during down-ramping of one monitored spill volume > 2,000 cfs

[7] The depth at which the sum of hydrostatic and atmospheric pressure exceeds the gas pressure of TDG-supersaturated water.

Spill Volume	Monitoring Locations	Number of Monitoring Events	Monitoring Frequency
>2,000	GORGE8, GORGE4	1	Once

Air Admission System at Diablo

In addition to baseline and monitoring during spill events, TDG will be monitored at GORGE8 downstream of Diablo Powerhouse outflow when operators project that Diablo Powerhouse will be generating at low levels and the air admission system will be engaged. The air admission system has led to localized TDG exceedances closer to the Diablo Powerhouse (GORGE1). This new monitoring location is slightly downstream, fully outside of the area of powerhouse turbulence, with access to deeper water to achieve monitoring outside the depth of compensation. City Light will attempt to forecast periods when low flow/generation is likely and deploy instrumentation accordingly. TDG monitoring will include an opportunistic short-term deployment of a Hydrolab® multiparameter sonde or equivalent equipment to measure TDG continuously (15-minute interval) for a period of seven days, to capture both the low flow/generation event(s), and baseline conditions surrounding the event(s) (Table 4-3).

Table 4-3. TDG monitoring location during Diablo Powerhouse operational event.

Operational Condition	Monitoring Locations	Monitoring Duration
Period of low generation at Diablo Powerhouse with air admission system engaged	GORGE8	7 days

Spill Events at Gorge

In order to capture the full range of spill events at Gorge Dam, City Light will monitor TDG at BYPASS4 and BYPASS3 during a minimum of one spill event during each range of spill volumes presented in Table 4-4. Approximately 90 percent of spill events at Gorge Dam are less than 6,000 cfs (Figure 2-2). Monitoring during relicensing found that spills less than 3,000 cfs did not cause elevated TDG levels, and no specific monitoring of these low volume spills (less than 3,000 cfs) is proposed; however, low volume spills will be monitored during down-ramping of larger spill events. Less than 5 percent of spill events at Gorge Dam are greater than 10,000 cfs (Figure 2-2). During spill events with volumes greater than 10,000 cfs, City Light will also monitor TDG at NEWCG1 and SKAGIT3 to assess the downstream extent of potentially elevated TDG levels. Monitoring during down-ramping of spill events will also include a characterization of TDG at lower spill volumes.

As proposed in the REP, City Light will provide channel maintenance flows no less than once every five years and no more than once every two years, so all flow conditions will be captured within a maximum of 5 years of monitoring. Monitoring may be completed in less than 5 years if all flow conditions have been met.

Table 4-4. TDG monitoring locations during Gorge Dam spill events.

Spill Volume	Monitoring Locations	Number of Monitoring Events	Monitoring Frequency
≤3,000	BYPASS4, BYPASS3, CEDARS1	5	During down-ramping of five monitored spill volumes > 3,000 cfs (3,001-6,000, 6,001-10,000, 10,001-15,000, 15,001-7Q10, >7Q10)
3,001 - 6,000	BYPASS4, BYPASS3, CEDARS1	5	Once, and during down-ramping of four monitored spill volumes > 6,000 cfs (6,001-10,000, 10,001-15,000, 15,001-7Q10, >7Q10)
6,001 - 10,000	BYPASS4, BYPASS3, CEDARS1	4	Once, and during down-ramping of three monitored spill volumes > 10,000 cfs (10,001-15,000, 15,001-7Q10, >7Q10)
10,001-15,000	BYPASS4, BYPASS3, CEDARS1,NEWCG1, SKAGIT3	3	Once, and during down-ramping of two monitored spill volumes > 15,000 cfs (15,001-7Q10, >7Q10)
15,001-7Q10	BYPASS4, BYPASS3, CEDARS1, NEWCG1, SKAGIT3	2	Once, and during down-ramping of one monitored spill volume > 7Q10
>7Q10	BYPASS4, BYPASS3, CEDARS1, NEWCG1, SKAGIT3	1	Once

4.2 Preliminary Compliance Schedule and Development of a Water Quality Attainment Plan

4.2.1 Compliance Measures

In addition to monitoring baseline conditions under the new FERC license flow regime, City Light also will concurrently assess Project operations in order to identify potential reasonable and feasible actions to reduce TDG towards meeting numeric criteria, if necessary. During the monitoring term, City Light will investigate modifications to operations to reduce TDG. As a part of the analysis of operational conditions when elevated TDG levels are observed, additional evaluation may include:

- An evaluation of generation data, including hydraulic and turbine configuration, to clarify City Light operations during periods of elevated TDG. This data may be used to identify operations that may be modified to reduce TDG, such as limiting the time period generating at TDG-producing levels, and prioritization of turbines if one is found to generate higher levels of TDG.

- An assessment of air intake operations to better understand whether routine turbine air admission causes exceedances over numeric criteria, and if so, under what conditions such exceedances occur. If the TDG levels within Gorge Lake indicate exceedances, these data may be used to help identify opportunities to optimize air admission operations to minimize periods of elevated TDG within the Diablo tailrace and within Gorge Lake.

- A review of spill gate operations at Diablo and Gorge Dams to evaluate impacts of spill gate volume, sequence, and other operational considerations on TDG generation during spill. The assessment of actions to reduce spill-produced TDG may include an increase in the volume of water that is run through the powerhouses and penstocks at both facilities, thereby reducing the quantity and frequency of spills at those locations. This increased volume would be dependent on City Light obtaining additional non-consumptive water rights necessary to divert such water through the powerhouses and penstocks.

4.2.2 Compliance Schedule and Development of Attainment Plan

Implementation of the TDG Monitoring Plan and Compliance Schedule will begin upon license issuance (the start of Year 1 of new FERC license), in conjunction with the Skagit River WQMDMP, and continue until all flow conditions identified in Section 4.1 have been captured in order to evaluate if elevated TDG levels persist under the new license operational proposal, and with consideration for appropriate monitoring locations identified in collaboration with Ecology.

- Year 1: City Light will submit an attainment plan for Ecology's approval in accordance with WAC 173-201A-510(5) within one year of license issuance to address instances where TDG conditions exceed numeric water quality standards. The attainment plan will identify next steps, including on-going implementation of the monitoring identified in this plan and the implementation of reasonable and feasible actions in order to achieve Project compliance.

  The attainment plan will also include a discussion of the following:

  1. Areas were TDG issues were observed during the monitoring period for the relicensing water quality study;

  2. Areas where City Light and Ecology may need to consider adjusting the monitoring locations moving forward to confirm whether elevated TDG is an issue; and

  3. Areas that lack sufficient data to characterize TDG conditions.

- Year 1-5: The monitoring program identified herein will require up to 5 years to capture identified flows, and may be complete within 2 years if all proposed flow conditions are met. During this monitoring term, City Light will investigate and implement interim and intermediate actions as listed above in order to explore options to reduce TDG, subject to Ecology's approval of the attainment plan. City Light will submit annual monitoring progress reports to Ecology.

- Year 6[8]: At the end of the monitoring period, City Light will conduct an assessment of the TDG production trends at the Project to present baseline conditions and will provide a final report to Ecology. This report will characterize baseline conditions under the new license and summarize effectiveness of interim compliance measures identified in Section 4.2.1. If monitoring results show TDG exceeds the 110 percent criterion, then City Light will report these exceedances and submit an evaluation of options for future actions to address TDG exceedances as a part of the Attainment Plan, and in consultation with Ecology.

4.3 Monitoring Methods

Methods for data collection, handling, and analysis will be in accordance with Ecology's Standard Operating Procedures (SOP; SOP EAP002, EAP129, and EAP130). A detailed monitoring plan will be included with the Skagit River Water Quality Monitoring and Data Management Plan (WQMDMP) and submitted as part of the application for Section 401 certification. Data collection will abide by an Ecology-approved Quality Assurance Project Plan (QAPP).

The field sampler will maintain a field notebook and will note relevant conditions during each sampling event on the field data sheet. At a minimum, the following information pertaining to each sample will be recorded: date, time, name(s) of people collecting samples, units of measurements, depth, Global Positioning System (GPS) coordinates for the sample site, and river flow volume.

The field measurement equipment that will be used during this Project includes the following (or a suitable equivalent):

- Multi-parameter water quality sondes (e.g., Hydrolab® DataSonde 5) will be used to measure TDG.

- Barometric pressure data loggers (e.g., Onset Barometric Pressure Sensor) will be used to measure continuous barometric pressure for calculation of percent saturation.

Multi-parameter water quality sondes will be calibrated, deployed, and post-checked consistent with Ecology SOP EAP002 and EAP129 (Appendix A). Sondes will be used for continuous and unattended data collection, deployed in a protective housing that will minimize risk of vandalism or theft. Sondes will be deployed below the applicable compensation depths. Data will be downloaded and post-processed consistent with Ecology SOP EAP130 (Appendix A).

4.4 Quality Assurance and Data Management

4.4.1 Quality Assurance

Data quality objectives (DQO) are a set of performance or acceptance criteria that the collected data should achieve to minimize the possibility of either making a decision error or failing to keep uncertainty in estimates to within acceptable levels. DQOs are defined in terms of five parameters: precision, accuracy, representativeness, completeness, and comparability. DQOs for monitoring TDG are presented in Tables 4-5 and 4-6.

[8] If all proposed flows have been captured prior to Year 6, this step will proceed on an earlier schedule.

Table 4-5. Data quality objectives for total dissolved gas.

Precision	Accuracy	Representativeness	Completeness	Comparability
Successive measurements are within precision limits	Within accuracy limits compared to a calibrated meter	Sample locations, sampling frequency and analytical methods follow study plan	90%	Sensor range includes expected range of conditions in the study area

Table 4-6. Field measurement methods and quality objectives for total dissolved gas.

Unit	Method	Range	Accuracy	Precision
% saturation	SM 2810B	100-140	1% or 5-mm Hg	1% or 5 mmHg

4.4.2 Data Management

City Light has developed a database to store and manage information collected by it and other entities within and outside (e.g., already established thermistor chains in reservoir forebays) the relicensing process. This tool, which has the capacity to be expanded to accommodate large datasets for a range or variables, will be used during the new license term to house, query, analyze, and report on water quality data and support adaptive management (see below). City Light will establish a user portal, through which other parties will be able to access data files after data are screened for quality assurance.

The database currently in use, and to be used during implementation of the new license requirements, already contains more than 1,000 files housing data collected by City Light and its contractors, as well as the National Park Service (NPS) and USGS, between 2001 and 2022. Data are organized by waterbody (i.e., Ross Lake, Diablo Lake, Gorge Lake, and the Skagit River), with data from tributaries grouped with their downstream waterbodies (e.g., data from Thunder Creek, a tributary to Diablo Lake, can be accessed by specifying Diablo Lake as the primary waterbody). Once a waterbody is selected, the user can access data for a site or sites within the water body, select start and end dates of interest, and preview the first 20 records from a specified search before downloading data. Downloaded results generate a newly created .csv file that contains data that conform to the search parameters.

4.5 Reporting

City Light anticipates that water quality data will be downloaded/entered into a publicly available database on a quarterly basis. Written reports will be provided to Ecology and filed with FERC annually during the first quarter of each year to document implementation of the WQMDMP and the TDG Monitoring Plan and Compliance Schedule. The annual reports will summarize monitoring results from the preceding year.

At the end of the monitoring period, City Light will conduct an assessment of the TDG production trends at the Project to present baseline conditions. Once baseline conditions have been characterized, City Light will work with Ecology on next steps.

5.0 REFERENCES

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_____. 2023c. Final License Application for the Skagit River Hydroelectric Project, FERC Project No. 553: Exhibit E, Environmental Analysis. April 2023

ATTACHMENT A

7Q10 CALCULATION MEMO

ATTACHMENT A - 7Q10 CALCULATION MEMO

Technical Memorandum

Date:	October 2024
Project:	Skagit River Hydroelectric Project
To:	Seattle City Light
From:	HDR
Subject:	**Skagit River 7Q10 Analysis**

Purpose and Background

Under WAC 173-201A-200, total dissolved gas (TDG) shall not exceed 110 percent of saturation. This TDG criteria does not apply when the stream flow exceeds the 7Q10. HDR Engineering, Inc. conducted an analysis to evaluate flow statistics of the Skagit River at the USGS gage 12178000 Skagit River at Newhalem, WA (Skagit River at Newhalem USGS gage) in order to identify the seven-day, 10-year frequency flood (7Q10) flow for the Project. This memo provides a statistical analysis of the annual peak 7-day average flow of the USGS gage 12178000 and basis for calculation of the 7Q10 flow for a period of record (POR) from 1961 through 2023 in order to support TDG compliance assessments in Seattle City Light's new license for the Skagit Hydroelectric Project.

Assessment Approach and Results

The annual peak rolling 7-day average flow was calculated utilizing the daily average reported flow for the Skagit River at Newhalem USGS gage. The flows reported at the Skagit River at Newhalem USGS gage are regulated by the three reservoirs of the Skagit River Hydroelectric Project (Project). The full POR of the flows reported for the Skagit River at Newhalem USGS gage includes daily average stream flow beginning in December 1908, however there are periods of missing data from June 1914 through September 1920 and December 2014 through March 2015.

Following the USGS Bulletin 17C Guidelines (reference 1) for determining flood-flow-frequency, annual peak 7-day average flows were used to calculate the 10-year recurrence interval flow. The 7Q10 statistic is defined as the annual **highest** 7-day average flow with a recurrence interval of ten years, which is the 10th percent chance exceedance value resulting from the Bulletin 17C[9] analysis. For development of peak flow frequency analyses, Bulletin 17C incorporates statistical methods to estimate the Log Pearson Type III distribution using the Expected Moments Algorithm, using an integrated manner to incorporate non-standard or historical data.

For this memo, Bulletin 17C results were produced from inputting the annual peak 7-day

[9] HDR also completed analyses utilizing USGS Bulletin 17B guidelines for comparative purposes; the results were the same. Therefore, this memo only describes the application of USGS Bulletin 17C results, as it incorporates more than 30-years of post-Bulletin 17B research and recommendations.

average flow values into the USACE Hydrologic Engineering Center Statistical Software Package (HEC-SSP) Version 2.3, which applies the Bulletin 17C methodologies to the inputted data. The analysis was run for the POR of 1961 through 2023, representing the period since the Project was fully operational. For the 7Q10 analysis, per the recommended approach in Bulletin 17C the generalized skew was derived by the dataset instead of utilizing a weighted skew or a regional skew estimate.

The HEC-SSP Bulletin 17C flood-flow-frequency analyses using the flows reported at the Skagit River at Newhalem USGS gage for the POR of 1961 through 2023 resulted in a 7Q10 flow of 18,261 cfs. Figure 1 provides a ranking of the annual peak 7-day-average flow for the Skagit River at Newhalem USGS gage records. To provide confidence bands for comparative purposes, Figure 2 provides the median, 10-percentile, and 90-percentile values for the respective calendar days of the Skagit River at Newhalem USGS gage 7-day average flow.

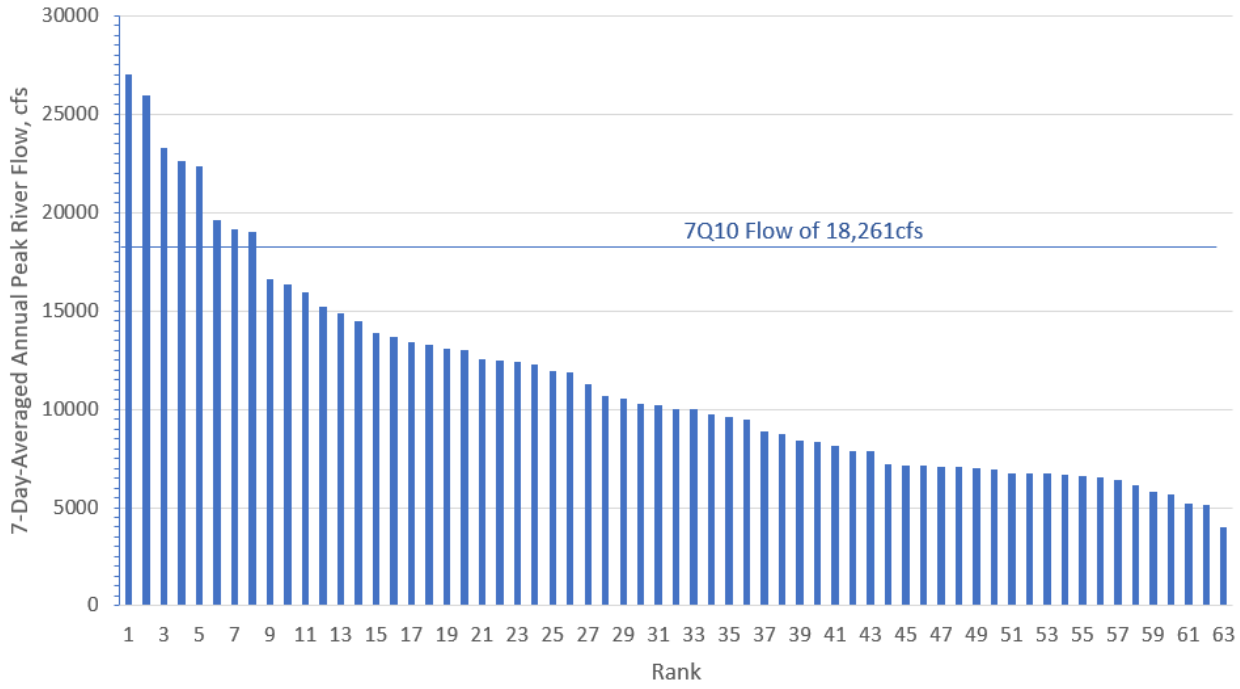

Figure 1. USGS 12178000 Annual Peak 7-Day Average Flow Rank (POR 1961-2023).

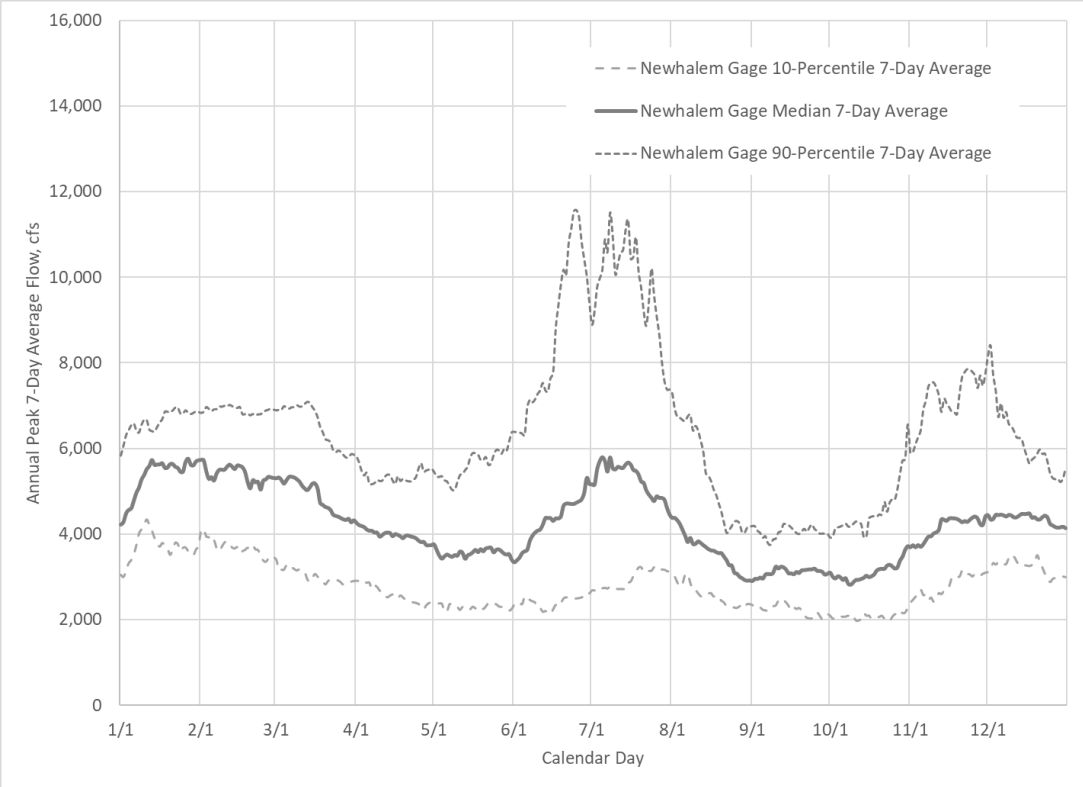

Figure 2. USGS 12178000 Annual Peak 7-Day Average Statistics Summary (POR 1961-2023).

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WILDLIFE PROTECTION AND ENHANCEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

November 2025

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List of Acronyms and Abbreviations

BACI .....before-and-after-control-impact
BAS .....best available science
BMP .....best management practice
City Light .....Seattle City Light
ESA .....Endangered Species Act
FERC .....Federal Energy Regulatory Commission
GIS .....Geographic Information System
MU .....Management Unit
NPS .....National Park Service
O&M .....operations and maintenance
PHS .....Priority Habitats and Species
Project .....Skagit River Hydroelectric Project
REP .....Riverscape Ecosystem Plan
ROW .....right-of-way
SLIC .....Skagit License Implementation Committee
SWAP .....State Wildlife Action Plan
USFS .....U.S Forest Service
USFWS .....U.S. Fish and Wildlife Service
WDFW .....Washington Department of Fish and Wildlife
WSDOT .....Washington State Department of Transportation

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Wildlife Protection and Enhancement Plan (Wildlife Plan) for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) Project No. 553. This Wildlife Plan provides guidance for the management of wildlife species and habitats within the Project Boundary. The goal of this Wildlife Plan is to protect and enhance terrestrial wildlife species and their habitats, and to minimize effects of Project operations and maintenance (O&M), new construction, and visitor use. Information obtained through the implementation of the Wildlife Plan will be used to inform decision-making regarding wildlife and wildlife habitats in an adaptive management context.

City Light will coordinate the efforts required under this Wildlife Plan with other license article obligations, including other Project resource management plans and measures included in the new license. This coordination will ensure actions associated with this Wildlife Plan are fundamentally consistent with the goals and objectives of the other management plans highlighted below. This Wildlife Plan is fundamentally interconnected with City Light's other management plans and measures, including:

- Avian Species Management Plan;
- Fish and Wildlife Mitigation Lands Management Plan;
- Historic Properties Management Plan;
- Invasive Plants Management Plan;
- Reservoir Erosion Management and Monitoring Plan;
- Riverscape Ecosystem Plan (REP);
- Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan;
- Wetland Enhancement Measures; and
- Vegetation Management Plan.

2.0 PURPOSE AND SCOPE OF THE PLAN

This Wildlife Plan provides best management practices (BMPs) and procedures to avoid, mitigate, and minimize impacts of Project O&M, construction, and visitor use on wildlife resources, and actions to enhance wildlife habitat at select locations. This Wildlife Plan is subject to annual reporting and periodic five (5) year review and updates in consultation with the Skagit License Implementation Committee (SLIC)[1].

2.1 Goals and Objectives

This section presents goals and objectives for protecting wildlife species and protecting or enhancing wildlife habitat impacted by the Project. The primary goals of this Wildlife Plan are as follows:

- **Goal** – Protect and enhance terrestrial wildlife and their habitats in the ecosystem, and avoid, mitigate, and/or minimize impacts of Project O&M, construction (including ground disturbance activities), and visitor use on non-avian[2] wildlife resources, including wildlife behavior and habitat connectivity.
  - Objective – Eliminate wildlife attractants in visitor use areas, townsites, at powerhouses, dams and other infrastructure, and work sites throughout the Project Boundary.
  - Objective – Integrate best available science (BAS) per the Governance Document for the Skagit License Implementation Committee and Work Groups and follow BMPs for Project O&M activities and new construction projects to minimize wildlife disturbance and habitat modification.
  - Objective – Monitor select wildlife species of management concern in specific areas close to existing or proposed new facilities and associated Project O&M to assess effects on wildlife movement/habitat connectivity and to inform adaptive protection actions. Implement further actions on existing wildlife mitigation, and if applicable, any wildlife mitigation lands purchased in the future to further promote or improve wildlife movement/habitat connectivity.
  - Objective – Develop and implement a wildlife reporting program to document sightings of species of management concern (including early detection of non-native wildlife species such as bullfrogs) and track all wildlife mortalities documented within the Project Boundary.
  - Objective – Provide wildlife occurrence and habitat requirement information to inform City Light's Vegetation Management Plan and other management actions (e.g., reservoir operations, shoreline improvements, wetland enhancements, etc.) to protect or enhance habitat for wildlife.

[1] The SLIC includes entities that will consult regarding implementation and monitoring of this Wildlife Protection and Enhancement Plan and contribute to adaptive management decisions.

[2] Avian species and habitats are addressed in City Light's Avian Species Management Plan.

- **Goal** – Comply with Endangered Species Act (ESA), and other regulatory requirements of the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the Washington Department of Fish and Wildlife (WDFW).
  - Objective – Implement BMPs to minimize effects on listed at-risk wildlife species and their habitats.
  - Objective – As necessary, conduct assessments for new construction projects.
- **Goal** – Maintain or enhance habitat and populations of non-avian wildlife species of management concern to agencies, Indian Tribes, and Canadian First Nations.
  - Objective – Monitor amphibian populations at identified areas (e.g., spotted frogs and western toads at Ross Lake and on fish and wildlife mitigation lands) to track indices of use and to detect invasion by invasive wildlife species.
  - Objective – Incorporate wildlife considerations into shoreline erosion, wetland, woody debris management, and littoral habitat management actions outlined in City Light's other management plans and measures.
  - Objective – Monitor wildlife use in areas treated for habitat enhancement through City Light's efforts outlined in other measures.
  - Objective – Implement wildlife habitat enhancements[3] by identifying target wildlife habitat to increase, maintain, or rehabilitate in the transmission line right-of-way (ROW) and other areas where City Light manages vegetation. At select habitat management areas, document pre- and post-implementation wildlife habitat conditions and species of management focus use levels.
- **Goal** – Consult with the SLIC at regular intervals to provide implementation updates, share data, and collaboratively update adaptive management strategies.

This Wildlife Plan will include BMPs consistent with implementation of City Light's HPMP to avoid, minimize, or mitigate adverse effects to historic properties as required by the National Historic Preservation Act.

2.2 Geographic Area

The geographic scope of this Wildlife Plan is the area within the Project Boundary except for the Project's fish and wildlife mitigation lands, which will be managed pursuant to City Light's Fish and Wildlife Mitigation Lands Management Plan.

2.3 Species Addressed

This Wildlife Plan will cover all non-avian species of wildlife and will be coordinated closely with City Light's Avian Species Management Plan. While all species are included in the protections of this Wildlife Plan, a focus will be on the wildlife species of management concern that are known to occur or have the potential to occur in the Project Boundary, and for which data collection, monitoring, and habitat enhancement may be performed. City Light will update this list every year

[3] Implementation of vegetation management is addressed in City Light's Vegetation Management Plan.

based on review of updated agency species lists, information on species occurrence in the Project Boundary, and consultation with the SLIC. Wildlife species of management concern may include:

- **ESA Federally Listed or Proposed Species** – Species that are listed and protected under the ESA of 1973, as endangered or threatened, or are proposed for listing.
- **ESA Candidate Species** – Species that the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation has not occurred because of other higher priority listing activities. Candidate species receive no statutory protection under the ESA. However, the USFWS encourages the formation of partnerships to conserve these species.
- **WDFW Priority Habitats and Species (PHS)** – Species that are priorities for conservation and management. These include state-listed endangered, threatened, sensitive,[4] or candidate species and species most in need of conservation action as reported in the State Wildlife Action Plan (SWAP; WDFW 2015) as Species of Greatest Conservation Need. SWAP species include species that are: experiencing threats to their life history needs or habitats; few or low in abundance or distribution; or currently not rare but showing declines in abundance or habitat. The PHS list also includes vulnerable species habitats (e.g., heron rookeries and bat colonies) and vulnerable species of recreational, commercial, or Tribal importance and priority habitat features (e.g., areas with high snag densities, riparian areas, wetlands, caves, springs and seeps, balds, old-growth and mature forests).
- **U.S. Forest Service (USFS) Sensitive Species** – Species on the Regional Forester's List of Sensitive Species for the Mt. Baker – Snoqualmie National Forest (USFS 2004). The Regional Forester's List does not include species already protected under the ESA.
- **National Park Service (NPS) Management Priority Species** – Species that are categorized as "species that warrant particular management attention as determined by park management staff." Select species from this extensive list are included as species of management concern, as advised in collaboration with NPS staff. Fourteen wildlife species of management concern documented are likely to occur or have potentially suitable habitat in the Project Boundary.
- **Culturally Important Species** – Species of particular importance to Indian Tribes and Canadian First Nations. This includes ungulates such as black-tailed deer (*Odocoileus hemionus columbianus*), mountain goat (*Oreamnos americanus*), elk (*Cervus canadensis*), and moose (*Alces alces*), forest carnivores (e.g., fisher, wolverine, pine marten, gray wolf, black and grizzly bear); and other species indicated by the Indian Tribes and Canadian First Nations during plan implementation.

[4] State endangered species include "a species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state." State threatened species include any "species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats." State sensitive species are defined as "a species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or removal of threats" (WDFW 20 21).

3.0 PLAN IMPLEMENTATION

Upon approval by FERC, this Wildlife Plan will be implemented in consultation with the SLIC. Collaboration with agencies, Indian Tribes and Canadian First Nations, non-governmental organizations, landowners or managers, or other groups will be included for specific efforts, as appropriate.

Review of implementation effectiveness will be reported to the SLIC annually and formal reports will be submitted to FERC every five (5) years. Additionally, changes will be incorporated to adapt management actions if new data indicate change is necessary. Implementation of this Wildlife Plan will include:

- Collect data regarding locations of wildlife use, habitat connectivity, locations for enhancement of habitat connectivity, and wildlife mortalities;
- Implement protective measures outlined in Section 3.3 of this Wildlife Plan, including the use of appropriate BMPs;
- In concert with City Light's Vegetation Management Plan, inform City Light vegetation management crews of BMPs and techniques to increase, maintain, or rehabilitate the quantity, quality, and diversity of wildlife habitat through treatments at select locations; and
- Conduct annual reporting activities and consultation with the SLIC.

This Wildlife Plan will be implemented in conjunction with City Light's other management plans and measures for the new license. Due to the interconnectedness of ecosystems, resources cannot fully be separated for management actions, and as a result, wildlife habitat will be addressed through restoration[5] or rehabilitations identified in other resource plans and measures. Habitat enhancement measures[6] will largely be performed through City Light's Vegetation Management Plan and Invasive Plants Management Plan, but also through stream crossing and instream habitat measures in the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan and the REP, although all management plans contribute to protecting or enhancing ecosystem values and habitats.

3.1 Habitat Connectivity

City Light will perform Geographic Information System (GIS) habitat analyses to identify habitat connectivity, potential movement barriers or risks to wildlife (particularly near Project infrastructure or proposed new Project facilities), and locations where City Light actions can enhance habitat connectivity within the Project Boundary. Current habitat connectivity will be assessed through GIS assessment of upland, wetland and riparian vegetation mapping (TR-01 Vegetation Mapping Study [City Light 2023a] and TR-02 Wetland Assessment [2023b]); Habitat Connectivity Analysis (Washington Connectivity Habitat Working Group 2023) data; known

[5] City Light recognizes four major categories of activities along the restorative continuum: 1) reduced impacts; 2) remediation; 3) rehabilitation, and; 4) ecological restoration (Nelson et al. 2024). City Light prioritizes and designs management actions to gain the greatest native ecosystem repair or recovery based on continued land-use, location and other constraints.

[6] Additional and separate protection and enhancement measures will be performed at select mitigation land properties through the Fish and Wildlife Mitigation Lands Plan.

stream crossing barriers (e.g., limiting amphibian movement); assessments in GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study Report (City Light 2023c); and available information from Washington State Department of Transportation (WSDOT), NPS, Indian Tribes, and Canadian First Nations.

City Light will complement the GIS habitat analyses by collecting baseline ungulate and forest carnivore occurrence in suitable habitat near select Project facilities within the Project Boundary using camera traps and bat echolocation detectors. The protocol and design of the camera trap program will be determined through consultation with the SLIC. Assessment results, potential enhancements, monitoring locations, and adaptive management decisions will also be determined through consultation with the SLIC.

3.2 Wildlife Observations

City Light will opportunistically record and report observations of species of management concern and wildlife mortalities within the Project Boundary. Data will be tracked via a GIS database that will provide a platform for City Light staff to report sightings of live and dead wildlife, and for compilation of monitoring data (e.g., camera trapping). City Light will coordinate with Indian Tribes, land managers, or other groups to develop and implement a protocol to monitor presence and movement of terrestrial wildlife species of management concern in the Project Boundary. City Light may additionally collaborate with other groups on wider ranging projects which may extend beyond the Project Boundary.

City Light will coordinate with NPS, WDFW, and USFWS regarding wildlife carcasses found in the Project Boundary. City Light will either report carcass locations to the agencies for collection or follow established protocols for collection and transfer to the appropriate agency. If a necropsy is performed, results will provide cause of death and inform possible associations with the Project- or visitor-related actions and will support NPS contaminant exposure monitoring. The data collected will be used by City Light to identify opportunities for changes to O&M activities that would protect or enhance wildlife resources.

To track populations of spotted frogs documented at Ross Lake and western toads (*Anaxyrus boreas*) at Ross Lake and on mitigation lands, City Light will develop a protocol to survey and assess habitat conditions at select locations with known occurrences or suitable habitat on a regular basis. Monitoring will also address occurrence of bullfrogs and other lentic habitat amphibian species. This protocol will be developed in consultation with the SLIC and be integrated with evaluations of reservoir operations and shoreline, littoral habitat, and wetland measures.

3.3 Wildlife Protections

3.3.1 Operations and Maintenance

This section includes BMPs for normal Project O&M and compliance with City Light's existing programs to minimize risk of environmental contamination and disturbance to wildlife and their habitats. Routine O&M activities within the Project Boundary include woody debris management on Project reservoirs, vegetation management, road and culvert maintenance, and basic maintenance of infrastructure. While conducting all routine O&M, crews will follow these general BMPs as well as task-specific BMPs described in the following sections. Any updates to best available science and BMPs will be made during adaptive management reviews every five (5)

years over the life of the new license, or as needed and proposed by the SLIC. These BMPs will include, but not be limited to, the following:

- Implement City Light's existing Pesticide Reduction Program (City Light undated), spill prevention, and other environmental compliance and management programs. City Light will continue to use electronic traps, exclusion and repellents only; no anticoagulant rodenticides will be utilized.
- Follow WDFW and NPS management recommendations for proper bat management at Project buildings;
- Implement BMPs that minimize effects of loud Project equipment activities during critical times of year in select sensitive locations (e.g., near deer fawning or elk calving areas in spring and early summer and near ungulate winter range in winter) by timing activities appropriately, and using properly sized equipment and other noise-reduction BMPs in the Project Boundary;
- Implement noise-reduction BMPs when working in proximity to wildlife dens, burrows, rendezvous sites, and known territories, and following appropriate NPS management guidelines for areas within NPS-managed lands (Ransom et al. 2023; Appendix A);
- Inform the application of specific BMPs based on wildlife species and habitat maps, and the O&M activities to be performed;
- Follow BMPs for City Light helicopter and drone flights to reduce disturbance to wildlife, including buffer zones and timing considerations; and
- Additional BMPs as determined through consultation with the SLIC.

3.3.2 City Light Helicopter and Drone Flights

City Light will implement BMPs when conducting periodic helicopter or drone flights necessary to support O&M, construction activities, ecological monitoring, or other activities. The BMPs will incorporate USFWS and WDFW requirements, and City Light will follow NPS requirements on land managed by NPS.[7] While the flight BMPs will primarily address avian species (see City Light's Avian Species Management Plan), they will also include guidance for minimizing adverse effects to mammalian wildlife species (e.g., mountain goats, deer, elk, and forest carnivores). These will include, but not be limited to the following BMPs: maintaining minimum approach distances for individuals observed and distances from known birthing or rearing areas, winter range, escape terrain, hibernation areas, or diurnal resting foraging sites during specified sensitive times of the year (see Ransom et al. 2023; Appendix A for NPS-managed lands).

3.3.3 Operations and Public Access/Recreation

City Light will take proactive measures to reduce impacts of staff and visitor activities related to Project operations, recreation, and miscellaneous public access at City Light facilities, townsites, and transmission line ROW. These actions include:

[7] Such procedures and BMPs will be consistent with FERC's June 27, 2024 Declaratory Order (187 FERC ¶ 61,210 (2024)).

- Reduce wildlife attractants at City Light facilities by using Interagency Grizzly Bear Committee-approved[8] bear-resistant trash cans and dumpsters;
- Identify options for appropriate locations and technologies and install wildlife crossing warning signs along select sections of public roads within the Project Boundary in coordination with NPS, WSDOT, and the Whatcom, Skagit, and Snohomish counties;
- Manage bats at City Light structures utilizing management recommendations from agencies and BAS;
- Explore options to minimize unauthorized motorized vehicle activity on City Light-owned property or in sensitive areas under other ownership within the Project Boundary where City Light has access and landowner cooperation;
- Employee training and visitor education, as described in Section 3.3.6 of this Wildlife Plan; and
- Additional actions or BMPs as determined through consultation with the SLIC.

3.3.4 New Construction

If new Project facilities need to be constructed, or existing facilities require substantial modification, City Light will implement BMPs and conduct an evaluation to minimize adverse wildlife effects in consultation with the SLIC. New construction involves substantial work (e.g., new structures, relocating a tower or section of Project road, significant construction of shoreline habitat treatments, bridges, or major culvert replacements, etc.) that would directly affect wildlife habitat or generate substantial noise for a significant period of time as defined by NPS, USFWS, and WDFW guidance. All new construction projects will be assessed for regulatory compliance (e.g., Endangered Species Act) and will follow permit requirements to avoid or minimize effects. Updates to construction BMPs will be made during adaptive management reviews every five (5) years over the life of the license, or as needed and proposed by the SLIC. For each project, procedures and BMPs include, but are not limited to the following:

- Implement seasonal or daily time restrictions to avoid or minimize disturbance, when possible, including adherence to sensitive time periods and BMPs established by NPS in Ross Lake National Recreation Area (Ransom et al. 2023; Appendix A);
- Minimize vegetation modification and revegetate disturbed areas using native plant species beneficial to wildlife;
- Minimize impacts to wildlife movement corridors using BAS to inform siting of new Project facilities. Site-specific habitat and noise effects assessments would be conducted, as appropriate;
- Assess habitat suitability using BAS, mapped habitat, and siting locations in the proposed Action Area[9] and, if appropriate, conduct pre-construction habitat assessment or specific

[8] The Interagency Grizzly Bear Committee supports recovery and delisting, and ongoing conservation of grizzly bear populations and their habitats in Washington, Montana, Idaho, and Wyoming state through interagency coordination of policy, planning, management, research, and communication (https://igbconline.org).

[9] Action Area includes all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 Code of Federal Regulations § 402.02).

surveys to inform BMPs and determine regulatory requirements for additional survey or reporting; and

- Consult with the SLIC on proposed BMPs at proposed sites to minimize disturbance or impacts to wildlife habitats or species of management concern.

3.3.5 Emergency Situations

Emergency situations are instances where there is imminent risk to human life, including a threat of fire hazard, mechanical failure, or power outage. In the event of an emergency situation, City Light will make efforts to avoid direct effects to wildlife and wildlife habitat and will communicate with appropriate agencies within 14 days if these situations arise that affect wildlife sensitive habitat or affect other resources of concern. Additionally, City Light will coordinate with their Cultural Resource Coordinator as expeditiously as possible.

3.3.6 Training and Visitor Education

City Light will provide employee training and outreach to inform visitors to Project facilities, City Light employees, and contractors on wildlife protection. City Light will develop an internal system for staff to report sightings of special status, uncommon carnivore or ungulate species or observations of dead, injured, or sick wildlife (see Section 3.2 of this Wildlife Plan). City Light will notify NPS, USFWS or WDFW, as appropriate, of any observed sick, injured, or dead wildlife and assist with transporting any carcasses to the NPS for necropsy. City Light will maintain a database of observations of species of management concern and documented wildlife mortalities near Project facilities to inform additional protection measures. When appropriate, City Light will implement proactive and reactive measures to reduce anthropogenic effects to wildlife, including the following:

- Conduct annual trainings for employees and contractors on wildlife conflict reduction and other protection BMPs;
- Coordinate with NPS and USFS to develop and use signage and informational brochures at City Light facilities and recreation sites to educate visitors on practices to minimize effects to wildlife and wildlife habitat (e.g., trash, feeding wildlife, fishing lures, reporting observations);
- Disseminate instructions to staff and visitors for reporting sick or dead wildlife observed in the Project Boundary to appropriate agencies; and
- Follow communication protocol for notifying agencies and protecting visitors when potential wildlife conflict situations (e.g., bear, cougar, other wildlife near townsites or Project facilities) occur.

3.4 Wildlife Habitat Enhancement

Actions to improve ecological functions and increase, maintain, or rehabilitate native terrestrial, riparian and wetland plant communities associated with wildlife habitat will be implemented primarily through City Light's other management plans and measures. Under City Light's Vegetation Management Plan and Invasive Plants Management Plan City Light will implement a combination of programmatic and site-specific actions to reduce invasive weed cover and promote diverse native plant communities, protect Project infrastructure, reduce long-term maintenance needs, enhance aesthetic values, and enhance habitat (North American Electric Reliability

Corporation 2011). Efforts to restore or enhance habitat value may include seeding or replanting with native plant species.

3.4.1 Transmission Line ROW Enhancements

Within the transmission line ROW, City Light's Vegetation Management Plan will apply the "modified wire-border zone"[10] approach and height-zonation to increase shrub and tree height and diversity consistent with safe operation of the transmission lines. This diversification in combination with treatment of invasive plants and replacement with native plants will, over time, diversify wildlife habitat throughout the transmission line ROW.[11] The increased cover by native plant communities compatible with the modified wire-border zone approach, will improve habitat structure for many wildlife species, increase the habitat connectivity with habitats adjacent to the transmission line ROW, increase hiding and security cover for mammalian species, reduce the edge effect,[12] and reduce invasive plant cover. Additionally, adherence to protections within wetland and riparian buffers under City Light's Vegetation Management Plan will benefit an array of wildlife species in addition to improving overall ecological functions.

City Light identified Management Units (MUs) as mapped divisions within the transmission line ROW to define primary management objectives within the constraints of underlying property ownership and adjacent habitats. These units define logical boundaries for ownership type, access, landforms and mix of general habitat types. Within each MU, "patches" of vegetation with similar dominant plant species/structure allow for management prescriptions to focus on the particular plant communities targeted for treatment within the MU. Specific vegetation management prescriptions within MUs will be based on patch characteristics, height-zonation, and management objectives. For each general type of habitat, species groups and possible wildlife indicator species (Table 3.4-1) can be used to inform specific vegetation management prescriptions. Habitat requirements for indicator wildlife species from wildlife habitat suitability index models, and habitat association studies (e.g., herbaceous, shrub, and tree composition, density, cover, height, and tree diameter targets; and snag and log abundance) may be used to inform management prescriptions within the ROW, dependent on interests or permissions of underlying landowner.

Riparian zones within the transmission line ROW will also be affected by implementation of instream habitat measures under City Light's REP. The primary measures will include addressing instream barriers and adding wood to select streams. These actions will increase connectivity for aquatic wildlife and help promote riparian habitat diversity.

[10] The wire zone is the section of the transmission line ROW directly under the wires and extending outward a short distance and is managed to promote a low-growing plant community dominated by graminoids, herbs and small shrubs. The border zone is the remainder of the transmission line ROW, managed to establish tall shrubs. "Modification" to the wire-border zone approach includes the addition of underlying topography and wire height.

[11] Exceptions may include areas where the underlying landowner manages the vegetation within the transmission line ROW rather than City Light.

[12] Edge effects include harsh transitions in vegetation structure and composition and can contribute to habitat fragmentation.

Table 3.4-1. Wildlife species groups and indicator non-avian species potentially associated with general habitat enhancement types within the transmission line ROW.

Habitat Type	Species Group	Possible Indicator Species
Riparian Zone	Lotic amphibians	Pacific Giant Salamander Tailed Frog (high gradient streams)
	Ungulates	Deer Elk
	Aquatic Mammals	Beaver Mink
	Forest Carnivores	Pine Marten Pacific Fisher River Otter Mink Muskrat Racoon
	Bats	Little Brown Bat
Wetland	Lentic Amphibians	Red-Legged Frog Western Toad Spotted Frog Northwestern Salamander Chorus Frog Long-Toed Salamander
	Aquatic Mammals	Mink Beaver
	Bats	All species
Upland Scrub	Ungulates	Deer Elk
	Small Mammals	Voles Mice Snowshoe Hare Squirrels
	Reptiles	Garter Snakes Alligator Lizard
	Forest Carnivores	Coyotes Pine Marten Bobcat
	Bats	Bats
Meadow	Pollinators	Pollinators
	Ungulates	Elk Deer
	Small Mammals	Voles Coyotes Snowshoe Hare
	Reptiles	Garter Snakes Alligator Lizard
Upland Forest	Ungulates	Deer Elk

Habitat Type	Species Group	Possible Indicator Species
	Forest Carnivores	Fisher Cougar Weasels Mink Pine Marten Bobcat
	Small Mammals/Rodents	Townsend's Squirrel Townsends Chipmunk Voles Mice Shrews Snowshoe Hare Mountain Beaver Porcupine
Rocky/Open Areas	Reptiles	Garter Snakes Alligator Lizard
	Small Mammals/Rodents	Hoary Marmot American Pika

3.4.2 Additional Wildlife Habitat Enhancements

Additional projects and vegetation management outside of the transmission line ROW will serve to improve habitats in collaboration with wildlife management goals. These may be directed either through City Light's other measures or agreements, or directly through vegetation management. Enhancements to habitats will be through restoration projects and landscaped areas in townsites, and near visitor and Project facilities, including:

- The removal of invasive trees in Newhalem and the adjacent riparian corridor;
- Replanting following the removal of houses in Diablo; and
- Habitat improvement actions at the mainstem Skagit River, select streams within the transmission line ROW, and wetlands associated with reservoirs.[13]

[13] New proposed reservoir operations may be monitored in relation to changes in wildlife habitat in wetlands at locations which may include Roland, Dry Creek, Big Beaver and near Hozomeen.

4.0 IMPLEMENTATION TIMELINE

City Light will implement this Wildlife Plan upon license issuance. The implementation actions included in this timeline (Table 4.0-1) will document progress towards this Wildlife Plan's goals and objectives. Implementation timelines will be modified as necessary to meet the goals of this Wildlife Plan.

Table 4.0-1. Timeline of Wildlife Plan implementation activities.

Timeline	Activity
Annually	Report to and consult with SLIC (consistent with the SLIC Governance Document) on previous year's activities and monitoring, and planned current and upcoming activities (three year rolling plan (previous year activities, and two year rolling workplan)). Annual work plan activities at locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS in the Implementation Work Plan (including the specific location, timing, and scope of the activities).
	Conduct annual trainings for employees and contractors on wildlife protection BMPs.
	Maintain a database of City Light wildlife study results and incidental observations of species of management concern to inform movement corridor protection.
	Review and update species lists from state and federal agencies.
	City Light will report annually to the SLIC on documented Project-related wildlife mortalities, number of wildlife protection measures implemented, monitoring results during years when data are collected, and other pertinent issues.
Within one (1) year of license issuance	City Light will develop an Implementation Work Plan in consultation with SLIC and with approval from the NPS when actions have the potential to affect NPS lands and waters and from NMFS and/or USFWS for actions that may affect ESA listed species or their habitat. This plan shall include management goals and objectives, priorities, and a schedule.
Within two (2) years following license implementation	Through consultation with the SLIC develop methods, locations, and schedule for monitoring ungulate, forest carnivore, and special status wildlife species occurrence movement in suitable habitats near Project facilities.
	Develop monitoring protocol and locations to monitor special-status amphibian abundance and bullfrog invasions, and amphibian habitats, which may be affected by Project operations in wetlands, littoral and amphibian habitats.
	Through consultation with the SLIC to determine the potential need for and types of data collection on species and number of bats using Project structures.
	Through consultation with the SLIC, complete GIS habitat analyses to identify habitat connectivity, potential movement barriers or risks to wildlife, and locations where City Light actions can enhance habitat connectivity within the Project Boundary.
	Use signage and informational brochures at City Light facilities and recreation sites to educate visitors on practices to minimize effects to wildlife and habitat (e.g., trash, feeding wildlife, fishing lures, reporting observations).

5.0 MONITORING AND REPORTING

5.1 Monitoring Schedule

This section describes the monitoring efforts that will document progress towards this Wildlife Plan's goals and objectives. The goals of monitoring are to determine the effectiveness of protection measures and wildlife habitat enhancement, and to inform adaptive management updates to this Wildlife Plan. Table 5.0-1 provides a general timeline of monitoring activities.

Table 5.0-1. Timeline of Wildlife Plan monitoring activities.

Every five (5) years following license implementation	Implement ungulate, forest carnivore, and select special status wildlife species monitoring, or as otherwise determined through consultation with the SLIC.
	Obtain updated available location data for PHS and SWAP species and NPS Management Priority Species from agencies.
	Monitor special status amphibians at select locations.

5.2 Monitoring Protective Measures

City Light will use monitoring to assess whether wildlife species of management concern are using areas close to existing or proposed new Project facilities in order to determine if connected habitats will need additional protection or enhancement measures. City Light will include the following protection monitoring elements (See Table 4.0-1 for timeline):

- Monitor ungulate, forest carnivore, and select special status wildlife species occurrences and use of habitats near select Project facilities and proposed new Project facilities, and movement patterns in these areas via camera trapping program, eDNA, or other appropriate technologies, and recording incidental observations;
- Record wildlife mortalities within the Project Boundary compiled from staff observations and synthesize with NPS mortality information, including necropsy results that could inform potential Project- and visitor-related effects and need for modifying BMPs;
- Update database and GIS maps of study-based and incidental wildlife observations within the Project Boundary and movement corridors near facilities;
- Update occurrence information for species of management concern from databases maintained by agencies and Indian Tribes and Canadian First Nations;
- Special status amphibian and bullfrogs monitoring; and
- Additional measures as needed.

5.3 Monitoring Enhancement Measures

City Light may monitor the progress of habitat enhancements in conjunction with changes in vegetative habitat through City Light's Vegetation Management Plan in consultation with the SLIC. Changes in vegetation variables associated with habitat quality for wildlife indicator species may be documented within select MUs, per the schedule for vegetative treatments in City Light's Vegetation Management Plan. Changes which may be measured or monitored include wildlife habitat suitability or connectivity, structural complexity in stream and wetland buffers, and cover

and diversity of native plant species. The following parameters may be assessed or monitored depending on MU prescriptions:

- Habitat connectivity, structural complexity in stream and wetland buffers, and cover and diversity of native plant species;
- Wildlife habitat suitability and use of before- and after-treatment on transmission line ROW and along reservoir shorelines; and
- Elk and deer habitat suitability before- and after-treatment at select sites in the transmission line ROW based on vegetation and road use data.

5.4 Adaptive Management and Plan Review

City Light will apply adaptive management through the process of gathering information, synthesizing new and existing information, and assessing the need to update management decisions outlined in this Wildlife Plan. At five (5) year intervals, or as needed and proposed by the SLIC, City Light will consult with the SLIC to determine if new BAS, BMPs, or changes in other management decisions will increase the success of the protection and enhancement measures included in this Wildlife Plan, and will revise this Wildlife Plan (including Implementation Work Plan) as needed.

City Light will engage in regular consultation with the SLIC and make timely submittals to FERC. City Light will report annually to the SLIC on documented Project-related wildlife mortalities, number of wildlife protection measures implemented, monitoring results during years when data are collected, and other pertinent issues. The report will also indicate activities planned for the upcoming two (2) years. Annual work plan activities at locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS. Every five (5) years, City Light will file a report with FERC describing implementation and any proposed modifications to this Wildlife Plan (including the Implementation Work Plan) based upon the results of monitoring and consultation with the SLIC.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or

waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

5.5 Data Management

City Light will follow specific protocols for updating and maintaining GIS maps and databases indicating habitats, monitoring locations, and wildlife presence. These will be updated with information collected from survey, observational information, or monitoring efforts. Data collected through this Wildlife Plan will be available to the SLIC upon request each year, although data that is time sensitive can be made available to agencies immediately. Sensitive data (i.e., listed or culturally important species) will be kept confidential from the public, but provided to Indian Tribes, Canadian First Nations, or agencies, as appropriate. Communications regarding data and data sharing (e.g., GIS layers) will follow City Light's HPMP, permit, or other stipulations developed in consultation with the SLIC.

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AVIAN SPECIES MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT
FERC NO. 553

Seattle City Light

November 2025

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List of Acronyms and Abbreviations

ARU .....autonomous recording unit
BACI .....before-and-after-control-impact
BAS .....best available science
BFD .....bird flight diverter
BGEPA .....Bald and Golden Eagle Protection Act
BMP .....best management practice
CFR .....Code of Federal Regulations
City Light .....Seattle City Light
ESA .....Endangered Species Act
FERC .....Federal Energy Regulatory Commission
GIS .....Geographic Information System
HPMP .....Historic Properties Management Plan
MBTA .....Migratory Bird Treaty Act
MU .....Management Unit
NPS .....National Park Service
O&M .....operations and maintenance
PHS .....Priority Habitats and Species
Project .....Skagit River Hydroelectric Project
REP .....Riverscape Ecosystem Plan
RCW .....Revised Code of Washington
ROW .....right-of-way
SLIC .....Skagit License Implementation Committee
SWAP .....State Wildlife Action Plan
USFS .....U.S. Forest Service
USFWS .....U.S. Fish and Wildlife Service
WDFW .....Washington Department of Fish and Wildlife

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Avian Species Management Plan (Avian Plan) for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) Project No. 553. This Avian Plan provides guidance on state and federal permit requirements and applicable laws and regulations for the management of avian species and habitats within the Project Boundary. The goals of this Avian Plan are to protect avian species and protect and enhance existing native avian habitats, restore[1] degraded habitat, and minimize effects of Project operations and maintenance (O&M) or new construction on bird species. This Avian Plan is intended specifically for the Skagit River Project for the life of a new license, and is a complement to City Light's Avian Protection Plan (City Light 2020), which addresses generation and transmission system operations in its service territory (including, but not limited to the Skagit River Project),[2] and provides a basis for compliance with the Migratory Bird Treaty Act (MBTA).

Information obtained through the implementation of this Avian Plan will be used to inform decision-making regarding avian and avian habitats within the Project Boundary, including at City Light's fish and wildlife mitigation lands.

City Light will coordinate the efforts required under this Avian Plan with other license article obligations, including other Project resource management plans and measures included in the new license. City Light's other management plans and measures relevant to this Avian Plan include:

- Fish and Wildlife Mitigation Lands Management Plan;
- Invasive Plants Management Plan;
- Lighting Management Plan;
- Reservoir Erosion Management and Monitoring Plan;
- Riverscape Ecosystem Plan (REP);
- Roads, Trails, and Transmission Line ROW Erosion Management Plan;
- Wetland Enhancement Measures;[3]
- Vegetation Management Plan; and
- Wildlife Protection and Enhancement Plan.

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1 City Light recognizes four major categories of activities along the restorative continuum: 1) reduced impacts; 2) remediation; 3) rehabilitation, and; 4) ecological restoration (Nelson et al. 2024). City Light prioritizes and designs management actions to gain the greatest native ecosystem repair or recovery based on continued land- use, location and other constraints.

2 City Light's service territory includes generation facilities at the Skagit River, Boundary, Tolt, and Cedar Falls hydroelectric projects.

3 The Wetland Enhancement Measures will be developed in consultation with the Skagit License Implementation Committee (SLIC) following license issuance.

2.0 PURPOSE AND SCOPE OF THE PLAN

City Light proposes this Avian Plan to provide best management practices (BMPs) and procedures to guide City Light's actions related to potential effects to avian species under the new license and to meet resource management goals. This Avian Plan is subject to annual reporting and periodic five (5) year review and updates in consultation with SLIC.[4]

2.1 Goals and Objectives

This section presents goals and objectives for protecting avian species and protecting or enhancing avian habitat within the Project Boundary. The primary goals of this Avian Plan are as follows:

- Comply with the Endangered Species Act (ESA), Bald and Golden Eagle Protection Act (BGEPA), and MBTA regulatory requirements and U.S. Fish and Wildlife Service (USFWS) and Washington Department of Fish and Wildlife (WDFW) permits regarding avian protection;
- Support the National Park Service (NPS) in meeting avian species conservation and management goals;
- Minimize effects of Project O&M and new construction on bird species due to collisions, electrocutions, habitat modification/alteration, and disturbances (including helicopter flights) that may affect the ability of a species to breed, forage, roost, nest, migrate, or survive; and
- Protect and enhance existing native bird habitats affected by Project O&M actions.

The implementation actions included in this Avian Plan are designed to meet the following objectives:

- Identify and integrate best available science (BAS) per the Governance Document for the SLIC and Work Groups and BMPs, including nesting season restrictions, for Project O&M activities and new construction projects to avoid, minimize, or mitigate effects to birds. This includes compliance with industry standards set by the Avian Power Line Interaction Committee and other BAS for minimizing electrocution and collision risks;
- Provide avian occurrence and habitat suitability information to inform City Light's other terrestrial management plans so actions increase, maintain, or rehabilitate the quantity, quality, and diversity of avian habitat. This also includes identifying bird occurrence and vegetation metrics by which to monitor efficacy of the actions and inform adaptive management; and
- Consult with the SLIC on a regular interval to provide implementation updates, share data, and collaboratively update adaptive management strategies.

2.2 Geographic Area

The geographic scope of this Avian Plan is the area within the FERC Project Boundary, which includes reservoirs, Project structures and facilities, the transmission line right-of-way (ROW),

[4] The SLIC includes entities that will consult regarding implementation and monitoring of this Avian Plan and contribute to adaptive management decisions.

and Project roads. For new construction, this includes an area up to 0.5 miles beyond the Project Boundary. Additional bird and bird habitat enhancement on select mitigation lands may be addressed in a separate Fish and Wildlife Mitigation Lands Management Plan, and avian protection measures throughout the entire FERC Project Boundary will be consistent with what is described in this Avian Plan.

2.3 Applicable Laws and Regulations

This section describes applicable laws or regulatory requirements and agencies with jurisdictional authority over the resources addressed in this Avian Plan. There are three federal laws that protect birds in the United States: (1) the MBTA of 1918 (16 United States Code 703-712); (2) the BGEPA; and (3) the ESA. These acts generally prohibit "take," which is any activity that results in harassing, harming, pursuing, wounding, killing, trapping, capturing, or collecting a protected species. The MBTA applies to all bird species considered to be native to the United States.

2.3.1 Management Priorities

This section lists specific management priorities in addition to the MBTA, BGEPA, and ESA that apply to species occurring within the Project Boundary.

2.3.1.1 USFWS

The USFWS leads efforts to avoid take of species listed under the ESA and works with other agencies to implement conservation and recovery plans for all wildlife, including avian species. As part of administering the MBTA, the USFWS works in partnership with numerous entities to determine status of migratory bird populations and to support avian management plans. The USFWS administers regulations for permitting take of bald eagles (*Haliaeetus leucocephalus*) and golden eagles *(Aquila chrysaetos*) under the BGEPA.[5] The following avian species protected by the ESA also have USFWS recovery plans:

Marbled Murrelet *(Brachyramphus marmoratus)*

The interim objective of the Marbled Murrelet Recovery Plan of September 1997 (USFWS 1997) is to stabilize marbled murrelet population sizes at or near current levels.

Northern Spotted Owl *(Strix occidentalis caurina)*

The Revised Recovery Plan for Northern Spotted Owls (USFWS 2011) supports the recovery of northern spotted owl so that: (1) populations are sufficiently large enough and distributed such that the species no longer requires listing under the ESA; (2) adequate habitat is available and will continue to exist to allow the species to persist without the protection of the ESA; and (3) the effects of threats have been reduced or eliminated such that populations are stable or increasing and the northern spotted owl is unlikely to become threatened again in the foreseeable future.

[5] In 2022, the USFWS proposed rule changes regarding the eagle incidental take permitting program aimed at improving the conservation of both bald and golden eagles.

2.3.1.2 USFS

The U.S. Forest Service (USFS) manages Sensitive Species, which are species recognized by the USFS Regional Forester as needing special management to prevent them from becoming threatened or endangered through actions that will contribute to a loss of viability or cause a significant trend toward listing under the ESA. Additionally, USFS has an MBTA Memorandum of Understanding with USFWS that "further clarifies the USFS commitment to bird conservation during forest and project-level planning" (Brewer et al. 2009).

2.3.1.3 NPS

The NPS prioritizes wildlife and habitat on lands managed by the NPS that may be at risk (special-status species). Special-status species include ESA-, state-, local-, and Indian Tribe-listed species, and other native species that are of special management concern including rare, declining, sensitive, endemic, or unique species. 36 CFR Section 2.2 addresses protections on NPS-managed lands and prohibits the taking of wildlife, except by authorized hunting and trapping activities, or the feeding, touching, teasing, frightening or intentional disturbing of wildlife nesting, breeding or other activities.

2.3.1.4 WDFW

Under Washington State law (Revised Code of Washington [RCW] 77.15.130), the nests of birds, with few exceptions,[6] are protected from removal or disturbance. WDFW is responsible for enforcement of this statute. WDFW also provides management recommendations for Priority Habitats and Species (PHS) for which special conservation measures should be taken. Priority habitats include those with unique or significant value to a large number of species. Priority species include state endangered, threatened, sensitive, and candidate species, or otherwise vulnerable species.

2.3.2 Permit Compliance

The MBTA prohibits the take, possession, or transportation of protected migratory bird species without prior authorization by the USFWS. This protection applies to birds, nests, and eggs of any migratory bird species. All active or occupied nests of migratory birds are protected by the MBTA and cannot be disturbed without specific authorization from the WDFW and/or USFWS Regional Office in Portland, Oregon. To do so without permission is a violation of laws and can result in prosecution.

City Light complies with the MBTA and state wildlife protection regulations through adherence to its USFWS Migratory Bird Special Purpose Utility permit and a WDFW Take Authorization Permit. Both permits include all of City Light's service territories and its generation facilities and transmission networks, including the Skagit River Hydroelectric Project. Compliance protocols and mitigation measures to address bird collisions, electrocutions, and other issues are detailed in City Light's Avian Protection Plan (City Light 2020), and generalized in this Avian Plan, which additionally includes Project-specific protections and enhancements.

[6] WDFW does not require permission to remove nests of house sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), and rock pigeons (*Columba livia*), which are non-native species

City Light's USFWS Migratory Bird Special Purpose Utility permit authorizes the take, transport, and relocation of active (eggs or young present) migratory bird nests from electrical equipment when there is the threat of a fire or power outage or when maintenance is required to avoid an imminent outage. Removal of empty nests or partially completed nests from City Light's electrical system does not require federal authorization.

City Light's WDFW State Wildlife Take Authorization Permit authorizes the take or harassment of wildlife, when requested, to conduct maintenance and safely operate the Project. The permit prevents the violation of state statutory authority when the permit conditions and guidelines are followed.

3.0 PLAN IMPLEMENTATION

Upon approval by FERC, this Avian Plan will be implemented in consultation with the SLIC Collaboration with agencies, Indian Tribes and Canadian First Nations, non-governmental organizations, landowners or managers, or other groups will be included for specific efforts, as appropriate.

City Light will implement the avian protection measures described in this Avian Plan for routine O&M and new construction activities, and will incorporate additional measures if new data indicate they are necessary. Review of implementation effectiveness will be reported annually to the SLIC, and formal reports will be submitted to FERC every five (5) years. Implementation of this Avian Plan will include:

- Implementation of protective measures outlined in Sections 3.2 through 3.3 of this Avian Plan, including the implementation of BMPs;
- Installation of avian safety protections (e.g., flight diverters, perch or nest deterrents, reconfigure pole tops, etc.) on structures where necessary if bird use creates risk to safe operation or to bird safety;
- Training of City Light's vegetation management crew to increase, maintain, and rehabilitate the quantity, quality, and diversity of avian habitat where feasible; and
- Annual reporting of all avian mortalities and nest management activities throughout City Light's service territory, along its transmission lines, and at generation facilities, as required by City Light's USFWS Migratory Bird Special Purpose Utility permit WDFW State Wildlife Take Authorization Permit.

This Avian Plan was designed to be implemented in a coordinated manner with other management plans and measures for the new license. Due to the interconnectedness of ecosystems, resources cannot fully be separated for management actions, and as a result, avian habitat may be addressed through restoration or rehabilitations identified in other resource plans and measures. Habitat enhancement measures will largely be performed through City Light's Vegetation Management Plan and Invasive Plants Management Plan, although all terrestrial management plans contribute to protecting or enhancing ecosystem values and habitats.

The following sections present elements of this Avian Plan. A generalized implementation timeline is presented in Table 4.0-1.

3.1 Avian Species of Management Concern Near Project Facilities

City Light will update the list of avian species of management concern every year based on review of updated agency species lists, information on species occurrence in the Project Boundary, and in consultation with the SLIC. Avian species of management concern include:

- **ESA Federally Listed or Proposed Species** – Species that are listed and protected under the ESA of 1973, as endangered or threatened, or are proposed for listing.
- **ESA Candidate Species** – Species that the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but

for which development of a proposed listing regulation has not occurred because of other higher priority listing activities. Candidate species receive no statutory protection under the ESA. However, the USFWS encourages the formation of partnerships to conserve these species.

- **WDFW PHS** – Species that are priorities for conservation and management. These include state-listed endangered, threatened, sensitive,[7] or candidate species and species most in need of conservation action as reported in the State Wildlife Action Plan (SWAP; WDFW 2015) as Species of Greatest Conservation Need. SWAP species include species that are: experiencing threats to their life history needs or habitats; few or low in abundance or distribution; or currently not rare but showing declines in abundance or habitat.
- **USFS Sensitive Species** – Species on the Regional Forester's List of Sensitive Species for the Mt. Baker – Snoqualmie National Forest (USFS 2004). The Regional Forester's List does not include species already protected under the ESA.
- **NPS Management Priority Species** – Species that are categorized as "species that warrant particular management attention as determined by park management staff." Select species from this extensive list are included as species of management concern, as advised in collaboration with NPS staff.
- **Culturally Important Species** – Species of particular importance to Indian Tribes and Canadian First Nations.

City Light will provide protections for all avian species, with a focus on species of the highest management concern known to occur in the Project Boundary based on current information. These include bald eagle, common loon (*Gavia immer*), peregrine falcon (*Falco peregrinus*), marbled murrelet, golden eagle, northern goshawk (*Accipiter gentilis*), osprey (*Pandion haliaetus*), northern spotted owl, and Mount Rainier white-tailed ptarmigan (*Lagopus leucura rainierensis*). Barred owl (*Strix varia*) is also considered a species of management concern because of potential effects to northern spotted owl. Osprey is considered a species of management concern because NPS tracks osprey nesting in the North Cascades National Park Complex, and City Light towers are used by nesting ospreys at several locations. Marbled murrelet, golden eagle, northern goshawk, and northern spotted owl and their habitat are discussed at length in relicensing studies by City Light: TR-05 Marbled Murrelet Study (City Light 2023a), TR-06 Golden Eagle Habitat Analysis (City Light 2023b), TR-07 Northern Goshawk Habitat Analysis (City Light 2023c), and TR-10 Northern Spotted Owl Habitat Analysis (City Light 2023d).

Occupancy and productivity of bald eagle, osprey, and peregrine falcon nests within the Project Boundary will be monitored annually. Each nesting season, the monitoring will be accomplished from land- or water-based vantage points, and may be supplemented by aerial surveillance using

[7] State endangered species include "a species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state." State threatened species include any "species native to the state of Washington that is likely to become an endangered species within the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats." State sensitive species are defined as "a species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or removal of threats" (WDFW 2021).

drone or helicopter. The number of nests monitored may vary from year to year; based on the last three years of NPS and City Light observations there are six peregrine falcon nest sites, three bald eagle nest sites, and eight osprey nest sites within or near the Project.[8]

If Project helicopter flights include low-elevation work or landing areas in alpine habitat, City Light will consult with NPS, USFWS, and WDFW to develop appropriate BMPs to protect Mount Rainer white-tailed ptarmigan that may be present.

To monitor changes in presence of spotted owl, marbled murrelet, and northern goshawk near Project facilities, City Light will consult with resource agencies to develop and implement a monitoring program. The program would utilize a combination of autonomous recording units (ARU) for owls and goshawks (Duchac et al. 2020; Cragg et al. 2016). Protocol surveys for these species and marbled murrelet will be considered with resource agencies, as necessary, prior to construction activities in suitable habitat near Project facilities, particularly in areas where new major City Light construction activities are planned in or within 0.5 miles of mapped suitable habitat. City Light will update Geographic Information System (GIS) maps of suitable northern spotted owl, marbled murrelet, and goshawk habitats (Table 4.0-1). Avian species observation databases and maps will be updated with new species records and monitoring data annually. If new evidence of occurrence of other species of management concern is documented or suspected, the species will be added to this Avian Plan. This information will be synthesized with WDFW PHS data, NPS observations, and modeled habitat, and shared with the SLIC and used for consultation regarding adaptive management decisions.

3.2 Avian Protections

3.2.1 Project Structures

This section describes measures and BMPs to maintain protections for avian species in relation to Project structures and facilities, including buildings, transmission line towers, and electric transmission lines.

3.2.1.1 Nest Management

When compatible with operations, City Light will allow bird nesting on structures (e.g., osprey nests on transmission towers). When bird use is incompatible with operations, City Light will use humane BMPs to remove nests and exclude birds (e.g., netting in boathouses, perch or nest deterrents on poles) in compliance with the federal and state permits. City Light's State Wildlife Take Authorization Permit, issued by the WDFW, includes the following nest management requirements:

[8] Known active nests in 2023 include: six peregrine falcon nest sites in Newhalem, Gorge, Diablo, Pumpkin Mountain, Skymo, and Little Jackass; three bald eagle nest sites at Roland, Dry Creek, and Little Beaver, and five osprey nest sites at Ross Lake and include Rainbow Creek South, Little Jackass North, Boundary Bay Middle, Boundary Bay CG, and Desolation Peak Upper (Christophersen and Ransom 2022), and Ross Powerhouse, transmission line ROW sites at Corkindale Creek crossing, and near Spearhead Lake.

- All nests are to be left in place if they do not represent a threat to reliable operations or to the nesting birds themselves, prevent or impede safe access for equipment maintenance, or constitute a nuisance;
- If possible, nests that represent a threat to reliable operations or safety will be removed when the nest is inactive or prior to egg laying;
- Nuisance nests[9] will be removed only when the nesting season is complete, and the nest is inactive; and
- If it is necessary to remove a nest with eggs or young due to safety risk, WDFW, NPS, and USFWS will be consulted to ensure permit compliance and appropriate disposition of nests, eggs, and/or carcasses.

USFWS's MBTA permit includes the following current nest management requirements:

- In emergency situations City Light is authorized to take (relocate or destroy) active migratory bird nests, including viable eggs or chicks, found on utility structures, in rights-of-way, or on hazard trees within the fall zone if the birds, eggs, or nest pose a safety threat.
- Relocation of nests is preferred if the circumstances or conditions warrant. If nests are relocated, City Light must relocate to a site and structure (natural or artificial) appropriate to the species' requirements and monitor relocated nests sufficient to determine if adult birds have returned or if the nest is abandoned. If adult birds have abandoned the nest, eggs/chicks may be transported to a federally permitted rehabilitator.
- If circumstances or conditions are not appropriate for relocation, City Light may destroy the nest. Viable eggs and/or chicks may be destroyed or transported to a federally permitted rehabilitator for care.

3.2.1.2 Transmission and Distribution Line Safety

City Light will maintain and periodically inspect the existing bird flight diverters (BFDs) installed on transmission line wires near river crossings and bald eagle winter roost areas: Pinkies Road, Bacon Creek, Illabot Creek, and Diobsud Creek.[10] BFDs are also installed on the optical ground wire [11] over the Snohomish River crossing and nearby agricultural fields south of the river. No other known high-risk sites exist but if, in the future, avian mortalities are documented along the City Light transmission system, or areas of high bird activity are noted near the transmission lines representing elevated collision risk, City Light will evaluate the need for additional avian protection equipment and follow industry standards.

Future collision (transmission and distribution lines) and electrocution (distribution lines) risks will be addressed on a site-specific basis through a structured process within the SLIC to determine

[9] Nuisance nests are those that do not pose a clear threat/risk.

[10] Several bald eagle communal winter roosts were documented in the Illabot Creek and Bacon Creek vicinities during the studies conducted in support of relicensing in the 1980s (City Light 2020b).

[11] Optical ground wire includes communication functions provided by the incorporated optical fibers in addition to the existing overhead ground wire which protects transmission cables from lightning strikes, and secures current flow in the case of cable faults.

if additional BMPs or other protections are necessary. Initial assessments will be performed within the first five years, and whenever City Light learns of avian risk issues and will include:

- Step 1: Using incidental observations from City Light staff and reports from the public, identify zones where risk assessments are warranted in areas that have increased probability of collisions or electrocutions;
- Step 2: City Light biologists, with input from engineers, conduct risk assessments at zones identified in Step 1;
- Step 3: If warranted, implement avian safety measures (e.g., modify habitat, modify equipment configuration to be avian-safe, or install insulation or covers, BFDs, or nest or perch deterrents), as warranted based on risk assessment analysis; and
- Step 4: Document risk assessment, safety measures implemented, and effectiveness monitoring results in scheduled reporting and integrate results into adaptive management decisions.

3.2.1.3 Building and Lighting Safety

If a Project building is found to be a source of collision mortalities, BMPs for reducing collisions will be implemented (e.g., window treatments). To prevent entrapment in Project buildings, bird netting will be used to block bird access to interior perch and nesting locations.

To reduce potential adverse effects to avian species from anthropogenic lighting required for safety at Project facilities, City Light will, where possible, install and maintain light fixtures that include timers, motion detectors, hue adaptors, and/or dimmers with the lowest lumens possible, as described in City Light's Lighting Management Plan.

3.2.2 Operations and Maintenance

This section includes BMPs specific to normal Project O&M and compliance with City Light's existing programs and USFWS and WDFW permits to minimize risk of environmental contamination and disturbance to avian habitats. While conducting all routine O&M, crews will follow these general BMPs as well as task-specific BMPs described in the following sections. Any updates to best available science and BMPs will be made during adaptive management reviews every five (5) years over the life of the new license, or as needed and proposed by the SLIC. These BMPs will be provided to Project staff via annual training sessions and digital references and will include, but not be limited to, the following:

- Avoid disturbing active bird nests;
- Continue to implement City Light's existing Pesticide Reduction Program (City Light undated) and Invasive Plants Management Plan for the selection and minimization of herbicide application, and to minimize contamination levels in the environment. City Light will continue to use electronic traps, exclusion and repellents only; no anticoagulant rodenticides will be utilized.
- Follow USFWS, NPS and WDFW designated nesting season restrictions, implement noise reduction BMPs, and follow guidance for O&M activities located within or near suitable habitat for northern spotted owl, marbled murrelet, northern goshawk, and Mount Rainier

white-tailed ptarmigan. Follow restrictions near known nest sites of peregrine falcon, osprey, bald eagle, golden eagle and common loon.

- Apply USFWS, NPS and WDFW designated nesting season restrictions when working in proximity to at-risk nests, schedule noisy tasks outside of the nesting period, and follow appropriate management guidelines (e.g., National Bald Eagle Management Guidelines [USFWS 2007], National Park Service BMPs [Appendix A in Ransom et al. 2023]) or BAS. Protect all current and future known hunting areas[12] of overwintering bald eagles from disturbance by avoiding construction or other noisy activities near foraging and roosting areas,[13]
- Increase transmission line ROW habitat quality and diversity for birds through City Light's Vegetation Management Plan and Invasive Plants Management Plan by maximizing woody vegetation in riparian zones to the extent possible; mitigating tree removal or limiting tree removal along transmission line ROW edges and Project roads to hazard or invasive trees; retaining native plant species; reducing invasive plants; using native plant species for restoration; and retaining snag, tall stump, and log habitat features to the extent possible;
- Inform and coordinate with the reservoir shoreline and littoral zone management actions with sensitive location information and avian habitat and other City Light management plans;
- Maintain clean work sites and do not provide food for birds in townsites or at Project facilities; and
- Coordinate with NPS on specific BMPs for reservoir shoreline work.

3.2.3 City Light Helicopter and Drone Flights

City Light will follow procedures and BMPs collaboratively developed with NPS for City Light helicopter or drone flights in the North Cascades National Park that are periodically necessary to support O&M or construction activities.[14] These will include, but not be limited to the following BMPs:

- Avoid operating helicopters within critical disturbance threshold distance, as specified by USFWS, NPS, and/or WDFW, of species of management concern (e.g., peregrine falcon, bald eagle, osprey, marbled murrelet, northern spotted owl, and Mount Rainier white-tailed ptarmigan) nests during the USFWS and/or WDFW designated nesting season, or near bald eagle wintering habitat during November through February;
- Minimizing low-altitude flights over suitable marbled murrelet, northern spotted owl, and Mount Rainier white-tailed ptarmigan habitat during USFWS and/or WDFW designated nesting season; and

[12] Groups of wintering eagles regularly hunt for salmon at the Newhalem Ponds, County Line Ponds, and Illabot Creek areas (City Light 2023e).

[13] Currently known foraging and roosting sites include Newhalem and County Line Ponds, Bacon Creek, Diobsud Creek, Corkindale Crossing to west of Illabot Creek, Stillaguamish River segments near the transmission line ROW, Barnaby Slough and Sauk River mitigation lands and will be updated annually.

[14] Such procedures and BMPs will be consistent with FERC's June 27, 2024 Declaratory Order (187 FERC ¶ 61,210 (2024)).

- Additional BMPs as determined by the SLIC to protect birds.

3.2.4 New Construction

If new Project facilities need to be constructed or existing facilities need to undergo substantial modification, City Light will implement BMPs and conduct an evaluation to minimize adverse avian effects. New construction involves substantial work (e.g., new structures, relocating a tower or section of Project road, significant construction of shoreline habitat treatments, bridges, or major culvert replacements, etc.) that would directly affect avian habitat or generate substantial noise for a significant period of time as defined by NPS, USFWS, and WDFW guidance. All new construction projects will be assessed for regulatory compliance (e.g., Endangered Species Act) and will follow permit requirements to avoid or minimize effects. Potentially suitable nesting habitat for species of management concern will be considered occupied unless ground-based habitat suitability assessment or protocol-level nesting surveys confirm the Action Area[15] lacks suitable habitat or is not occupied. Updates to construction BMPs will be made during adaptive management reviews every five (5) years over the life of the license, or as needed and proposed by the SLIC. For each project, procedures and BMPs include, but are not limited to the following:

- Implement USFWS and WDFW designated nesting season restrictions to avoid or minimize disturbance; following NPS guidance for construction within NPS-managed lands (Appendix A in Ransom et al. 2023) or USFWS regulation for ESA species.
- Minimize vegetation modification and revegetate disturbed areas using native plant species beneficial to wildlife;
- Minimize effects to wildlife corridors using BAS to inform siting of new facilities. Site-specific habitat and noise effects assessments will be conducted, as appropriate;
- Assess habitat suitability using BAS, mapped habitat, and siting locations in the proposed Action Area and, if appropriate, conduct pre-construction surveys using protocols approved by USFWS, WDFW, or NPS to inform BMPs and determine regulatory requirements for additional survey or reporting;
- Consult with the SLIC on proposed BMPs at proposed sites to minimize disturbance or effects to wildlife habitats or species of management concern; and
- Minimize vegetation modification and ground disturbance.

3.2.5 Emergency Situations

Emergency situations are instances where there is imminent risk to human life, including a threat of fire hazard, mechanical failure, or power outage. In the event of an emergency situation, City Light will make efforts to avoid direct effects to birds and bird habitat and will communicate with appropriate agencies within 14 days if these situations arise that affect known bird nests (e.g., osprey nests on towers that need immediate work). Additionally, City Light will coordinate with their Cultural Resource Coordinator as expeditiously as possible.

[15] Action Area includes all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 Code of Federal Regulations [CFR] § 402.02).

3.2.6 Training and Visitor Education

City Light will provide employee training and outreach to inform visitors to City Light facilities, City Light employees, and contractors on nest and nest habitat protection and conflict minimization (food and garbage management). City Light will develop an internal system for staff to report sightings of uncommon avian species or dead, injured, or sick birds. City Light will notify NPS or WDFW of any observed sick, injured, or dead birds and assist with transporting any carcasses to the appropriate agency for necropsy. City Light will maintain a database of observations of species of management concern and documented avian mortalities near Project facilities to inform additional protection measures. Training and outreach will include:

- Coordinate with NPS and USFS to develop and use signage and informational brochures at City Light facilities and recreation sites to educate visitors on practices to minimize effects to birds and avian habitat (e.g., trash, feeding birds, fishing lures, reporting observations). Signs on NPS lands will follow NPS standards.
- Disseminate instructions to staff and visitors for reporting sick or dead birds observed in the Project Boundary to appropriate agencies.
- Conduct annual trainings for employees and contractors on:
  - Avian conflict reduction including bear-resistant trash containers in townsites and at Project facilities;
  - Habitat identification and protection, including nest identification and common vegetation associated with nesting;
  - Background and importance of avian protective measures, including applicable laws, regulations, and permit requirements;
  - Avian protective equipment and standards;
  - Protocol for encountering nests, or sick or injured birds;
  - Known nesting locations; and
  - Other pertinent information and BMPs.

3.3 Avian Habitat Enhancement

Actions to improve ecological functions and increase, maintain, or rehabilitate native terrestrial, riparian and wetland plant communities associated with avian habitat will be implemented primarily through City Light's other management plans and measures. Under City Light's Vegetation Management Plan and Invasive Plants Management Plan, City Light will implement a combination of programmatic and site-specific actions to reduce invasive weed cover and promote diverse native plant communities, protect Project infrastructure, reduce long-term maintenance needs, enhance aesthetic values, and enhance habitat (North American Electric Reliability Corporation 2011).

3.3.1 Transmission Line ROW Enhancements

City Light identified Management Units (MUs) as mapped divisions within the transmission line ROW to define primary management objectives within the constraints of underlying property

ownership and adjacent habitats. These units define logical boundaries for ownership type, access, landforms and mix of general habitat types. Within each MU, "patches" of vegetation with similar dominant plant species/structure allow for management prescriptions to focus on the particular plant communities targeted for treatment within the MU. Specific vegetation management prescriptions within MUs will be based on patch characteristics and management objectives. For each general type of habitat, species groups and possible avian indicator species (Table 3.3-1) can be used to inform specific vegetation management prescriptions. Habitat requirements for avian indicator species from wildlife habitat suitability index models and habitat association studies (e.g., herbaceous, shrub, and tree composition, density, cover, height, and tree diameter targets; and snag and log abundance) may be used to inform management prescriptions within the ROW, dependent on interests or permissions of underlying landowners.

Riparian zones within the transmission line ROW will also be affected by implementation of instream habitat measures under City Light's REP. The primary measures will include addressing instream barriers and adding wood to select streams. These actions will increase connectivity for aquatic wildlife and help promote riparian habitat diversity.

Table 3.3-1. Avian species groups and indicator species potentially associated with general habitat enhancement types within the transmission line ROW.

Habitat Type	Species Group	Indicator Species
Riparian Zone	Riparian Birds	Yellow Warbler Song Sparrow American Dipper
	Passerine Birds	Warblers Song Sparrow
	Cavity-Nesting Birds	Pileated Woodpecker Downy Woodpecker Black-Capped Chickadee
	Waterfowl/Wading Birds	Harlequin Duck Great Blue Heron
	Raptors	Bald Eagle Osprey
Wetland	Wetland Passerines	Song Sparrow Willow Flycatcher
	Waterfowl/Wading Birds	Dabbling Ducks Wood Duck Great Blue Heron
	Cavity-Nesting Birds	Wood Duck Hooded Merganser Pileated Woodpecker Downy Woodpecker
Meadow	Ground-Nesting Birds	Savannah Sparrow
	Raptors	Golden Eagle Red-Tailed Hawk
Upland Forest	Forest Passerine Birds	Warblers Band-Tailed Pigeon
	Cavity Nesting Birds	Downy Woodpecker Black-Capped Chickadee
	Raptors	Red-Tailed Hawk Cooper's Hawk Northern Goshawk
Rocky/Open Habitats	Ground- and Shrub-Nesting Birds	Warblers Song Sparrow
	Raptors	Golden Eagle Peregrine Falcon

3.3.2 Additional Avian Habitat Enhancements

Additional projects and vegetation management outside of the transmission line ROW will serve to improve habitats in collaboration with avian management goals. These may be directed either through City Light's other measures or agreements, or directly through vegetation management. Enhancements to habitats will be through restoration projects and landscaped areas in townsites, and near visitor and Project facilities, including:

- The removal of invasive trees in Newhalem and the adjacent riparian corridor;
- Replanting following the removal of houses in Diablo; and
- Habitat improvement actions at the mainstem Skagit River, select streams within the transmission line ROW, and wetlands associated with reservoirs. [16]

[16] New proposed reservoir operations may be monitored in relation to changes in avian habitat in wetlands at locations which may include Roland, Dry Creek, Big Beaver and near Hozomeen.

4.0 IMPLEMENTATION TIMELINE

City Light will implement this Avian Plan upon license issuance. The implementation actions included in this timeline (Table 4.0-1) will document progress towards this Avian Plan's goals and objectives. Implementation timelines will be modified as necessary to meet the goals of this Avian Plan.

Table 4.0-1. Timeline of Avian Plan activities.

Timeline	Activity
Annually	Report to and consult with SLIC (consistent with the SLIC Governance Document) on previous year's activities and monitoring, and planned current and upcoming activities (three year rolling plan (previous year activities, and two year rolling workplan)). Annual work plan activities and monitoring locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS in the Implementation Work Plan (including the specific location, timing, and scope of the activities).
	Update the list of avian species of management concern based on review of updated agency species lists and information on species occurrence in the Project Boundary.
	Conduct annual monitoring of bald eagle, osprey, and peregrine falcon nest sites within the Project Boundary in coordination with NPS to document occupancy and productivity, and identify potential Project conflicts.
	Timely documentation and reporting to USFWS, NPS, and WDFW of avian collisions or mortalities near Project facilities and transfer carcasses to NPS for necropsy.
	Update GIS database of avian protection measures (e.g., treatment on transmission lines) and sensitive areas (e.g., known nests, suitable habitat).
	Update database of priority avian species to complement agency data for peregrine falcon, osprey, and bald eagle nest site locations and productivity, and management issues and observations of other species of management focus.
	Update and synthesize confidential database of species of management concern species observations and other available information within the Project Boundary.
	Collaborate with the NPS to develop and annually disseminate instructions to staff and visitors for reporting sick or dead birds observed in the Project Boundary to appropriate agencies.
Within one (1) year of license issuance	City Light will develop an Implementation Work Plan in consultation with SLIC and with approval from the NPS when actions have the potential to affect NPS lands and waters and from NMFS and/or USFWS for actions that may affect ESA listed species or their habitat. This plan shall include management goals and objectives, priorities, and a schedule.
Within two (2) years of license issuance	Coordinate with NPS and USFS to use signage and informational brochures at City Light facilities and recreation sites to educate visitors on practices to minimize effects to birds and avian habitat (e.g., trash, feeding wildlife, fishing lures, reporting observations).
	Disseminate instructions to staff and visitors for reporting sick or dead birds observed in the Project Boundary to appropriate agencies.
Within three (3) years of license issuance	Develop ARU program in consultation with the SLIC for northern spotted owl, marbled murrelet, and northern goshawk for habitat and species presence at select sites within the Project Boundary between Ross Dam and the Bacon Creek confluence with the Skagit River.
Within 5 years of license issuance	Initial assessments of avian risk issues at electrical line river crossings.

Timeline	Activity
Every five (5) years following license issuance	Conduct surveys for northern spotted owl, marbled murrelet, and northern goshawk for habitat and/or species presence at select sites within the Project Boundary between Ross Dam and the Bacon Creek confluence with the Skagit River. These surveys may include use of ARUs for northern spotted owl and northern goshawk, ground-based auditory/visual surveys, and/or habitat assessments using accepted methods in prioritized areas.
	Update GIS maps of potentially suitable habitat for northern spotted owl, marbled murrelet, and northern goshawk within the Project Boundary and 0.5 -mile buffer and near ancillary facilities plus a 0.5-mile buffer.
As needed	Evaluate habitat suitability for species of management concern within the Project Boundary near select Project activity sites, ancillary City Light facilities, or near planned major construction sites.

5.0 MONITORING AND REPORTING

This section describes the monitoring efforts that will document progress towards this Avian Plan's goals and objectives. Monitoring is an extension of City Light's protection and enhancement implementation and will use baseline information from City Light relicensing study efforts. The goals of monitoring are to determine the effectiveness of protection measures and avian habitat enhancement, and to inform adaptive management updates to this Avian Plan.

5.1 Monitoring Protective Measures

City Light will include the following protection monitoring elements (see Table 4.0-1 for timeline):

- Record avian mortalities within the Project Boundary compiled from staff observations and synthesize with NPS mortality information, including necropsy results that could inform potential Project- and visitor-related effects and need for modifying BMPs;
- Inspect installed avian protection equipment and maintain GIS database of installed equipment and mortality incidents;
- Monitor bald eagle, osprey, and peregrine falcon nest sites to report occupancy, productivity, and document any potential human-caused issues;
- Document all City Light helicopter and drone flights in Project Boundary; and
- Perform auditory monitoring surveys for northern spotted owl and northern goshawk and auditory/visual surveys for marbled murrelet in suitable habitat near Project facilities.

5.2 Monitoring Enhancement Measures

City Light will monitor the progress of habitat enhancements in conjunction with changes in vegetative habitat through City Light's Vegetation Management Plan in consultation with the SLIC. Changes in vegetation variables associated with habitat quality for avian indicator species may be documented within select MUs, per the schedule for vegetative treatments in City Light's Vegetation Management Plan. Changes which may be measured or monitored include avian habitat suitability or connectivity, structural complexity in stream and wetland buffers, and cover and diversity of native plant species. At select intensive management sites, surveys of breeding birds using point count or transect surveys[17] may be performed to complement monitoring of vegetation variables associated with habitat quality and suitability for avian indicator species.

5.3 Adaptive Management and Plan Review

City Light will apply adaptive management through the process of gathering information, synthesizing new and existing information, and assessing the need to update management decisions outlined in this Avian Plan. At five (5) year intervals or as needed and proposed by the

[17] To the extent possible, before-and-after-control-impact (BACI) design may be used to assess avian habitat changes as a component of this Avian Plan. BACI is used to evaluate environmental responses by comparing changes in response before and after treatments, with the disparity interpreted as evidence of and effect of the treatment. In this application of BACI, the treatment will be specific vegetation management strategies and the response will be changes in quantity and diversity of avian use.

SLIC, City Light will consult with the SLIC to determine if new BAS, BMPs, or changes in other management decisions will increase the success of the protection and enhancement measures included in this Avian Plan, and will revise this Avian Plan (including Implementation Work Plan) as needed pursuant to Section 5.5.

City Light will engage in regular consultation with the SLIC and make timely submittals to FERC. City Light will report annually to the SLIC on avian use locations, avian protection equipment, and documented Project-related avian mortalities, number of avian protection measures implemented, monitoring results during years when data are collected, and other pertinent issues through the annual report. The annual report and work plan will include a summary of the previous year's work, schedule of current year's work and anticipated work in the following year. Annual Work Plan activities on locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS. Every five (5) years, City Light will file a report with FERC describing implementation and any proposed modifications to this Avian Plan based upon the results of monitoring and consultation with the SLIC.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS, before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

5.4 Annual Reporting

Annual reporting will include compliance with USFWS and WDFW permits addressed in Section 2.3.2 of this Avian Plan, and summarized, below:

- City Light's annual reports to the USFWS will include a summary of all activities conducted the previous year that include all birds collected and any active nests relocated or destroyed, as well as all eagle or threatened or endangered species discovered. Additional information to

be recorded, which may not be included in annual reporting but available upon request, includes the relocation of inactive nests, migratory birds obtained by donation, and mortality events involving unexpectedly high numbers of birds.

- Annual reporting to the WDFW will include a summary of any avian wildlife affected by City Light management activities, including nest removals.
- Annual reports and data will be provided to the SLIC and appropriate land management agencies.

If City Light and WDFW, NPS, or USFWS collaboratively determine that revisions to this Avian Plan should be made, City Light will make any revisions in consultation with the SLIC, and revisions shall be filed with FERC for approval prior to implementation.

5.5 Data Management

City Light will follow specific protocols for updating and maintaining GIS maps and databases indicating changes to habitats or species presence. These will be updated with information collected from survey, observational information, or monitoring efforts. Data collected through this Avian Plan will be available to the SLIC upon request each year, although data that is time sensitive can be made available to agencies immediately. Sensitive data (i.e., listed or culturally important species) will be kept confidential from the public, but provided to Indian Tribes, Canadian First Nations, or agencies, as appropriate. Communications regarding data and data sharing (e.g., GIS layers) will follow City Light's Historic Properties Management Plan (HPMP), permit, or other stipulations developed in consultation with the SLIC.

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FISH AND WILDLIFE MITIGATION LANDS MANAGEMENT PLAN

SKAGIT RIVER HYDROELECTRIC PROJECT FERC NO. 553

Seattle City Light

November 2025

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List of Acronyms and Abbreviations

ARU .....autonomous recording unit
ATV .....all-terrain vehicle
BAS.....best available science
BMP .....best management practice
City Light.....Seattle City Light
CMZ.....channel migration zone
DAHP.....Washington Department of Archaeology and Historic Preservation
DNR .....Department of Natural Resources (Washington State)
EBM.....ecosystem-based management
ESA .....Endangered Species Act
FERC.....Federal Energy Regulatory Commission
GIS .....Geographic Information System
HCP.....Habitat Conservation Plan
HPMP.....Historic Properties Management Plan
mitigation lands.....fish and wildlife mitigation lands
MU .....Management Unit
NPS .....National Park Service
O&M .....operations and maintenance
PHS .....Priority Habitats and Species
Project .....Skagit River Hydroelectric Project
REP .....Riverscape Ecosystem Plan
RLNRA.....Ross Lake National Recreation Area
RMZ.....riparian management zone
RTE.....rare, threatened, or endangered
SOP .....Standard Operating Procedure
SR.....State Route
SLIC.....Skagit License Implementation Committee
SRSC.....Skagit River System Cooperative
SWAP .....State Wildlife Action Plan
TLTP.....Trust Land Transfer Program
TNC.....The Nature Conservancy

UDP.....Unanticipated Discovery Plan

USDA.....U.S. Department of Agriculture

USFS.....U.S. Forest Service

WDFW.....Washington Department of Fish and Wildlife

WMZ.....wetland management zone

WSR.....Wild and Scenic River

1.0 INTRODUCTION

This document describes Seattle City Light's (City Light) Fish and Wildlife Mitigation Lands Management Plan (Mitigation Lands Plan) for the Skagit River Hydroelectric Project (Project or Skagit River Project), Federal Energy Regulatory Commission (FERC) Project No. 553. This Mitigation Lands Plan will provide guidance for the management of City Light's fish and wildlife mitigation lands (mitigation lands) within the Project Boundary (Table 1.0-1 and Figure 1.0-1) acquired by City Light to provide mitigation for inundation of terrestrial, riparian, and wetland wildlife habitats by Project reservoirs. The goal of this Mitigation Lands Plan is to continue to mitigate for the inundation of terrestrial, riparian, and wetland wildlife habitats by Project reservoirs through a combination of active management actions and monitoring through the new license period. This Mitigation Lands Plan will be implemented collaboratively in coordination with City Light's Avian Species Management Plan, Wildlife Protection and Enhancement Management Plan and Invasive Species Management Plan with the primary purpose of improving the availability of habitats and sustaining or enhancing the ecosystem functions for native fish and wildlife species. Information obtained through the implementation of the Mitigation Lands Plan will be used to inform decision-making regarding wildlife and wildlife habitats at each mitigation property (one or more geographically associated county parcels) in an adaptive management context.

City Light will coordinate the efforts required under this Mitigation Lands Plan with other license article obligations, including other Project resource management plans included in the new license.

Table 1.0-1. Mitigation land property names and acreages.

Property Name and Basin/Area	Total Property Area (Acres)
Ross Lake National Recreation Area	
County Line Ponds	111
Newhalem Ponds	56
Sauk River Basin	
North Sauk	46
Sauk Island	21
North Everett Creek	174
Everett Creek	39
Dan Creek	42
Skagit River Basin	
Bacon Creek	119
B&W Road 1	79
B&W Road 2	11
Bacon Creek	119
Corkindale Creek	143
South Marble 40	41
Illabot North	726
O'Brian Slough	47
Illabot South	2522
Bogert and Tam	17
Barnaby Slough	255
Johnson Slough	67
False Lucas Slough	203
Napoleon Slough	62
McLeod Slough	126

Property Name and Basin/Area	Total Property Area (Acres)
Finney Creek	642
Pressentin	637
Savage Slough	211
Day Creek Slough	39
South Fork Nooksack Basin	
Bear Lake	155
Nooksack	3954
Nooksack West	389
Total	**10,804**

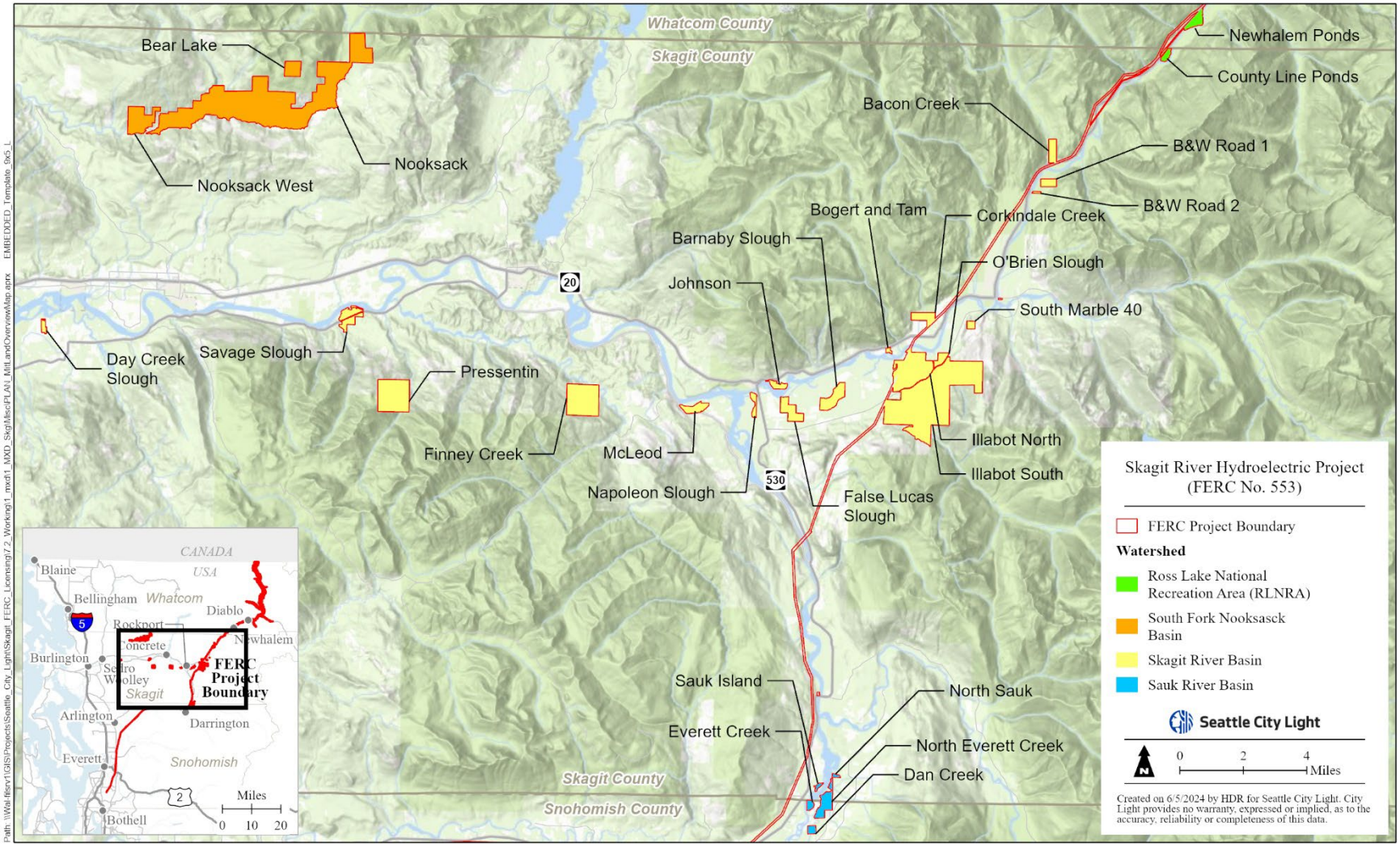

Figure 1.0-1. Fish and wildlife mitigation land properties by basin or area.

2.0 PURPOSE AND SCOPE OF THE PLAN

The purpose of this Mitigation Lands Plan is to guide City Light's actions in consultation with the Skagit License Implementation Committee (SLIC) related to the protection and enhancement of wildlife habitat under the new license to meet agency and tribal resource management goals and provide best management practices (BMPs) and procedures for assessing and conducting habitat management actions. This Mitigation Lands Plan is subject to annual reporting and periodic five (5) year review and updates in consultation with the SLIC.[1]

2.1 Goals and Objectives

This section presents goals and objectives for managing City Light's mitigation lands to promote species and habitats affected by the Project in a manner that follows ecosystem-based management (EBM).[2] The primary goals of this Mitigation Lands Plan (in no specific order) are as follows:

- Foster native biodiversity, ecological processes, ecosystem services, and climate change resiliency;
- Where appropriate, prioritize active management actions to protect or enhance habitat for culturally important and sensitive habitats and species;
- Protect and enhance culturally significant plants or areas and access to such areas in coordination with Indian Tribes and Canadian First Nations;
- Protect historic properties and cultural resources in accordance with City Light's Historic Properties Management Plan (HPMP);
- Promote connectivity of high-quality forest habitat and associated habitat elements;
- Support, where possible, salmonid habitat restoration[3];
- Retain habitat connectivity with neighboring properties;
- Minimize adverse effects from Project roads and trails on aquatic and riparian habitat;
- Minimize the introduction or spread of invasive plant and animal species;
- Avoid, minimize, and mitigate effects from Project-related construction and operations and maintenance (O&M) activities;
- Manage all mitigation and other City Light conservation lands in the watershed with a consistent set of goals and objectives;
- Where consistent with resource protection, allow for low intensity public recreation while minimizing disturbance from recreation and other human uses; and

[1] The SLIC includes entities that will consult regarding implementation and monitoring of this Mitigation Lands Plan and contribute to adaptive management decisions.

[2] EBM is an integrated approach that incorporates entire ecosystems into resource management decisions and is guided by an adaptive management approach (National Oceanic and Atmospheric Administration 2011).

[3] City Light recognizes four major categories of activities along the restorative continuum: 1) reduced impacts; 2) remediation; 3) rehabilitation, and; 4) ecological restoration (Nelson et al. 2024). City Light prioritizes and designs management actions to gain the greatest native ecosystem repair or recovery based on continued land-use, location and other constraints.

- Limit the vulnerability of mitigation lands from illegal human activities, such as theft, vandalism, resource poaching, and off-road recreational vehicles, or other activities that cause habitat degradation.

The implementation actions included in this Mitigation Lands Plan are designed to meet the following objectives:

- Develop and implement property-specific management actions that use EBM principles to promote sustainable ecosystem functions, species and habitat diversity, connectivity, health, and resilience;
- Characterize property-specific access issues and explore options to increase Indian Tribal access for traditional practices, to extent feasible;
- Evaluate the potential of each mitigation property to support species of concern, which include culturally important species, state and federally listed, federal candidate, Washington State Priority Species and Habitats, and other sensitive species and identify management actions that would protect or enhance habitats for these species;
- Identify potential habitat corridors between each mitigation property and other conservation and public lands;
- Consider climate change resilience and adaptation into management action prescriptions; and
- Minimize adverse effects to wildlife during habitat management projects.

2.2 Geographic Area

The geographic scope of this Mitigation Lands Plan is City Light's mitigation lands within the Project Boundary that were acquired to satisfy requirements of the 1991 settlement agreement. The wildlife mitigation lands were selected and acquired in the Skagit, Sauk, and South Fork Nooksack basins through approval of the Land Acquisition Group/Wildlife Management Review Committee and Wildlife Settlement Agreement. Fish mitigation lands were acquired along the Skagit River in the Ross Lake National Recreation Area (RLNRA) and at sites near Rockport and Sedro-Woolley through approval of the Non-Flow Coordination Committee under the Fisheries Settlement Agreement. This Mitigation Lands Plan may be updated to include any additional mitigation lands acquired or lands exchanged in consultation with the SLIC.

3.0 PLAN IMPLEMENTATION

Upon approval by FERC, this Mitigation Lands Plan will be implemented in consultation with the SLIC. Collaboration with agencies, Indian Tribes and Canadian First Nations, non-governmental organizations, landowners or managers, or other groups will be included for specific efforts, as appropriate.

This section outlines the implementation activities providing the framework to support EBM and integrate best available science (BAS) and BMPs. EBM is an iterative process which includes the assessment of a habitat's ecological system functional condition, weighs ecological value against human priorities (e.g., regulations or Indian Tribe/Canadian First Nations access), and culminates in management specific to the habitats assessed.

City Light will follow the EBM process through data collection, assessment, and management considerations/decisions. Considerations will be based on direction from agencies, Indian Tribes, and Canadian First Nations, and will be tailored to address specific locations based on quality habitat or connectivity, presence of wildlife species of focus and associated habitat, culturally important areas or resources, areas in which public access may adversely affect the natural resources, and other factors. This Mitigation Lands Plan provides guidelines for following EBM, which may change over time during the license period.

The implementation timeline[4] will begin immediately following the new license issuance, with specific actions implemented on a prioritized rolling schedule to be developed through annual consultation with the SLIC. The rolling schedule will address data collection, prescription development, and site stewardship and monitoring. The specific timeline will be dependent on the data collection and habitat evaluation, and active management activities will be scheduled to occur regularly as practicable throughout the license period. Management changes will be made as needed with a formal review and update to this Mitigation Lands Plan at five (5) year intervals, or as needed and proposed by the SLIC.

This Mitigation Lands Plan is fundamentally interconnected with City Light's other management plans and measures, with specific applicability based on property-specific attributes. Resource protection and enhancement measures on the mitigation lands will be consistent with City Light's other plans and measures and will utilize appropriate BMPs.

Sections 3.1 through 3.9 of this Mitigation Lands Plan discuss broad management policies and principles for all mitigation properties. Section 3.10 presents preliminary processes and initial information for each of the properties that will form the basis of property-specific management plans.

3.1 Baseline Data Summarization and Data Collection

An initial implementation step will be to use information from relicensing studies and other existing data sources to describe baseline conditions for streams and wetlands, slopes, soils, vegetation, wildlife, aquatic, and other resources relevant for managing each mitigation land property. A review of the existing information will determine what additional data are needed to

[4] The implementation timeline is included in Section 4.0 Implementation Timeline of this Mitigation Lands Plan.

develop objectives and management prescriptions for desired future conditions in identified Management Units (MUs) in each mitigation property and may be updated through the license period. City Light will consult with the SLIC to identify data collection locations, topics, and schedule for each mitigation property. Data collection may include, but will not be limited to, the following:

- Mapping aquatic and terrestrial plant communities, forest structure, northern spotted owl (*Strix occidentalis caurina*) habitat, marbled murrelet (*Brachyramphus marmoratus*) habitat, northern goshawk (*Accipiter gentilis*) habitat, surrounding land uses (e.g., ownership categories and juxtaposition with other City Light public and conservation organization lands), development and agricultural areas, roads, invasive plant species locations, etc.;
- Conducting stream assessments to identify any impairments (i.e., poorly functioning culvert, erosion/sedimentation) of aquatic habitat functions (e.g., shading, wood recruitment, wildlife habitat, etc.);
- Conducting geographically targeted forest surveys to characterize over- and understory vegetation species composition and structure, and document snags, downed wood, and other unique habitat features;
- Using camera traps to gather information on ungulate and forest carnivore (e.g., bear, fisher, wolf) occurrence/movement in select areas, particularly where active habitat management is proposed;
- Deploying auditory autonomous recording units (ARU) at strategic locations to record wildlife vocalizations and gain information on spotted owl (and barred owl), marbled murrelet, and northern goshawk occurrence, and monitor wetlands for bullfrog invasion, and bat detection in select locations;
- Developing and maintaining a Geographic Information System (GIS) database of locations of rare, threatened, or endangered (RTE) and culturally significant plant species on the mitigation lands;
- Identifying adjacent development and infrastructure (i.e., public roads or developed or intensive agricultural land) which may have adverse effects on mitigation land ecosystem functions or wildlife connectivity. Likewise, identifying adjacent lands that may enhance habitat or wildlife connectivity by sharing similar management goals or extending specific habitats (i.e., management of adjacent older forests);
- Assessing restoration opportunities and constraints, with a focus on protecting existing ecosystem functions, species and habitat diversity, connectivity, and resilience, or enhancing degraded habitat systems to meet functional capacity;
- Track all baseline data in database and GIS maps;
- Periodically identify priority species and priority habitats and species using the Washington State Wildlife Action Plan (SWAP) database and through consultation with the WDFW; new information will be incorporated into property specific plans and the WDFW will be notified if species are found; and
- Habitat evaluation in select locations (see Section 3.10.3 of this Mitigation Lands Plan).

3.2 Habitat Protection and Enhancement Methods

City Light will consult with the SLIC to evaluate and select enhancement approaches appropriate to advance current conditions to desired conditions within Management Units (MUs) on each property. These methods will be determined based on information (gathered and synthesized from existing information and additional data collection) and through collaborative development of property-specific management plans (see Section 3.10 of this Mitigation Lands Plan). These approaches may include, but are not limited to the following:

- Riparian and wetland buffer enhancements;
- Silvicultural prescriptions (e.g., canopy gap creation, variable-density thinning, small clearcuts, etc.);
- Shrub, grass, and forb plantings for target ecosystem functions and target wildlife species;
- Pest and invasive plant species monitoring and management (per City Light's Invasive Plants Management Plan);
- Snag, downed log, and habitat pile creation and artificial bird nest box and bat box installation;
- Instream habitat enhancements either through City Light's Riverscape Ecosystem Plan (REP; 2023m) in the Skagit River (e.g., Powerline or Illabot spawning channels) or independent actions identified for streams on mitigation lands;
- Access control measures to minimize habitat degradation and wildlife disturbance; and
- Stewardship monitoring.

All access, monitoring, or treatments at mitigation lands will follow Standard Operating Procedures (SOPs) and BMPs identified in City Light's Invasive Plants Management Plan (Invasive Plants Plan) to prevent the introduction or spread of invasive plants. Where maintenance of facilities (i.e., Newhalem Ponds) or roadways is required, or new work is proposed (e.g., access roads necessary for habitat management, culvert replacement), City Light will follow SOPs and BMPs identified in its Vegetation Management Plan, Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan, and REP.

3.3 Habitat Connectivity

A primary focus of the management of City Light mitigation lands will be to maximize connectivity with surrounding lands for ecosystem processes and wildlife movement. Steps and actions to identify and manage in order to accomplish the Mitigation Lands Plan goals include:

- Identify potential habitat corridors between mitigation lands and public or other conservation lands based on vegetation maps, elk and deer use and telemetry data from co-managers and researchers, and Washington Wildlife Connectivity analyses and related information (https://waconnected.org/resources-and-information/);
- Analyze information on wildlife movement on and near mitigation lands for potential barriers;
- Identify opportunities to collaborate with neighboring landowners, land managers, road infrastructure managers, and others to jointly manage habitats for connectivity and reduce risks to wildlife;

- Use camera trap data to inform management of ungulate and forest carnivore travel corridors on the mitigation lands; and
- Remove impediments to fish and aquatic wildlife species movement using culverts to cross Project roads on the mitigation lands.

3.4 Species and Habitats of Management Focus

While a priority of this Mitigation Lands Plan will be to promote natural processes and ecological functions, wildlife species and associated habitats of management focus are considered for each property. These include agency identified species (e.g., federal- and state-listed species, Washington priority species and habitats, and those identified by the U.S. Forest Service [USFS] and the National Park Service [NPS]). Focus species additionally include:

- Culturally important wildlife and plants (e.g., species that are culturally important to Indian Tribes and Canadian First Nations);
- Keystone species (i.e., beaver and beaver habitat,);
- Species of recreational or economic value (i.e., game species);
- Indicator species (e.g., the presence of which can indicate if an ecosystem is healthy, cavity nesting bird habitat, native amphibians); and
- Additional species based on SLIC input and adaptive management decisions.

3.5 Climate Change Considerations

City Light will incorporate climate change considerations in vegetation and hydrology management actions on mitigation lands in tandem with other Mitigation Lands Plan programs and property-specific plans. Consideration and actions that will inform climate change management measures include, but are not limited to the following:

- Use Seedlot Selection Tool (U.S. Department of Agriculture [USDA] 2023) or the current BAS to choose plant provenance suitable for projected climatic conditions 30-50 years in the future;
- Consider expected changes in hydrology when evaluating management actions affecting aquatic habitats; and
- Manage lands consistent with BAS throughout the license period and City Light's Climate Change Vulnerability Assessment and Adaptation Plan (City Light 2015), and include vulnerability analysis in property-specific management plans to consider warmer temperatures, more intense precipitation events, lower snowpack and summer stream flow, more frequent flooding, more windstorms, greater risk of wildfire, and more frequent landslides.

3.6 Wildfire

Due to the proximity of mitigation lands to private timberlands and residences, City Light will attempt to reduce human-caused wildfire ignitions and address increasing wildfire risk by eliminating dense fire-prone invasive plant species such as Scot's broom, reducing fuels near open roads (while maintaining wildlife hiding cover), and maintaining signage prohibiting campfires. City Light will collaborate with neighboring landowners (private, state, or federal) wherever it is feasible for wildfire prevention and responses, or use prescribed fire for forest health. Increased

City Light property monitoring patrols during times of high fire danger may be warranted in select locations. If a wildfire were to ignite on or spread to the mitigation lands, City Light would ask the Washington Department of Natural Resources (Washington DNR) to respond to the fire. City Light pays a mandatory fire assessment to the Washington DNR for forest-fire response.

3.7 Emergency Situations

Emergency situations are instances where there is imminent risk to human life, including a threat of fire hazard, mechanical failure, or power outage. In the event of an emergency situation, City Light will make efforts to avoid direct effects to natural or cultural resources and will communicate with appropriate agencies within 14 days if these situations arise that affect resources of concern. Additionally, City Light will coordinate with their Cultural Resource Coordinator as expeditiously as possible.

3.8 Culturally Important Resources

City Light shall collaborate with Indian Tribes and Canadian First Nations to maximize opportunities to access the mitigation lands for traditional uses, where possible while respecting neighboring landowners. On each property, City Light will collaborate with the City Light cultural resources specialists, and Indian Tribes and Canadian First Nations to protect historic properties and cultural resources. City Light's cultural resources specialists will review proposed related actions in accordance with the activity review process outlined in the HPMP. The HPMP complies with federal and state cultural resource protection regulations and includes an Unanticipated Discovery Plan (UDP) for the Skagit Hydroelectric Project (see City Light's HPMP).

City Light will always maintain respectful and private communications with Indian Tribes and Canadian First Nations for the purposes of protecting traditional knowledge and sensitive information. No sensitive information will be released beyond the Indian Tribes, Canadian First Nations, and land management and cultural resource management agencies. Communication regarding culturally important areas and plants will be fully coordinated with the protocols and management measures in City Light's HPMP.

3.9 Scientific Research

Scientific research[5] by outside researchers may be conducted on mitigation lands provided the proposed activity does not compromise the habitat and wildlife values for which the property is being preserved, and after review and approval in consultation with the SLIC. Further, the SLIC may recommend funding scientific research on mitigation lands if such research would provide a management benefit to the lands or the wildlife using those lands.

3.10 Public Use[6]

City Light will consult with the SLIC to develop and implement a public use policy for the mitigation lands with a priority of protecting fish and wildlife resources. A general policy will be to allow non-motorized access and recreation that does not involve commercial gain, overnight

[5] Examples of current scientific study include air quality monitoring on the Corkindale Creek property, forest inventory assessment plots on several properties, and trout eDNA testing on the Nooksack properties.

[6] The word "public," as used in this Mitigation Lands Plan, does not include the Indian Tribes or Canadian First Nations, which are sovereign entities in their own right, or their members.

camping, campfires, tree cutting, firewood gathering, mineral extraction, or removal of any naturally occurring material that impacts habitat. Special use restrictions may be warranted in areas where public could affect wildlife or wildlife habitat.

Fishing and hunting are generally permitted on the mitigation lands, as regulated by the Washington Department of Fish and Wildlife (WDFW) and Indian Tribes. The SLIC may recommend exceptions to City Light. Reasons to restrict hunting by the public may include:

- Public safety, because of the proximity of housing or other human activity;
- Evidence that hunting has unacceptable adverse impacts on wildlife populations, including wildlife other than the species being hunted; and/or
- Conflicts with other uses.

3.10.1 Easements and Special-Use Permits

Most mitigation properties are subject to third-party easements. These are legal agreements that must be honored through their full term and may allow the easement holders to gain access to their properties across City Light property. In some cases, City Light has easements over land owned by others in order to access mitigation lands. Easements may have associated provisions for allocation of road maintenance responsibilities.

Some properties were acquired under terms that allowed previously existing uses to continue, such as haying or grazing.[7] These agreements will be evaluated annually, and activities that conflict with wildlife habitat objectives may be discontinued if allowable under terms of the agreement. City Light will only grant new easements or special-use permits for uses that are compatible with this Mitigation Lands Plan, and they will only be granted through consultation with SLIC.

3.10.2 Protection and Security

City Light will implement a security and monitoring program at select mitigation lands to minimize incidence and extent of wildlife and habitat effects from illegal/unauthorized activities, and to protect resources from unlawful recreation activities on the mitigation lands. Risks of illegal activity associated with remote lands may include tree/wood, wildlife, or fish poaching; squatters taking up residence; installation of drug labs; dumping of trash; off-road vehicle use; or other destructive uses. The program will include the following activities:

- Regularly monitor mitigation lands to identify locations of habitat damage, poaching, or illegal sources of disturbance from illegal and legal activities. Regular but unscheduled visits will be conducted where warranted;
- Plant and maintain native vegetation visual screens near roads to reduce wildlife poaching risk;
- Maintain gates or permanent barriers to limit unauthorized motorized vehicular access where feasible;

[7] Previous easements which have reached the term of their agreements have included fish rearing at Barnaby and operation of a gravel pit at Bacon Creek. The only ongoing agreements are haying and grazing at Corkindale Creek, haying at Savage Slough, and estate haying at McLeod.

- Coordinate with neighbors to stay informed on issues;
- When necessary, consider options to enter Memorandum of Agreements with state, county, and Tribal law enforcement to increase security patrols in problem areas and respond to throughout the license period and to; and
- Develop action plans, as needed, as a component to property-specific management plans to restore damaged habitat or to reduce or eliminate source of problems.
- When necessary, City Light will collaborate with and fund appropriate law enforcement entities to conduct additional monitoring of areas prone to illegal activities and provide rapid incidence response, issue citations and pursue prosecution of illegal activities.

3.11 Property-Specific Management Plans

City Light will consult with the SLIC to develop and implement property-specific management plans on a rolling schedule. The property-specific management plans will present management opportunities and recommendations based on known existing conditions and desired future conditions. Individual properties may be managed independently or grouped together if management goals are aligned. Relicensing study information collected in 2021 and 2022[8] and other available data provide the basis for current condition descriptions, although more data collection will be completed at select locations to provide necessary detail regarding opportunities, constraints, and potential treatments to progress toward management goals.

The systematic process used to identify desired future conditions and implement management actions at specific locations within each property will be completed through consultation with the SLIC and include the following steps:

(1) **Define preliminary MUs[9] on each property** - Use existing vegetation, wildlife habitat, fish and aquatic habitat, roads, and geology/soils information to map areas with similar access, vegetation types, tree ages, type of connected habitats, slope stability, riparian and wetland management zones (RMZ and WMZ), and other considerations. City Light has developed GIS maps of approximately 290 preliminary MUs to allow for initiation of consultation and evaluation; these MUs may be modified during the consultation process.

(2) **Identify desired future condition goals and management feasibility for each MU** – Use existing information to identify general goals, management direction (desired future

[8] Licensing study results are reported in GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way Study (City Light 2023a), TR-01 Vegetation Mapping (City Light 2023b), TR-02 Wetland Assessment (City Light 2023c), TR-03 Rare, Threatened and Endangered Plants (City Light 2023d), TR-04 Invasive Plants Study (City Light 2023e), TR-05 Marbled Murrelet Study (City Light 2023f), TR-06 Golden Eagle Habitat Analysis (City Light 2023g), TR-07 Northern Goshawk Habitat Analysis (City Light 2023h), TR-08 Special-Status Amphibian Study (City Light 2023i), TR-09 Beaver Habitat Assessment (City Light 2023j), and TR-10 Northern Spotted Owl Habitat Assessment (City Light 2023k). Information collected outside of licensing studies and prior to license implementation will also be integrated into property-specific analysis and planning, and will be made available to the SLIC.

[9] City Light identified MUs as GIS-mapped divisions to define management objectives. These units define logical boundaries for landforms, mix of general habitat types, and adjacent habitats. The GIS layer of MUs will be used in consultation with the SLIC in the development of property-specific management plans and will be updated as needed.

conditions), and management feasibility for the MUs. See Section 3.10.1 of this Mitigation Lands Plan for more detail on assigning desired future conditions to MUs; see Section 3.11.1 of this Mitigation Lands Plan for more details on determining management feasibility.

(3) **Collect additional data to refine MU goals and identify management options** – Consult with the SLIC to prioritize habitat evaluation or collection of other needed data in MUs identified for active habitat management actions and determine suite of data to be collected, geographic extent of the data collection, collection methods, and schedule (phased implementation). See section 3.10.3 for more details on MU habitat evaluation.

(4) **Select MU management action(s)** – Using all data, identify one to several management alternatives and select preferred action (could include multiple actions), refine treatment area(s) within the MU, develop prescription and post-treatment vegetation composition and structural targets, select monitoring approaches, develop contract specifications, identify implementation and monitoring schedule.

(5) **Conduct pre-activity assessments** – Identify baseline monitoring data needs, conduct pre-activity consultation and assessments for RTE plants, federally listed[10] wildlife, Priority Habitats and Species (PHS), and Washington SWAP species. City Light's cultural resources specialists will complete such consultation and assessments in accordance with the activity review process outlined in the HPMP.

(6) **Implement actions** – Implement actions following prescription/specifications and using appropriate BMPs.

(7) **Monitoring –** Define monitoring protocols to include regular, appropriately timed data collection to track habitat condition changes. Measure habitat parameters (possibly wildlife use at select sites) for specified number of years and report to SLIC on habitat changes to inform adaptive management and implement management necessary to address any unanticipated adverse changes such as invasive species.

3.11.1 Desired Future Conditions

Generalized habitat types that are in alignment with the desired future conditions of MUs have been assigned to MUs to support preliminary planning and habitat evaluation needs. These are subject to revision through approval by SLIC during the license period. These generally include:

- **High-quality Early Seral Communities** - These habitats are plant communities that occupy potentially forested sites after a stand disturbance and before re-establishment of a closed forest canopy and include meadows, shrublands, and young forests. Small man-made fields and forest gaps can support high-quality early seral habitat elements as well. These provide habitat for a variety of birds, ungulates (i.e., deer, elk, mountain goats), pollinators, and other wildlife. They may be maintained through active management, as needed.
- **Forest Ungulate Habitat** – Forest stands can provide important foraging and hiding cover for deer and elk if they support an appropriate mix of woody vegetation, forbs, and grasses, and support diverse structural classes. Select forested MUs will be evaluated to identify areas suitable for potential enhancements such as creating small early seral habitat openings (forest

[10] Species that are listed and protected under the ESA, as endangered or threatened, or are proposed for listing.

gaps), understory plantings, or other forest treatments (e.g., selective harvest) to provide for diversity in ungulate habitat while also promoting structural diversity for other wildlife.

- **Forest Diversity** – Select forested MUs will be evaluated for overall ecological functions and wildlife habitat conditions, and suitability for active management actions. The results of the ground-based habitat evaluations will be used to identify appropriate site-specific prescriptions to address overall forest species and age structure, overly dense tree stands, locations with high wildfire fuel loads, availability of snags and downed wood, understory vegetation abundance and composition, and other modifications to benefit multiple wildlife species.
- **Older Forest Protection/Development** - Older forests will be maintained to allow for development of old growth conditions to the extent possible. These areas provide habitat for a variety of species, including northern spotted owl, marbled murrelet, and northern goshawks. These areas are expected to require minimal active management actions and will rely largely on passive management.
- **WMZ/RMZ** - Wetland and riparian management zones include the waterbody (lake, river, stream, wetland) and a buffer to protect transitional areas. These areas provide habitat for ungulates, forest carnivores, bats and avian species, and are critical for amphibians and aquatic mammals (i.e., beaver). They also shade aquatic habitats and are sources for wood recruitment. These areas will primarily be managed through protections but may include some enhancement actions to be determined through ground-based habitat evaluations.

3.11.2 MU Feasibility Categorization

In addition to desired future conditions, City Light assigned each MU a preliminary feasibility category attribute to assist the SLIC with planning habitat evaluation, data collection, and management activities over the life of the license. The categorization is a tool to plan phased, rolling implementation of actions so that active management can begin on some MUs, while data collection and planning are in progress on other MUs. Preliminary feasibility categories are defined as follows:

- Category A: MUs which are anticipated to have high benefit from implementation of management activities because they have clear and attainable habitat enhancement options and limited potential for adverse environmental effects. These include MUs which can be accessed via existing roads or by re-establishing relatively short sections of previously abandoned roadbeds with minimal stream crossings. Preliminary classification identified 3,220 acres of Category A MUs.
- Category B: MUs which have potential enhancement opportunities but that need additional data to determine appropriate actions and/or may have adverse environmental effects related to access (e.g., moderate access challenges requiring re-established road access, with more than one small stream crossing, or crossing of a significant stream). Preliminary classification identified 3,227 acres of Category B MUs.
- Category C: These MUs have upland, riparian, or wetland communities that are currently intact with good ecological functions and wildlife habitat value. They have significant access limitations and/or would likely sustain substantial adverse or unintentional environmental effects from active management (e.g., require building new roads). These MUs are candidates for passive management (e.g., allowing existing forests to age) and stewardship monitoring.

However, if the SLIC determines that resource enhancement actions should be considered, they will be evaluated to identify possible cost-effective active management actions that would be implemented if approved by the SLIC. Preliminary classification identified 4,357 acres of Category C MUs.

3.11.3 MU Habitat Evaluation

City Light will evaluate select MUs that require additional habitat information for habitat management opportunities to increase forest health and diversity, enhance forest for ungulates, or identify locations to increase high-quality complex early seral habitat. Habitat evaluations will be performed on phased, rolling schedule, with Category A MU evaluations beginning in Years 1-3 and Category B MU evaluations beginning in Year 5. If deemed appropriate by the SLIC, select Category C MUs will be included. Of the acres evaluated and determined to be feasible for active management, all acres will be treated to the extent practicable.

3.11.3.1 Forest Diversity and Forest Ungulate Habitat

To promote forest health and diversity and enhance forest for ungulates, City Light will conduct ground-based over- and understory habitat evaluations in selected MUs currently supporting upland forests. The results of the evaluations will be used to identify appropriate forest management activities to move vegetation structure and composition toward desired future conditions. City Light will consult with the SLIC to select appropriate management actions based on the evaluations that could include, but not be limited to: (1) passive management with monitoring; (2) invasive plant management and native plantings; (3) creation and maintenance of small forest canopy gaps to promote dense understory shrubs, grasses, and forbs (potentially with supplemental seeding); (4) variable density thinning or other selective tree harvest; (5) snag creation; and (6) maintenance of visual buffers along roads.

Within the areas classified as Category A MUs for forests, initial mapping identified the following evaluation acreages: 327 acres for older forest protection/development, 420 acres for potential creation of complex early seral habitat (see Section 3.10.3.2), and 1,448 acres for forest diversity, including 60 acres for visual buffers and smaller acreage for hydrologic connectivity. The preliminary feasibility Category B forest habitat evaluations include: 1,187 acres of older forest protection/development, 90 acres for potential creation of complex early seral habitat, and 1,069 acres for forest diversity including 22 acres for visual buffers.

3.11.3.2 Complex Early Seral Habitat

Habitat evaluations will be conducted to identify locations to develop new complex early seral habitat or to identify specific management actions to protect and enhance existing complex early seral habitat.

Preliminarily, complex early seral habitat will be developed at the Nooksack, Nooksack West, False Lucas Slough, and Illabot South properties. The existing 190 acres of fields and meadows will be maintained or enhanced on the Corkindale Creek, Day Creek Slough, Illabot North, Johnson Slough, McLeod Slough, Nooksack, O'Brien Slough, and Savage Slough properties. As indicated in Section 3.10.3.1, approximately 420 acres of existing second-growth forest will be evaluated for additional creation of early seral habitat areas that can be actively maintained to support a diverse mix of native herbaceous and shrub species; some non-invasive non-native

herbaceous species may be included for ungulate forage if approved by SLIC.

City Light will actively manage complex early seral habitat to maintain or enhance quality ecosystem characteristics. Specific maintenance actions will depend on location and SLIC approval, but may include activities such as invasive plant management following City Light's Invasive Plants Plan, hayfield management, creating and maintaining vegetated visual buffers near roads, seeding and planting, and mowing. Note that approximately 1,792 acres have preliminary prescriptions as early seral habitat MUs on the transmission line ROW through City Light's Vegetation Management Plan; six acres of these overlap the Illabot North property.

3.11.3.3 Wetland/Riparian Management Zones

Approximately 3,832 acres have been preliminarily identified as WMZ/RMZ MUs for the protection and restoration of riparian ecosystem functions and habitat values for species associated with riparian, wetland, and aquatic habitats. The WMZ/RMZ MUs were delineated to incorporate WDFW riparian management area recommendations (Rentz et al. 2020), and where appropriate, include extended buffers to capture the extent of immediate drainages and where slopes need protection. The mitigation lands border about 8 miles of rivers (Skagit, Sauk, and South Fork Nooksack and their major side channels) and encompass about 118 miles of mapped tributary streams. The main management actions will aim to maintain aquatic connectivity along lakes, streams, wetlands, and seeps; promote diverse tree and shrub layers with a mix of conifer and deciduous tree species; minimize invasive plant species; and provide snag and downed wood habitats.

Approximately 441 acres of WMZ/RMZ on the properties have been identified as candidates for ground-based habitat evaluation; of those, 84 acres are in Category A MUs, 321 acres are in Category B MUs, and 37 acres are in Category C MUs. MU borders may shift based on habitat evaluation results; some portions of WMZ/RMZ MUs may be included in upland forest MUs, as appropriate.

3.11.4 Management Actions

Management actions describe the means by which City Light will strive toward creating or maintaining desired future conditions within MUs. Preliminary management actions have been prescribed for some MUs (Attachment A), while other MUs require habitat evaluation to determine management actions appropriate to the specific current conditions and desired future conditions. Determination and implementation of potential management actions may also be based on feasibility factors, such as cost to benefit ratio or demonstrated negative environmental effects.

Passive Management Actions - Under passive management, City Light will take very limited or no direct action to maintain or modify the structure, composition, or other attributes of a natural community with the aim to generally allow natural processes to control conditions over time. Passive management may include basic, minimal maintenance of current conditions, or repair or improvement to infrastructure associated with the property or property access. Specific actions which may be associated with areas of passive management may include:

- Ground-based habitat assessments to collect vegetation data to inform decision-making;
- Regular stewardship monitoring which involves visual inspection of select areas to evaluate changes over time resulting from natural processes and human activities to inform adaptive management;
- Small-scale control of non-native invasive species;
- Maintenance of vehicle access control points (gates and barriers);
- Installation and maintenance of signage; and
- Ditch and culvert maintenance with hand tools.

Active Management Actions - Under active management, City light will perform specific actions to create, maintain, or enhance natural communities to work toward ecological functions and habitat values aligned with the desired future conditions for each MU. Active management actions conducted under this Mitigation Lands Plan may include, but not be limited to, the following:

- Use of machinery, chainsaws or hand tools to complete silvicultural prescriptions, such as canopy gap creation, variable-density thinning, small clearcuts, and selective tree removal, snag creation;
- Removal of invasive plant species through mechanical, manual, chemical, biological control (per City Light's Invasive Plants Plan);
- Removal of tree stumps and grading for creation of complex early seral habitat;
- Planting of trees, shrubs, or herbaceous species;
- Wildfire fuel management and wildfire fighting and restoration activities;
- Mowing of fields;
- Rotational grazing by livestock to control invasive plants (e.g., temporary actions at the Corkindale Creek property);
- Road, ditch, and culvert maintenance with machinery;
- Construction of roads to facilitate forest management activities;
- Repair or replacement of roads or bridges;
- Grading the ground with machinery or hand tools to maintain or modify surface water drainage;
- Road abandonment (e.g., roadbed and water crossing structures) following management activities;
- Hydrologic modifications (e.g., grading and excavation, modifying flows, wood placement, beaver dam analogs) for fish habitat restoration projects;
- Beaver coexistence management (e.g., pond-leveler, beaver deceiver);
- Control of invasive non-native wildlife (i.e., bullfrogs); and
- Actions to address horticultural pests and diseases per State and County regulations.

Commitments to passive or active management actions may be reevaluated over the license term following the systematic process (Section 3.10) used to identify preliminary desired future conditions, implement management actions, and monitor habitat condition changes. Decisions on evaluated acreage and treated and untreated acreage will be documented in the annual reports and tracked on a MU basis to demonstrate accomplishments so that if conditions change during the license period, City Light and the SLIC can reassess in the future. At select treatment areas, City Light will monitor vegetation and wildlife response (see Sections 5.0 and 5.1).

3.11.5 Preliminary Property Descriptions

Property-specific management plans will be developed and implemented on a phased, rolling schedule. The following sections provide a broad overview of the information for each of the properties, while more detailed initial property-specific information and preliminary MUs are provided in Attachment A; preliminary MUs for each property are shown in maps in Attachment B.

3.11.5.1 Properties within the Ross Lake National Recreation Area

The mitigation lands within the RLNRA consist of two properties that have been managed for fish habitat under the current license: the County Line Ponds and Newhalem Ponds totaling 167 acres. Both properties border the Skagit River in an area designated as Wild and Scenic River (WSR) and federal lands and adjoin City Light lands, with State Route (SR) 20 along the northeastern property boundaries.

Newhalem Ponds

Newhalem Ponds is an easily accessible 111-acre property between SR20 and the Skagit River near RM 91. The Newhalem Ponds property is primarily used to support fish habitat associated with the Skagit River, but also the protection of wetland and riparian habitats. City Light uses about 3 acres of the property for storage of stone, wood, culverts, and heavy machinery for O&M and as a river access point for boat launching and adding wood to the river. This property supports WDFW releases of hatchery-raised fish. Vegetation communities are dominated by riparian and wetland forests surrounding the large ponds and channels with areas of submerged aquatic vegetation. Some of the channels are fringed by emergent wetlands composed of a mix of native plants and patches of reed canarygrass. A western toad breeding site was documented at one section of a pond shoreline that receives greater insolation. Forests include Douglas-fir, western red cedar, and western hemlock.

City Light created off-channel habitat for Chum Salmon by modifying excavated gravel pits into ponds and constructed spawning channels connecting the ponds to the Skagit River. City Light has also began the restoration of impacted riparian forest and wetland buffers by reducing the footprint of the aggregate storage facility, abandoning unnecessary roads, and replanting areas with native plants.

The main management actions for this property are anticipated to be directed by City Light's REP to maintain or enhance the channels for salmonids and floodplain processes, while also protecting and enhancing, wetlands and riparian areas, and habitat for birds, amphibians, and beaver habitat if it is not conflicting with other fish or wildlife management goals. Through this Mitigation Lands Plan, City Light will implement steps to further minimize operations effects from the storage

facility per the Aggregate Storage Facility Management Plan (City Light 2022) and will consider modifying the storage area if necessary to complete any channel enhancements that might be planned under the REP. Opportunities for culturally significant plant enhancement may be pursued in coordination with Indian Tribes or Canadian First Nations. City Light will treat invasive plants directed through the Invasive Plants Plan. Other actions may include maintaining or increasing vegetation cover near SR 20 for visual buffers and evaluating installation of highway wildlife crossing signage between Bacon Creek and Newhalem. Refer to Attachment A for more detailed information about the property (Table 1a) and preliminary MUs (Table 1b), and Attachment B for mapped locations of MUs.

County Line Ponds

County Line Ponds is an easily accessible 56-acre property between SR 20 and the Skagit River near RM 90. Vegetation communities are dominated by riparian hardwood forest and shrub communities around wetlands; upland area supports mixed forests. Beaver dam construction and foraging of deciduous trees and shrubs have a major effect on aquatic and wetland communities. Several wetland sites support submerged aquatic and emergent herbaceous vegetation with mix of native plants and patches of reed canarygrass (*Phalaris arundinacea*). Western toad (*Anaxyrus boreas*) breeding was documented at one wetland.

City Light created off-channel habitat for Chum Salmon by modifying excavated gravel pits into ponds and constructed spawning channels connecting the ponds to the Skagit River. The channels support WDFW releases of hatchery-raised fish.

The main management actions for this property are anticipated to be directed by City Light's REP to maintain or enhance the channels for salmonids and floodplain processes, while also protecting and enhancing wetlands and riparian areas, habitat for birds, amphibians, and beaver (if beaver habitat is not conflicting with other fish or wildlife management goals). Opportunities through this Mitigation Lands Plan may include culturally significant plant enhancement in riparian or wetland areas and would be pursued in coordination with Indian Tribes or Canadian First Nations. Other actions may include maintaining or increasing vegetation cover near SR 20 for visual buffers and evaluating installation of highway wildlife crossing signage between Bacon Creek and Newhalem. Refer to Attachment A for more detailed information about the property (Table 2a) and preliminary MUs (Table 2b), and Attachment B for mapped locations of MUs.

3.11.5.2 Properties within the Sauk River Basin

The mitigation lands within the Sauk River basin are comprised of five separate properties totaling 322 acres. These properties are on both sides of the Sauk River in an area designated as WSR and is located between SR 530 to the west and the agricultural lands of the Town of Mansford to the east.

North Sauk

The North Sauk property is 46 acres bordering about 0.8 miles of the Sauk River with an additional 0.4 miles of fish bearing tributary streams. The property is on the east side of the Sauk River with the southern portion bordering the North Everett Creek property. There are about 14.5 acres of forested/shrub wetlands and 14 acres of riverine wetlands, with the vegetation dominated by riparian forest hardwood with some riverine. East-west wildlife connectivity is affected by SR 530

and rural/residential development between the Town of Darrington and the Suiattle River. Access is limited to river access or walking from an adjacent City Light ESA (Endangered Species Act) Program property (Gravel Creek) via Inman Road.

The main management actions for the North Sauk property are to maintain healthy riparian and upland forests. The property will be monitored and treated for invasive plants and monitored for unauthorized use. Forest management options will be evaluated. Refer to Attachment A for more detailed information about the property (Table 3a) and preliminary MUs (Table 3b), and Attachment B for mapped locations of MUs.

Sauk Island

The Sauk Island property consists of 21 acres in the floodplain of the Sauk River. It borders about 0.5 miles of the Sauk River and has about 5 acres of riverine wetland. Vegetation is dominated by riparian forest hardwood, riverine, and some conifer. East-west wildlife connectivity is affected by SR 530 and rural/residential development between the Town of Darrington and the Suiattle River. Access is walk-in about 0.4 miles along Washington DNR owned shoreline from Estes Road.

The main management actions for the Sauk Island property are to maintain healthy, functioning channel migration zone (CMZ), wetlands, and riparian forest. The property will be monitored and treated for invasive plants as necessary and monitored for unauthorized use. Refer to Attachment A for more detailed information about the property (Table 4a) and preliminary MUs (Table 4b), and Attachment B for mapped locations of MUs.

North Everett Creek

The 174-acre North Everett Creek property is located on the east side of the Sauk River and adjacent to the Everett Creek property on the southern boundary. It includes 0.9 miles of Sauk River shoreline and an additional 0.3 miles of fish bearing streams. About 9 acres are wetlands and riverine wetlands, with much of the property within the RMZ and CMZ of the Sauk River. Vegetation is dominated by riparian forest mixed, riverine and shrub wetland, and mid seral hardwood types, with minimal occurrences of invasive plants identified along the access trail. Access to the property is limited to river access or walking in from Crawford Loop Road via a City Light easement across private property and The Nature Conservancy (TNC) owned land.

City Light has monitored the North Everett Creek property for resource damage from unauthorized public access which used to include all-terrain vehicles (ATV), equestrian, and hiking use of the informal trail on abandoned roadbed. ATV traffic has stopped from City Light's collaborative efforts with TNC to barricade and add signage. City Light acquired a 20-acre inholding to fill gap in shoreline ownership and facilitate removal of debris left by the previous owner; City Light also address horse trespass on a wetland on the property.

The main management actions for this property are to maintain the healthy wetlands and riparian/upland forests. City Light will monitor for unauthorized use, and monitor and treat invasive plants, and evaluate the forests for feasibility of creating small forest gaps and cavity-nesting bird (woodpecker and waterfowl) habitat. Refer to Attachment A for more detailed

information about the property (Table 5a) and preliminary MUs (Table 5b), and Attachment B for mapped locations of MUs.

Everett Creek

The 39-acre Everett Creek property is located on the west side of the Sauk River, bordering about 0.25 miles. The property consists predominantly of wetland (14 acres) and riparian forest habitats (7 acres). Vegetation includes riparian forest mixed, riverine and shrub wetland, and mid seral mixed and hardwood. Habitat connectivity in the vicinity to the west is broken by SR 530 which is roughly 0.25 acres to the west. City Light accesses the property via an easement across private property, which is not open to public use. Due to very limited access, no active management has occurred.

The main management actions at the Everett Creek property are for the continued protection of wetlands, Sauk side channel, and riparian areas. The property will be monitored for unauthorized use and new occurrences of invasive plants. Refer to Attachment A for more detailed information about the property (Table 6a) and preliminary MUs (Table 6b), and Attachment B for mapped locations of MUs.

Dan Creek

The 42-acre Dan Creek property borders about 0.09 miles of a side channel of Sauk River and is entirely within the river's CMZ. Vegetation communities are mostly riparian conifer forest, mid-seral mixed forest, and riverine. The property supports slough habitat and Coho spawning habitat at the junction with Dan Creek. The property adjoins lands managed by TNC and the Sauk-Suiattle Indian Tribe, as well as City Light ESA Program[11] properties making an effective block of conserved riparian habitat. The property is walk-in accessible across ESA Program property (Upper Dan Creek) from county road, or by trail from TNC property off Crawford Loop Road.

Due to the hike-only access, no active management has occurred expect for installation of a tank trap along a jeep trail from a neighboring private property in response to one incidence in 2013 of timber theft. The tank trap has been effective at keeping pickup trucks and jeeps out but due to the flat ATVs or motorcycles occasionally circumvent the tank trap, but resource damage has been limited to the tracks.

The main management actions for this property are anticipated to include evaluation for potential snag resources, continued monitoring for trespass damage, and monitoring and treatment of invasive plants such as knotweed, with the goal of maintaining healthy, functioning channel migration zone and associated habitats. Refer to Attachment A for more detailed information about the property (Table 7a) and preliminary MUs (Table 7b), and Attachment B for mapped locations of MUs.

[11] ESA Program lands are owned by City Light and managed for salmon habitat. Although these ESA Program properties are separate from the Skagit Project, City Light considers habitat connectivity of all nearby or adjacent conservation properties in planning for property-specific management.

3.11.5.3 Properties within the Skagit River Basin

The mitigation lands in the Skagit River basin consist of 18 separate properties comprising a total of 5,917 acres. These properties are located throughout the Skagit River watershed generally downstream of Newhalem, although they are not necessarily located adjacent to the Skagit River.

Bacon Creek

This 119-acre property is located adjacent to SR 20 and intersects with the transmission line ROW along the southeastern corner. The property includes approximately 0.8 miles of Bacon Creek and 0.1 miles of a non-fish tributary. About 4 acres of freshwater forested wetlands are associated with the Bacon Creek channel. The vegetation is mostly forested with early- to mid-seral hardwoods, some late seral mixed forest along creek with many large, big-leaf maples. Riparian areas and Bacon Creek appear healthy with significant amounts of large woody debris. The area that was formerly a rock pit is dominated by sapling and pole-size alder, Douglas-fir, and other revegetating tree species.

The Bacon Creek property is bordered by public land and near Skagit Land Trust parcel, which contributes to wildlife connectivity between lower Bacon Creek and the Skagit River. There is mapped marbled murrelet potential habitat on and near the property. The property has direct access via USFS-maintained road (NF-1060) and SR 20, both of which affect wildlife connectivity but vehicle use is relatively low. In 2004, Skagit River System Cooperative (SRSC) realigned a section of the USFS on City Light land to reduce effects to the CMZ. There is evidence of unauthorized camping at a couple of sites near the USFS road. About 8 acres of the property are a former commercial gravel pit. As part of the Gorge Second Tunnel License Amendment approved in 2013, City Light proposed to use the pit for disposal of spoils and then to implement a habitat restoration plan. The Gorge Second Tunnel Project is still part of the proposed Skagit River Hydroelectric Project.

The main management actions at the Bacon Creek property are to implement restoration of the Gorge Second Tunnel spoil disposal area, maintain forest habitat, and monitor the property for invasive plants and unauthorized activity resource damage. Refer to Attachment A for more detailed information about the property (Table 8a) and preliminary MUs (Table 8b), and Attachment B for mapped locations of MUs.

B&W Road 1

The B&W Road 1 property consists of 79 acres and is completely forested. The forest consists of mostly second-growth conifer stands with some very large western redcedars on the eastern slopes. The eastern portion supports older forest and is mapped as potentially suitable habitat for marbled murrelet. Designated critical habitat occurs short distance east of this property. The property is bordered by USFS land on 3.5 sides which creates a wildlife corridor between the Skagit River and mountains to the east. Access is by a gated private road from the end of the B&W Road that goes north from the Cascade River Road, behind three private gates.

The main management action for the B&W Road 1 property is to maintain diverse forest habitat and to retain wildlife corridor. The younger forests on the flatter western portion of the property will be evaluated for potential forest management actions to promote habitat diversity. Refer to

Attachment A for more detailed information about the property (Table 9a) and preliminary MUs (Table 9b), and Attachment B for mapped locations of MUs.

B&W Road 2

The B&W Road 2 property is 11 acres on the west side of the Skagit River south of B&W Road 2 and is almost completely forested, including hardwoods, mixed, and conifer. The property is adjacent to recreational lots with cabins on three sides, reducing habitat connectivity, but this property along with adjacent USFS land creates a narrow wildlife corridor between the Skagit River and the mountains to the east. There are 0.6 acres of potentially suitable habitat for marbled murrelet. There is one private road crossing the property near the eastern boundary of the property; access to this property is via the private road, through two locked gates.

The main management actions for the B&W Road 2 property are protection of the riparian and upland forests. Refer to Attachment A for more detailed information about the property (Table 10a) and preliminary MUs (Table 10b), and Attachment B for mapped locations of MUs.

Corkindale Creek

The Corkindale Creek property, which was acquired in 2018, consists of 143 acres of land, with the southern boundary intersecting with City Light's transmission line ROW. Some portions of the property are forested along the northern boundary with mixed deciduous-conifer forests on the northern portion and along the seasonal stream which bisects the property and has been heavily channelized between the southern property line and the Skagit River on the opposite side of SR 20 (0.8 miles of creek). Dense patches of Himalayan blackberry are present along the riparian zone and along forest edges and other invasive species occur scattered throughout the pasture and hayfield. Some fence lines have a mix of blackberry and native shrubs. Agricultural lands surrounding the property limits connectivity to the south and east, while forested USFS and WDFW lands to the north and west provide good wildlife habitat connectivity. City Light has legal access via gated farmland through private parcels; public access is only possible by hiking 0.8 miles from SR 20 through WDFW, Washington DNR, and federal land.

City Light has had a permittee continue grazing and haying to prevent weed infestations until a long-term management plan is developed. City Light is working with the current permittee to fence off forests from livestock and brush-cut blackberry patches to improve access for mammals.

The main management actions include developing a restoration/management plan for increasing wildlife habitat value in current pasture and hayfield and improving riparian habitat conditions. Options to be evaluated include extensive invasive plant species management, stream channel habitat measures on the altered creek alluvial fan, riparian forest under plantings. Due to the large size and degraded condition of the fields, this will require a phased approach. Refer to Attachment A for more detailed information about the property (Table 11a) and preliminary MUs (Table 11b), and Attachment B for mapped locations of MUs.

South Marble 40

The South Marble 40 property is 41 acres dominated by mixed and conifer forests, wet shrublands, and grassland/shrublands with about 0.5 miles of mapped stream. The property is surrounded by

industrial forestland. The property is walk-in accessible from industrial forestland roads at the southeast corner.

The property is used to conserve forest habitats. It was acquired from the Washington DNR specifically for this conservation purpose and is subject to the Habitat Conservation Plan (HCP) restriction.

The main management actions include the continued conservation of older forests for avian and wildlife species per the marbled murrelet HCP restriction. Refer to Attachment A for more detailed information about the property (Table 12a) and preliminary MUs (Table 12b), and Attachment B for mapped locations of MUs.

Illabot North

The Illabot North property includes 726 acres between the Rockport-Cascade Road and the Skagit River. Vegetation is diverse, with conifer and mixed conifer/deciduous forest and patches of riparian and wetland forest and shrubland communities. A substantial wetland complex is associated with the Illabot Slough, and in the constructed Powerline Pond and Illabot Chum channels. The property includes 0.6 miles of O'Brien Creek and 2.7 total stream miles of tributaries and sloughs connected to Illabot Creek. There is a total of about 85 acres of freshwater forested/shrub wetlands associated with both creeks. Wildlife connectivity is good as the property connects to adjacent City Light mitigation and ESA Program conservation properties at O'Brien Creek and across Rockport-Cascade Road, Illabot South and O'Brien Creek, as well as slough corridors and conservation lands to the west. The property is affected by presence of the Skagit transmission line ROW (approximately 0.7 miles of ROW overlaps the mitigation land) and access road, and the private recreation lots along the river. Access to Illabot North is direct from Illabot Creek Lane (gated) which mostly aligns with the transmission line ROW, and Pandora Circle Road which borders a portion of the eastern boundary, as well as walk-in access from the Rockport-Cascade Road.

City Light's enhancement actions completed to date include the construction of the two spawning channels, acquisition of ESA Program properties to reduce trespass on the mitigation land, abandonment of all interior forest roads per Washington DNR Road Maintenance and Abandonment Plan, installation of the Illabot Creek Lane gate and signage to reduce vandalism and traffic through stream and wetland areas, invasive plant management within the ROW and along the Powerline Spawning Channel, and some seeding/plantings on the transmission line ROW portion of the property.

Main management activities will prioritize the continued protection and enhancement of healthy wetland, riparian, and upland forest communities to support Chum channels, and vegetation in the transmission line ROW habitat to support ungulates and songbirds, and pollinators. City Light will continue to monitor and treat invasive plants and monitor for unauthorized use or other anthropogenic effects. There are more than 400 acres of forest that can be evaluated for forest health and ungulate habitat enhancement actions such as the creation of small canopy gaps or variable-density thinning. Refer to Attachment A for more detailed information about the property (Table 13a) and preliminary MUs (Table 13b), and Attachment B for mapped locations of MUs.

O'Brien Slough

The O'Brien Slough property is 47 acres and is managed to protect aquatic and riparian habitats. The property includes 0.5 miles of fish bearing creek/slough and 0.03 miles of intermittent tributary, associated with 14 acres of freshwater forested/shrub wetland that are accessed by salmon and provide good habitat for pond-breeding amphibians. Vegetation includes upland, riparian, and wetland forests; reed canarygrass is common in some portions of the slough. The property adjoins City Light's North Illabot and ESA Program lands up- and downstream along most of O'Brien Slough. There is a cluster of privately-owned recreation lots along the Skagit River on the opposite side of the ESA Program lands. Access is direct from both Pandora Circle Road and Rockport-Cascade Road. There is a limited vegetated buffer between the country road and the wetland along some of the slough.

Previous actions have focused on invasive plant treatment near Rockport-Cascade Road. The SRSC also removed the road prism that used to cross O'Brien Slough.

The main management actions include increasing the visual buffer of the Rockport-Cascade Road, and maintaining diverse slough habitat. Refer to Attachment A for more detailed information about the property (Table 14a) and preliminary MUs (Table 14b), and Attachment B for mapped locations of MUs.

Illabot South

The 2,522-acre Illabot South property is currently managed for forest habitat and protection of streams that feed Illabot Creek and the Skagit River. Vegetation is dominated by diverse upland hardwood and mixed forests, and wetland mixed forests. There is a very small patch of burned forest adjacent to the transmission line ROW (approximately 0.18 miles overlap the mitigation land) from a wildfire in 2015. Potentially suitable marbled murrelet habitat is east and west of Illabot Creek, and designated critical habitat occurs 0.5 miles south of the property. Wildlife connectivity is very good as property adjoins adjacent Washington DNR and USFS forestland to the southeast and City Light mitigation properties to the northwest. The property includes about 2 miles of Illabot Creek which is a designated Wild and Scenic River on City Light land and upstream USFS land. The transmission line ROW crosses a short section at the northwest corner of the property. There is an industrial forest road along the southern border, and the Rockport-Cascade Road along the northwest border. Industrial forestlands are to the east north, and southwest. The northern portion of the property is directly walk-in accessible from Rockport Cascade Road. Vehicle access is controlled by gates on the transmission line ROW and on an industrial forestland road along the southern boundary of the property.

City Light's enhancement actions to date have included decommissioning and revegetating an extensive network of former logging roads. City Light has also actively supported the SRSC's restoration of multiple channels on Illabot Creek both up- and downstream of Rockport-Cascade Road.

Main management actions will include a combination of maintaining older forest habitat and connectivity with surrounding forests for long-term development of marbled murrelet habitat (691 acres), evaluation of potential forest management for ungulates (247 acres) or habitat diversity and forest health (893 ac.), and protection of wetland and riparian zones (654 acres). City Light will

monitor and manage invasive species along the transmission line ROW and roads, and will monitor for unauthorized use and other anthropogenic effects. Refer to Attachment A for more detailed information about the property (Table 15a) and preliminary MUs (Table 15b), and Attachment B for mapped locations of MUs.

Bogert and Tam

The Bogert and Tam property consists of 17 acres in a rural residential area between SR 20 and the Skagit River. Vegetation includes diverse forest and shrubland types, with riparian forest along the stream channel. The property borders 0.20 miles of a Skagit River side channel that supports known Priority Habitats and Species (PHS) spawning habitat for Coho and Chum salmon and PHS-mapped breeding habitat for harlequin duck. The side channel also provides wintering bald eagle foraging habitat. Access to the Bogert and Tam property is direct from SR 20; it is bordered by private parcels developed for residential uses on three sides.

The main management actions for this property are to maintain river shoreline and riparian forest habitat, including the side channel and associated island. The property will be monitored for invasive plants and anthropogenic effects. Refer to Attachment A for more detailed information about the property (Table 16a) and preliminary MUs (Table 16b), and Attachment B for mapped locations of MUs.

Barnaby Slough

The Barnaby Slough property includes 225 acres south of the Skagit River. The upland portion of the property is mostly forested and has been used as industrial forestland and rural residential, but a significant portion of the property includes Harrison Pond and Harrison Slough. Vegetation is dominated by mixed forest, with conifer forest along Martin Ranch Road at the southeast border. Riparian forest and wet shrublands occur along the shoreline of sloughs and ponds. There are very recent clearcuts on adjacent private property. The Barnaby Slough property has high quality, diverse habitat for birds, amphibians, and fish. Harrison Pond provides waterfowl habitat for a variety of ducks, geese, swans, and wading birds. Upper Harrison Slough which has extensive beaver-modified wetland habitat, that provides high-quality amphibian breeding habitat, bat foraging areas and dense forest, shrub, and herbaceous vegetation. A bald eagle nesting territory occurs on WDFW land near Barnaby Slough. Surrounding lands to the north and west include TNC, WDFW, and City Light ESA Program lands, which creates an effective block of conservation land with floodplains. The property is bordered on the south and east by industrial forest land and private land.

Trail access is available along the decommissioned Barnaby Slough Road from Martin Ranch Road which runs along a portion off the southwest border. This property is heavily visited by recreationists. The public use the property for hunting, fishing, mushroom and berry picking, and photography. The eastern portion of the property is near a private residence so a portion of the property is posted as a shooting safety zone. An informal canoe and small boat launch has been created to Harrison Pond from Martin Ranch Road creating a narrow (about 12 ft) zone of bank lacking vegetation.

City Light addressed unauthorized ATV use and vandalism by installing gates, barricades, and reducing nuisance attractants. City Light worked with SRSC and WDFW to remove a former

WDFW caretaker house, decommission a water pipe between Harrison and Barnaby Slough, and barricade Barnaby Slough Road.

The main management actions for this property are to support salmon habitat restoration efforts proposed by Indian Tribes, and to maintain diverse aquatic and wetland communities for wildlife. Refer to Attachment A for more detailed information about the property (Table 17a) and preliminary MUs (Table 17b), and Attachment B for mapped locations of MUs.

Johnson Slough

The Johnson Slough property includes 67 acres, which is currently used for the protection of wetland and riparian habitats. Vegetation is relatively diverse, with mixed upland forest, wet shrublands, meadow and marsh shrublands, ruderal meadow and marsh shrubland, grassland, and cultivated areas. The property supports about seven acres of riverine and ten acres of freshwater forested/shrub wetlands associated with the Skagit River and about 0.7 miles of other fish bearing streams. There is good wildlife connectivity with surrounding floodplain lands that are managed by the county, WDFW, and the Skagit Land Trust property upriver. SR 20 does affect movement between the floodplain and the forests to the north. City Light's ESA Program 57-acre "Rockport" property borders the mitigation land and provides a buffer along 0.5 miles of SR 20. Access is direct from SR 20 along an unpaved, gated farm road through the ESA Program property.

Activities to date have focused on riparian reforestation for salmonid habitat and small area of elk habitat management. SRSC has replanted and stewarded Salmon Recovery Funding Board-eligible areas, while the SRSC and the Sauk-Suiattle Indian Tribe have annually mowed non-eligible area (approximately ~3 acres) for elk forage.

Main management actions will prioritize maintenance or enhancement of functional floodplain riparian zones connecting to upstream conservation lands, and a diverse mix of forest, shrub, and meadow habitats. The mitigation land and the adjacent ESA Program land will be managed cohesively. City Light will work to maintain a reduced remnant pasture/hayfield, increase plant species and structural diversity, reduce Himalayan blackberry, and increase visual buffers on the ESA Program property while continuing to steward riparian forests and mowed field on the mitigation land. City Light will monitor and treat invasive plants. Refer to Attachment A for more detailed information about the property (Table 18a) and preliminary MUs (Table 18b), and Attachment B for mapped locations of MUs.

False Lucas Slough

The False Lucas Slough property consists of 203 acres dominated by mixed forests, riparian and wetland vegetation groups. There are approximately 1.5 miles of stream within the property, with the northwest corner intersecting with about 0.03 miles of the Skagit River. The property is bordered by public and conservation organization land to north and northeast, with rural residential properties to the west and partially to the south. Excellent wildlife connectivity is present on the floodplain to the north and with private forested lands to the east and to the south but rural residential properties along the west and southwest borders do limit connectivity and impinge on wetland buffers. City Light has an easement to access the property through industrial forestlands via a gated road. The wetlands provide excellent habitat for native amphibians.

The main management actions include wetland protection, and support of salmon habitat restoration efforts proposed by Indian Tribes. Other actions that can be evaluated include the removal of a former railroad bed prism and other small slough barriers, and possible forest management in select areas for overall forest diversity. Refer to Attachment A for more detailed information about the property (Table 19a) and preliminary MUs (Table 19b), and Attachment B for mapped locations of MUs.

Napoleon Slough

The Napoleon Slough Property includes 62 acres partially adjacent to and south of the Skagit River, and to the west of SR 530. The Napoleon Slough property is used for the protection of wetland and riparian habitats. Vegetation includes mixed and conifer upland forest, riparian forest, and wet shrublands. The property includes 0.5 miles of fish bearing creek/slough, which is connected to 0.5 miles of stream to the west and 0.3 miles to the east. The property has a total of 19 acres of freshwater forested/shrub wetland. The Napoleon Slough property buffers the floodplain from industrial forestland and SR 530 and provides wildlife connectivity between adjacent conservation land and the Sauk River. Access to the property is limited to walk-in from Napoleon Slough or the Skagit River.

The main management actions include maintaining healthy and diverse riparian habitat. Refer to Attachment A for more detailed information about the property (Table 20a) and preliminary MUs (Table 20b), and Attachment B for mapped locations of MUs.

McLeod Slough

The McLeod Slough property includes 126 acres of both agricultural land under a life estate, and undeveloped land used for the protection of wetland and riparian habitats. Vegetation includes mixed, conifer and riparian forests, wet shrublands, and grassland shrublands. There are about 21 acres of freshwater forested/shrub and about 2 acres of riverine wetlands. McLeod Slough is just south of the Skagit River, with 0.9 miles of fish bearing slough and 0.2 miles of tributaries. Wildlife connectivity includes adjacent WDFW land to the north along the Skagit River and private agriculture/forest properties to the south, which is frequented by a group of elk. Based on Washington DNR Water Type Modification Forms, Cutthroat are present in McLeod Slough tributary south of the property. The property is directly accessible from Concrete-Sauk Valley Road which runs along the southern boundary of the property.

To date, City Light has modified haying practices to reduce effects to wetlands, removed maggot-infested apple trees to comply with Washington Department of Agriculture, and supported SRSC riparian plantings. City Light has also installed a gate and rock barriers to prevent unauthorized vehicular access, and removed a patch of knotweed.

The main management actions include continued haying (haying area has been reduced in overall size), with increased buffer along Concrete-Sauk Valley Road and private residence, and stream/slough areas. Within the cultivated field, enhance wetlands within the western end, increase elk forage, and reduce blackberry cover along the perimeter. The life estate allows the former owner to continue haying field so some management actions may be delayed until life estate ends. Refer to Attachment A for more detailed information about the property (Table 21a) and preliminary MUs (Table 21b), and Attachment B for mapped locations of MUs.

Finney Creek

The Finney Creek property consists of 642 acres of forested lands with Finny Creek crossing the Northeast corner. The forest types include mixed and riparian, with patches of shrublands or grasslands. Most of the forests on lower slopes and near Finney Creek are 35 to 50 years old while upper slopes are 50 to 80 years with small, scattered patches of 100- to 170-year-old trees. The property supports about 0.6 miles of Finney Creek and about 7 total stream miles from seven tributaries; about 21 acres of riverine wetlands are associated with Finny Creek. The property is surrounded primarily by industrial forestland and some USFS land, which provides good wildlife connectivity to surrounding areas. About three-quarters of the property is mapped as potentially suitable habitat for marbled murrelet and the southwest corner abuts designated critical habitat for marbled murrelet. Access to the property is from the Finney Creek Road network, through private gates.

This property was acquired through the Washington DNR Trust Land Transfer Program (TLTP) and thus has a deed restriction to adhere to the marbled murrelet HCP restriction. City Light has not conducted any active management in its protection of riparian and forest habitats.

The main management actions are to maintain forest and riparian habitat connectivity with adjacent timberlands and federal lands. It may be appropriate to evaluate instream habitat improvement actions. Refer to Attachment A for more detailed information about the property (Table 22a) and preliminary MUs (Table 22b), and Attachment B for mapped locations of MUs.

Pressentin

The Pressentin property includes 637 acres of mixed forest. It is composed of older forests (70 to over 400 years old), although approximately 96 acres were clearcut harvested in the late 1990s. The property includes 0.5 miles of Pressentin Creek and 3.3 miles of additional tributary streams. It is surrounded by both federally owned land and industrial forestlands. The Pressentin property is accessible on a long network of gated industrial forestland roads; City Light has an easement to use the roads for administrative access but the gate is privately controlled. The land has a deed restriction which requires adherence to the marbled murrelet HCP restriction and requires the maintenance or development of older forests.

The main management actions are to protect the forest and enhance old forest habitat. Refer to Attachment A for more detailed information about the property (Table 23a) and preliminary MUs (Table 23b), and Attachment B for mapped locations of MUs.

Savage Slough

The Savage Slough property is 211 acres on the south side of the Skagit River. The property supports a mix of old agricultural field, sloughs, wetlands and associated wet shrublands or riparian forests, mixed and conifer forest in upland areas. The property includes 380 feet of Mill Creek and 1.4 miles of fish bearing tributaries associated with 4 acres of riverine and 9 acres of freshwater forested/shrub wetlands. The property has wildlife connectivity with adjacent City Light ESA Program lands and borders approximately 1.3 miles of the Skagit River. The South Skagit Highway bisects the property diagonally, roughly southwest to northeast, and a small access road runs parallel to a part of the northern border. There are two residential inholdings along Savage

Road near the Skagit River. Access is direct form the South Skagit Highway and Savage Slough Road.

In order to reforest the land for the protection and enhancement of salmon habitats associated with the sloughs on the property, City Light has performed extensive planting of trees and shrubs in fallow pastures and conifer underplanting[12] in riparian zones. City Light permits haying on remnant field and implements invasive plant treatments as needed.

Main management actions include enhancing wetland and riparian forests and retaining small meadow and shrubland areas. Refer to Attachment A for more detailed information about the property (Table 24a) and preliminary MUs (Table 24b), and Attachment B for mapped locations of MUs.

Day Creek Slough

The 40-acre Day Creek Slough property is located just south of the Skagit River, with the Day Creek Slough at the northern end. It is vegetated by cultivated pasture, mixed forest, wet shrublands and grassland shrublands. The property is primarily agricultural (haying) with a narrow band of riparian vegetation at the edges of the slough. Wildlife habitat connectivity is limited by the surrounding agricultural lands, although the slough provides salmonid habitat. Access to the property is direct from Walberg Road. City Light has implemented restoration plantings for salmonid habitat immediately along Day Creek Slough.

The main management actions are to maintain and enhance healthy wetland and riparian communities in select areas to benefit both fish and wildlife. Due to the potential for conflicts with agricultural landowners, habitat enhancement for elk will not be implemented. Refer to Attachment A for more detailed information about the property (Table 25a) and preliminary MUs (Table 25b), and Attachment B for mapped locations of MUs.

3.11.5.4 Properties within the South Fork Nooksack Basin

The mitigation lands within the South Fork Nooksack basin consist of three separate properties along the South Fork Nooksack River. These properties, Bear Lake, Nooksack, and Nooksack West have a combined total of 4,398 acres. Access to the properties is limited to a long network of private industrial forestland gated roads, which City Light has an easement to use.

Bear Lake

The 155-acre Bear Lake property is vegetated by late seral conifer old growth forests, and supports some wetlands associated with Bear Lake itself. It is currently passively managed for habitat preservation. This property has only limited pedestrian access, the shortest of which is approximately 2.4 miles on orphaned/abandoned forest roadbeds after driving more than 15 miles on a network of private forestland road network.

Due to the limited access, the main management actions for this property are anticipated to be to leave it alone to allow for long-term development of older forests for old-growth associated species

[12] Underplanting is a silviculture technique of planting young tree seedlings underneath the canopy of an existing stand, which allows managers to adjust species composition and increase diversity.

such as murrelets, and to periodically monitor the alpine lake and emergent wetland habitat for any evidence of resource damage from unauthorized uses. Refer to Attachment A for more detailed information about the property (Table 26a) and preliminary MUs (Table 26b), and Attachment B for mapped locations of MUs.

Nooksack

The Nooksack property is very large (3,854 acres) along about 9.75 miles of the South Fork Nooksack River, with about 65 tributary streams, totaling about 30 stream miles. Most areas are forested with a variety of mid-seral mixed or hardwoods, interspersed with patches of slightly older trees on moderately steep slopes with narrow riparian zones and wetlands on river terraces. Forests include mixed, conifer, and riparian, with some swamp, wetland, and riparian shrublands. There are substantial areas in and near the property that have slope stability limitations due to underlying geology/soils. This property is bordered by privately-owned industrial forestlands and state lands along most of the borders; the eastern end borders USFS land. As the property was purchased from a timber company, most forests are second or third growth stands.

Access to the Nooksack property requires travel on over 10 miles of private industrial timberland gated road system, which City Light has an easement to use. A portion of the Pacific Northwest Trail is on the abandoned roadbed through the northeastern part of the property and then follows the Sierra Pacific Industries 300 Road along a portion of the property before turning east toward Baker Lake drainage.

City Light has taken actions to minimize legacy effects from the logging by abandoning all interior roads and removing all culverts on the property per the Washington DNR Road Maintenance and Abandonment Plan. It has also worked with tribes to remove industrial forestland bridges (at Roads No. 330 and No. 300) over the river and install engineered log jams. City light has also worked with tribes to create 14 acres of elk forage meadows and conduct riparian conifer underplantings to increase river shading.

The extensive acreage of this property provides many options for upland and riparian forest management actions to maintain or enhance habitat for fish and wildlife. To plan and implement measures, City Light has delineated 92 preliminary MUs to evaluate further with the SLIC for management prescriptions for protection/enhancement of RMZ/WMZ, forest diversity, or ungulate habitat through phased creation of small canopy gaps or variable-density thinning. Refer to Attachment A for more detailed information about the property (Table 27a) and preliminary MUs (Table 27b), and Attachment B for mapped locations of MUs.

Nooksack West

The 389-acre Nooksack West property borders about 0.8 miles of the South Fork Nooksack River downstream of the Sierra Pacific Industries 200 Road bridge. It supports about 9 acres of riverine wetlands. Vegetation communities include mid- and late- seral hardwood, early- and mid-seral mixed forest, riparian, and riverine and shrub wetlands. Access to the Nooksack property is limited to an 8.3-mile private industrial forestland gated road from the town of Hamilton, which City Light has an easement to use.

Actions to date include conifer underplanting in riparian areas by the Lummi Tribe. The main management actions for this property are anticipated to include monitoring riparian and upland habitats for effects from open industrial forestland roads (e.g., erosion and invasive species), promote upland forest structural diversity and ungulate habitat enhancement. To facilitate evaluation and planning of habitat management actions, the property has been divided into nine preliminary MUs. Refer to Attachment A for more detailed information about the property (Table 28a) and preliminary MUs (Table 28b), and Attachment B for mapped locations of MUs.

4.0 IMPLEMENTATION TIMELINE

Implementation of this Mitigation Lands Plan is designed to incorporate decision-making in consultation with the SLIC on a rolling schedule that allows for prioritization of actions over the life of the license. The intent of this schedule is to accommodate discussion, planning, data gathering, and analysis of new data, and to spread the cost of larger efforts over time. Property-specific management plans will determine the implementation and monitoring schedules at each property, to be developed on a prioritized schedule.

Within the first year of license implementation, City Light will finalize the overall program for this Mitigation Lands Plan. Within the first three years of license issuance, City Light will perform habitat evaluation at Category A MUs in order to develop appropriate prescriptions. Also, within the first three, City Light will begin the prioritization, development, and implementation of at least one property-specific management plan, and will continue the same process with additional properties as soon as reasonably feasible; implementation of property-specific plans may occur sequentially or in tandem with others. For each property-specific plan, implementation timelines will be tailored for the specific actions and management objectives but will generally follow the timeline outlined in Table 4.0-1. Adaptive management and reporting are addressed in Section 5.0 of this Mitigation Lands Plan.

Within the areas classified as Category A MUs for forests, initial mapping identified the following evaluation acreages: 327 acres for older forest protection/development, 310 acres for potential creation of complex early seral habitat (see Section 3.10.3.2), and 1,448 acres for forest diversity, including 60 acres for visual buffers and smaller acreage for hydrologic connectivity. The preliminary feasibility Category B forest habitat evaluations include: 1,187 acres of older forest protection/development, 90 acres for potential creation of complex early seral habitat, and 1,069 acres for forest diversity including 22 acres for visual buffers.

Table 4.0-1. Timeline of implementation activities.

Timeline	Activity
Annually	Report to and consult with SLIC (consistent with the SLIC Governance Document) on previous year's activities and monitoring, and planned current and upcoming activities that are based on the Implementation Work Plan and shared through the Annual Report (three year rolling plan (previous year activities, and two year rolling work plan)). Annual work plan activities and monitoring locations on or affecting NPS lands and waters are subject to NPS approval if not previously approved by NPS in the Implementation Work Plan (including the specific location, timing and scope of the activities).
	Continue to develop and implement property-specific management plans, monitoring and adaptive management for each property.
	The frequency and timing of patrols will be reviewed and adjusted in response to observed issues.
Within the first year of license issuance	Finalize Mitigation Lands Plan and overall program.
	Develop and begin implementation of security patrols at locations where unauthorized use is known to occur.
	Develop a prioritization and schedule of implementation for property-specific management plans.
	At prioritized properties, identify and clarify property-specific interests, property-specific management objectives, and appropriate monitoring approaches for specific treatments.
	Finalize prioritized site-specific management plans and begin implementation or monitoring activities.[1]
	At select locations, begin baseline data collection and habitat evaluation of feasibility Category A MUs by which to evaluate options for protection and enhancements and develop specific management prescriptions.
	At select locations, monitor land use access to determine specific security issues.
	Communicate with Indian Tribes and Canadian First Nations on access routes to mitigation lands. GIS maps or data will be developed and updated if there are changes to access.
Within first three years of license	City Light will begin the implementation of at least one property-specific action.
Years 4-5 from license issuance	At select locations, implement security precautions to prevent detrimental actions and continue monitoring for effectiveness.
	Begin habitat evaluation of Category B MUs.

1 Some implementation and monitoring activities may begin earlier if site-specific plans are finalized sooner.

5.0 MONITORING AND REPORTING

This section describes the monitoring approach that will document progress towards meeting Mitigation Lands Plan goals and objectives. Monitoring is an extension of City Light's protection and enhancement implementation. The goals of monitoring are to determine the effectiveness of protection measures and habitat enhancements and to inform the EBS and adaptive management updates to this Mitigation Lands Plan.

Monitoring activities will be developed to address the implementation actions at each property, as outlined in property-specific management plans. For each property or block of properties, City Light will select appropriate monitoring methods depending on habitat, management actions, and target species to include a combination of vegetation structure (habitat quality) and wildlife use. At select locations, City Light will use documented changes in site-specific response metrics and compare to target values to assess the effectiveness of management actions, reassess ecosystems on mitigation properties and surrounding landscapes, and adapt future management actions. The following methods may be implemented to obtain this data:

- Conduct pre- and post-treatment vegetation composition and structure data monitoring at active management locations;
- At select sites, consider conducting pre- and post-activity wildlife use surveys using point count bird surveys and amphibian visual encounter surveys (for appropriate life stages) in select wetlands;
- Deploy ARUs at strategic locations to gain more information on northern spotted owl, marbled murrelet, bat, and northern goshawk occurrence;
- Potentially conduct protocol auditory/visual surveys for spotted owls, marbled murrelets, and northern goshawks at select sites;
- Deploy ARUs and conduct visual surveys for bullfrogs at wetlands; and
- Deploy camera traps at select locations to document forest carnivore and ungulate use.

Monitoring efforts will be implemented per the schedule of the development and implementation of property-specific management plans.

5.1 Adaptive Management and Plan Review

This section describes the application of adaptive management by which City Light will gather information, synthesize new and existing information, and assess the need to update management decisions outlined in this Mitigation Lands Plan. Adaptive management will be applied to each implementation activity through the specified monitoring, using metrics for ongoing management decisions. City Light will consult with the SLIC to evaluate monitoring information to determine if new BAS, BMPs, or changes in other management decisions will increase the success of the protection and enhancement measures included in this Mitigation Lands Plan.

This section describes the schedule and method for regular consultation with the SLIC and submittals to FERC. City Light will report annually on the number of protection measures implemented, monitoring results during years when data is collected, and other pertinent issues.

Every five (5) years, City Light will file a report with FERC describing implementation and any proposed modifications to this Mitigation Lands Plan based upon the results of monitoring and consultation with the SLIC.

When proposing to modify this Plan after issuance of the New License, City Light shall consult with the SLIC and follow the applicable procedures and requirements in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3). When a plan modification affects NPS lands or waters, City Light shall seek the approval of NPS before filing such proposed modification with the Commission for approval. When a plan modification affects an ESA-listed species and/or its habitat, City Light shall seek the approval of USFWS and/or NMFS before filing such modification with the Commission for approval.

If, after following the applicable procedures and requirements outlined in the Governance Document for the SLIC and Work Groups (Settlement Agreement Appendix 3) and the Settlement Agreement, City Light does not obtain applicable agency approvals, City Light shall include City Light's reasons for proceeding with the filing based upon Project-specific information. Upon Commission approval, City Light shall implement the modification to the Plan.

If substantial changes occur to resource conditions associated with the original Plan or Implementation Plan outside of the five-year review period, City Light, in consultation with the SLIC, will review, update, and/or revise the Plan. For areas on or affecting NPS lands and/or waters, City Light will revise a Plan if notified by NPS that resource conditions substantially change as a result of: 1) unforeseen adverse effects to NPS lands or waters from new or existing Project-related activities, 2) significantly changed conditions due to natural events such as fire or flood, 3) monitoring feedback indicates baseline conditions have materially changed or resource objectives are not being met, or 4) establishment of other regulatory or legal requirements directly related to the Plan.

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FISH AND WILDLIFE MITIGATION LANDS MANAGEMENT PLAN

ATTACHMENT A

PROPERTY-SPECIFIC CURRENT AND DESIRED CONDITIONS OF MITIGATION LANDS

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List of Acronyms and Abbreviations

ARU .....Autonomous Recording Units
ATV .....all-terrain vehicle
City Light.....Seattle City Light
CMZ.....channel migration zone
DNR .....Department of Natural Resources (Washington State)
ESA.....Endangered Species Act
GIS .....geographic information system
HCP.....Habitat Conservation Plan
NPS .....National Park Service
MU .....Management Unit
O&M.....operations and maintenance
ORV .....off-road recreational vehicle
PEM .....palustrine emergent
PFO .....palustrine forested
PHS .....priority habitat species
PNWT .....Pacific Northwest Trail
PSS.....palustrine scrub-shrub
PUB.....palustrine unconsolidated bottom
REP .....Riverscape Ecosystem Plan
RLNRA.....Ross Lake National Recreation Area
ROW .....right-of-way
SR.....State Route
SRSC.....Skagit River System Cooperative
TNC.....The Nature Conservancy
USFS .....U.S. Forest Service
USNVC.....U.S. National Vegetation Classification
WDFW.....Washington Department of Fish and Wildlife
WSR.....Wild and Scenic River

1.0 OVERVIEW

This Attachment A is intended to supplement Seattle City Light's (City Light) Fish and Wildlife Mitigation Lands Management Plan (Mitigation Lands Plan) as a means of informing property-specific management plan decision-making. The current conditions and attributes of each mitigation property are described, as well as the desired future conditions, if known. A summary of known information regarding the properties is included in tabular format, although most properties require additional data collection to inform potential management opportunities and constraints.

Information from City Light's relicensing studies may be referenced in descriptions of mitigation property attributes and may contain technical or resource-specific terms. These generally include mapped vegetation communities (TR-01 Vegetation Mapping Study Report [City Light 2023b]), classifications and assessments of wetlands (TR-02 Wetland Assessment Report [City Light 2023c]), and stream classifications (GE-02 Erosion and Geologic Hazards at Project Facilities and Transmission Line Right-of-Way [ROW] Study Report [City Light 2023a]). A summary of vegetation communities and wetland types/ratings referenced in this Attachment have been compiled in Section 2.0 of this document; although additional information or details[1] will be located in the original study reports listed above. Additionally, some riparian enhancements will be directed through the non-flow program of the Riverscape Ecosystem Plan (REP; City Light 2023l) which is intended to guide management on mainstem, riparian, floodplain, side channel, and off-channel habitats.

There are 28 separate mitigation properties described in this Attachment, organized by general geographic location as follows:

- Ross Lake National Recreation Area (RLNRA)
  - Newhalem Ponds
  - County Lines Ponds
- Sauk River Basin
  - North Sauk
  - Sauk Island
  - North Everett Creek
  - Everett Creek
  - Dan Creek

[1] City Light's other terrestrial study reports may also provide relevant details for mitigation properties. These include TR-03 Rare, Threatened and Endangered Plants Study Report (City Light 2023d), TR-04 Invasive Plants Study Report (City Light 2023e), TR-05 Marbled Murrelet Study Report (City Light 2023f), TR-06 Golden Eagle Habitat Analysis Report (City Light 2023g), TR-07 Northern Goshawk Habitat Analysis Report (City Light 2023h), TR-08 Special-Status Amphibian Study Report (City Light 2023i), TR-09 Beaver Habitat Assessment Report (City Light 2023j), and TR-10 Northern Spotted Owl Habitat Analysis Report (City Light 2023k).

- Skagit River Basin
  - Bacon Creek
  - B&W Road 1
  - B&W Road 2
  - Corkindale Creek
  - South Marble 40
  - Illabot North
  - O'Brien Slough
  - Illabot South
  - Bogert and Tam
  - Barnaby Slough
  - Johnson Slough
  - False Lucas Slough
  - Napoleon Slough
  - McLeod Slough
  - Finney Creek
  - Pressentin
  - Savage Slough
  - Day Creek Slough
- South Fork Nooksack Basin
  - Bear Lake
  - Nooksack
  - Nooksack West

2.0 INITIAL PROPERTY-SPECIFIC INFORMATION AND PRELIMINARY MANAGEMENT UNITS

This section provides City Light's current understanding of the details and conditions for each mitigation property. Preliminary Management Units (MUs) have been identified, although specific prescriptions may not yet be determined. For each property, two tables provide information, one with property-wide information, and the other with preliminary MU designations. This summary of information is intended as reference for the development of property-specific management plans. This attachment is supplementary to City Light's Mitigation Lands Plan and is intended to be referenced in conjunction with Attachment B, which provides figures illustrating the MUs for each property.

2.1 Ross Lake National Recreation Area Mitigation Properties

Table 1a. Current and desired conditions, property attributes and constraints at the Newhalem Ponds property.

Attribute	Description
Current Conditions	
City Light Program	Fish Program
Land Size	111 acres
Land Use	The Newhalem Ponds property is primarily used to support fish habitat associated with the Skagit River, but also for the protection of wetland and riparian habitats. City Light uses about 3 acres of the property for storage of stone, wood, culverts, and heavy machinery for operations and maintenance (O&M) and as a river access point for boat launching and adding wood to the river.
City Light Enhancement Actions to Date	City Light created off-channel habitat for Chum Salmon by modifying excavated gravel pits into ponds and constructed spawning channels connecting the ponds to the Skagit River. These types of groundwater-fed channels provide spawning and rearing habitat, which was intended specifically to benefit Chum Salmon, but also benefit other anadromous fishes (e.g., Coho and Pink salmon). Beavers are known to be active along these channels, and dams have been removed periodically in recent years to maintain fish access. In 2021, City Light began to implement its Aggregate Storage Facility Implementation Plan (City Light 2022). This began the restoration of impacted riparian forest and wetland buffers by reducing the footprint of the storage facility, abandoning unnecessary roads, and replanting areas with native plants. Habitat piles have been created from woody debris and plantings completed in an approximately 0.7-acre area adjacent to the east pond. Invasive plants are treated to reduce populations and minimize spread.
Vegetation	Vegetated areas around the Chum ponds and channels are dominated by North Pacific Lowland Riparian Forest and Woodland, North Pacific Red Alder - Bigleaf Maple - Douglas-fir Rainforest, Vancouverian Freshwater Wet Meadow and Marsh, and North Pacific Maritime Douglas-fir - Western Hemlock Rainforest communities. PFO/PEM wetlands (Class III) occur along sloughs and in portions of ponds. Red alder, Douglas spirea, and red-osier dogwood are common species in the wetlands. State Route (SR) 20 and the O&M portion of the property reduces riparian/buffer quality and creates a pathway for invasive plants. Invasive plants documented include reed canarygrass, Himalayan blackberry, diffuse knapweed, flannel mullein, purple toadflax, greater burdock, common tansy, and Robert's geranium. Reed canarygrass is common around the shoreline of some ponds.

Attribute	Description
Wildlife Habitat and Habitat Connectivity	Substantial beaver activity affects wetland hydrology, vegetation communities, and Chum channels. Western toads, red-legged frogs, and other lentic breeding amphibians are supported in wetlands. Passerine birds are supported in riparian forests. Marbled murrelets are provided suitable habitat in patches of tall trees in mixed forest areas, although no populations/individuals are known in this area. Bald eagles forage for salmon during the winter. The property has approximately 1.25 miles of Skagit River shoreline and additional aquatic connectivity along the spawning channels. SR 20 along the western border of the property may affect terrestrial wildlife connectivity with surrounding lands, and O&M access roads may affect wildlife connectivity. Four stream culverts were identified on the property, one of which has beaver exclusion fencing. The Washington Department of Natural Resources (Washington DNR) geographic information system (GIS) data indicates that a fish stream crosses SR 20 to one of the Newhalem Ponds.
Stream Information	The property borders approximately 1.1 miles of the Skagit River and includes about 0.8 miles of stream connecting about 5 acres of emergent wetland and 2 freshwater pond wetlands for an approximate total of 15 acres.
Access	The property is directly accessible from SR 20. The public can walk in on a 0.1-mile-long gated road. Shooting firearms is not permitted due to the presence of the O&M storage area. Property can be accessed from the Skagit River.
Adjacent Land	Newhalem Ponds property is adjacent to Washington State Department of Transportation ROW and the National Park Service (NPS) RLNRA. Approximately 3 acres of the property is O&M storage area.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Reduce potential effects by confining operations per City Light's Newhalem Aggregate Storage Facility Implementation Plan (City Light 2022). If feasible, consider relocating O&M storage to upland location.
Management Opportunities	Future actions will be driven by channel management decisions under the REP. There are 4 preliminary MUs identified; see Table 1b for details. Additional opportunities to be considered include: Conifer underplantings in riparian zone; reduce footprint or remove O&M (aggregate storage) area; assess options for snag creation and waterfowl nest boxes. City Light will control invasive species per its Invasive Plants Management Plan (City Light 2023m). City Light will monitor winter eagle use and toad populations, including early detection of (invasive) bullfrogs.
Potential Tribal Interests	Interests may include, but not be limited to, channel maintenance for Chum, riparian habitat protection or enhancement, river wood recruitment, and riparian nutrients.
Management Constraints	Actions for the Chum ponds and channels will be dictated by the REP in coordination with the property-specific prescription to incorporate allowance of beaver activity. Once the REP actions are identified, specific measures for plant and wildlife protection and enhancements will be included in the Fish and Wildlife Mitigation Lands Management Plan.

Attribute	Description
Species of Management Focus	
Wildlife	Beaver, wintering bald eagles, western toads and other lentic breeding amphibians, passerine birds, wading birds, cavity nesting waterfowl, and bats.
Fish	Chum and Coho salmon.
Culturally Significant Plants	To be determined.
Data	
Data gaps	City Light has limited information on the number and location of snags.
Proposed Data Collection or Monitoring Methods	▪ Perform salmon channel assessment under the REP; ▪ Conduct survey(s) to map locations of snags and document use by avian species; and ▪ Use Autonomous Recording Units (ARU) and visual encounter surveys to monitor bullfrog invasion and western toad reproduction.

Table 1b. Management Unit preliminary management actions for the Newhalem Ponds property.

Management Unit Identifier	Acres	Desired Future Conditions	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NWP-01	38.86	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	Evaluate off-channel habitat modifications; retain cedar stand; revegetate previously disturbed areas per Aggregate Storage Management Plan (City Light 2022); beaver management.
NWP-02	6.62	Other	Operations	No	Category C	Manage potential effects of interior road; plantings for birds and visual screening from SR 20; access road; boat launch, woody material storage; materials storage.
NWP-03	0.92	Toad Breeding Habitat	-	No	Category A	Maintain open shoreline and shallow water with no tree or shrub cover.
NWP-04	64.72	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category A	Evaluate off-channel habitat modifications; retain cedar stand; revegetate previously disturbed areas including former roads per Aggregate Storage Management Plan (City Light 2022); beaver management.

Table 2a. Current and desired conditions, property attributes and constraints at the County Line Ponds property.

Attribute	Description
Current Conditions	
City Light Program	Fish Mitigation
Land Size	56 acres
Land Use	The County Line Ponds property is used primarily to support fish habitat associated with the Skagit River, but also the protection of wetland and riparian habitats. There is about 0.17 miles of interior gravel road used periodically for channel habitat maintenance; no other Project O&M activities occur on the property.
City Light Enhancement Actions to Date	City Light created off-channel habitat for Chum Salmon by modifying excavated gravel pits into ponds and constructed spawning channels connecting the ponds to the Skagit River. These types of groundwater-fed channels also provide spawning and rearing habitat intended to benefit Chum Salmon, but also benefit other anadromous fishes (e.g., Coho and Pink salmon). Beavers are known to be active along these channels, and dams have been removed periodically in recent years to maintain fish access.
Vegetation	This property is dominated by North Pacific Lowland Riparian Forest, and Woodland and North Pacific Red Alder - Bigleaf Maple - Douglas-fir Rainforest, with small areas of Successional Gravel Bar Shrubland and Vancouverian Freshwater Wet Meadow and Marsh along the shorelines of the ponds along the Skagit River. Douglas-fir, western red cedar, and western hemlock are common in the mesic and drier areas. PSS/PFO Wetlands (Class III) dominated by red alder, black cottonwood, willows, salmonberry, and red-osier dogwood are mapped along ponds and sloughs. The overstory tree canopy heights for the property areas are generally between 60 and 150 feet. Invasive plants include reed canarygrass, common tansy, and Robert's geranium occur in the forest closest to the SR 20 corridor. Occurrences of invasives (e.g., reed canarygrass, sycamore maple, traveler's joy) were mapped on or near the property.
Wildlife Habitat and Habitat Connectivity	Breeding western toads and other lentic habitat breeding amphibians were documented in 2021 relicensing surveys. Marbled murrelets are provided potentially suitable habitat from small patches of tall trees, although no populations/individuals are known to forage or nest in the vicinity of County Line Ponds. Bald eagles are known to forage on salmon during the winter. The property has approximately 0.75 miles of Skagit River shoreline and additional aquatic connectivity along the spawning channels. SR 20 along the western border of the property may affect terrestrial wildlife connectivity with surrounding lands. No culverts were mapped on site.
Stream Information	The property borders the Skagit River and includes approximately 1.2 miles of year-round fish bearing streams connecting about 14 total acres of ponds and associated wetlands.
Access	The property is directly accessible from SR 20. There is a short internal road that is gated to prevent unauthorized motorized access. Property can be accessed from the Skagit River.
Adjacent Land	County Line Ponds property is adjacent to Washington State Department of Transportation ROW and the NPS RLNRA.
Unauthorized Use	None identified.

Attribute	Description
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	City Light will maintain or enhance aquatic, wetland, and riparian habitat per its REP to support species of management focus.
Fish or Wildlife Management Opportunities	There are 3 preliminary MUs identified; see Table 2b for details. City Light has previously addressed major management opportunities through the creation of the off-channel habitat and spawning channels. Additional opportunities include the maintenance of wetlands and amphibian habitat, and the enhancement of wildlife and avian habitat by planting shrubs along SR 20 to reduce edge habitat and provide visual screening from SR 20. Other enhancement opportunities could include conifer under plantings in riparian zones, snag creation, and waterfowl nest boxes. City Light will consider decommissioning the internal road. Winter eagle use and toad populations will be monitored to inform future management decisions, while wetlands may be monitored for the early detection of (invasive) bullfrogs. Invasive plant species will be treated through City Light's Invasive Plants Management Plan (City Light 2023m),
Potential Tribal Interests	Interests may include, but not be limited to, channel maintenance for Chum, riparian habitat protections or enhancements, river wood recruitment, and riparian nutrients.
Management Constraints	Actions for the Chum ponds and channels will be dictated by City Light's REP (City Light 2023l) but should incorporate allowance of beaver activity. Once the REP actions are identified, specific measures for plant and wildlife protection and enhancements will be included in the property-specific management plan for County Line Ponds.
Species of Management Focus	
Wildlife	Beaver, wintering bald eagles, western toads and other lentic breeding amphibians, passerine birds, wading birds, cavity nesting waterfowl, and bats.
Fish	Chum and Coho salmon.
Culturally Significant Plants	To be determined.
Data	
Data gaps	City Light has limited information on the number and location of snags.
Proposed Data Collection or Monitoring Methods	▪ Perform a salmon channel assessment directed by the REP; ▪ Conduct survey(s) to map locations of snags and document use by avian species; and ▪ Use visual encounter surveys to monitor western toad reproduction. ▪ Use visual encounter surveys and ARUs to provide early detection of possible future bullfrog invasion.

Table 2b. Management Unit preliminary management actions for the County Line Ponds property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
CLP-01	5.09	Other	Visual Buffer	No	Category C	Maintain dense tree and shrub cover outside of the transmission line ROW.
CLP-02	50.40	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category A	Evaluate off-channel habitat modifications; retain cedar stands; revegetate previously disturbed areas including former roads per Aggregate Storage Management Plan (City Light 2022); beaver management.
CLP-03	0.77	Toad Breeding Habitat	-	Yes	Category A	Maintain open shoreline and shallow water with no tree or shrub cover.

2.2 Sauk River Basin

Table 3a. Current and desired conditions, property attributes and constraints at the North Sauk property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	46 acres
Land Use	The North Sauk property is used for the protection of riparian habitats.
City Light Enhancement Actions to Date	Acquisition of 20-acre inholding and removal of previous owner's debris.
Vegetation	Riparian forest hardwood, some Riverine. Plant Association Groups: North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest Group, North Pacific Maritime Douglas-fir - Western Hemlock Forest Group, Vancouverian Wet Shrubland, North Pacific Lowland Riparian Forest and Woodland. Inventoried wetlands in sloughs. East-West connectivity affected by SR 530, and rural residential development between Darrington and the Suiattle River.
Wildlife Habitat and Habitat Connectivity	This section of the Sauk River is designated as Wild and Scenic River (WSR). Property owned by The Nature Conservancy (TNC), Sauk-Suiattle Indian Tribe, and City Light (Gravel Creek Endangered Species Act [ESA] Program property) and a private property in the Sauk River floodplain provide connectivity. Collectively 2.8 miles of the left bank of the river in protective ownership. The eastern boundary borders agricultural land (not supportive of elk population).
Stream Information	The property includes 0.8 miles of the Sauk River within the WSR, of which 0.4 miles is fish-bearing. There is approximately 14.5 acres of freshwater forested/shrub and 14 acres of riverine wetlands.
Access	The property is river-accessible by hiking in from adjacent ESA Program Gravel Creek property via Inman Road.
Adjacent Land	Sauk River, City Light ESA Program Gravel Creek property, private agriculture and rural residential land to east.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Healthy riparian/upland forests.
Management Opportunities	Entire property is within a single preliminary RMZ MU; see Table 3b for details. Difficult access for forest management but can evaluate forest for snag resources and monitor for trespass damage. Invasive plants (e.g., knotweed) will be monitored and, if warranted, treated through City Light's Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	Walk-in access only. Entire property is in RMZ and CMZ of river.
Species of Management Focus	
Wildlife	Deer, elk, waterfowl, songbirds, cavity-nesting birds, bald eagle, red-legged frog, and western toad.
Fish	Salmon, steelhead, and Cutthroat Trout.

Attribute	Description
Culturally Significant Plants	To be determined.
Data	
Data gaps	City Light has limited information on the number and location of snags.
Proposed Data Collection or Monitoring Methods	Snag inventory.

Table 3b. Management Unit preliminary management actions for the North Sauk property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NSA-01	45.58	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.

Table 4a. Current and desired conditions, property attributes and constraints at the Sauk Island property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	21 acres
Land Use	The Sauk Island property is used for the protection of wetland and riparian habitats.
City Light Enhancement Actions to Date	None.
Vegetation	Riparian forest hardwood, Riverine, and some Conifer. Plant Association Groups: North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest Group, North Pacific Maritime Douglas-fir - Western Hemlock Forest Group, Vancouverian Wet Shrubland, North Pacific Lowland Riparian Forest and Woodland.
Wildlife Habitat and Habitat Connectivity	This section of the Sauk River is designated as WSR. Properties owned by TNC, Sauk-Suiattle Indian Tribe, and City Light (ESA Program land) and a private property provide connectivity to the Sauk River floodplains. Collectively, 2.8 miles of left bank of Sauk River in designated WSR protective ownership. Approximately 300 feet from nearest residence. East-West connectivity is affected by SR530, and rural residential development between Darrington and Suiattle River.
Stream Information	The property includes 0.5 miles along the Sauk River and approximately 5 acres of riverine wetland.
Access	The property is river accessible and from SR530 to Estes Road, then walk in 0.4 miles of shoreline on property owned by Washington DNR.
Adjacent Land	Sauk River, private rural residential parcels to the west.
Unauthorized Use	Several all-terrain vehicles (ATVs) tracks were observed on river gravel bars in 2006.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Healthy, functioning channel migration zone and wetlands and riparian forest.
Management Opportunities	The entire property is within a single preliminary RMZ MU. Access may be too difficult to implement extensive forest management actions, but it may be evaluated for snag resources. Monitor for trespass damage. Invasive plants (e.g., knotweed) will be monitored and, if warranted, treated through City Light's Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	Access is walk-in about 0.4 miles along Washington DNR owned shoreline from Estes Road. The entire property is in both RMZ and channel migration zone (CMZ) of the Sauk River; with much land lost due to avulsion some is on left bank.

Attribute	Description
Species of Management Focus	
Wildlife	Deer, elk, waterfowl, songbirds, cavity-nesting birds, bald eagle, red-legged frog, and western toad.
Fish	Salmon, Steelhead, and Cutthroat Trout.
Culturally Significant Plants	To be determined.
Data	
Data gaps	None identified.
Proposed Data Collection or Monitoring Methods	None identified.

Table 4b. Management Unit preliminary management actions for the Sauk Island property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
SAI-01	21.33	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	No action.

Table 5a. Current and desired conditions, property attributes and constraints at the North Everett Creek property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	174 acres
Land Use	The North Everett Creek property is used for the protection of wetland, riparian, and forest habitats.
City Light Enhancement Actions to Date	City Light has monitored the North Everett Creek property for resource damage from unauthorized public access which used to include ATV, equestrian, and hiking use of the informal trail on abandoned roadbed. ATV traffic has stopped from City Light's collaborative barricading and signage. City Light has facilitated the removal of the former owner's camper and debris, and has removed a horse from habitually grazing in the wetland.
Vegetation	Riparian forest mixed, riverine and shrub wetland, and mid seral hardwood. Plant Association Groups: North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest Group, North Pacific Maritime Douglas-fir - Western Hemlock Forest Group, Vancouverian Wet Shrubland, North Pacific Lowland Riparian Forest and Woodland. Inventoried wetlands in sloughs. Small amounts of invasive species (e.g., knotweed) occur along the access trail.
Wildlife Habitat and Habitat Connectivity	This section of the Sauk River is designated as WSR and parcels owned by TNC, Sauk-Suiattle Indian Tribe, and City Light (ESA Program land) provide connectivity. Collectively, 2.8 miles of the right bank of the Sauk River is in WSR protective ownership. Eastern boundary borders open agricultural land along 0.75 miles and several rural residences.
Stream Information	The property includes 0.9 miles of the Sauk River (WSR) shoreline and 0.3 miles of fish-bearing streams. There are 4 acres of freshwater forested and 5 acres of riverine wetlands.
Access	The property is walk-in accessible from Crawford Loop Road via trail in City Light easement across private and TNC property. Access from the Sauk River may provide seasonal access.
Adjacent Land	Sauk River, City Light (ESA Program land) Gravel Creek property, private agricultural and rural residential land to east.
Unauthorized Use	ATV, hikers, and neighbor's horse found grazing in wetland in 2012.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Maintain or enhance healthy wetlands and riparian/upland forests.
Management Opportunities	The property has been divided into 5 preliminary MUs for wetland protection and forest diversity evaluation; see Table 5b for details. There is potential to create or enhance small forest gaps and snags using hand tools. Invasive plants will be monitored and treated through City Light's Invasive Plants Management Plan (City Light 2023m). The property will be monitored for unauthorized use and associated effects.
Potential Tribal Interests	To be determined.
Management Constraints	Access to the Everett Creek property is limited to walk-in access from trail across private property. Most of the property is in RMZ and CMZ of the Sauk River.

Attribute	Description
Species of Management Focus	
Wildlife	Deer, elk, waterfowl, songbirds, cavity-nesting birds, bald eagle, red-legged frog, and western toad.
Fish	Salmon, steelhead, and Cutthroat Trout.
Culturally Significant Plants	To be determined.
Data	
Data gaps	City Light has limited information on the forest over and understory, and snag resources.
Proposed Data Collection or Monitoring Methods	▪ Forest over- and understory inventory in manageable upland areas; ▪ Snag data; and ▪ Periodic visits to monitor for unauthorized activities.

Table 5b. Management Unit preliminary management actions for the North Everett Creek property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NEC-01	56.31	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	Monitor.
NEC-02	34.89	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NEC-03	21.08	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NEC-04	39.23	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NEC-05	22.29	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory; monitor.

Table 6a. Current and desired conditions, property attributes and constraints at the Everett Creek property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	39 acres
Land Use	The Everett Creek property is used for the protection of wetlands and riparian habitats.
City Light Enhancement Actions to Date	City Light performs periodic monitoring of vegetation and habitat quality.
Vegetation	Riparian forest mixed, riverine and shrub wetland, and mid seral mixed and hardwood. Plant Association Groups: North Pacific Red Alder –- Bigleaf Maple – Douglas-fir Rainforest Group and North Pacific Lowland Riparian Forest and Woodland.
Wildlife Habitat and Habitat Connectivity	The entire property consists of wetland and riparian habitats; with approximately 21 acres of wetlands (14 acres freshwater forested/shrub and 7 acres of riverine). East-west terrestrial connectivity is affected by SR 530, and rural residential development between Darrington and the Suiattle River.
Stream Information	This property includes approximately 0.25 miles of the Sauk River within an area designated as WSR.
Access	The property is accessible from the Sauk River or City Light can access this property from SR 530 across private property via easement.
Adjacent Land	The Everett Creek property borders a combination of Washington DNR and private land with residential development west of the Sauk River. It's approximately 400 feet from the nearest residence. Collectively 0.7 miles of the left bank of the river are owned by City Light or Washington DNR at this location near the Snohomish-Skagit county line.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Maintain or enhance healthy wetlands and riparian/upland forests.
Management Opportunities	The property has been preliminarily identified as a single WMZ/RMZ MU. Invasive plants will be monitored and, if warranted, treated through City Light's Invasive Plants Management Plan (City Light 2023m). The property will be monitored for unauthorized use and associated affects.
Potential Tribal Interests	To be determined.
Management Constraints	Walk-in access only. Entire property is in RMZ and CMZ of river.

Attribute	Description
Species of Management Focus	
Wildlife	Deer, elk, waterfowl, songbirds, cavity-nesting birds, bald eagle, red-legged frog, and western toad.
Fish	Salmon, steelhead, and Cutthroat Trout.
Culturally Significant Plants	To be determined.
Data	
Data gaps	City Light has limited information on the number and location of snags.
Proposed Data Collection or Monitoring Methods	None identified.

Table 6b. Management Unit preliminary management actions for the Everett Creek property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
ECR-01	38.54	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.

2.3 Skagit River Basin

Table 7a. Current and desired conditions, property attributes and constraints at the Dan Creek property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	42 acres
Land Use	The Dan Creek property is used to support fish habitat associated with the Sauk River, but also for the protection of wetland and riparian habitats.
City Light Enhancement Actions to Date	City Light installed a tank trap on jeep trail from an adjacent property in response to timber theft in 2013. Some ATV use still occurs but no more timber theft or resource damage has been noted.
Vegetation	Riparian forest conifer, mid seral mixed, and riverine; Plant Association Groups include North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest, North Pacific Maritime Douglas-fir - Western Hemlock Forest, Vancouverian Wet Shrubland, and North Pacific Lowland Riparian Forest and Woodland. Most of forest stand is 50 to 70 years old.
Wildlife Habitat and Habitat Connectivity	The property borders the Sauk River in an area designated as WSR and properties owned by City Light (ESA Program land), TNC, Sauk-Suiattle Indian Tribe, and private property. It's approximately 500 feet from the nearest residence. Collectively 2.8 miles of the right bank of the Sauk River are owned by a conservation organization, City Light or Tribe protective ownership. The connectivity is affected by SR 530, and rural residential development between Darrington and the Suiattle River.
Stream Information	The property includes approximately 1,900 feet of slough habitat and 450 feet of the Sauk River (WSR) channel shoreline. Coho Salmon spawning habitat is present in the Sauk River and Dan Creek junction.
Access	The property is walk-in accessible across City Light Upper Dan Creek ESA Program Land property from Crawford Loop Road, or by trail from TNC property off Crawford Loop Road. Property can be accessed from the Skagit River.
Adjacent Land	City Light, Sauk-Suiattle Indian Tribe, TNC, and private parcels.
Unauthorized Use	ATV traffic from nearby private lands driving through channels with Coho. Timber theft occurred in 2013.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Healthy, functioning CMZ, WMZ, and riparian/upland forests.
Management Opportunities	The entire property is within a single RMZ MU. City Light may evaluate the forest for snag resources, but larger forestry management is limited by walk-in access. The property will be monitored for unauthorized access and associated effects. Invasive plants will be monitored and, if warranted, treated through City Light's Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	Walk-in access only. The entire property is in RMZ and CMZ of the river and along designated WSR.

Attribute	Description
Species of Management Focus	
Wildlife	Deer, elk, waterfowl, songbirds, cavity-nesting birds, bald eagle, red-legged frog, and western toad.
Fish	All species of salmon, steelhead, and Cutthroat Trout.
Culturally Significant Plants	To be determined.
Data	
Data gaps	City light has limited information on the number and location of snags.
Proposed Data Collection or Monitoring Methods	Snag inventory.

Table 7b. Management Unit preliminary management actions for the Dan Creek property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
DCR-01	42.14	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	Monitor unauthorized access (trespass).

Table 8a. Current and desired conditions, property attributes and constraints at the Bacon Creek property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	119 acres
Land Use	The Bacon Creek property is used for public and inholding access.
City Light Enhancement Actions to Date	City Light is planting and facilitating natural revegetation. Skagit River System Cooperative (SRSC) relocated U.S. Forest Service (USFS) road (NF-1060) away from the floodplain on City Light land following flood damage in 2004.
Vegetation	Plant Association Groups: Central Rocky Mountain Douglas-fir - Pine Forest, North Pacific Red Alder - Bigleaf Maple - Douglas-fir Rainforest, North Pacific Maritime Douglas-fir - Western Hemlock Rainforest, mostly early to mid-seral hardwoods, some late seral mixed forest along creek with many large bigleaf maple. Riparian areas and stream appear healthy with significant large woody debris. Former rock pit is dominated by sapling and pole size alder, Douglas-fir, and other species.
Wildlife Habitat and Habitat Connectivity	The property bordered by public land and near Skagit Land Trust parcel contributes to connectivity between lower Bacon Creek and the Skagit River. Mapped marbled murrelet habitat is located on and near the property. The open USFS road increases disturbance and bisects habitats. Southern property line borders City Light's transmission line ROW and SR 20.
Stream Information	The property includes 0.8 miles of the Bacon Creek channel and 0.1 miles of non-fish tributary on the property. Approximately 4 acres of freshwater forested wetlands are associated with the Bacon Creek channel.
Access	The property is directly accessible from USFS road (NF-1060) and SR 20. Property can be accessed from Bacon Creek.
Adjacent Land	Bacon Creek property is surrounded by City Light, USFS and Washington Department of Fish and Wildlife (WDFW) land. City Light's transmission line ROW is at the southern boundary.
Unauthorized Use	Evidence of campfires along USFS road. An informal trail has been recently established between USFS road (NF-1060) and Bacon Creek.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Maintain forest habitat along Bacon Creek and slopes.
Management Opportunities	There are 6 preliminary MUs for RMZ protection, spoil disposal/restoration, road corridors; see Table 8b for details. Protect maturing forests. Restore former gravel pit. Invasive plants (e.g., Himalayan blackberry, tansy, Robert's geranium) near the road will be monitored and, if warranted, treated through City Light's Invasive Plants Management Plan (City Light 2023m). City Light will monitor for unauthorized access to confirm there are no active anthropogenic effects. Consider if additional monitoring of SRSC's 2004 floodplain restoration project is warranted.
Potential Tribal Interests	To be determined.
Management Constraints	USFS road presents connectivity and wildlife enhancement challenges. Reclaimed gravel pit is identified as the repository of tunnel excavation material from the Gorge Second Tunnel if constructed. Occasional public activity on City Light's transmission line ROW next to property.

Attribute	Description
Species of Management Focus	
Wildlife	Marbled murrelet, forest carnivore and ungulate corridor.
Fish	Salmonids.
Culturally Significant Plants	To be determined.
Data	
Data gaps	The use of the former gravel pit for Project spoil disposal is a possibility.
Proposed Data Collection or Monitoring Methods	▪ Monitoring, ▪ Possible murrelet ARU surveys, and ▪ Vegetation data in former gravel pit.

Table 8b. Management Unit preliminary management actions for the Bacon Creek property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
BCR-01	0.30	Other	Access	No	Category C	Maintain vegetation per City Light's Vegetation Management Plan or Roads, Trails, and Transmission Line ROW Erosion Management Plan (2023o; 2023n); due to proximity to SR 20 focus should not be ungulate habitat.
BCR-02	8.23	Other	G2T Spoil and Site Restoration	Yes	Category B	Monitor the Bacon Creek quarry restoration and spoil revegetation efforts.
BCR-03	64.30	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category A	Monitor unauthorized access.
BCR-04	12.46	Other	Access	Yes	Category C	USFS maintains the USFS road 1060; monitor for invasive species; monitor unauthorized activities and restore damaged use areas.
BCR-05	28.67	Older Forest	Protect/Develop Old Forests	Yes	Category C	Monitor.
BCR-06	4.80	Older Forest	Protect/Develop Old Forests	No	Category C	Monitor.

Table 9a. Current and desired conditions, property attributes and constraints at the B&W Road 1 property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	79 acres
Land Use	The B&W Road 1 property is vacant forestland surrounded by a combination of federal lands and privately owned recreational lots, some of which have permanent cabins.
City Light Enhancement Actions to Date	None.
Vegetation	All forested; western two-thirds are second-growth; some very large cedars. Central Rocky Mountain Douglas-fir - Pine Forest, North Pacific Red Alder - Bigleaf Maple - Douglas-fir Rainforest, North Pacific Maritime Douglas-fir - Western Hemlock Rainforest, North Pacific Lowland Riparian Forest and Woodland.
Wildlife Habitat and Habitat Connectivity	Eastern one-third has potentially suitable marbled murrelet habitat. Rest of forest is younger second-growth. Behind two locked gates with two recreational lots nearby. Bordered by USFS land on 3.5 sides. Property along with USFS land creates corridor between Skagit River and mountains to east. The property is approximately 0.6 miles from designated critical habitat for marbled murrelet. The property includes 1,200 feet of road that is gated at City Light property line that is only used by one landowner. Skagit backwater 750 feet to north supported western toad breeding site identified in 2012.
Stream Information	The property includes one unmapped stream at the southern border, which appears to have been diverted on adjacent USFS land and routed to a nearby cabin, and the creek loses surface flow on City Light property. Washington DNR shows 0.3 miles of stream and approximately 5 acres of freshwater forested/shrub wetlands on the property.
Access	The property is accessible 3.6 miles on rough road from Cascade River Road, behind three private gates (one City Light at property line, one before quarry, and one north of quarry).
Adjacent Land	Surrounded on 3.5 sides by USFS land and the remaining 0.5 side by a private recreation lot with a cabin.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Maintain diverse forest habitat to retain travel corridor between the river and federal lands to the east.
Management Opportunities	There are 4 preliminary MUs identified; see Table 9b for details. It may be possible to create small canopy gaps to promote larger trees and increase understory diversity if allowable under the Habitat Conservation Plan (HCP) restrictions.
Potential Tribal Interests	To be determined.
Management Constraints	Long access route. Recreation lots with cabins north and south of the property. HCP restriction on the entire property so actions must be consistent with protecting potential marbled murrelet habitat.

Attribute	Description
Species of Management Focus	
Wildlife	Deer, elk, marbled murrelet, and riparian-associated species.
Fish	Salmonids.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Forest over and understory data.
Proposed Data Collection or Monitoring Methods	Forest inventory in select areas.

Table 9b. Management Unit preliminary management actions for the B&W Road 1 property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
BW1-01	8.73	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	Periodic monitoring of road zone.
BW1-02	32.77	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory results; maintain gate at property line.
BW1-03	7.34	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	Management to be based on forest inventory; maintain forest for stream/seep protection and buffer from cabin south of property; clematis control; abandoned car removal.
BW1-04	30.59	Older Forest	Protect/Develop Old Forests	Yes	Category C	No action.

Table 10a. Current and desired conditions, property attributes and constraints at the B&W Road 2 property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	11 acres
Land Use	The B&W Road 2 property is used for recreation.
City Light Enhancement Actions to Date	None.
Vegetation	Plant Association Groups include North Pacific Lowland Riparian Forest and Woodland, North Pacific Red Alder - Bigleaf Maple - Douglas-fir Rainforest, North Pacific Maritime Douglas-fir - Western Hemlock Rainforest, and North-Central Pacific Maritime Silver Fir-Western Hemlock Rainforest. Some remanent large cedars on the property. High bank along Skagit River.
Wildlife Habitat and Habitat Connectivity	The property and adjacent USFS land create a forested corridor between the Skagit River and mountains to the east. Habitat connectivity is reduced from a private road and recreational cabin. The property is 0.6 miles to designated critical habitat for marbled murrelet. Eastern boundary has 640 feet of road.
Stream Information	The property includes 950 feet of unknown stream associated with approximately 4 acres of freshwater forested/shrub wetland.
Access	The property is accessible via 3.3 miles from Cascade River Road, behind two gates (one before quarry and one north of quarry). Property can be accessed from the Skagit River.
Adjacent Land	In addition to the Skagit River, B&W Road 2 property is surrounded on 3 sides by private recreation lots, one with a cabin but lands are well forested.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Riparian and upland forest protection.
Management Opportunities	There are 2 preliminary MUs; see Table 10b for details. Monitor and control invasive plants (one small patch of common tansy near river and several small patches of Robert's geranium). Invasive plants (e.g., knotweed) will be monitored and, if warranted, treated through City Light's Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	Long, rough access road. Very small parcel, adjacent recreation lot has cabin close to property line.

Attribute	Description
Species of Management Focus	
Wildlife	Ungulates, birds, bald eagles, and forest carnivores.
Fish	Salmonids.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Limited information on forest overstory and understory data.
Proposed Data Collection or Monitoring Methods	▪ Forest Inventory; and ▪ Snag assessment.

Table 10b. Management Unit preliminary management actions for the B&W Road 2 property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
BW2-01	2.59	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
BW2-02	8.30	Older Forest	Protect/Develop Old Forests	Yes	Category C	Monitor.

Table 11a. Current and desired conditions, property attributes and constraints at the Corkindale Creek property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	143 acres
Land Use	The Corkindale Creek property is used for the protection of riparian habitats.
City Light Enhancement Actions to Date	City Light works with a permittee to fence off forests from livestock and permits continued livestock grazing and haying to prevent invasive plant infestations. City Light mows blackberries in fields and strategic locations along perimeter to create connectivity access for mammals.
Vegetation	Mixed deciduous-conifer forests on northern portion. Large bigleaf maples., hayfield and overgrazed pasture. Extensive Himalayan blackberry along creek and along forest edges and other invasive plants in pasture. Shrub community along fenceline has some blackberry but otherwise a diverse mix of native shrubs (e.g., elderberry, ocean spray, wild rose). 0.3 miles of the property borders floodplain wetland communities. Plant Association Groups: Cultivated Pasture and Hay Grass Cultural Group; Western North American Ruderal Wet Shrubland, Meadow, and Marsh; North Pacific Lowland Riparian Forest and Woodland; Southern Vancouverian Lowland Ruderal Grassland and Shrubland; North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest; North Pacific Maritime Douglas-fir - Western Hemlock Forest.
Wildlife Habitat and Habitat Connectivity	Borders USFS and WDFW land on the north and west, with agricultural land to the south and City Light's transmission line ROW crossing the southeast corner. Includes 0.25 miles of creek/riparian that is channelized downstream of the property. Elk use of the property is challenging with adjacent agricultural lands. According to permittee, elk sightings are rare and limited to an occasional bull. Very common to see black bear foraging for berries.
Stream Information	The property includes a channelized creek on and downstream of the property, completely dry throughout the summer. The uppermost 850 feet of the creek are not channelized. There are approximately 0.5 miles of Shoreline of State and designated fish stream. There are no other Washington DNR-mapped streams.
Access	The property is hike-in accessible by a 0.8-mile hike from SR 20 through WDFW, Washington DNR, and federal parcels to the west. City Light can access via gated farmland through 3 private parcels.
Adjacent Land	Corkindale property borders USFS and WDFW land on the north and west, and private agricultural land to the south.
Unauthorized Use	None identified.

Attribute	Description
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Increased wildlife habitat in current pasture and hayfield, improved riparian habitat condition.
Management Opportunities	There are 12 preliminary MUs identified; see Table 11b for details. Riparian forest restoration on altered alluvial fan has best potential – blackberry removal and planting understory, levee deconstruction. Check property line for opportunities to remove barbed wire fencing. Explore conservation easements for downstream section of creek if fisheries benefits exist. Invasive plant management to improve wildlife habitat. Restoration of pastures and hayfield. City Light will control invasive species per its Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	Blackberry patches (Himalayan and cutleaf) persist across much of the pasture. Permittee farmer is attempting to control by mowing annually. Farmer has installed wire fencing to keep cows out of riparian forest and creek, but still occurs occasionally with broken wires. City Light has an agricultural access easement on the west and direct access on the east side of the creek through private land.
Species of Management Focus	
Wildlife	Wildlife of management focus include harlequin duck, which is a priority habitat species (PHS), as a known breeding habitat.
Fish	Unknown presence of fish. There is anecdotal presence of Coho but have not seen confirmation.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Fish use (timing and species) of creek during fall/winter/spring, riparian forest over and understory data, fringe of fields need vegetation and soil assessed to plan vegetation restoration; pasture and hayfield agronomist.
Proposed Data Collection or Monitoring Methods	Vegetation sampling in MUs.

Table 11b. Management Unit preliminary management actions for the Corkindale Creek property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
CCR-01	6.92	Transmission Line ROW: Complex Early Seral Habitat	Assess Hydro Connectivity	No	Category A	Herbaceous focus for vegetative cover; assess modelled wetland.
CCR-02	0.89	Complex Early Seral Habitat	Assess Hydro Connectivity	No	Category A	Herbaceous focus for vegetative cover.
CCR-03	12.16	Complex Early Seral Habitat	Assess Hydro Connectivity	No	Category A	Stop livestock grazing and promote native herbaceous vegetation through planting and invasive plant management; assess modeled wetland.
CCR-04	33.72	Complex Early Seral Habitat	Assess Hydro Connectivity	No	Category A	Stop livestock grazing and promote native herbaceous vegetation through planting and invasive plant management; ungulate and grassland bird habitat; create shrub border on east side; possible hayfield.
CCR-05	15.74	Complex Early Seral Habitat	Assess Hydro Connectivity	No	Category A	Stop livestock grazing and promote native herbaceous vegetation through planting and invasive plant management; ungulate and grassland bird habitat; create shrub border on east side.
CCR-06	11.73	Forest	Assess Hydro Connectivity	Yes	Category A	Plant tree and shrub species.
CCR-07	4.60	Other	Fenceline Issue	No	Category C	No action.
CCR-08	15.02	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category A	Himalayan blackberry removal; evaluate regrading levees; understory planting; add wood to stream.
CCR-09	7.18	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category A	Himalayan blackberry removal; evaluate regrading levees; understory planting; add wood to stream.
CCR-10	14.64	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category A	Evaluate options for complex early seral habitat vs. hayfield.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
CCR-11	7.93	Forest	Diversity/Functions	Yes	Category A	Himalayan blackberry removal; tree/shrub planting.
CCR-12	12.05	Forest	Diversity/Functions	Yes	Category A	Himalayan blackberry removal from forest edge; natural forest succession.

Table 12a. Current and desired conditions, property attributes and constraints at the South Marble 40 property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Acres	41 acres
Land Use	The South Marble 40 property is used for conservation of forest habitats.
City Light Enhancement Actions to Date	None.
Vegetation	Forests and shrubland, diversity of tree ages 30 to 230 years. Plant Association Groups: North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest Group; North Pacific Maritime Douglas-fir - Western Hemlock Forest; Vancouverian Wet Shrubland; Southern Vancouverian Lowland Ruderal Grassland and Shrubland.
Wildlife Habitat and Habitat Connectivity	Patch of marbled murrelet habitat on property but surrounding lands managed as industrial forestlands.
Stream Information	The property includes 0.5 miles of stream (marked as non-fish bearing). There are no mapped wetlands.
Access	The property is walk-in accessible from industrial forestland roads network near the property line to access the southeast corner of the property.
Adjacent Land	Surrounded by industrial forestlands.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Retain older forests in matrix of industrial forestland.
Management Opportunities	Habitat protection; there are 3 MUs that are all mapped for natural development of older forests; see Table 12b for details.
Potential Tribal Interests	To be determined.
Management Constraints	Rugged terrain, HCP restriction, and no vehicle access.
Species of Management Focus	
Wildlife	Wildlife of management focus include marbled murrelet and other old forest species per HCP restriction, forest carnivores.
Fish	None identified.
Culturally Significant Plants	To be determined.
Data	
Data gaps	To be determined.
Proposed Data Collection or Monitoring Methods	To be determined.

Table 12b. Management Unit preliminary management actions for the South Marble 40 property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
SM40-01	14.78	Older Forest	Protect/Develop Old Forests	No	Category C	HCP restrictions; base management on forest inventory; natural forest succession.
SM40-02	19.23	Older Forest	Protect/Develop Old Forests	No	Category C	HCP restrictions; base management on forest inventory; natural forest succession.
SM40-03	7.06	Older Forest	Protect/Develop Old Forests	Yes	Category B	HCP restrictions; base management on forest inventory; natural forest succession.

Table 13a. Current and desired conditions, property attributes and constraints at the Illabot North property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	726 acres
Land Use	The Illabot North property is used for the protection of wetland and riparian habitats. There are abandoned forest roads (no open roads) on the property.
City Light Enhancement Actions to Date	City Light provides invasive plant management on overlapping transmission line ROW and some complex early seral habitat plantings in the transmission line ROW. Previously, City Light installed a gate at Rockport-Cascade Road, which stopped trail motorcycle activity, and provided signage to prevent traffic through creek and wetland areas.
Vegetation	Forests, substantial wetland complexes in slough and constructed Chum channels. Transmission line ROW some diverse but some affected by non-native species. Plant Associations: North Pacific Lowland Riparian Forest and Woodland; North Pacific Maritime Douglas-fir - Western Hemlock Forest; Vancouverian Wet Shrubland; Southern Vancouverian Lowland Ruderal Grassland and Shrubland; North Pacific Lowland Riparian Forest and Woodland; North Pacific Lowland Riparian Forest and Woodland; Invasive Shrub/Native Shrub/Forb (invasive shrub cover dominant); Mixed Native Shrub/Tree/Forb (co-dominants).
Wildlife Habitat and Habitat Connectivity	Connects to Illabot Creek, and O'Brien Creek and Slough corridors and conservation lands to the west. Adjoins City Light (ESA Program land) lands at Pandora Circle Road. Connects with O'Brien and Illabot Slough (across Rockport-Cascade Road). Sloughs and wetlands. Chum channels at Powerline Pond and Illabot Channel.
Stream Information	The property includes 0.6 miles of O'Brien Creek and 2.7 total stream miles of tributaries to Illabot Creek. There is a total of about 85 acres of freshwater forested/shrub wetlands associated with both creeks.
Access	The property is accessible from Illabot Creek Lane (gated) off Rockport-Cascade Road. Pandora Circle Road borders a portion of the eastern boundary.
Adjacent Land	Other City Light mitigation or ESA Program land, industrial forestlands, and small recreational lots adjacent to the river off of Illabot Creek Lane and Pandora Circle.
Unauthorized Use	Past trespassing from private property on Pandora Circle Road. Fallen cedar log cutting and bigleaf maple theft on two occasions (one person cited by WDFW).

Attribute	Description
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Healthy wetland, riparian, and upland forest communities and mix of ungulate and songbird habitat on the transmission line ROW that overlaps the mitigation land. Reduced adverse effects of vegetation management and unauthorized activities in the transmission line ROW.
Management Opportunities	There are 29 preliminary MUs identified; see Table 13b for details. Maintain gate on Illabot Creek Lane and security monitoring at problem sites. Monitor and control invasive plants in the transmission line ROW. Fish and aquatic management of Illabot channels and Powerline Pond for side and off-channel habitat. Restoration of invasive plant populations in the transmission line ROW for pollinators, deer, elk, and birds. Flat areas outside wetland buffers with even-age second-growth forest could be managed to improve diversity/health. Protect extensive wetlands. Increase diversity in forests, small canopy gaps for understory vegetation development; Increase security from unauthorized uses. Promote healthy and diverse riparian zones, reduce adverse effects of transmission line ROW, explore opportunities to collaborate with conservation-minded neighbors to plant shrubs and trees to increase deer and elk hiding cover along Illabot Creek Lane. City Light will control invasive species per its Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	Private recreation lots. County road and open access of Pandora Circle Road provide trespassing potential.
Species of Management Focus	
Wildlife	Ungulates, beaver, bald eagles, bats, forest and shrubland birds, pollinators in the transmission line ROW.
Fish	Chinook, Chum, Coho, resident trout.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Forest overstory and understory data; Powerline Pond and Illabot Channel fish habitat management objectives.
Proposed Data Collection or Monitoring Methods	▪ Channel assessments to determine hydraulic and vegetation management actions; ▪ Transmission line ROW vegetation management actions to increase ungulate and other wildlife habitat quality; and ▪ Forest inventory and snag assessment off the transmission line ROW.

Table 13b. Management Unit preliminary management actions for the Illabot North property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
ILN-01	0.35	Transmission Line ROW	Maintain or Enhance Complex Early Seral Habitat	Yes	Category A	Invasive plant management; promote shrubs for visual screen per height zonation.
ILN-02	0.93	Transmission Line ROW	Maintain or Enhance Complex Early Seral Habitat	Yes	Category A	Monitor; invasive plant management.
ILN-03	3.21	WMZ/RMZ	Maintain Spawning Channel	Yes	Category A	Maintain or establish low shrubs per height zonation.
ILN-04	3.59	WMZ/RMZ	Maintain Spawning Channel	Yes	Category A	Monitor; invasive plant management.
ILN-05	1.55	Transmission Line Row	Maintain or Enhance Complex Early Seral Habitat	Yes	Category A	Seed or plant with pollinator host plants.
ILN-06	1.59	Transmission Line ROW	Maintain Spawning Channel	No	Category C	Increase shrub cover per height zonation; invasive plant management.
ILN-07	125.78	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.
ILN-08	91.02	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; monitor for trespass resource damage; monitor for invasive plants.
ILN-09	210.52	WMZ/RMZ	Diversity/Functions	Yes	Category A	Maintain diverse forest overstory/understory around wetlands; invasive plant management
ILN-10	2.69	Transmission Line ROW	Maintain or Enhance Complex Early Seral Habitat	No	Category C	Maintain or enhance mix of shrub and complex early seral habitat for ungulates; invasive plant management.
ILN-11	1.82	Transmission Line ROW	Maintain Spawning Channel	No	Category C	Protect and enhance shrub cover around channel per height zonation; beaver management; invasive plant management.
ILN-12	1.59	Transmission Line ROW	Operations	No	Category C	Maintain space for Project equipment but maintain patches of shrub habitat; monitor and manage invasive plants.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
ILN-13	2.12	Transmission Line ROW	Maintain or Enhance Complex Early Seral Habitat	No	Category C	Protect/enhance complex early seral habitat for ungulate forage; invasive plant management.
ILN-14	2.44	Transmission Line ROW	Maintain Spawning Channel	No	Category C	Increase shrub cover per height zonation; invasive plant management.
ILN-15	8.28	Transmission Line ROW	Maintain Spawning Channel	Yes	Category A	Maintain/enhance shrubs per height zonation for ungulate hiding and forage.
ILN-16	1.71	Forest	Diversity/Functions	Yes	Category C	Invasive plant management.
ILN-17	2.12	Other	G2T Spoil and Site Restoration	Yes	Category B	Tree and shrub planting; invasive plant management.
ILN-18	1.10	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers -	No	Category A	Conifer underplanting; blackberry removal and monitoring.
ILN-19	1.26	WMZ/RMZ	Maintain Spawning Channel	No	Category A	Maintain low shrubs per height zonation for shading; beaver management.
ILN-20	44.79	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category A	Monitoring.
ILN-21	19.19	Forest	Diversity/Functions	No	Category B	Monitor unauthorized use.
ILN-22	5.81	Older Forest	Protect/Develop Old Forests	Yes	Category A	No action.
ILN-23	102.35	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; monitor unauthorized use; invasive plant management.
ILN-24	3.48	Forest	Diversity/Functions	Yes	Category A	No action.
ILN-25	42.23	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; monitor unauthorized use; invasive plant management.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
ILN-26	13.85	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	Maintain/increase understory vegetation.
ILN-27	15.73	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; protect big leaf maple and cedar trees; monitor unauthorized use; invasive plant management along roads.
ILN-28	1.61	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	Yes	Category B	Replace reed canarygrass with ungulate-preferred herbaceous plants.
ILN-29	12.20	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	Maintain native plant species diversity; invasive plant management along public road; monitor for trespass resource damage.

Table 14a. Current and desired conditions, property attributes and constraints at the O'Brien Slough property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Acres	47 acres
Land Use	The O'Brien Slough property is used for recreation and the protection of riparian habitats.
City Light Enhancement Actions to Date	SRSC removed an old road prism from O'Brien Slough.
Vegetation	Extensive wetland habitat. Reed canarygrass is common. Plant Associations: North Pacific Red Alder – Bigleaf Maple – Douglas-fir Forest; Vancouverian Wet Shrubland; North Pacific Lowland Riparian Forest and Woodland; North Pacific Maritime Hardwood-Conifer Swamp.
Wildlife Habitat and Habitat Connectivity	Adjoins City Light North Illabot and ESA Program lands along much of the slough (up- and downstream). Connects with Illabot North and Illabot South (across Rockport-Cascade Road). County road along 2,275 feet of property. Pond breeding amphibians use slough. Cluster of recreation lots along the Skagit River on opposite side of ESA Program lands. Northeast of Rockport-Cascade Road, private forestland occupies slopes.
Stream Information	The property includes 0.5 miles of fish bearing creek/slough and 0.03 miles of intermittent tributary, associated with 14 acres of freshwater forested/shrub wetland. There is a minimal buffer between the county road and wetland along 1,300 feet.
Access	The property is directly walk-in accessible from both Pandora Circle Road and Rockport-Cascade Road.
Adjacent Land	City Light mitigation (Illabot) and ESA Program properties, private recreation lots.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Increase visual buffer along Rockport Cascade Road, maintain diverse slough habitat.
Management Opportunities	There are 2 preliminary MUs; see Table 14b for details. Protect slough; invasive plant monitoring/management. Snag creation (or nest boxes).
Potential Tribal Interests	To be determined.
Management Constraints	Reed canarygrass in slough near county road.
Species of Management Focus	
Wildlife	Beaver, forest carnivores, amphibians, and passerines.
Fish	Coho Salmon.
Culturally Significant Plants	To be determined.

Attribute	Description
Data	
Data gaps	To be determined.
Proposed Data Collection or Monitoring Methods	To be determined.

Table 14b. Management Unit preliminary management actions for the O'Brien Slough property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
OBS-01	22.95	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	Maintain native plant species diversity; manage invasive plants along public road; monitor for resource damage associated with unauthorized use.
OBS-02	24.24	Forest	Diversity/Functions	Yes	Category B	Monitor for trespass resource damage.

Table 15a. Current and desired conditions, property attributes and constraints at the Illabot South property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	2,522 acres
Land Use	The Illabot South property is conservation land used for forest habitat.
City Light Enhancement Actions to Date	City Light decommissioned former logging roads and removed culverts. All interior roadbeds are being revegetated. A section of the transmission line ROW is used for disposal from the Illabot Creek restoration project (SRSC) and is revegetated with native herbaceous plants.
Vegetation	Plant Associations: Developed; North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest; North Pacific Maritime Douglas-fir - Western Hemlock Forest; Vancouverian Wet Shrubland; Southern Vancouverian Lowland Ruderal Grassland and Shrubland; North Pacific Lowland Riparian Forest and Woodland; North Pacific Maritime Hardwood-Conifer Swamp. Relatively large patches of suitable murrelet habitat east and west of Illabot Creek second-growth stands.
Wildlife Habitat and Habitat Connectivity	Connects to Washington DNR and USFS land to the southeast. Illabot Creek is a designated WSR on City Light land and further upstream. Vegetation management and routine O&M transmission line ROW affects the corner of the property where it crosses. Industrial forestland road along edge and timberlands to east, north, and southwest. Rockport-Cascade Road passes between Illabot South and Illabot North blocks. Designated critical habitat for marbled murrelet less than 0.5 miles south of the property.
Stream Information	The property includes approximately 2 miles of Illabot Creek in an area designated as WSR, 1 mile of O'Brien Creek, and a total of 10 stream miles of many small tributaries to both creeks. Total of 57 acres of riverine wetland mapped patches, this acreage is essentially just the stream beds).
Access	The property is directly walk-in accessible from Rockport Cascade to the northern portion of the property. Vehicle access is controlled by gates on the transmission line ROW and on an industrial forestland road along the southern boundary of the property.
Adjacent Land	Industrial forestland and Washington DNR land.
Unauthorized Use	Rare camping and other actions off transmission line ROW. Legal mineral prospecting was permitted in Illabot Creek by WDFW in 2013.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Well-connected forested habitat. Some areas near marbled murrelet designated critical habitat.
Management Opportunities	There are 44 preliminary MUs; see Table 15b for details. Some of the large block of forest may benefit from management actions to promote forest health and increase habitat value. Protect/promote older forest in patches that connect with similar forests on adjacent land. Control invasive plants along the road. Secure access and monitor abandoned road for squatting. City Light will control invasive species per its Invasive Plants Management Plan (City Light 2023m).

Attribute	Description
Potential Tribal Interests	To be determined.
Management Constraints	Forest management will require re-opening of abandoned roads. Managing access and preventing squatting along the transmission line ROW road and from county road will be a challenge.
Species of Management Focus	
Wildlife	Ungulates, bald eagles, bats, old forest species, and forest carnivores.
Fish	Chinook, Coho, and resident trout.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Forest over and understory data.
Proposed Data Collection or Monitoring Methods	Forest over and understory data collection in select areas.

Table 15b. Management Unit preliminary management actions for the Illabot South property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
ILS-01	3.39	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	No action.
ILS-02	17.86	Forest	Visual Buffer	Yes	Category A	Maintain/increase understory vegetation.
ILS-03	76.40	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory, consider forest management to increase ungulate forage.
ILS-04	13.35	Older Forest	Protect/Develop Old Forests	Yes	Category A	No action.
ILS-05	69.04	Forest - Ungulate Evaluation	Ungulate Evaluation	Yes	Category A	Management to be based on forest inventory; consider forest management to increase ungulate forage.
ILS-06	279.36	Older Forest	Protect/Develop Old Forests	Yes	Category A	No action.
ILS-07	75.41	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; consider forest management to increase ungulate forage.
ILS-08	187.55	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	Consider feasibility of reestablishing road crossing of small stream on south edge.
ILS-09	74.03	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; consider forest management to increase ungulate forage and overall diversity.
ILS-10	6.69	Forest	Visual Buffer	Yes	Category A	Maintain/increase understory vegetation.
ILS-11	88.68	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; consider forest management to increase ungulate forage and overall diversity.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
ILS-12	27.50	Older Forest	Protect/Develop Old Forests	Yes	Category B	No action.
ILS-13	49.95	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Consider feasibility of reestablishing road crossing of stream.
ILS-14	11.25	Forest	Visual Buffer	Yes	Category B	Maintain/increase understory vegetation.
ILS-15	9.35	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
ILS-16	13.38	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	No action.
ILS-17	59.24	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.
ILS-18	55.42	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory, consider forest management to increase ungulate forage and overall diversity.
ILS-19	328.18	Older Forest	Protect/Develop Old Forests	Yes	Category B	Management to be based on forest inventory.
ILS-20	30.00	Forest	Visual Buffer	Yes	Category A	Maintain or increase understory vegetation.
ILS-21	3.92	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	Maintain or increase understory vegetation.
ILS-22	62.31	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.
ILS-23	41.87	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; consider forest management to increase ungulate forage and overall diversity.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
ILS-24	11.98	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	No action.
ILS-25	2.87	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	No action
ILS-26	15.72	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory, consider forest management to increase ungulate forage.
ILS-27	325.41	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	No action.
ILS-28	170.33	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
ILS-29	0.29	Transmission Line ROW	-	No	Category C	Monitor unauthorized access.
ILS-30	4.61	Transmission Line ROW	-	No	Category C	Pollinator habitat; monitor unauthorized access.
ILS-31	36.35	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.
ILS-32	86.96	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.
ILS-33	43.03	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category A	Management to be based on forest inventory.
ILS-34	32.05	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.
ILS-35	20.02	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
ILS-36	72.00	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.
ILS-37	7.31	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.
ILS-38	37.43	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	No action.
ILS-39	9.62	Older Forest	Protect/Develop Old Forests	No	Category C	No action.
ILS-40	27.55	Older Forest	Protect/Develop Old Forests	Yes	Category A	Management to be based on forest inventory.
ILS-41	8.80	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.
ILS-42	5.92	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.
ILS-43	6.31	Older Forest	Protect/Develop Old Forests	Yes	Category A	Management to be based on forest inventory.
ILS-44	7.41	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory.

Table 16a. Current and desired conditions, property attributes and constraints at the Bogert and Tam property.

Attribute	Description
Current Conditions	
City Light Program	Fish Mitigation
Land Size	17 acres
Land Use	The Bogert and Tam property is used to support fish habitat, and the protection of wetland and riparian habitats.
City Light Enhancement Actions to Date	City Light removed Pole Barn, decommissioned well, removed debris, installed gate, invasive plant removal, and revegetation.
Vegetation	Plant Association Groups: North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest, Vancouverian Wet Shrubland, Southern Vancouverian Lowland Ruderal Grassland and Shrubland, North Pacific Lowland Riparian Forest and Woodland. Riparian forest along channel.
Wildlife Habitat and Habitat Connectivity	This is a fish habitat property that borders 1,070 feet of Skagit River side channel that supports salmon spawning habitat. On other three sides, the property is bordered by private parcels developed for residential uses. Northern boundary borders SR 20.
Stream Information	The property includes no streams or wetlands. The property was purchased due to the adjacent side channel which is a high use Chum Salmon spawning channel. Currently the channel is occupied by beavers with multiple dams creating ponds.
Access	The property is directly accessible from SR 20.
Adjacent Land	Bogert and Tam property is adjacent to a side channel of the Skagit River and borders private agricultural land to the west. Property to the west was identified in the Chinook Recovery Plan as a high value property for acquisition and restoration.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Provide river shoreline and riparian forest habitat including side channel/island.
Management Opportunities	There are 2 preliminary MUs: 1 RMZ and 1 access MU; see Table 16b for details. Protect/enhance riparian conditions and monitor invasive plants. Support salmon habitat restoration efforts; maintain diverse aquatic and wetland communities for beaver, amphibians.
Potential Tribal Interests	To be determined.
Management Constraints	Small property; susceptible to invasive plants. Reach-level salmon restoration actions on other ownership and on this property will determine range of other actions on City Light land. There is a private residence to the west of property that is of interest due to its potential to reconnect side channels west of the property.

Attribute	Description
Species of Management Focus	
Wildlife	Wintering bald eagle foraging habitat in the side channel of the Skagit River.
Fish	Chinook, Coho, Chum, Sockeye, Bull Trout.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Reach-level salmon habitat restoration actions need to be identified first. Overstory and understory structure data in upland forests.
Proposed Data Collection or Monitoring Methods	Monitor for anthropogenic effects. Forest inventory in upland forest MUs.

Table 16b. Management Unit preliminary management actions for the Bogert and Tam property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
BGT-01	16.90	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	Monitor; invasive plant control.
BGT-02	0.03	Access	-	No	Category C	Monitor; invasive plant control.

Table 17a. Current and desired conditions, property attributes and constraints at the Barnaby Slough property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	225 acres
Land Use	The Barnaby Slough property is used for the protection of wetland and riparian habitats.
City Light Enhancement Actions to Date	City Light addressed unauthorized ATV traffic and vandalism by installing gates, barricades, and reducing nuisance attractants. City Light worked with SRSC and WDFW to remove a former WDFW caretaker house, decommission a water pipe between Harrison and Barnaby Slough, and barricade Barnaby Slough Road.
Vegetation	Plant Association Groups: North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest, North Pacific Maritime Douglas-fir - Western Hemlock Forest, Vancouverian Wet Shrubland, Southern Vancouverian Lowland Ruderal Grassland and Shrubland, North Pacific Lowland Riparian Forest and Woodland Group.
Wildlife Habitat and Habitat Connectivity	Harrison Pond is a waterfowl habitat for ducks, geese, swans, and wading birds. Upper Harrison Slough is extensive high-quality pond-breeding amphibian habitat. Extensive beaver-modified wetland habitat in slough and portion of Harrison Pond provides high-quality amphibian breeding habitat and bat foraging areas; second-growth conifer forest in southeast portion of the property next to Sierra Pacific Industries clearcut. Beaver dams support extensive wetland habitat. Connects to TNC, WDFW, and City Light ESA Program lands to create an effective block of conservation land on floodplain. Bordered by industrial forestland and private land on the south and east. Martin Ranch Road borders the property. Trail now occupies the former Barnaby Slough Road.
Stream Information	The property includes a stream located on the northeast side of property, just north of Martin Ranch Road, which is fish bearing with Coho and Sculpin and a stream southwest of the property and upstream is also fish bearing. Washington DNR shows 1.8 total stream miles. There are about 26 acres of freshwater emergent, 7 acres of freshwater forested/shrub, and 1 acre of freshwater pond wetlands.
Access	The property is directly accessible from Martin Ranch Road.
Adjacent Land	Barnaby Slough property connects to WDFW, TNC, and City Light ESA Program lands. There are collective protections of Barnaby and Harrison Sloughs. Industrial forestland to south Martin Ranch Road along the southern edge.
Unauthorized Use	Substantial public use; historical ATV trespass on and near Barnaby Slough Road but rock barriers have stopped it.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Support salmon habitat restoration efforts proposed by tribes; maintain diverse aquatic and wetland communities for beaver and amphibians.
Management Opportunities	There are 8 preliminary MUs; see Table 17b for details. Continue collaboration with SRSC on assessment of Barnaby Reach restoration project phases. Assess selected patches of second growth conifer forest for management to increase habitat diversity; snag creation.

Attribute	Description
Potential Tribal Interests	To be determined.
Management Constraints	Reach-level salmon restoration actions on other ownership and on this property will determine range of other actions on City Light land. Private residence east of property requires firearm safety zone on portion of the property. Industrial forestland management south of the property.
Species of Management Focus	
Wildlife	Deer, elk, beaver, amphibians, waterfowl.
Fish	Chinook, Coho.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Reach-level salmon habitat restoration actions need to be identified first before management of Harrison Slough can be determined. Overstory and understory structure data in upland forests.
Proposed Data Collection or Monitoring Methods	Forest inventory in upland forest MUs.

Table 17b. Management Unit preliminary management actions for the Barnaby Slough property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
BAS-01	69.93	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category A	Beaver habitat; amphibian habitat; wood duck nest boxes.
BAS-02	1.18	WMZ/RMZ	Invasive Plant Management	No	Category C	Invasive plant management.
BAS-03	17.61	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; maintain forest for stream/seep protection and buffer from cabin south of property; clematis control; abandoned car removal.
BAS-04	6.57	Other	Trail	No	Category C	No action.
BAS-05	91.63	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category A	Snags; beaver habitat; amphibian habitat, wood duck nest boxes.
BAS-06	27.95	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	No action.
BAS-07	0.94	Forest	Diversity/Functions	Yes	Category A	Management to be based on forest inventory; maintain forest for stream/seep protection and buffer from cabin south of property; clematis control; abandoned car removal.
BAS-08	9.64	Forest	Diversity/Functions	Yes	Category B	No action.

Table 18a. Current and desired conditions, property attributes and constraints at the Johnson Slough property.

Attribute	Description
Current Conditions	
City Light Program	Fish Mitigation
Land Size	67 acres
Land Use	The Johnson Slough property is used for the protection of wetland and riparian habitats.
City Light Enhancement Actions to Date	City Light removed the former blueberry field from the floodplain. The SRSC is replanting Salmon Recovery Funding Board-eligible areas. Non-eligible area (approximately 3 acres) was mowed by Sauk-Suiattle Indian Tribe for elk forage.
Vegetation	Plant Association Groups: Cultivated Row Crops; Developed; North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest; Vancouverian Wet Shrubland; Western North American Ruderal Wet Shrubland, Meadow, and Marsh; Southern Vancouverian Lowland Ruderal Grassland and Shrubland; North Pacific Lowland Riparian Forest and Woodland. Invasive plants are along the river and access road to the property.
Wildlife Habitat and Habitat Connectivity	0.7 miles of Skagit River. Connects to County, WDFW, and Skagit Land Trust property upriver. ESA Program 57-acre "Rockport" property borders the mitigation land and provides a buffer along 0.5 miles of SR 20.
Stream Information	The property includes 0.7 miles of fish bearing stream. About 7 acres of riverine and 10 acres of freshwater forested/shrub wetlands associated with Skagit River.
Access	The property is directly accessible from SR 20 through a City Light farm gate on the ESA Program property. Property can be accessed from the Skagit River.
Adjacent Land	Johnson Slough property borders the Skagit River, and City Light ESA Program land (Rockport property) between the property and SR 20.
Unauthorized Use	Past, low-level ATV traffic. Small shelter recently found.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Functional floodplain riparian zone connecting to upstream conservation lands. Diverse mix of forest, shrub, and complex early seral habitats; reduced invasive plant cover.
Management Opportunities	There are 9 MUs mapped; see Table 18b for details. There are 6 MUs mapped on the ESA Program Rockport property just north of the Johnson Slough property, designed to build wildlife connectivity with the Johnson Slough property; support the SRSC's stream channel restoration (Johnson Creek Alluvial Fan Restoration - SRSC). Maintain ungulate habitat on combined mitigation and ESA Program properties and enhance visual buffers along SR 20 on ESA Program land. City Light will control invasive species per its Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	Field management, coordinate with management of upper fields on ESA Program properties.

Attribute	Description
Species of Management Focus	
Wildlife	Beaver and ungulates.
Fish	Salmonids.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Forest over and understory in select areas.
Proposed Data Collection or Monitoring Methods	Cohesive management of mitigation and ESA Program properties for fish, ungulates, and other wildlife.

Table 18b. Management Unit preliminary management actions for the Johnson Slough property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
JSS-01	11.54	Other	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
JSS-02	16.34	WMZ/RMZ	Forest Diversity, Channel Restoration	No	Category C	Monitor; snag evaluation/creation.
JSS-03	1.72	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
JSS-04	24.60	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category A	Monitor; channel connection.
JSS-05	3.51	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Invasive plant monitoring.
JSS-06	1.09	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Invasive plant monitoring.
JSS-07	1.37	Forest	Diversity/Functions	Yes	Category B	Invasive plant management.
JSS-08	4.19	Forest	Diversity/Functions	No	Category B	Invasive plant management; forest thinning.
JSS-09	3.10	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category B	Mow.

Table 19a. Current and desired conditions, property attributes and constraints at the False Lucas Slough property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	203 acres
Land Use	The False Lucas Slough property is used for the protection of riparian habitats.
City Light Enhancement Actions to Date	City Light removed some blockages in small swales on the property.
Vegetation	Plant Association Groups: G237 - North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest; North Pacific Maritime Douglas-fir - Western Hemlock Forest; Vancouverian Wet Shrubland; Southern Vancouverian Lowland Ruderal Grassland and Shrubland; North Pacific Lowland Riparian Forest and Woodland. Blackberry in various locations.
Wildlife Habitat and Habitat Connectivity	Connects with conservation lands to the north and east but bordered by private land to the south and west. Approximately 1.1 miles border TNC/WDFW land, 1.2 miles borders industrial forestland, and 1.3 miles borders private rural residential. Good connectivity with floodplain on northeast side but residential development on west side limits connection with WDFW and county parcels downriver of this property. Extensive wetland habitat provides diverse habitat for amphibians and bats.
Stream Information	The property includes 1.5 miles of creek/slough, 176 feet directly borders the Skagit River.
Access	The property is river accessible on the northwest corner. City Light can access via industrial forestland road off Martin Ranch Road, with a gate 0.5 miles east of the property.
Adjacent Land	Rural residential areas are to the west and southwest, conservation lands are to the north and northeast, and industrial forestland to the east and southeast.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Healthy, diverse sloughs, riparian and upland forest.
Management Opportunities	There are 6 MUs identified; see Table 19b for details. Wetland protection. Support salmon habitat restoration efforts proposed by tribes. Consider removal of former railroad bed prism that crosses slough and other small slough barriers; possible forest management for deer/elk habitat or overall forest diversity. City Light will control invasive species per its Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	Access is through third party. Roads would need to be reestablished for any major work.

Attribute	Description
Species of Management Focus	
Wildlife	Pond-breeding amphibians, riparian birds, deer. and elk. Wetland may be susceptible to bullfrog invasion.
Fish	Salmonids.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Fish resources and reach-level project for salmonid habitat.
Proposed Data Collection or Monitoring Methods	Monitor amphibians; monitor and control invasive plants.

Table 19b. Management Unit preliminary management actions for the False Lucas Slough property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
FLS-01	173.40	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category A	Monitor unauthorized access.
FLS-02	16.51	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
FLS-03	1.90	Restoration	Evaluate Blocked Slough	No	Category A	Evaluate removal of blockage.
FLS-04	1.00	Restoration	Evaluate Blocked Slough	No	Category C	Evaluate removal of blockage.
FLS-05	0.34	Restoration	Evaluate Blocked Slough	No	Category C	Evaluate removal of blockage.
FLS-06	10.34	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.

Table 20a. Current and desired conditions, property attributes and constraints at the Napoleon Slough property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Acres	62 acres
Land Use	The Napoleon Slough property is used for the protection of wetland and riparian habitats.
City Light Enhancement Actions to Date	City Light periodically monitors vegetation and habitat quality.
Vegetation	Slough, wetland, riparian forest – Plant Association Groups: North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest; North Pacific Maritime Douglas-fir - Western Hemlock Forest; Vancouverian Wet Shrubland; North Pacific Lowland Riparian Forest and Woodland.
Wildlife Habitat and Habitat Connectivity	Buffers floodplain from industrial forestland and SR 530 to the east. Connects with conservation land to the Sauk River.
Stream Information	The property includes 0.5 miles of fish bearing creek/slough, which is connected to 0.5 miles of adjacent stream. The property includes a total of 19 acres of freshwater forested/shrub wetland.
Access	The property is walk-in accessible through the slough or by the Skagit River shoreline.
Adjacent Land	Private forestland.
Unauthorized Use	Unknown.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Healthy and diverse riparian habitat.
Management Opportunities	There is 1 MU; see Table 20b for details. Protect wetland, slough, and forest areas.
Potential Tribal Interests	To be determined.
Management Constraints	Very limited access.
Species of Management Focus	
Wildlife	Beaver, riparian birds, and bald eagles.
Fish	Chinook, Coho, and Chum.
Culturally Significant Plants	To be determined.

Attribute	Description
Data	
Data gaps	To be determined.
Proposed Data Collection or Monitoring Methods	To be determined.

Table 20b. Management Unit preliminary management actions for the Napoleon Slough property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NAS-01	61.64	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor; evaluate for snag creation.

Table 21a. Current and desired conditions, property attributes and constraints at the McLeod Slough property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	126 acres
Land Use	The McLeod Slough property is agriculture under life estate and used for the protection of wetland and riparian habitats.
City Light Enhancement Actions to Date	City Light has modified haying practices to reduce effects to wetland, removed apple maggot infested apple trees to comply with Washington Department of Agriculture, installed a gate and rock barriers to stop vehicular access, and removed a small patch of knotweed. SRSC installed riparian plantings (small area).
Vegetation	Plant Associations: Cultivated Pasture and Hay Grass Cultural Group; Developed; North Pacific Red Alder – Bigleaf Maple – Douglas-fir Forest; North Pacific Maritime Douglas-fir - Western Hemlock Forest Group; Vancouverian Wet Shrubland; Western North American Ruderal Wet Shrubland, Meadow, and Marsh; Southern Vancouverian Lowland Ruderal Grassland and Shrubland; North Pacific Lowland Riparian Forest and Woodland.
Wildlife Habitat and Habitat Connectivity	Connects to WDFW land along river. County road along southern boundary and private agriculture/forest properties to the south. Large hayfield and forested bottomland frequently used by group of elk.
Stream Information	The property includes 0.9 miles of fish bearing creek/slough and 0.2 total stream miles of tributaries. About 21 acres of freshwater forested/shrub and about 2 acres of riverine wetlands. Cutthroat present in McLeod Slough tributary south of the property.
Access	The property is directly accessible from Concrete-Sauk Valley Road.
Adjacent Land	Rural residential and agricultural land.
Unauthorized Use	Historic vehicular activity in field.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Continued hayfield use but smaller and with improved buffer along county road and residence. Increased riparian buffer; reduced blackberry cover along field perimeter. Enhance wetland within field.
Management Opportunities	There are 6 MUs identified; see Table 21b for details. Continue some form of haying to limit invasive plants and promote elk forage, improve visual security habitat by planting trees and shrubs along public road. Increase riparian forest buffer near slough. Remove fringing blackberry. City Light will control invasive species per its Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	Life estate allows former owner to continue haying field so some actions may need to be delayed until life estate ends. One neighbor is problematic for lawful hunting.

Attribute	Description
Species of Management Focus	
Wildlife	Elk.
Fish	Salmonids.
Culturally Significant Plants	To be determined.
Data	
Data gaps	To be determined.
Proposed Data Collection or Monitoring Methods	To be determined.

Table 21b. Management Unit preliminary management actions for the McLeod Slough property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
MLS-01	65.37	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	Monitor; evaluation for snag creation.
MLS-02	4.71	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	Monitor.
MLS-03	40.32	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category A	Hayfield.
MLS-04	3.69	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	Increase hydrophytic shrubs around wetland; minimizing mowing.
MLS-05	10.76	Forest	Visual Buffer	No	Category B	Increase tree and shrub cover for visual buffer along road.
MLS-06	1.14	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	Tree/shrub planting.

Table 22a. Current and desired conditions, property attributes and constraints at the Finney Creek property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	642 acres
Land Use	The Finney Creek property is conservation land used for habitat protection per Washington DNR HCP restriction.
City Light Enhancement Actions to Date	None.
Vegetation	Plant Associations: North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest; North Pacific Maritime Douglas-fir - Western Hemlock Forest; Vancouverian Wet Shrubland; Southern Vancouverian Lowland Ruderal Grassland and Shrubland; North Pacific Lowland Riparian Forest and Woodland; Most of the forests on lower slopes and near the creek are 35 to 50 years old while upper slopes are 50 to 80 years with small, scattered patches of 100 to170 year-old trees.
Wildlife Habitat and Habitat Connectivity	Touches USFS land on one corner but surrounded by private industrial forestlands. 100 percent forested, 0.6 miles of Finney Creek, three-quarters of forest is mapped as potentially suitable murrelet habitat. The southwest corner abuts designated critical habitat for marbled murrelet.
Stream Information	The property includes 0.6 miles of Finney Creek and about 7 total stream miles from 7 main tributaries. About 21 acres of riverine wetlands associated with mainstem Finny Creek.
Access	The property is accessible from Finney Creek Road network. There are industrial forestland gates less than 1 mile from the property.
Adjacent Land	Industrial forestland, federal land.
Unauthorized Use	None known.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Forest and riparian habitat connectivity with adjacent timberlands and federal lands.
Management Opportunities	There are 4 preliminary MUs mapped; see Table 22b for details. Protect forests to develop old forest characteristics over time per HCP restriction; evaluate riparian zone along creek on the parcel.
Potential Tribal Interests	To be determined.
Management Constraints	HCP restriction.
Species of Management Focus	
Wildlife	No wildlife of management focus on the Finney Creek property, but northside of the river is known elk (PHS) winter range.
Fish	Salmonids.
Culturally Significant Plants	To be determined.

Attribute	Description
Data	
Data gaps	To be determined.
Proposed Data Collection or Monitoring Methods	To be determined.

Table 22b. Management Unit preliminary management actions for the Finney Creek property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
FCR-01	51.13	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	No action.
FCR-02	582.28	Forest	Diversity/Functions	No	Category C	HCP restrictions.
FRC-03	3.51	Other	Access	No	Category C	Monitor invasive plants and erosion.
FRC-04	4.58	Forest	Diversity/Functions	No	Category C	HCP restrictions.

Table 23a. Current and desired conditions, property attributes and constraints at the Pressentin property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Acres	637 acres
Land Use	The Pressentin property is conservation land used for the protection of riparian and forest habitats.
City Light Enhancement Actions to Date	None.
Vegetation	100 percent forested – Plant Associations: G237 - North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest; North Pacific Lowland Riparian Forest and Woodland. There is a recent clearcut completed by Washington DNR in the late 1990s but rest of the forested area composed of trees 70 to over 400 years of age.
Wildlife Habitat and Habitat Connectivity	Borders USFS land on the south and southwest; rest is surrounded by private industrial forestlands. Critical marbled murrelet habitat directly adjacent to the property on USFS land.
Stream Information	The property includes 0.5 miles of Pressentin Creek and 3.3 total tributary miles. A couple of sections mapped as fish bearing. There are no mapped wetlands.
Access	The property is accessible from a long access road on industrial forestland with gates.
Adjacent Land	Industrial forestland, federal land.
Unauthorized Use	Unknown.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	There are 2 MUs for this property; see Table 23b for details. Protect forest to develop old forest habitat.
Management Opportunities	Manage regenerating clearcut; protect older forests per HCP restriction.
Potential Tribal Interests	To be determined.
Management Constraints	HCP restriction.
Species of Management Focus	
Wildlife	Marbled murrelet per HCP restriction.
Fish	Unknown.
Culturally Significant Plants	To be determined.

Attribute	Description
Data	
Data gaps	To be determined.
Proposed Data Collection or Monitoring Methods	To be determined.

Table 23b. Management Unit preliminary management actions for the Pressentin property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
PST-01	540.94	Older Forest	Protect/Develop Old Forests	Yes	Category B	Monitor.
PST-02	96.09	Older Forest	Protect/Develop Old Forests	Yes	Category B	Management to be based on forest inventory, pre-commercial thin to promote tree crown/height ratio.

Table 24a. Current and desired conditions, property attributes and constraints at the Savage Slough property.

Attribute	Description
Current Conditions	
City Light Program	Combined ESA-Wildlife-Fish Program
Acres	211 acres
Land Use	The Savage Slough property is former pasture being reforested for the protection of forest habitats for the protection and enhancement of salmon habitats associated with the sloughs on the property.
City Light Enhancement Actions to Date	City Light put in an extensive planting of trees and shrubs in fallow pastures and conifer underplanting in riparian zone. City Light implements invasive plant management and permits haying on remnant field.
Vegetation	Mix of old field, sloughs, riparian forest, wetlands. Plant Association Groups: Developed; North Pacific Red Alder - Bigleaf Maple - Douglas-fir Forest; North Pacific Maritime Douglas-fir - Western Hemlock Forest Group; Vancouverian Wet Shrubland; Western North American Ruderal Wet Shrubland, Meadow, and Marsh; Southern Vancouverian Lowland Ruderal Grassland and Shrubland; North Pacific Lowland Riparian Forest and Woodland Group. Forests south of county road are 44 to 80 years old.
Wildlife Habitat and Habitat Connectivity	With adjacent City Light (ESA Program) land, includes approximately1.3 miles of Skagit River left bank. Bisected by South Skagit Highway. Private road cuts across corner. Two resident inholdings along Savage Road near the Skagit River. Connects to adjacent ESA Program property near Mill Creek.
Stream Information	The property includes 380 feet of Mill Creek and 1.4 miles of fish bearing tributaries associated with 4 acres of riverine and 9 acres of freshwater forested/shrub wetlands.
Access	The property is directly accessible from South Skagit Highway and Savage Slough Road. Property can be accessed from the Skagit River.
Adjacent Land	Skagit River, residential; industrial forestland.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Enhanced wetland and riparian forests. Retain small complex early seral habitat and shrubland.
Management Opportunities	There are16 MUs mapped; see Table 24b for details. Slough connectivity enhancement, complex early seral habitat enhancement; conifer enhancement in riparian, snag creation and/or nest boxes; protect wetlands for fish and amphibians, protect tree and shrub plantings
Potential Tribal Interests	To be determined.

Attribute	Description
Management Constraints	Two private inholdings along Savage Slough Road. Invasive plant management: Elk conflicts with properties north of river so enhancing elk habitat may not be compatible. Invasive plants are an ongoing problem. County road has culverts and on ESA Program land, Mill Creek bridge that lacks adequate bedload passage. City Light will control invasive species per its Invasive Plants Management Plan (City Light 2023m).
Species of Management Focus	
Wildlife	Riparian birds, beaver, and bald eagle (wintering). Ungulates tolerated but not promoted.
Fish	Coho.
Culturally Significant Plants	To be determined.
Data	
Data gaps	To be determined.
Proposed Data Collection or Monitoring Methods	To be determined.

Table 24b. Management Unit preliminary management actions for the Savage Slough property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
SVS-01	9.86	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category B	Monitor; invasive plant management; conifer underplantings.
SVS-02	30.52	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor; invasive plant control; salmon.
SVS-03	1.37	Forest	Visual Buffer	No	Category C	Invasive plant management.
SVS-04	4.02	Forest	Visual Buffer	No	Category C	Monitor; invasive plant management.
SVS-05	0.24	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category B	Invasive plant management.
SVS-06	0.90	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Invasive plant management.
SVS-07	25.25	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	Care for tree/shrub plantings; invasive plant management, pre-commercial thin at appropriate age.
SVS-08	10.24	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category C	Mow; invasive plant control.
SVS-09	2.73	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category C	Plant conifers and shrubs (2024).
SVS-10	2.41	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category B	Monitor.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
SVS-11	22.47	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor; maintain visual buffer along road.
SVS-12	0.36	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category C	Monitor; invasive plant management.
SVS-13	1.53	Forest	Visual Buffer	No	Category C	Monitor; invasive plant management; increase visual buffer.
SVS-14	86.08	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor; snag evaluation/creation; salmon.
SVS-15	2.05	Forest	Diversity/Functions	No	Category C	Monitor.
SVS-16	10.53	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.

Table 25a. Current and desired conditions, property attributes and constraints at the Day Creek Slough property.

Attribute	Description
Current Conditions	
City Light Program	Fish Mitigation
Land Size	39 acres
Land Use	The Day Creek Slough property is used for the protection of wetland and riparian habitats.
City Light Enhancement Actions to Date	City Light funds salmonid habitat restoration plantings by a conservation group.
Vegetation	Plant Association Groups: Cultivated Pasture and Hay Grass Cultural; North Pacific Red Alder – Bigleaf Maple – Douglas-fir Forest; Vancouverian Wet Shrubland; Western North American Ruderal Wet Shrubland, Meadow, and Marsh; Southern Vancouverian Lowland Ruderal Grassland and Shrubland. Upper terrace (southern portion) is agricultural while lower terrace (northern portion) is combination of agricultural and wetland/riparian.
Wildlife Habitat and Habitat Connectivity	0.3 miles of the property borders floodplain wetland communities. Elk use of the property is challenging with adjacent agricultural lands. Private agricultural lands bordering property limit wildlife habitat connectivity.
Stream Information	The property includes 860 feet of designated fish stream.
Access	The property is directly accessible from Walberg Road.
Adjacent Land	Agricultural lands.
Unauthorized Use	Previous access by ATVs but is no longer occurring.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Healthy wetland and riparian communities and plantings in select areas to benefit fish and wildlife
Management Opportunities	There are 6 preliminary MUs identified; see Table 25b for details. Uplands will be maintained in agriculture as there is limited benefit to planting away from the river. Floodplain areas can be planted to benefit fish and wildlife.
Potential Tribal Interests	To be determined.
Management Constraints	Neighboring agricultural properties limit river/riparian restoration opportunities.
Species of Management Focus	
Wildlife	No wildlife of management focus on the Day Creek Slough property, but northside of the river is known elk (PHS) winter range.
Fish	Salmonids.
Culturally Significant Plants	To be determined.

Attribute	Description
Data	
Data gaps	To be determined.
Proposed Data Collection or Monitoring Methods	To be determined.

Table 25b. Management Unit preliminary management actions for the Day Creek Slough property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
DCS-01	6.28	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category A	Riparian planting; salmon; amphibian monitoring.
DCS-02	2.94	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category C	Invasive plant management; fish buffer.
DCS-03	2.10	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitoring; invasive plant management.
DCS-04	26.35	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	No	Category C	Hayfield; invasive plant management.
DCS-05	1.06	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Riparian planting.
DCS-06	0.92	Other	Access	No	Category C	Monitor.

2.4 South Fork Nooksack Basin

Table 26a. Current and desired conditions, property attributes and constraints at the Bear Lake property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	155 acres
Land Use	The Bear Lake property is used for habitat preservation and recreational activities.
City Light Enhancement Actions to Date	None.
Vegetation	This property is dominated by late seral conifer old-growth, freshwater pond, and PEM wetland. Plant Association Groups include North Pacific Maritime Douglas-fir – Western Hemlock Forest Group and Vancouverian Wet Shrubland. The riparian forests along the South Fork Nooksack River on the Cit Light property are in good to excellent condition (Tatum 2021).
Wildlife Habitat and Habitat Connectivity	There is strong connectivity with surrounding lands from intact forests surrounding the property by at least a mile, on all sides.
Stream Information	The property includes 4.25 acres of lacustrine (freshwater pond), 1.7 acres of freshwater emergent wetlands, and approximately 2.5 miles of stream (Washington DNR mapped as non-fish bearing).
Access	The property is restricted to walk-in and hike-in access. Walk-in along about 2.3 miles of abandoned and overgrown roadbed from the east side of Howard Creek. Hike-in about 4.8 miles from the South Fork Nooksack River at the location of the 330 bridge removal (approximately 0.5 miles from 300 Road). The hike requires permission to access starting point from industrial forestland owner, via 16.5 miles of road from SR 20 at the Town of Hamilton.
Adjacent Land	Bear Lake property is surrounded by Washington DNR and USFS lands.
Unauthorized Use	None identified (historical off-road recreational vehicle [ORV] tracks in 2010). Low-level ATV use documented more than 10 years ago but trails have been abandoned so motorized access is no longer possible.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Allow development of older forests for old-growth associated species (e.g., murrelets). Protect alpine lake and emergent wetland habitat.
Management Opportunities	There are 3 MUs for this property; see Table 26b for details. Monitor property to ensure no environmental effects are being caused by unauthorized activities. Periodically survey the wetlands for breeding amphibians (western toads).
Potential Tribal Interests	To be determined.
Management Constraints	Primary constraint is the property is only accessible via a long hike, so monitoring is most feasible.

Attribute	Description
Species of Management Focus	
Wildlife	Old forest associated species.
Fish	Unknown.
Culturally Significant Plants	To be determined.
Data	
Data gaps	None.
Proposed Data Collection or Monitoring Methods	Conduct periodic site visits to confirm no new anthropogenic effects from public use.

Table 26b. Management Unit preliminary management actions for the Bear Lake property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
BLK-01	50.71	Older Forest	Protect/Develop Old Forests	No	Category C	No action; HCP restriction.
BLK-02	31.05	WMZ/RMZ	Protect/Develop Old Forests	No	Category C	Monitor; HCP restriction.
BLK-03	73.15	Older Forest	Protect/Develop Old Forests	No	Category C	No action; HCP restriction.

Table 27a. Current and desired conditions, property attributes and constraints at the Nooksack property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	3,854 acres
Land Use	The Nooksack is used for conservation of extensive riparian and upland forests. The property was formerly industrial forestland with now abandoned forest roads (no open roads). A section of the Pacific Northwest Trail (PNWT) is located on the property for public hiking use.
City Light Enhancement Actions to Date	City Light removed former squatter cabin, removed 330 Road bridge, and installed engineered log jams in South Fork Nooksack River. Supported Upper Skagit Indian Tribe in creation of 14 acres of complex early seral habitat through harvest of second-growth forest and seeding with desired elk forage plant species. Nooksack Tribe conducted riparian conifer underplantings near former 330 bridge.
Vegetation	Mid seral mixed, mid- and late-seral hardwood, riparian, riverine and forested/shrub wetlands, shrub and emergent wetland, mid seral conifer, and some late seral conifer old-growth. Plant Association Groups include: North Pacific Red Alder – Bigleaf Maple – Douglas-fir Forest, North Pacific Maritime Douglas-fir – Western Hemlock Forest Group, Vancouverian Wet Shrubland, North Pacific Lowland Riparian Forest and Woodland Group, North Pacific Maritime Hardwood-Conifer Swamp. Mix of forest stand ages throughout watershed around the City Light property.
Wildlife Habitat and Habitat Connectivity	Surrounding lands are managed as industrial forestlands and small amount of state and federal lands. There are limited connectivity effects from logging roads.
Stream Information	The property includes approximately 8.7 miles of the South Fork Nooksack River and roughly 65 tributary streams (approximately 30 total stream miles) connecting approximately 61 acres of wetlands (half riverine and half freshwater emergent).
Access	The property is accessible via industrial forestland road network from Hamilton. There are gates on 100 Road at Hamilton and at South Fork Nooksack River on 300 Road, which is abandoned south of the easternmost City Light parcel and thereafter is walk-in access only, without rebuilding the road.
Adjacent Land	Nooksack property is adjacent to industrial forestlands and lesser amounts of Washington DNR and USFS lands.
Unauthorized Use	None identified.

Attribute	Description
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Increased forest habitat diversity throughout property. Provide areas with preferred deer and elk forage species in forests and forest openings. In appropriate areas, promote development of older forests. Maintain healthy riparian zones along river and streams.
Management Opportunities	There are 92 preliminary MUs identified including 4 units for prioritized evaluation of riparian complex early seral habitat for elk habitat, and 11 units for potential assessment of upland forest habitat for ungulate habitats; see Table 27b for details. Protect stream and riparian habitats. Where terrain and access permit, evaluate forest management options for forest health, structural diversity, and wildlife habitat improvements (e.g., elk, deer, murrelets). The remainder (approximately 3,459 acres) is primarily identified for riparian protection and overall forest health and diversity.
Potential Tribal Interests	To be determined.
Management Constraints	The property has steep terrain, numerous tributary streams, and frequent unstable slopes. It is adjacent to privately owned forestland, and roads along edge of property are maintained and used by timber companies. Olivine Ends parcels have HCP restriction. Presence of PNWT in and along property.
Species of Management Focus	
Wildlife	Elk, deer, marbled murrelet, salmonids, forest carnivores, and beaver.
Fish	Sockeye, steelhead, Chinook, Coho, Pink, Cutthroat, Bull Trout, Rainbow Trout, and Dolly Varden.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Stand level forest and understory vegetation data, snag/wood resources.
Proposed Data Collection or Monitoring Methods	▪ Conduct forest inventory to collect existing vegetation (over- and understory), snag, and downed wood resources in select management units; and ▪ Conduct stream surveys and fish surveys in tributary streams where warranted.

Table 27b. Management Unit preliminary management actions for the Nooksack property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NS-01	86.24	Older Forest	Protect/Develop Old Forests	No	Category C	Retain forest.
NS-02	64.42	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor for potential effects of the PNWT.
NS-03	174.87	Older Forest	Protect/Develop Old Forests	Yes	Category B	Management to be based on forest inventory; monitor for potential effects of the PNWT.
NS-04	28.49	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor for potential effects of the PNWT.
NS-05	18.59	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory; monitor for potential effects of the PNWT.
NS-06	347.10	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	No action.
NS-07	33.29	Older Forest	Protect/Develop Old Forests	No	Category C	No action.
NS-08	144.84	Forest	Diversity/Functions	No	Category C	No action.
NS-09	11.72	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-10	27.49	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-11	29.70	Older Forest	Protect/Develop Old Forests	No	Category C	No action.
NS-12	22.42	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NS-13	35.27	Older Forest	Protect/Develop Old Forests	No	Category C	Retain forest.
NS-14	1.04	Forest	Diversity/Functions	No	Category C	Monitor natural regeneration.
NS-15	15.03	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	Yes	Category A	Maintain ungulate forage.
NS-16	12.17	Older Forest	Protect/Develop Old Forests	Yes	Category B	Monitor.
NS-17	18.08	Older Forest	Protect/Develop Old Forests	No	Category C	No action; HPC restriction.
NS-18	28.01	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor; HPC restriction.
NS-19	10.76	Older Forest	Protect/Develop Old Forests	No	Category C	Retain forest; HPC restriction.
NS-20	15.68	Older Forest	Protect/Develop Old Forests	No	Category C	Retain forest; HPC restriction.
NS-21	154.45	Older Forest	Protect/Develop Old Forests	No	Category C	No action; HPC restriction.
NS-22	112.40	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-23	187.64	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.
NS-24	50.08	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.
NS-25	498.62	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-26	120.30	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-27	7.57	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NS-28	4.48	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-29	5.03	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.
NS-30	8.34	Forest	Diversity/Functions	No	Category C	Retain forest.
NS-31	30.62	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-32	0.75	Forest – Ungulate Evaluation	-	Yes	Category A	Create/maintain gaps in forest for ungulates.
NS-33	1.39	Forest – Ungulate Evaluation	-	Yes	Category A	Create/maintain gaps in forest for ungulates.
NS-34	5.21	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.
NS-35	1.07	Forest – Ungulate Evaluation	-	Yes	Category A	Create/maintain gaps in forest for ungulates.
NS-36	19.79	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor; invasive plant management on roadbed.
NS-37	17.27	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category B	Monitor conifer underplanting.
NS-38	4.03	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor the engineered log jam reach.
NS-39	27.78	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-40	20.74	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NS-41	6.34	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	Yes	Category B	Complex early seral habitat evaluation/management.
NS-42	787.68	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor; consider conifer underplantings; ungulate forage in meadows; snag evaluation.
NS-43	1.78	Forest – Ungulate Evaluation	-	Yes	Category A	Create/maintain gaps in forest for ungulates.
NS-44	1.03	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-45	10.69	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-46	4.96	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-47	15.63	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-48	5.56	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-49	26.26	Forest	Diversity/Functions	No	Category C	Monitor.
NS-50	29.15	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-51	1.07	Complex Early Seral Habitat	Maintain or Enhance Complex Early Seral Habitat	Yes	Category B	Complex early seral habitat evaluation/management.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NS-52	4.25	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-53	19.82	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-54	9.63	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-55	9.30	Forest	Diversity/Functions	No	Category C	No action.
NS-56	28.40	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-57	7.79	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-58	13.91	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-59	58.92	Forest	Diversity/Functions	No	Category C	Monitor.
NS-60	21.82	Forest - Ungulate Evaluation	-	Yes	Category B	Management to be based on forest inventory.
NS-61	38.45	Forest – Ungulate Evaluation	-	Yes	Category B	Management to be based on forest inventory.
NS-62	3.43	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-63	13.40	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-64	7.57	Other	Unstable Slope	No	Category C	Monitor.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NS-65	0.97	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category A	Monitor site restoration.
NS-66	16.46	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-67	8.51	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-68	9.08	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-69	10.57	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-70	10.84	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-71	12.79	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-72	46.66	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-73	17.75	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-74	9.91	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.
NS-75	15.69	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NS-76	8.50	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-77	6.82	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-78	9.63	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-79	10.17	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-80	9.24	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-81	3.78	Forest – Ungulate Evaluation	-	Yes	Category B	Management to be based on forest inventory.
NS-82	19.56	Forest	Diversity/Functions	No	Category C	Management to be based on forest inventory.
NS-83	7.87	Forest	Diversity/Functions	Yes	Category C	Management to be based on forest inventory.
NS-84	7.46	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-85	3.50	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-86	12.21	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-87	3.88	WMZ/RMZ	Maintain or Enhance Wetland/Riparian	No	Category C	Monitor: sensitive slopes.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NS-88	14.66	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category A	Monitor; invasive plant treatment; beaver; sensitive.
NS-89	16.89	Forest – Ungulate Evaluation	-	Yes	Category B	Management to be based on forest inventory.
NS-90	23.81	Forest	Diversity/Functions	Yes	Category B	Management to be based on forest inventory.
NS-91	2.15	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Monitor.
NS-92	5.31	Forest	Diversity/Functions	Yes	Category C	Monitor.

Table 28a. Current and desired conditions, property attributes and constraints at the Nooksack West property.

Attribute	Description
Current Conditions	
City Light Program	Skagit Settlement Wildlife Mitigation Lands
Land Size	389 acres
Land Use	The Nooksack West property is used for the protection of riparian habitats. There are abandoned forest roads (no open roads) on property.
City Light Enhancement Actions to Date	Lumni Tribe conducted riparian conifer underplantings along south shore of river at one location.
Vegetation	This property is dominated by mid and late seral hardwood, early and mid-seral mixed, riparian, riverine and shrub wetlands. Vegetation communities include North Pacific Red Alder – Bigleaf Maple – Douglas-fir Forest, North Pacific Maritime Douglas-fir – Western Hemlock Forest Group, Vancouverian Wet Shrubland, North Pacific Lowland Riparian Forest and Woodland Group, and North Pacific Maritime Hardwood-Conifer Swamp.
Wildlife Habitat and Habitat Connectivity	Surrounding land is managed as industrial forestlands. Forest roads used by timber industry may affect connectivity.
Stream Information	The property includes 0.8 miles of the South Fork Nooksack River and approximately 9 acres of associated riverine wetland. There are 8 tributary streams (approximately 4.7 stream miles) mapped on the property.
Access	The property is accessible via 8.7 miles of private industrial forestland road network from Hamilton (gate at Hamilton).
Adjacent Land	Nooksack West property is surrounded by industrial forestlands.
Unauthorized Use	None identified.
Desired Conditions and Management Opportunities	
Vegetation, Wildlife Habitat, and Wildlife Connectivity	Habitat diversity throughout property. Healthy riparian zones along river and streams.
Management Opportunities	There are 9 preliminary MUs identified for consideration of riparian management (e.g., protection/enhancement, evaluation of silvicultural management opportunities to promote upland forest structural diversity, and ungulate habitat enhancement); see Table 28b for details. Monitor riparian and upland habitats for effects from open industrial forestland roads (e.g., erosion and invasive species). City Light will control invasive species per its Invasive Plants Management Plan (City Light 2023m).
Potential Tribal Interests	To be determined.
Management Constraints	None identified.

Attribute	Description
Species of Management Focus	
Wildlife	Elk, deer, marbled murrelet, salmonids, forest carnivores, and beaver.
Fish	Steelhead, Chinook, Coho, Cutthroat, Bull Trout, Rainbow Trout, Dolly Varden, and potentially Sockeye and Pink.
Culturally Significant Plants	To be determined.
Data	
Data gaps	Stand level forest and understory vegetation data, snag/wood resources.
Proposed Data Collection or Monitoring Methods	▪ Conduct forest inventory to collect existing vegetation (over- and understory), snag, and downed wood resources in select management units; and ▪ Consider stream surveys and fish surveys in tributary streams where warranted.

Table 28b. Management Unit preliminary management actions for the Nooksack West property.

Management Unit Identifier	Acres	Desired Future Condition	Specific Management Action	Habitat Evaluation	Feasibility Category	Measures
NSW-01	36.43	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category C	Monitor; possible forest management between streams.
NSW-02	11.74	Forest – Ungulate Evaluation	-	Yes	Category A	Management to be based on forest inventory.
NSW-03	13.05	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	No action.
NSW-04	20.51	Forest – Ungulate Evaluation	-	Yes	Category C	Management to be based on forest inventory.
NSW-05	63.02	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	No	Category C	Conifer underplantings (2011).
NSW-06	236.67	Forest	Diversity/Functions	Yes	Category C	No action.
NSW-07	4.19	Forest	Diversity/Functions	Yes	Category C	Monitor.
NSW-08	0.71	WMZ/RMZ	Maintain or Enhance Wetland/Riparian and Buffers	Yes	Category C	Monitor.
NSW-09	2.60	Forest	Diversity/Functions	No	Category C	Monitor.

3.0 SUMMARY OF VEGETATION AND WETLANDS

City Light's relicensing studies provide general information regarding some of the resources associated with mitigation properties. These study reports should be referenced directly for details, but a summary of some of the more frequently referenced terms are included in this section.

3.1 Vegetation Mapping

City Light mapped vegetation within the FERC Project Boundary using the U.S. National Vegetation Classification (USNVC) Standard[2], based on species and other shared biogeographic characteristics. Table 3.1-1 provides a description of the vegetation cover types and acreages mapped within mitigation lands.

[2] For more information on the USNVC Standard and categories see: https://usnvc.org/about/plant-communities-and-vegetation-classification/natural-vegetation-classification/.

Table 3.1-1. Acreage of mapped USNVC vegetation cover types.

Vegetation Group Type	Description of Vegetation Group Type	Area of Mapped Vegetation Groups			
		RLNRA Mitigation Properties	South Fork Nooksack Mitigation Properties	Sauk River Basin Mitigation Properties	Skagit River Basin Mitigation Properties
USNVC[1] Upland Forest and Shrubland Groups					
G240 North Pacific Maritime Douglas-fir – Western Hemlock Rainforest Group	Mesic to dry lowland forests dominated by Douglas-fir (*Pseudotsuga menziesii*). Other coniferous species may be present, primarily western red cedar (*Thuja plicata*) and/or western hemlock (*Tsuga heterophylla*). Deciduous species such as red alder (*Alnus rubra*) and/or bigleaf maple (*Acer macrophyllum)* are frequently observed in the subcanopy, but never the dominant species.	3 acres	2,970 acres	6 acres	3,703 acres
G237 North Pacific Red Alder –- Bigleaf Maple – Douglas-fir Rainforest Group	Lowland hardwood or mixed-hardwood-conifer forest group dominated by red alder or bigleaf maple. Common companion species observed through the study area include conifers such as Douglas-fir, western red cedar, and/or western hemlock and hardwood species including cascara (*Frangula purshiana*) and bitter cherry (*Prunus emarginata*).	95 acres	509 acres	201 acres	1,251 acres
G648 Southern Vancouverian Lowland Ruderal Grassland and Shrubland 8	This group is dominated by non-native invasive shrubs, such as Scot's broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus bifrons*), and common gorse (*Ulex europaeus*), as well as non-native grasses. It is abundant in waste areas and disturbed land throughout Pacific coastal areas either as abandoned pastures, roadside margins, or other weedy places, below approximately 1,500 meters (5,000 feet) in elevation.	0 acres	37 acres	57 acres	51 acres
G851 North Pacific Lowland Riparian Forest and Woodland Group	Low-elevation linear forests found in riparian areas and alluvial floodplains dominated by red alder, black cottonwood (*Populus balsamifera*), and bigleaf maple. Some conifers are also observed, primarily western red cedar. It occurs at elevations ranging from 300 to 2,300 meters (1,000-7,500 feet).	29 acres	489 acres	57 acres	336 acres

Vegetation Group Type	Description of Vegetation Group Type	Area of Mapped Vegetation Groups			
		RLNRA Mitigation Properties	South Fork Nooksack Mitigation Properties	Sauk River Basin Mitigation Properties	Skagit River Basin Mitigation Properties
G210 Central Rocky Mountain Douglas-fir – Pine Forest	Montane coniferous forests found in the interior Pacific Northwest. Typically dominated by Douglas-fir and lodgepole pine (*Pinus contorta*), and ponderosa pine (*Pinus ponderosa*) may be present. Other seral species have increased on many sites once dominated by Douglas-fir and ponderosa pine. Generally, floristic affinities are with areas of maritime-influenced climate of the interior Pacific Northwest.	0 acres	0 acres	0 acres	5 acres
USNVC Riparian and Wetland Group Types					
G853 North Pacific Maritime Hardwood-Conifer Swamp	Forested wetlands occurring in poorly drained areas dominated by tree species that grow on saturated or seasonally flooded soils. Cover can be conifer- or hardwood-dominated stands. Dominant species observed in the study area included western red cedar and red alder.	0 acres	204 acres	0 acres	18 acres
G524 Western North American Ruderal Wet Shrubland, Meadow, and Marsh	Disturbed wet meadows found in lowland, montane, and subalpine elevations, occasionally reaching into the lower edges of the alpine elevations (sea level to 3,600 meters [11,800 feet]) throughout the western U.S. Vegetation is dominated by non-native grasses including reed canarygrass (*Phalaris arundinacea*), and various weedy forbs. Native species may be present but are low in abundance.	0 acres	1 acre	0 acres	29 acres
G322 Vancouverian Wet Shrubland	This wetland group is dominated by shrub species that are adapted to seasonally wet to saturated soils. Common dominant species observed throughout the study area were willows (*Salix* sp.), hardhack (*Spirea douglasii*), and salmonberry (*Rubus spectabilis*).	0 acres	64 acres	20 acres	212 acres

Vegetation Group Type	Description of Vegetation Group Type	Area of Mapped Vegetation Groups			
		RLNRA Mitigation Properties	South Fork Nooksack Mitigation Properties	Sauk River Basin Mitigation Properties	Skagit River Basin Mitigation Properties
G517 Vancouverian Freshwater Wet Meadow and Marsh Group	Freshwater herbaceous and shrubby wetlands dominated by a wide variety of graminoids and forbs, usually along freshwater ponds or wet meadows. Dominated by native sedges and rushes such as slough sedge (*Carex obnupta*) and soft rush (*Juncus effusus*). Shrubs are primarily willows.	1 acre	0 acres	0 acres	0 acres
USNVC Cultural Groups					
CGR022 Cultivated Pasture and Hay Grass Cultural	Arable land specifically modified to grow pasture and hay.	0 acres	0 acres	4 acres	169 acres

3.2 Wetlands

City Light collected three elements for wetland evaluation: (1) mapping; (2) classification based on the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979); and (3) functional assessment of wetlands in areas with potential Project effects using the Wetland Rating System for Western Washington (Hruby 2014). This Attachment A references both Cowardin classes and functional assessments, which are summarized below.

The classification of wetlands identifies the aquatic system, type of substrate, and water regime of wetlands. All of the wetlands mapped were classified as palustrine wetlands, which describes all nontidal wetlands dominated by trees, shrubs, persistent emergent vegetation, emergent mosses, or lichens. Major vegetation classes of the palustrine system include forested (PFO), scrub-shrub (PSS), and emergent (PEM). Wetlands that are largely open water were categorized as palustrine unconsolidated bottom (PUB), which are wetlands that have a vegetated cover of less than 30 percent.

The Wetland Rating System for Western Washington provides a numerical evaluation of each wetland's sensitivity to disturbance, rarity, and ecological functions provided. Per the functional assessment, each wetland was categorized as follows:

- **Category I**[3] (total score 23 – 27 points) are those wetlands that represent a unique or rare wetland type, or are more sensitive to disturbance than most wetlands, or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime, or provide a high level of function. These wetlands are rare and require a high level of protection.

[3] No Category I wetlands were mapped within the study area.

- **Category II** (total score 20 – 22 points) are those wetlands that are difficult, although not impossible, to replace and that provide high levels of some functions. These occur more commonly than Category I wetlands, although still need a high level of protection.
- **Category III** (total score 16 – 19 points) are considered to be wetlands with a moderate level of function, can often be adequately replaced with a well-planned mitigation project, generally have been disturbed in some ways, and are often less diverse or more isolated from other natural resources than Category II wetlands.
- **Category IV** (total score is less than 16 points) are often heavily disturbed and are wetlands that should be able to be replaced and, in some cases, be able to be improved.

4.0 REFERENCES

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. U.S. Fish and Wildlife Service (USFWS).

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_____. 2023c. TR-02 Wetland Assessment Report for the Skagit River Hydroelectric Project, FERC Project No. 553; Prepared by Environmental Science Associates. March 2023.

_____. 2023d. TR-03 Rare, Threatened and Endangered Plants Study Report for the Skagit River Hydroelectric Project, FERC Project No. 553; Prepared by Environmental Science Associates. March 2023.

_____. 2023e.TR-04 Invasive Plants Study Report for the Skagit River Hydroelectric Project, FERC Project No. 553; Prepared by Environmental Science Associates. March 2023.

_____. 2023f. TR-05 Marbled Murrelet Study Report for Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by Hamer Environmental. March 2023.

_____. 2023g. TR-06 Golden Eagle Habitat Analysis, Report for Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by HDR Engineering, Inc. March 2023.

_____. 2023h. TR-07 Northern Goshawk Habitat Analysis Report for Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by Environmental Science Associates. March 2023.

_____. 2023i. TR-08 Special-Status Amphibian Study Report for the Skagit River Hydroelectric Project, FERC Project No. 553; Prepared by HDR Engineering, Inc. March 2023.

_____. 2023j. TR-09 Beaver Habitat Assessment for the Skagit River Hydroelectric Project, FERC Project No. 553; Prepared by HDR Engineering, Inc. March 2023.

_____. 2023k. TR-10 Northern Spotted Owl Habitat Analysis Report for Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by Hamer Environmental. March 2023.

_____. 2023l. Riverscape Ecosystem Plan (REP) for the Skagit River Hydroelectric Project, FERC Project No. 553. Prepared by HDR Engineering, Inc. April 2023.

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____. 2023n. Roads, Trails, and Transmission Line ROW Erosion Management Plan Draft for the Skagit River Hydroelectric Project, FERC Project No. 553. December 2023.

_____. 2023o. Vegetation Management Plan Draft for the Skagit River Hydroelectric Project, FERC Project No. 553. December 2023.

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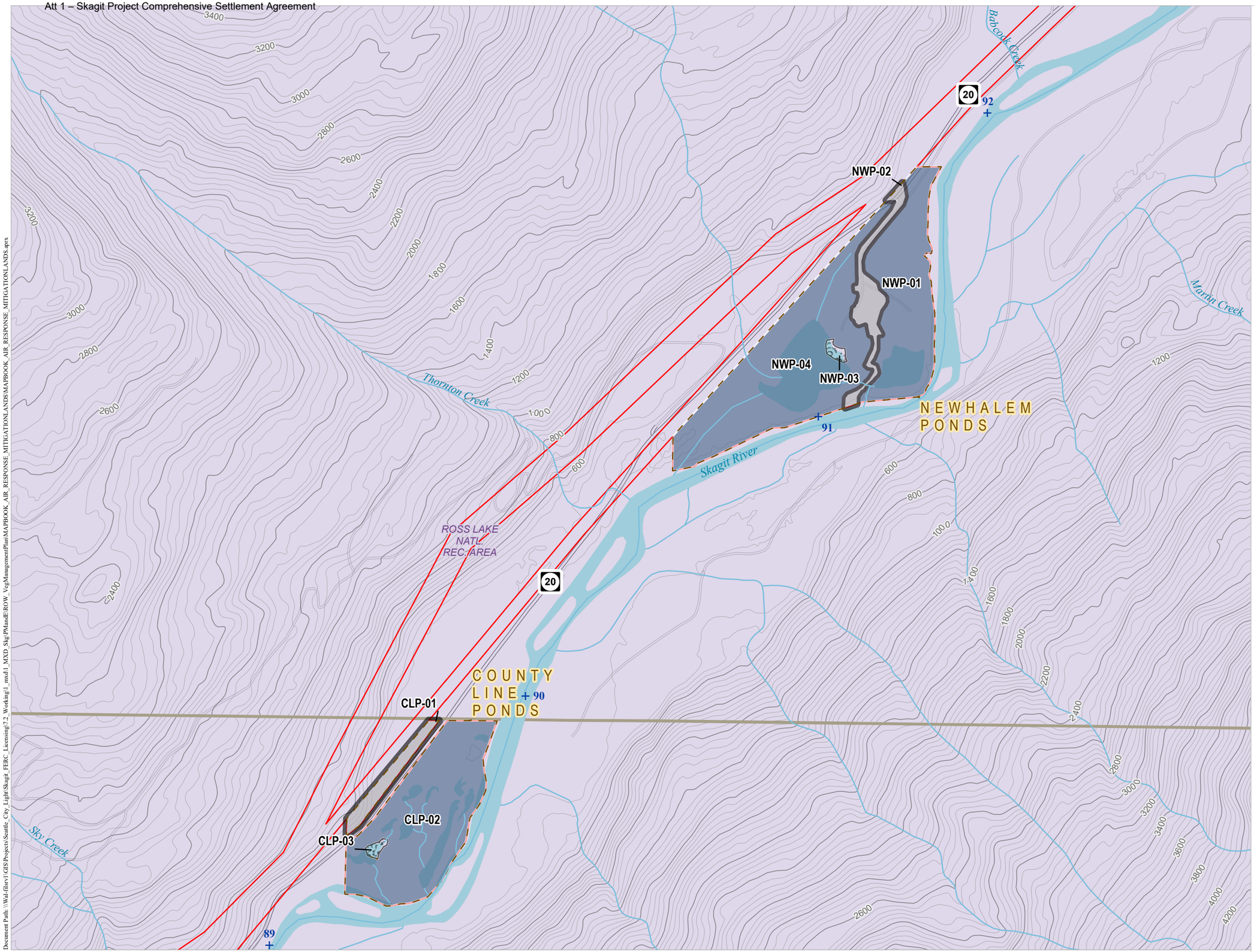
FISH AND WILDLIFE MITIGATION LANDS MANAGEMENT PLAN

ATTACHMENT B

PROPERTY-SPECIFIC PRELIMINARY MANAGEMENT UNIT MAPS



MITIGATION LANDS MANAGEMENT PLAN

NEWHALEM PONDS AND COUNTY LINE PONDS

ROSS LAKE NATIONAL RECREATION AREA

- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

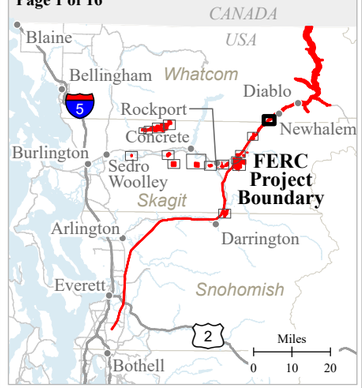
Management Unit (MU)

- Toad Breeding Habitat
- Wetland/Riparian Management Zone (WMZ/RMZ)
- Other

N

0 575 1,150 Feet

Page 1 of 16



Seattle City Light

SKAGIT RIVER HYDROELECTRIC PROJECT (FERC NO. 553)

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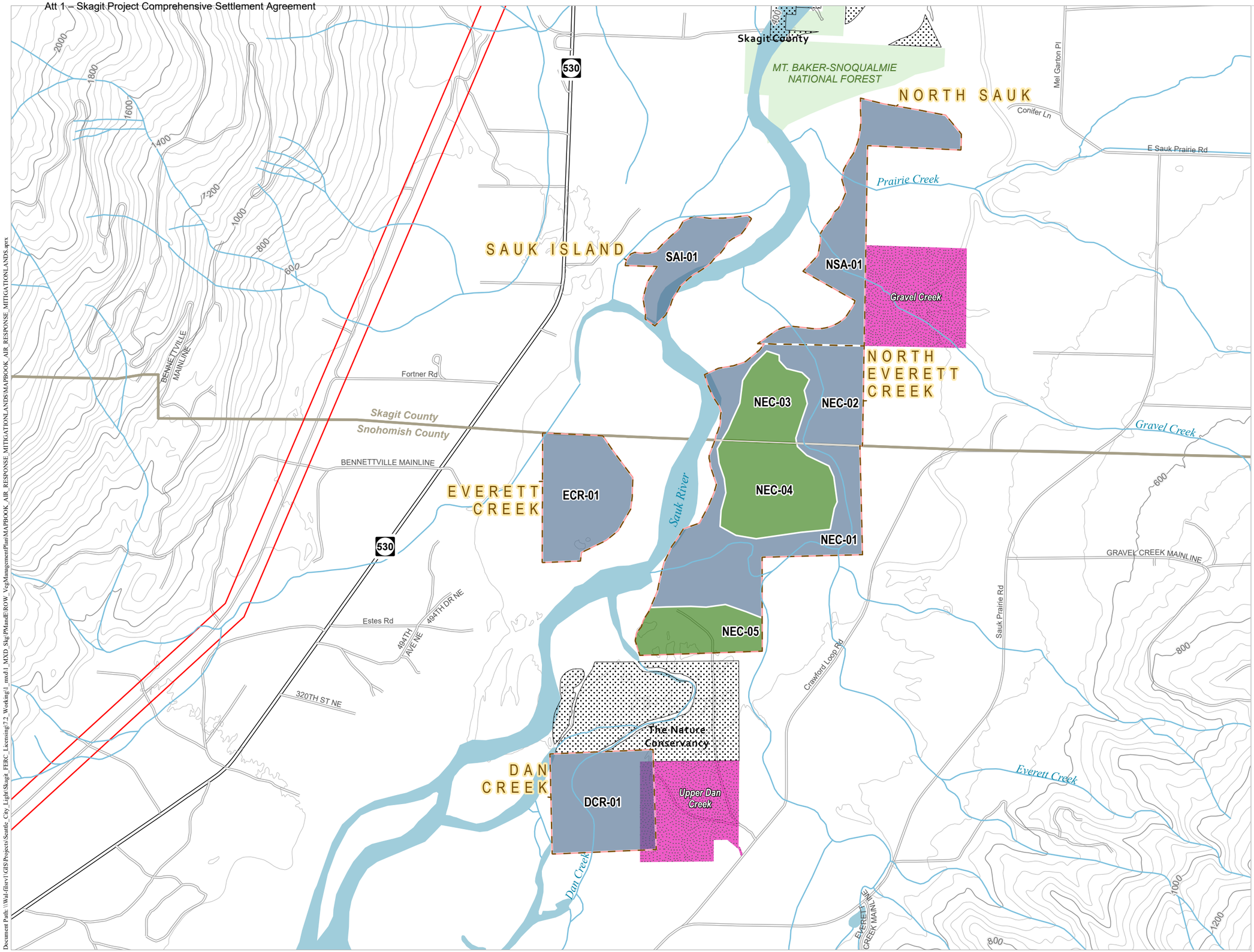
MITIGATION LANDS MANAGEMENT PLAN

NORTH SAUK, SAUK ISLAND, NORTH EVERETT CREEK, EVERETT CREEK AND DAN CREEK

SAUK RIVER BASIN



- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Wetland/Riparian Management Zone (WMZ/RMZ)
- ESA Program Lands

N

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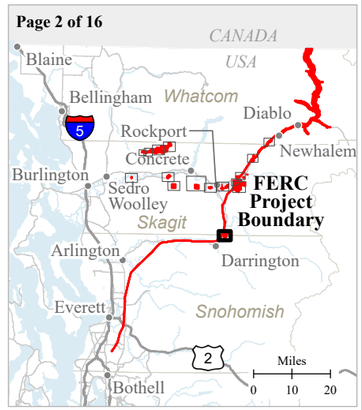

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MITIGATION LANDS MANAGEMENT PLAN

BACON CREEK, B&W ROAD 1 AND B&W ROAD 2

SKAGIT RIVER BASIN

BACON CREEK
MT. BAKER-SNOQUALMIE NATIONAL FOREST
NF-1080 Road
BCR-04
BCR-06
BCR-05
BCR-03
BCR-02
BCR-01
Skagit Land Trust
Skagit County
BW1-01
BW1-02
BW1-03
BW1-04
B&W ROAD 1
BW2-02
BW2-01
B&W ROAD 2
ROSS LAKE NATL. REC. AREA
Skagit River
Copper Creek
82
83
84
85
20

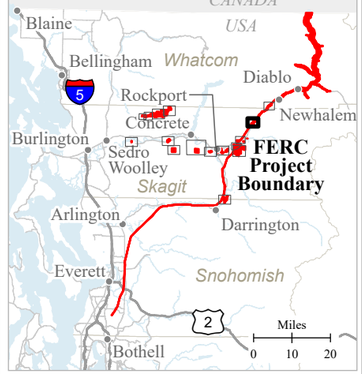
- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Older Forest
- Transmission line ROW
- Wetland/Riparian Management Zone (WMZ/RMZ)
- Other

N

0 575 1,150 Feet



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MITIGATION LANDS MANAGEMENT PLAN

CORKINDALE CREEK AND SOUTH MARBLE 40

SKAGIT RIVER BASIN

- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Older Forest
- Complex Early Seral Habitat
- Wetland/Riparian Management Zone (WMZ/RMZ)
- Other

N

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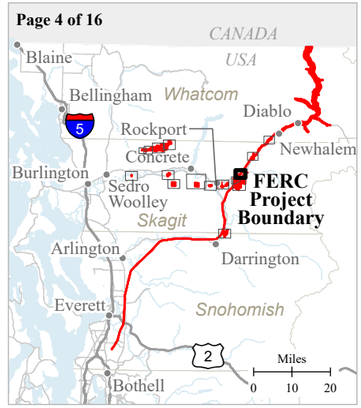

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MT. BAKER-SNOQUALMIE NATIONAL FOREST

CORKINDALE CREEK

CCR-07
CCR-06
CCR-11
CCR-08
CCR-05
CCR-12
CCR-10
CCR-04
CCR-02
CCR-01
CCR-09
CCR-03

SOUTH MARBLE 40

SM40-02
SM40-01
SM40-03

Olson Creek
Skagit River
Corkindale Creek
Rockport Cascade Rd
WDFW
Skagit Land Trust
Skagit County
20
76

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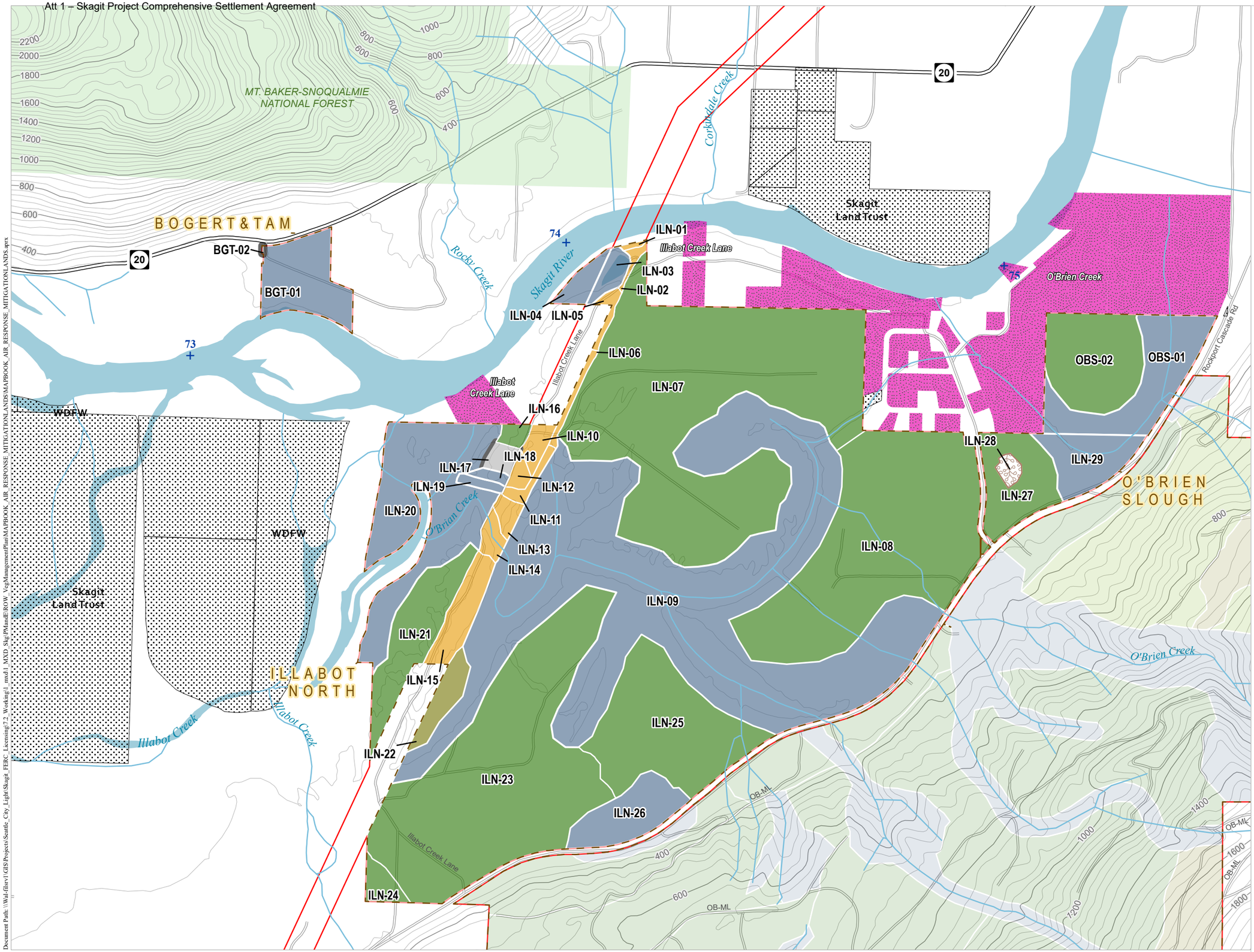
MITIGATION LANDS MANAGEMENT PLAN

BOGERT&TAM, O'BRIEN SLOUGH AND ILLABOT NORTH

SKAGIT RIVER BASIN



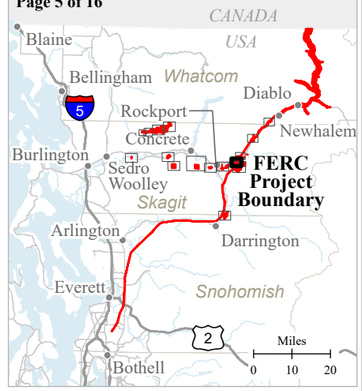
- FERC Project Boundary
- \+ Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Older Forest
- Complex Early Seral Habitat
- Transmission line ROW
- Wetland/Riparian Management Zone (WMZ/RMZ)
- Other
- ESA Program Lands

N

0 530 1,060 Feet



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MITIGATION LANDS MANAGEMENT PLAN

ILLABOT SOUTH

SKAGIT RIVER BASIN

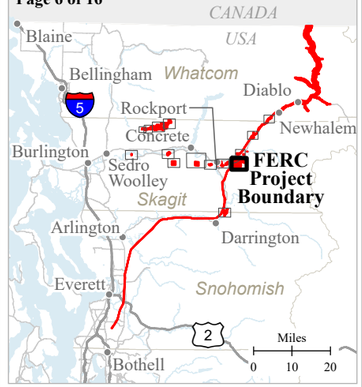
- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Older Forest
- Forest - Ungulate Evaluation
- Transmission line ROW
- Industrial Forest Land
- Wetland/Riparian Management Zone (WMZ/RMZ)
- ESA Program Lands

N

0 820 1,640 Feet



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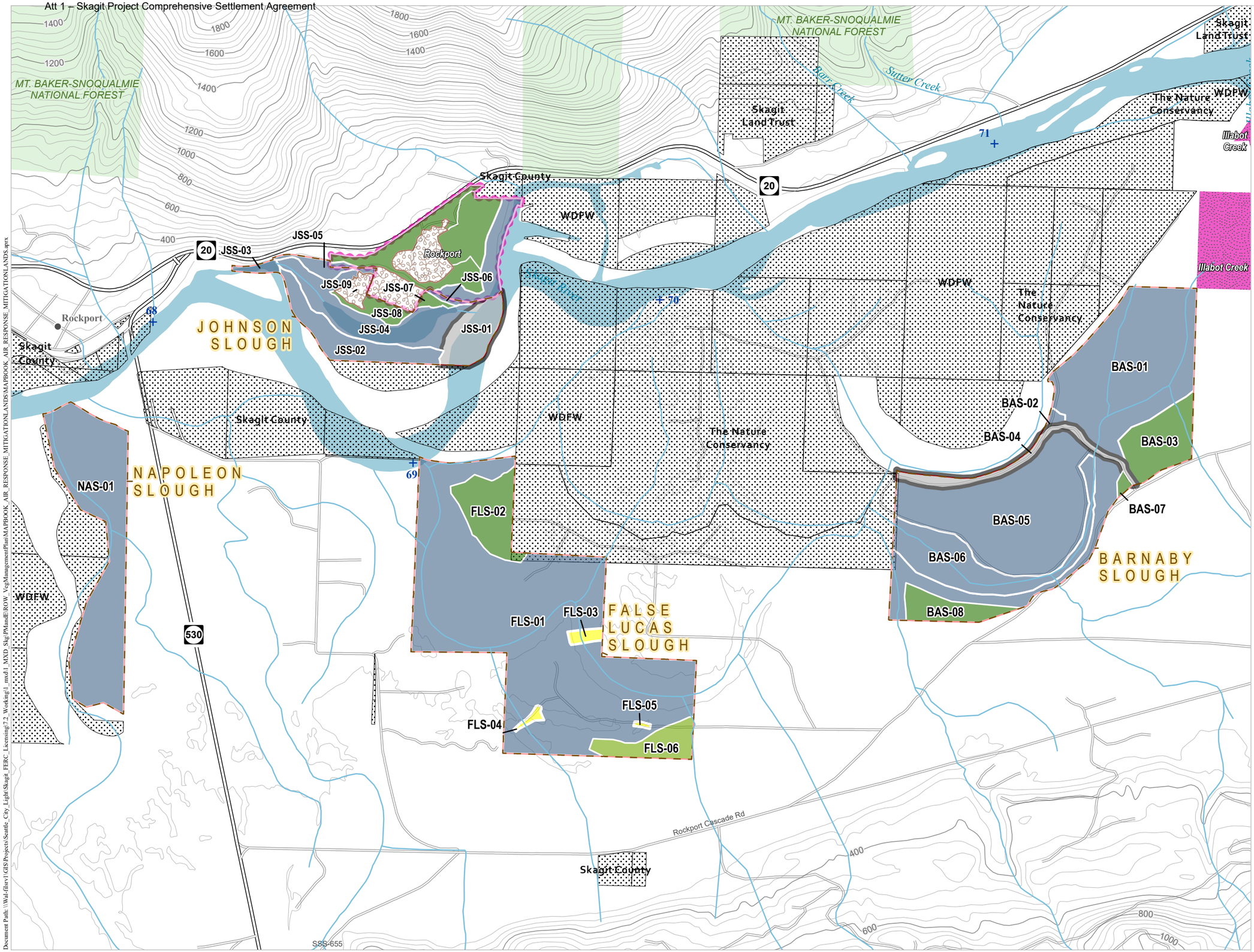
MITIGATION LANDS MANAGEMENT PLAN

BARNABY SLOUGH, JOHNSON SLOUGH, NAPOLEON SLOUGH AND FALSE LUCAS SLOUGH

SKAGIT RIVER BASIN



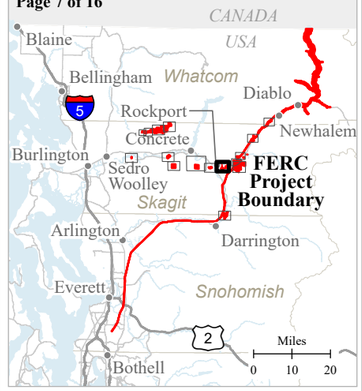
- FERC Project Boundary
- \+ Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Forest - Ungulate Evaluation
- Complex Early Seral Habitat
- Restoration
- Wetland/Riparian Management Zone (WMZ/RMZ)
- Other
- ESA Program Lands
- ESA Program Lands (Boundary)

N

0 660 1,320 Feet



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MITIGATION LANDS MANAGEMENT PLAN

MCLEOD SLOUGH

SKAGIT RIVER BASIN

- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

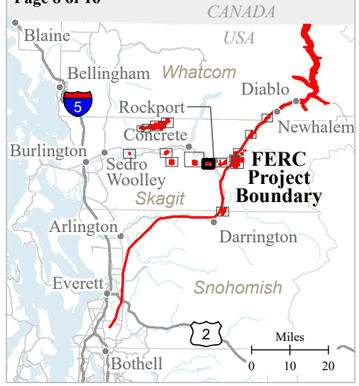
Management Unit (MU)

- Forest
- Complex Early Seral Habitat
- Wetland/Riparian Management Zone (WMZ/RMZ)

N

0 530 1,060 Feet

Page 8 of 16



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MITIGATION LANDS MANAGEMENT PLAN

FINNEY CREEK

SKAGIT RIVER BASIN

FERC Project Boundary
Project River Miles
Other Conservation Land
Mitigation Land Property Boundary

Management Unit (MU)

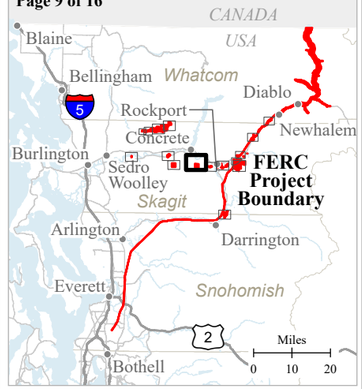
Forest
Wetland/Riparian Management Zone (WMZ/RMZ)
Other

FINNEY CREEK
FCR-01
FCR-02
FRC-03
FRC-04

Concrete Sauk Valley Rd
Skagit River
Finney Creek
Hatchery Creek
Big Fir Creek
Glacier Creek
Alder Creek
Miller Creek
MT. BAKER-SNOQUALMIE NATIONAL FOREST
FC-SPUR-A
FC-SPUR-B
FC-SPUR-C
FY-ML
USFS-17
JM-ML
JM-06

59 60 61 62 63

0 1,000 2,000 Feet



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MITIGATION LANDS MANAGEMENT PLAN

PRESSENTIN

SKAGIT RIVER BASIN

- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Older Forest

PRESSENTIN

PST-01

PST-02

PS-69

PS-70

PS-ML

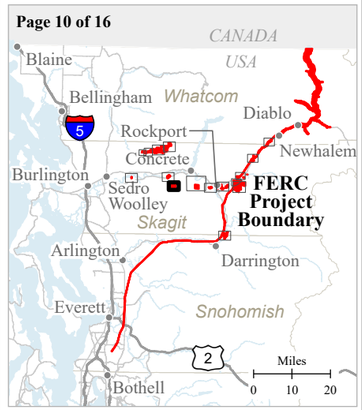
PS-68

Mill Creek

Pressentin Creek

MT. BAKER-SNOQUALMIE NATIONAL FOREST

0 530 1,060 Feet



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MITIGATION LANDS MANAGEMENT PLAN

SAVAGE SLOUGH

SKAGIT RIVER BASIN

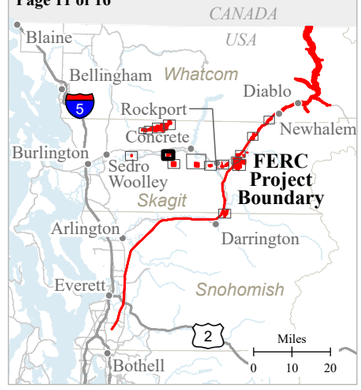
- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Complex Early Seral Habitat
- Wetland/Riparian Management Zone (WMZ/RMZ)
- ESA Program Lands

N

0 530 1,060 Feet



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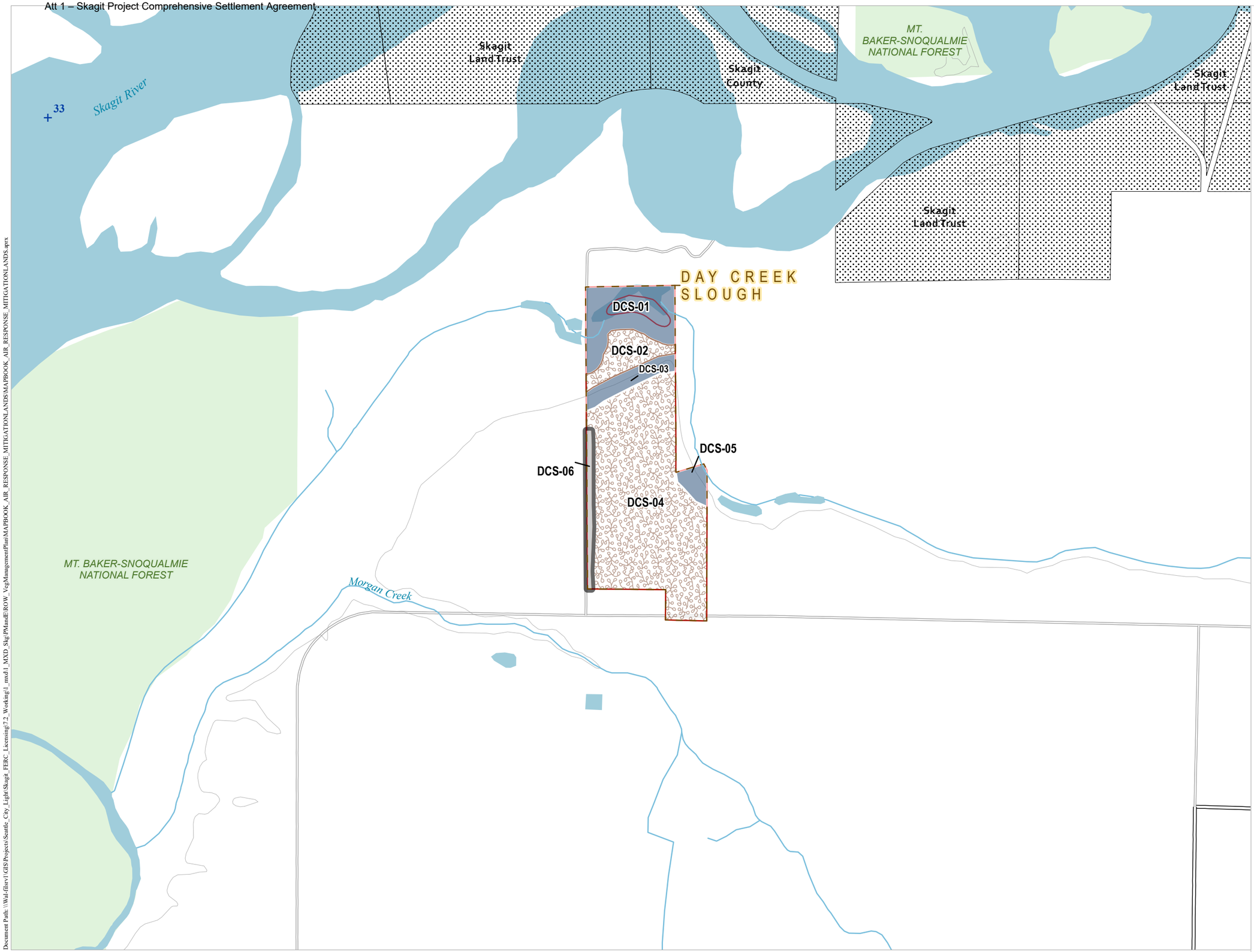
MITIGATION LANDS MANAGEMENT PLAN

DAY CREEK SLOUGH

SKAGIT RIVER BASIN



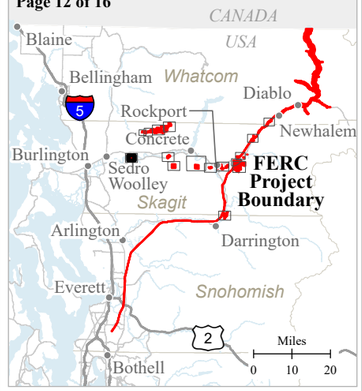
- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Complex Early Seral Habitat
- Wetland/Riparian Management Zone (WMZ/RMZ)
- Other

N

0 350 700 Feet



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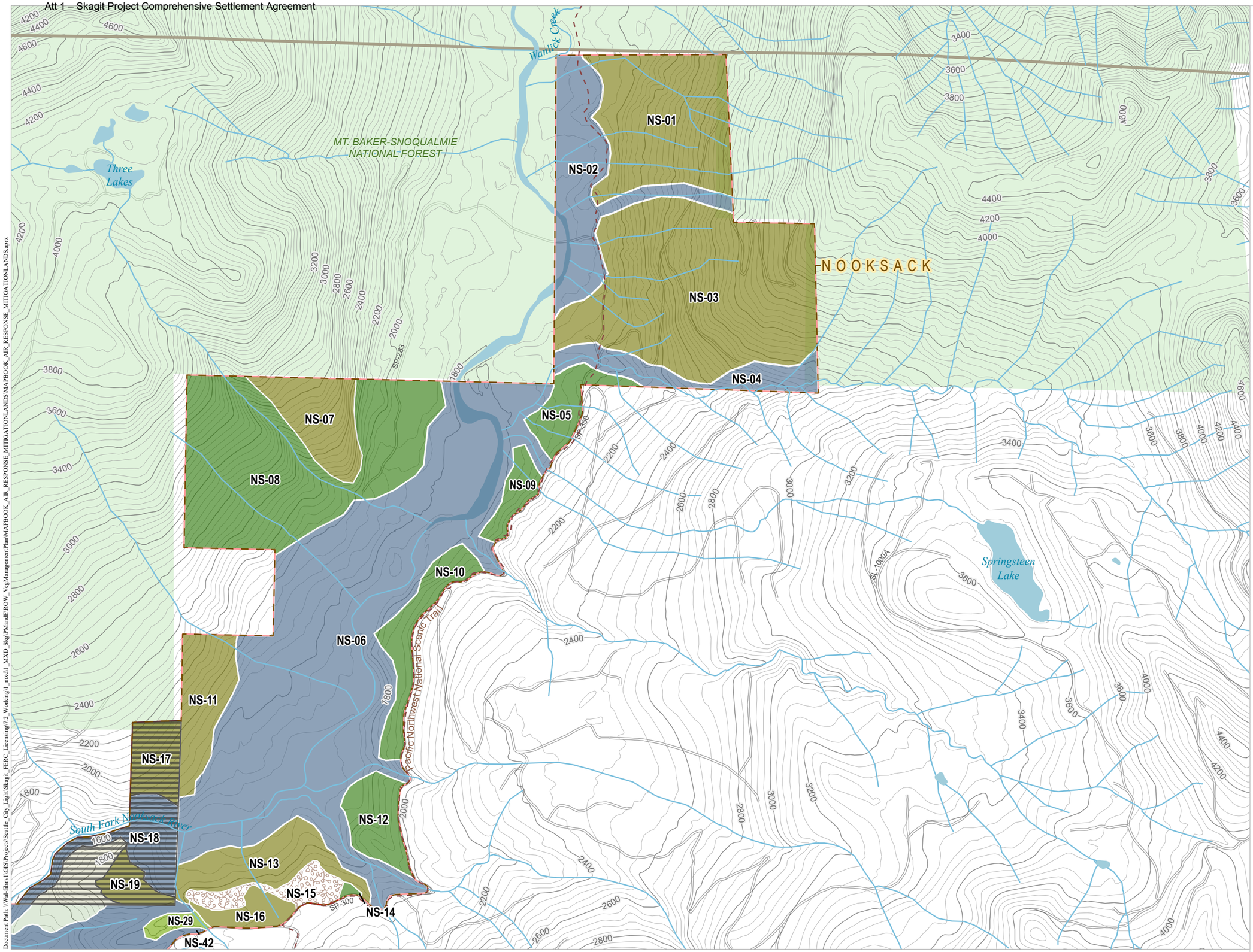


MITIGATION LANDS MANAGEMENT PLAN

NOOKSACK (UPRIVER SEGMENT)

SOUTH FORK NOOKSACK BASIN

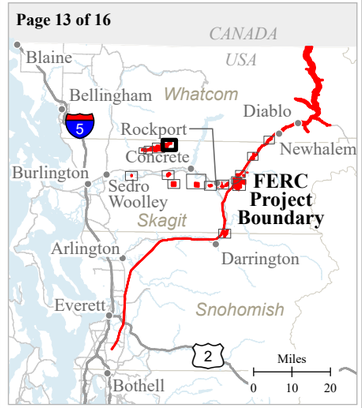
- FERC Project Boundary
- Project River Miles
- Pacific Northwest Trail
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Older Forest
- Forest - Ungulate Evaluation
- Complex Early Seral Habitat
- Wetland/Riparian Management Zone (WMZ/RMZ)
- HCP Restriction

N

0 710 1,420 Feet



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MITIGATION LANDS MANAGEMENT PLAN

NOOKSACK (MIDDLE SEGMENT) AND BEAR LAKE

SOUTH FORK NOOKSACK BASIN

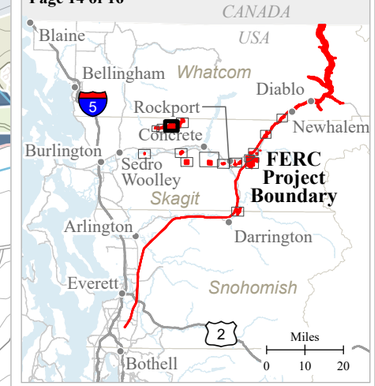
- FERC Project Boundary
- Project River Miles
- Pacific Northwest Trail
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Older Forest
- Forest - Ungulate Evaluation
- Complex Early Seral Habitat
- Wetland/Riparian Management Zone (WMZ/RMZ)
- HCP Restriction

N

0 660 1,320 Feet



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MITIGATION LANDS MANAGEMENT PLAN

NOOKSACK (DOWNRIVER SEGMENT)

SOUTH FORK NOOKSACK BASIN

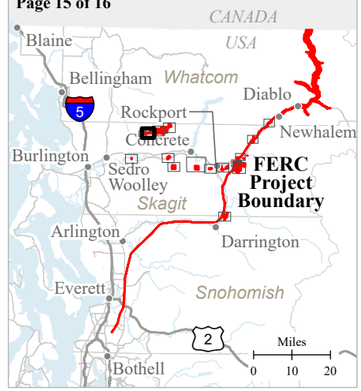
- FERC Project Boundary
- Project River Miles
- Pacific Northwest Trail
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Forest - Ungulate Evaluation
- Wetland/Riparian Management Zone (WMZ/RMZ)
- Other

N

0 660 1,320 Feet



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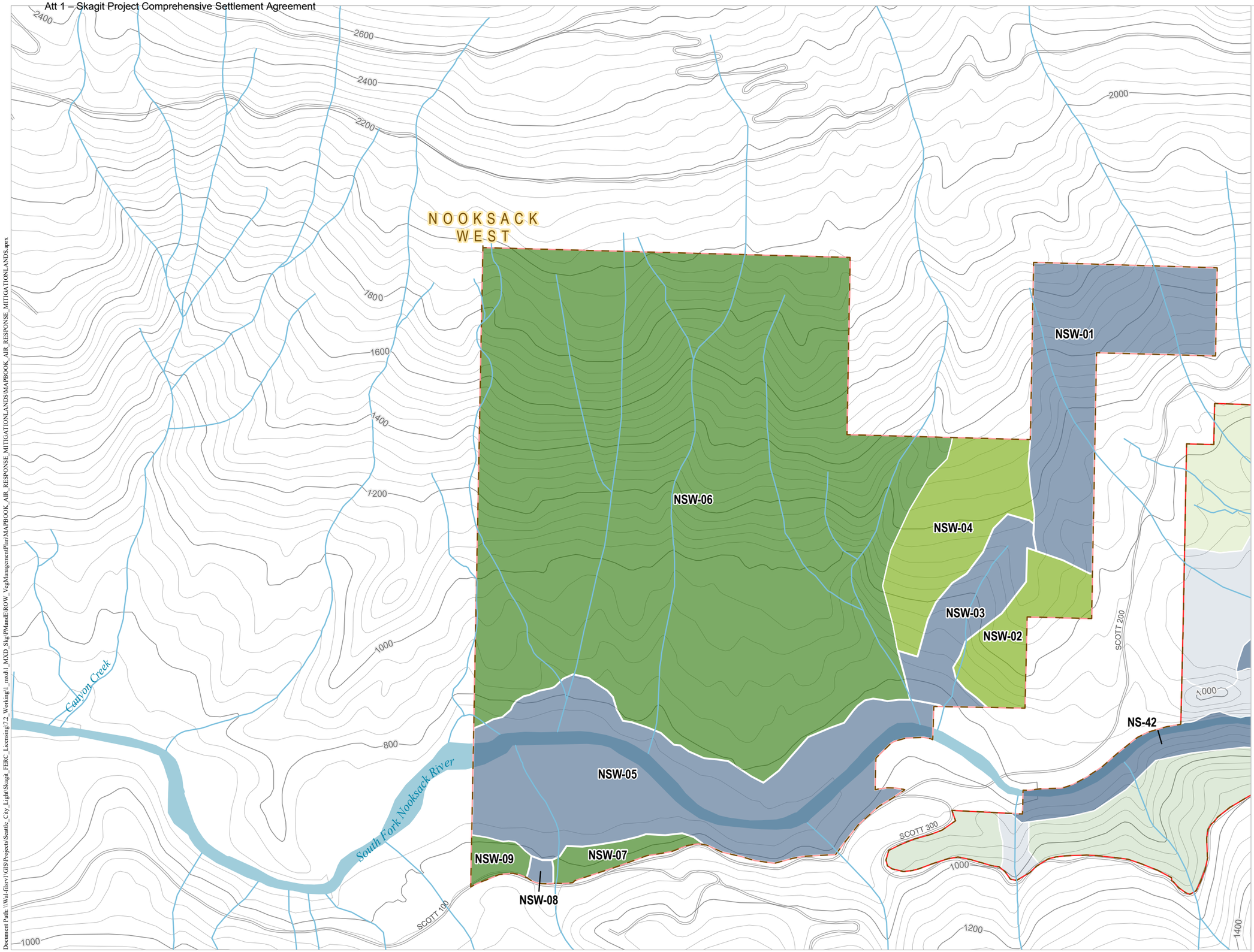


MITIGATION LANDS MANAGEMENT PLAN

NOOKSACK WEST

SOUTH FORK NOOKSACK BASIN

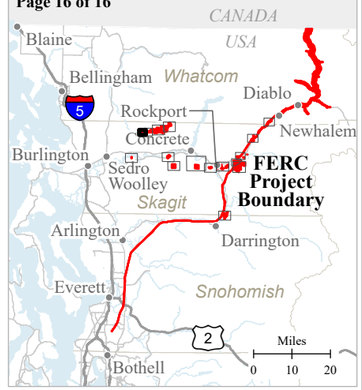
- FERC Project Boundary
- Project River Miles
- Other Conservation Land
- Mitigation Land Property Boundary

Management Unit (MU)

- Forest
- Forest - Ungulate Evaluation
- Wetland/Riparian Management Zone (WMZ/RMZ)

N

0 350 700 Feet



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SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 19

EXAMPLES OF MONITORING TO BE PROVIDED FOR IN THE ECOSYSTEM MONITORING AND ADAPTIVE MANAGEMENT PROGRAM

Settlement Agreement Appendix 19

AM LA-01 Examples of Monitoring to be Provided for in the Ecosystem Monitoring and Adaptive Management Program

The Ecosystem Monitoring and Adaptive Management Plan (EMAMP) includes monitoring activities to advance the scientific understanding of the health of the overall ecosystem and the effectiveness of the mitigation and enhancement programs under the License. These example activities provide a means to evaluate population level responses in productivity, abundance and habitat. The current lists of potential monitoring actions have linked hypotheses. These hypotheses were developed from knowledge of limiting factors for Chinook, Coho and anadromous *O. mykiss*, however some species of interest might have different limiting factors. Also incorporated here are other forms of information that are being collected and needed to address some of the EMAMP hypothesis (e.g., spawn ground surveys and fisheries recoveries to derive escapement abundance and total adult return). While not perfect, the list hopefully provides some examples to help shape the EMAMP program.

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
			Reservoir Monitoring				
Possible Reservoir Goals and Objectives	RFMP has a number of study components already listed, which upon completion would inform the EMAMP. However, following the completion of the FPIP, and implementation of the license, further studies may be deemed necessary. Goals for the Reservoir may include the following: 1. Sustain ecologically viable (Tear et al. 2005), naturally reproducing populations of Bull Trout, Dolly Varden, O. mykiss, and Brook Lamprey in all three reservoirs. 2. Enhance tribal fisheries and recovery of ESA listed anadromous salmonids, as, for example, related to fish passage. 3. Implement actions identified by the USFWS for the recovery of Bull Trout related to maintaining viable population structure, connectivity, impacts of non-	Objectives for the Reservoir EMAMP may include the following: 1. Evaluate reservoir fish population dynamics, habitat use, and migration timing for all species, age classes, and in all habitats. 2. Monitor trends in abundance and distribution and hybridization rates for Eastern Brook Trout and Redside Shinner. Coordinate with Aquatic Invasive Species Plan to minimize predation and competition between invasive fish and fish species of management concern.				The SLIC will review existing data to determine data gaps & assumptions in the existing reservoir information and determine monitoring needs and /or monitoring adjustments. The SLIC will propose corrective actions for Project effects that are determined as a result of additional data collection. Suggested reservoir management actions and research, per objective, for consideration are as follows: <u>3. Stranding/Trapping</u> Comprehensive stranding/ trapping surveys at night, and needed frequencies during peak drawdown cycle.	

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
	native species, and water quality related to project operations. 4. Monitor and enhance reservoir habitat to sustain ecological function and reservoir fish populations of management concern and optimize the value of primary and secondary productivity in the project reservoirs (e.g. littoral and riparian vegetation and benthic communities) 5. Mitigate and minimize the impacts of Project operations (for example, ensuring fish passage into tributaries, securing littoral habitat quantity/quality, and drawdowns that limit stranding/trapping) on the fish species of management concern (e.g. Bull Trout, Dolly Varden, O. mykiss, Brook lamprey, anadromous salmonids, and amphibians). 6. Establish a monitoring program based on quantifiable and SLIC-approved metrics to determine if management goals are being achieved and inform changes to management actions if needed for the duration of the license. 7. Research, monitor, and develop actions to eliminate or reduce non-native species in Project reservoirs.	3. Evaluate hybridization between Cutthroat Trout and O. mykiss and between Dolly Varden and Bull Trout and develop management strategies to eliminate or reduce rates of hybridization. Implement management actions if effects of hybridization are negatively affecting O. mykiss, DV, or BT. 4. Minimize and mitigate impacts of stranding and trapping of reservoir fish, including lamprey and amphibians. 5. Ensure access to tributaries for all ages of fish on a year-round basis. 6. Habitat quality- improve quality of aquatic and riparian native vegetation in littoral and virial zones through plantings and habitat enhancement measures in all reservoirs. Enhance rearing and migratory habitat in tributary streams and the drawdown zone of the reservoirs, including Stetattle Creek alluvial fan. 7. Detail prey availability and productivity.				Identify problem water elevations and avoid detwatering these areas. Avoid drawdown rates that increase risk of stranding/ trapping, and develop a “best efforts” rate. Move fish from stranding locations. Create and maintain outlets in isolated pools where trapping is a perennial challenge with changing reservoir elevations. <u>5. Tributary Access</u> Conduct access surveys on a seasonal basis. Implement management actions to ensure access to reservoir tributaries are accessible when fish require it, in concert with fish population monitoring to determine timing. Monitor to determine if/how fish migration is impeded- where & when. Evaluate if: • turbidity and exposed habitat impede access • distance of exposed habitat present predation risk • physical obstructions impede access	

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
						Inform monitoring from fish habitat use & migration timing monitoring activities. Allow for access through potentially: • Remove debris impeding passage. • Modify geomorphological features under certain circumstances to facilitate the minimization of passage impediments • Alter Project operations to allow passage, when possible, balancing other water needs on consultation with the SLIC • Install instream structures to increase water depth, provide cover, and minimize bank erosion • Trap and move fish around barriers • Restore entrenched stream channels to promote and maintain upstream passage. <u>6. Habitat Quality</u> Operate reservoir levels to promote aquatic and riparian native vegetation in littoral and virial zones- coordinating with the REP variable full pool, shoreline erosion plan, and terrestrial plans.	

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
						Enhance wetland and littoral habitat through the use of floating wetlands and other restoration techniques, potentially using wood existing in the reservoirs (e.g. habitat structure wood 'rafts,' native plantings) <u>7. Prey availability.</u> Use CE-QUAL-W2 models to evaluate nutrients, production cycline, and plankton densities under different scenarios. Evaluate the need to increase plankton sampling effort including more sample locations and depths.	
			<u>Downstream Effects</u>				
Reservoir Fish Tracking in Downstream Habitats	All Skagit Salmon express a diverse suite of life history types within their juvenile stages from early freshwater emigration (e.g. ocean type Chinook, Coho fry migrants) to rearing in freshwaters for a year (e.g. stream type Chinook, Coho) or more (e.g. Steelhead and Rainbow Trout). Environmental conditions within freshwaters are known to influence the variation of life history types (Taylor 1990) that maybe also be influenced by reservoir operation. Fish produced upstream of current distributions (i.e. passed at the different SCL facilities) may exhibit similar or different life history type variation. Some of these life history types might result in competitive sympatry with individuals who hatch downstream especially in habitats that are already at capacity (Floodplain, Zimmerman et al. 2015 and Estuary, Greene et al. 2020). Marking at downstream passage	Fish passage, process flow/flow management, reservoir fish survival	Fish passed downstream do not exhibit delayed mortality to meet passage compliance Fish passed downstream of the project are allopatric to downstream fishes thus limiting competitive overlap	Freshwater residence time Freshwater outmigration survival and adult to smolt productivity Freshwater occupancy and sympatry	Tagging program that would be applicable to all size classes for target species to be passed (e.g. Chinook, Coho, O. mykiss, etc.).	Potential ability to leverage tagging for passage studies and RFMP studies. Tag selection should consider ability to recover fish throughout the management area that includes recoveries in Alaskan and Canadian fisheries. Current spawn ground surveys including SCL stranding and redd surveys should be sufficient to support this effort	WDFW Burlington screw trap Co-manager spawn ground surveys SRSC nearshore sampling effort State Creel Monitoring

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
	a subset of individuals produced from the reservoirs and tracking they presence in downstream habitats would allow for identification of life history types by species, evaluate outmigration survival, and areas of sympatry with downstream fish that can inform competitive interactions.		Fish passed downstream will have reduced downstream movement timing Fish passed downstream will have adequate survival Returning Reservoir fish have similar stray rates as other populations				
Upper Skagit Freshwater Productivity		Fish passage, process flow/flow management, mainstem plan	Increased available habitat from direct restoration and flow management increases freshwater smolt production in the upper Skagit River.	Adult to Smolt production, Outmigration Timing, Growth	Screw trap operation from January thru June in the Upper Skagit above the Sauk (Rockport area), Screw trap operation in the lower Sauk (if feasible) Government Bridge might be a good initial site to consider	Smolt trap will take some time to find appropriate location, permit and install. In addition, some adaptive management may need to be implemented if capture efficiency is low. Consider 3-5 years to have an effective trap.	WDFW Burlington screw trap Co-manager spawn ground surveys Tribal Harvest Monitoring WDFW Creel Studies
Floodplain Fish Use, Residency and Growth	Chinook, Coho, Steelhead and Bull trout are known to rear extensively in floodplain and mainstem habitats. Skagit Coho (Beechie et al. 1994), Chinook (Zimmerman et al. 2015) and Steelhead (Scheuerell	Fish passage, process flow/flow management, mainstem plan	Process Flows will change mainstem habitat features resulting in	Floodplain fish density, residence, and growth.	Monitoring 10 reference floodplain habitats and 10 mainstem habitats	Skagit Coho (Beechie et al. 1994), Chinook (Zimmerman et al. 2015) and Steelhead (Scheuerell et al. 2020) production seems limited by	WDFW Burlington screw trap

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
	et al. 2020) production seems limited by freshwater capacity. Changes in habitat structure and processes (flows, wood, gravel) can influence densities, residency (life history type) and growth. In addition, individuals passed downstream could also use these habitats increasing the potential of negative competitive interactions. While smolt traps can evaluate the aggregate productivity, they cannot provide inference on types of habitats in use and interactions of multiple species and populations at the site level. A freshwater monitoring network will also provide the reference sites to evaluate restoration project effectiveness against within a Before-After-Control-Impact design (Underwood 1994).		increased growth and residence time, possibly changes in life history expression (more yearlings) Process Flows will inundate more off channel habitat increasing floodplain connectivity providing more habitat, that will reduce salmon densities in the floodplain, and increase growth and residence time. Floodplain restoration in the mainstem plan will increase available floodplain habitat area that will reduce salmon densities in the floodplain and increase growth and residence time. Fish passed downstream from	Occupancy of fish passed downstream.	biweekly from January to August methods could include fence weir smolt trapping, seining, electrofishing or snorkeling.	freshwater capacity. By increasing habitat either by improving process or via restoration we should see fewer fish in reference areas or longer residence. In addition, this monitoring will provide reference sites to evaluate restoration actions in the mainstem plan.	Co-manager spawn ground surveys SRSC nearshore sampling effort

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
			reservoirs could increase crowding and competition, however, this could be identified if tagging occurs.				
Skagit Delta Fish Use, Residency and Growth	Estuarine habitats provide critical rearing habitat for juvenile Chinook Salmon and juvenile Chum Salmon. While not strong expression in the Skagit estuary, Coho Salmon are known to have an ocean type and rear in estuaries (Neher et al. 2013). In the Skagit estuary, habitat capacity is limiting juvenile Chinook recovery (SCRP 2005) and likely impacting Chum Salmon (Ruff et al. 2024) Changing management of river flows, downstream passage and increase of estuarine/floodplain habitats all can influence estuarine rearing for these species. River flows can influence timing and residence of outmigrating salmon. As for habitat, Quinn (2007) posed a question: "Does the presence of migrating fry indicate that the carrying capacity of the stream has been reached, or does it represent an alternative life-history pattern?" Long term monitoring since 1993 has occurred in the Skagit estuary to determining habitat use, density, growth and residence of salmon. Early work focused on Coho Salmon use of the tidal delta and then the focus shifted to evaluating responses of juvenile Chinook to estuarine restoration. Now referred as the Skagit IMW Program, the program documents the site level fish use newly available habitat quickly, some restoration designs work better and at the system level there is some indication of increased	Fish passage, estuary plan	Estuary plan will increase available habitat that will reduce salmon densities in the estuary and increase growth and residence time. Fish passed downstream from reservoirs could increase crowding and competition, however, this could be identified if tagging occurs	Estuary fish density, residence and growth. Occupancy of fish passed downstream.	Continue IMW monitoring the 12 Fyke Skagit Delta locations bi-weekly from Feb-Aug	This is to continue the Skagit IMW program that has successfully been used to evaluate site and system level effects. It is expected the Skagit IMW to be completed and will no longer receive funding. Continued estuary monitoring will be critical to understand the net impact of restoration and if shifting life history types are occurring. In addition, this monitoring will provide reference sites to evaluate restoration actions in the estuarine plan.	WDFW Burlington screw trap Co-manager spawn ground surveys SRSC nearshore sampling effort

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
	capacity and SAR response, but habitat increase has been slower than expected (Beamer et al. 2020). While the Skagit IMW has been a long term and successful program, long term funding will end in the next 5 years. Continuation of this program can allow for effective evaluation of proposed actions in Fish passage and Estuarine Plan and evaluate life history expression shifts from process flow management and habitat restoration in the freshwater.						
			Habitat Monitoring				
Floodplain connectivity	Much of our understanding of floodplain connectivity is associated with modeling scenarios under current conditions and assumptions of future condition. The model scenarios describe limit variation of the system that may not include all considerations in flow management. Floodplain habitats that are heavily used by Coho Salmon, Chinook Salmon, Chum Salmon and various trout species. In addition, recent work of seasonal disconnected floodplain habitats has suggested a large degree of fish use that is under appreciated (Hicks NCC funded project). Measuring the connectivity over time will allow a measure of downstream influence of flow management and how new approaches are engaging new habitats.	Process flows/flow management	Flow management maintains floodplain connectivity over periods of salmon rearing	extent and duration of connectivity	water level and connection monitoring 8 sentinel sites and 10 roving sites on a 3-year rotation. (38 in total)	This could be linked with the floodplain fish monitoring to limit costs	USGS Stream flow network
Water Quality Monitoring	Hydropower management of flows has a direct impact of water quality of the Skagit River. Temperature and dissolved oxygen can all influence fish presence and survival in a habitat, in addition nutrients can influence vegetation structure and overall habitat productivity. While WA Department of Ecology operates two long term ambient monitoring stations in the Skagit River and one in	Process flows/flow management, mainstem plan and estuary plan	WQ will improve with restoration and flow management within the floodplain and estuary	Temp, DO, Salinity, Nutrients	4 continuous monitoring locations (Concrete, Sauk River, SF and NF delta) for temperature, dissolved oxygen, nutrients, and 8		SCL WQ monitoring USGS Stream flow network Dept of ECY ambient

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
	the Sauk River. Not contained are sites that include floodplain habitats or estuarine habitats and additional resolution within along the Skagit mainstem.				roving floodplain monitoring sampled on a monthly basis, these methods would follow ECY Ambient monitoring program		monitoring network Temperature monitoring WDFW, SRSC, Skagit County, Sauk
Remote Sensing	Flow management in the new license is likely to alter habitat and surface ground water interactions, yet few studies are in place to mapped these changes. Forward Looking Infrared Radar and bathymetric light detection and ranging can be methods to attain snapshots of habitat condition.	Process flows/flow management	Habitat will become more complex with pulse flow and flow management.	Temperature, elevation	Remote Sensing would occur every 5 years along the Skagit mainstem.		
Habitat Status and Trends	Fish respond to cumulative changes in habitat that include anthropogenetic gains and losses and natural gains and losses. Tracking habitat change is a key indicator of system response to direct restoration, process change or gravel and wood augmentation.	Process flows/flow management, mainstem plan and estuary plan	Actions from this plan will increase available habitat in the Skagit watershed and estuary.	Estuary extent (channel and wetlands), Estuarine landscape connectivity, Estuary vegetation, Hydromodification extent, floodplain edge (more to add on floodplain)	GIS mapping with field ground truthing every 3 years, channel mapping every 3 years, hydromodification and wood surveys every 5 years		SRSC HST data from 2004, 2012/13, 2019, 2023 Hydromodification surveys (SWC monitoring plan)
<u>Effectiveness Monitoring</u>							
Mainstem Plan Actions	Mainstem Plan addresses a number of specific actions to change habitat structure and process. Each specific action will have a series of objectives that can be converted into testable hypotheses to evaluate if objectives were met. Further, adaptive management prescriptions can be establish before an action that can set thresholds that can then trigger additional work. Data from direct site observations		NA, will be developed with the action	Action specific and can include measures of habitat structure, process and biological response.	Before-After-Control-Impact design, Reference-Treatment design, or Staircase design are more effective approaches.		

EMAMP Component	Description	Relevant Proposed Actions	Potential Hypotheses to Investigate	Response	Methods	Comments	Other Monitoring Activities the EMAMP associates with
	generally compared to neighboring reference habitats are required to inform both hypotheses and adaptive management.						
Estuary Plan Actions	Estuary Plan addresses a number of specific actions to change habitat structure and process. Each specific action will have a series of objectives that can be converted into testable hypotheses to evaluate if objectives were met. Further, adaptive management prescriptions can be establish before an action that can set thresholds that can then trigger additional work. Data from direct site observations generally compared to neighboring reference habitats are required to inform both hypotheses and adaptive management.		NA, will be developed with the action	Action specific and can include measures of habitat structure, process and biological response.	Given the long-standing work in the Skagit Estuary by SRSC, Before-After-Control-Impact		
Non-Directed Monitoring Fund							
Fund to support unforeseen monitoring needs, new techniques, or technologies	Non-directed research fund has been critical to improving ecological understanding in the Skagit Basin. Examples of this work includes, but no limited to: Hicks Seasonal Disconnected Habitats, Chum Telemetry Study, Chum Retrospective Analysis, Steelhead Introgression Study, Chinook life history variation study, O. mykiss Survival and Emigration Study, among others. This fund will support any new questions that could occur during the license, either to improve aspects of the current work (e.g. tagging experiments for smolt trap or validation of habitat mapping) or can include new questions or dive into specific analyses.						

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SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 20

TEMPERATURE ACTION PLAN

Settlement Agreement Appendix 20

Temperature Action Plan

This Appendix 20 to the Settlement Agreement describes the agreed-upon terms and conditions related to development of the Temperature Action Plan. The Temperature Action Plan is to be completed as part of the Ecosystem Outcome Effectiveness Monitoring Program, as described in License Article AM LA-01 Skagit River Ecosystem Monitoring and Adaptive Management Program.

1) **Temperature Action Plan**:

a. City Light commits to continuing to collect temperature data in the reservoirs and river consistent with current monitoring as part of the Early Implementation Actions.

b. City Light will transition to the new temperature data collection points consistent with the Water Quality Monitoring and Data Management Plan within one year from the Effective Date of the Settlement Agreement, or as early as possible, given permitting requirements and other constraints.

c. City Light will consult with the Skagit License Implementation Committee (SLIC) to identify indicators of potential biological effects from temperature variations (cold and warm) due to the Project below Gorge Dam and design and implement studies, approved by the National Park Service, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service (Services) and the Washington Department of Ecology (Ecology), to understand the potential biological effects as an Early Implementation Action.

d. City Light acknowledges that terms and conditions of the eventual biological opinion(s) relative to temperature management in the Skagit River ecosystem, based on best available science, may apply to above Gorge Dam and would not be considered a material modification; however, a temperature conditioning tower would be considered a material modification.

e. City Light, starting one year after the Effective Date of the Settlement Agreement and continuing through the issuance of the Final Temperature Report at Year 20, will report and make available to the SLIC temperature data and any study results on an annual basis. Additional SLIC meetings may be arranged to report on significant milestones or results that require attention sooner than the Annual Meeting.

f. If, at any time, Project operations result in temperature impacts that are determined to exceed state numeric and narrative water quality standards, City Light will work with Ecology to develop an attainment plan per WAC 173-201A-510(5).

g. If City Light, in consultation with the SLIC, and approved by all signatories of the Settlement Agreement, identifies (based upon the best available science) prior to

License issuance a data trend(s) that signals an adverse biologically significant impact, or indicates that adverse biologically significant impacts are reasonably certain to occur, City Light will file a revision to the license application with FERC that specifies feasible and cost effective adaptations to measures proposed in the Final License Application.

h. All monitoring and studies shall continue after License issuance and contribute to the development of the 10-Year Interim Report on temperature. The 10-Year Interim Report shall include relevant summaries from the future conditions modeling effort. City Light agrees to produce the 10-Year Interim Report based on the date that biological opinions are final (rather than on final License issuance). If at the 10-Year Interim Report identifies water quality violations, and/or biologically significant adverse impacts are detected, City Light in consultation with the SLIC will develop and implement an attainment plan as required per WAC 173-201A-510(5) and subject to Ecology's approval. The Twenty-Year report will identify the extent to which temperature variations below Gorge Dam are having an adverse biologically significant impact to aquatic species/listed species and will propose, in consultation with the SLIC and approval by the Services and Ecology, feasible and cost-effective adaptations to address the effect. If the Twenty-Year Report indicates that adverse biologically significant impacts are occurring or likely to occur, City Light will, at a minimum, continue this Temperature Action Plan for an additional ten years.

i. Nothing in this Plan restricts Ecology's authorities under the 401 Water Quality Certification to include requirements to evaluate water temperature impacts that result from structural or operational changes of the Project during the license period.

2) **Future conditions modeling**: City Light commits to evaluating future conditions predicted by climate models in conjunction with CE-QUAL-W2 and other available water quality models in the Project reservoirs and lower Skagit River. The first report will be made available within one year after License issuance. The following reports will be done every five years and may be synchronized with the Ecosystem Monitoring and Adaptive Management Program (EMAMP) Five-Year Ecosystem Plan Reports. The results of the modeling will also be incorporated into the Temperature Action Plan reports. The evaluations may be conducted more frequently if the temperature data or future conditions predictions change significantly.[1] This effort will be coordinated with the modeling and data analysis included in the EMAMP. The results of this process will evaluate effects and outcomes of protection, mitigation, and enhancement measures and Project operations, and City Light will implement feasible and cost-effective adaptations using Science-based Decision-Making Framework.

[1] These evaluations require approximately six months of work.

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 21

ANTICIPATED CONDITIONS IN THE CLEAN WATER ACT SECTION 401 WATER QUALITY CERTIFICATION

Settlement Agreement Appendix 21

Anticipated Conditions in the Clean Water Act Section 401 Water Quality Certification

The relicensing of non-federal hydroelectric projects by FERC is considered a federal undertaking (36 Code of Federal Regulation [CFR] § 800.16[y]). As such, a License for the Project is subject to regulatory requirements under the Federal Power Act (FPA) and other applicable statutes. The major regulatory and statutory requirements relevant to water quality include a range of authorities under the FPA and compliance with Section 401 of the Clean Water Act (CWA). Under Section 401, a license applicant must obtain certification from the jurisdiction in which the project discharges that the project meets water quality standards. In Washington State, the Department of Ecology (Ecology) is responsible for issuing the Section 401 Water Quality Certification (401 Certification) that verifies Project compliance with applicable water quality requirements. 401 Certification conditions typically include requirements to monitor water quality throughout the term of a new Project License, pursuant to an Ecology-approved Quality Assurance Project Plan. For hydropower projects that do not demonstrate full compliance, the Washington State Surface Water Quality Standards allow certification conditions to be met subsequent to License issuance in accordance with approved compliance schedules and associated parameter-specific attainment plans.

To issue a 401 Certification, for each relevant parameter, the Licensee must provide Ecology with either a characterization with supporting data and information demonstrating that water quality standards are met, or must request a compliance schedule to obtain compliance under post License Project operations. In some cases, further study may be necessary to characterize conditions resulting from operation under a New License. Ecology may allow the compliance schedule to include further evaluation to determine whether, or to what extent, the project may be causing or contributing to a violation of water quality standards. Furthermore, when and if such characterizations show non-compliance, subsequent compliance schedules and associated attainment plans must be submitted to Ecology for approval.

The Settlement Parties (Parties) recognize that Ecology has not issued a 401 Certification for issuance of the New License. Pursuant to FERC regulations, the Licensee will request a 401 Certification from Ecology. By entering this Settlement Agreement, Ecology is not making a pre-decisional determination of the outcome of the Licensee's forthcoming 401 Certification application.

The Parties anticipate, based upon existing analyses and information, that the License Articles proposed in the Settlement Agreement will be consistent with Washington State water quality requirements. The Parties also anticipate that the 401 Certification will include additional general and specific conditions upon the License. This document intends to describe the Parties' understanding of those Project-specific conditions anticipated to be included in the 401 Certification.

Total Dissolved Gas

During monitoring conducted for relicensing, Total Dissolved Gas (TDG) concentrations exceeded Ecology's criterion of 110 percent saturation at four locations in the Project vicinity, including: (1)

the upper end of Gorge Lake as the result of air admission during periods of low flow/generation at the Diablo Powerhouse; (2) throughout Gorge Lake as the result of spill at Diablo Dam; (3) in the Gorge bypass reach as the result of spill at Gorge Dam, and (4) at the Gorge Powerhouse outflow. Proposed measures (e.g., Gorge bypass reach minimum instream flows, updated flow management program below Gorge Powerhouse, Ross Lake Summer Variable Reservoir Operations Zone, modifications to the Flood Risk Management operations, etc.) are anticipated to result in changed conditions in the Project vicinity, including areas where TDG has been documented to exceed Ecology's numeric criteria.

The Parties anticipate that the 401 Certification will include a compliance schedule and attainment plan for TDG per WAC 173-201A-510(5). Appendix A to the Water Quality Monitoring and Data Management Plan (WQMDMP) includes City Light's draft proposed TDG Compliance Schedule and associated Attainment Plan, to be finalized based on Ecology's input and prior to submission of the 401 Certification application. The duration of this compliance schedule shall be set to the duration necessary to collect further TDG compliance, characterization information, and if necessary evaluate TDG improvement options. All TDG exceedances shall be documented by City Light in a summary report and City Light shall identify all reasonable and feasible improvements that could be used to meet TDG standards when and where exceedances have been documented. The evaluation of such improvements shall be subject to Ecology's approval.

Skagit River Minimum Instream Flows – Gorge Reach

The Parties anticipate that the 401 Certification will include conditions related to compliance with Skagit River Minimum Instream Flows in the Gorge Reach as described in License Article LA OPS LA-03. Pending further submittals from the Licensee supporting the proposed instream flow, the Parties anticipate that the 401 Certification will include conditions establishing an instantaneous minimum flow from Gorge Dam of 250 cubic feet per second (cfs) as confirmed by flow measurements in the Gorge Reach at a gage to be established upstream of the Gorge Powerhouse. The Parties anticipate that a compliance schedule and attainment plan will be necessary per WAC 173-201A-510(5). The Parties anticipate that the attainment plan included in the 401 Certification will be limited to the following elements: (1) description of and schedule for installation of the physical infrastructure necessary to provide for minimum instream flows in the Gorge Reach; and (2) benchmarks and reporting protocols. If City Light is unable, for any reason, to install new infrastructure to provide for minimum instream flows in the Gorge Reach, then City Light must request a new compliance schedule to evaluate all other reasonable and feasible improvements to meet the instream flow requirement.

Skagit River Minimum Instream Flows – Below Gorge Powerhouse

The Parties anticipate that the 401 Certification will include conditions related to compliance with Skagit River Minimum Instream Flows below Gorge Powerhouse as described in License Article FA LA-02 Riverscape Ecosystem Plan (REP). In summary, the Parties anticipate the CWA Section 401 Certification will include the following minimum instream flow requirements in the Skagit River below Gorge Powerhouse (Table 1):

Table 1. Minimum Instream Flow Requirements at Newhalem Gage.

Month	Minimum Instantaneous Flow (cfs)
January	1,700
February	1,700
March	1,700
April	1,700
May	1,600
June	1,600
July	1,400
August	1,400
September	2000
October	2000
November 1-15	2000
November 16-30	1,700
December	1,700

Skagit River Downramping Requirements – Below Gorge Powerhouse

The Parties anticipate that the 401 Certification will include conditions related to compliance with interim downramping restrictions in Skagit River below Gorge Powerhouse as described in License Article FA LA-02 REP. These interim downramping restrictions will be required while City Light completes ongoing studies of the effect of Project downramping to aquatic life, as part of a compliance schedule that will include an attainment plan to be approved by Ecology. In summary, the Parties anticipate the 401 Certification will include the following interim downramping rate restrictions (Table 2) until City Light proposes, and Ecology approves, final downramping rates based on updated study information. Accordingly, the Parties anticipate that the 401 Certification will include a compliance schedule and attainment plan.

Table 2. Interim Upper Skagit River Downramping Rate Requirements.

Start Date	Jan 1	Feb 1	Mar 1	Apr 1	May 1	Jun 1	Jul 1	Aug 1	Sep 1	Oct 1	Oct 16	Nov 1	Dec 1
Daytime Downramping Start (Hour Start)	7	7	6	6	5	4	4	5	6	6	6	6	8
Nighttime Downramping Start (Hour Start)	17	17	18	19	19	20	20	20	19	18	16	16	16
DAYTIME DOWNRAMPING RATE													
Hourly Daytime Downramping Rate (cfs/hr) when flow is ≤4,480 cfs at Newhalem	2” (± 300 cfs)	2” (± 300 cfs)	2” (± 300 cfs)	2” (± 300 cfs)	2” (± 300 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)
Hourly Daytime Downramping Rate (cfs/hr) when flow is >4,480 cfs at Newhalem	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)
NIGHTTIME DOWNRAMPING RATE													
**Hourly Nighttime Downramping rate (cfs/hr) when flow is ≤4,480 cfs at Newhalem	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	3.5” (±500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)	10” (±1500 cfs)
Hourly Nighttime Downramping rate (cfs/hr) when flow is >4,480 cfs at Newhalem	13.5” (±2000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	7” (±1000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)	13.5” (±2000 cfs)
COMPLIANCE POINT													
Downramping Gage	NH	NH	NH	NH	NH	NH	NH	NH	NH	NH	NH	NH	NH

Skagit River Process Flows – Below Gorge Powerhouse

The Parties anticipate that the 401 Certification will include conditions to implement process flow releases in the Skagit River below Gorge Powerhouse as described in License Article FA LA-02 REP. In summary, the Parties anticipate the CWA Section 401 Certification will include the following process flow requirements (Table 3):

Table 3. Minimum Process Flow Requirements.

Process Flow Type	Magnitude at Newhalem Gage	Duration	Frequency	Timing
Winter Side Channel Connectivity Flow	7,521 cfs	24 hours	Once every 12 months	December 1 – February 15
Spring Flushing and Outmigration Flow	4.620 cfs	6-12 hours	Once every 12 months	February 20 – April 20
Spring Connectivity Flow	7,521 cfs	24 hours	Once every 12 months	May 1 – June 30
Fall Flushing Flow	4.620 cfs	6-12 hours	Once every 12 months	September 1 – September 30
Fall Upmigration Flow	4.620 cfs	6-12 hours	Once every 12 months	October 5 – November 30
Large Side Channel Connectivity Flow	12,200 cfs	24 hours	Once every 24 months	TBD in consultation with the SLIC

The parties anticipate that the 401 Certification will include a reference to the channel maintenance provisions in the Process Flows Adaptive Management Plan (AMP):

- City Light will consult with the Skagit License Implementation Committee (SLIC) to achieve the intended outcomes of channel maintenance flow releases of up to 26,400 cfs. City Light commits to implementing channel maintenance flows, the timing, duration, frequency, and flow magnitude of which will be based upon the results of the development of the Process Flows AMP. Channel maintenance flow releases will be subject to the conditions described in Section 2.3 of the Process Flows AMP and the planning, coordination and testing described in Section 4 of the Process Flows AMP.

Turbidity Monitoring and Compliance Evaluation

The WQMDMP includes commitments to begin monitoring for turbidity prior to issuance of the New License (early action) in addition to monitoring under the New License. The Parties anticipate that the 401 Certification will include conditions related to specific monitoring, reporting and compliance evaluation requirements to determine compliance with water quality standards.

Temperature Action Plan

In addition to the Terms agreed to in Appendix 20 of the Settlement Agreement (Temperature Action Plan), the 401 Certification will include requirements to evaluate water temperature impacts that result from the building or operation of fish passage infrastructure, or any other structural or operational changes of the project during the License period.

Additional Water Quality Conditions

The WQMDMP includes an extensive monitoring program intended to monitor water quality conditions with respect to temperature, dissolved oxygen, turbidity, total suspended solids, nutrients, and other parameters. If monitoring described in the WQMDMP identify ongoing exceedances of water quality standards as a result of Project operations, Ecology may require City Light to enter into a compliance schedule per WAC 173-201A-510(5), and City Light shall prepare an attainment plan to be approved by Ecology.

In addition, the Parties anticipate that the 401 Certification will include general conditions with respect to Water Quality Standards, amendments to the 401 Certification, emergency notification and reporting, conditions related to contaminant spill and release prevention and control, conditions related to construction projects and habitat modifications, and conditions related to herbicide, pesticide, and fertilizer applications, and reporting requirements.

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 22

USDA FOREST SERVICE PRELIMINARY 4(e) ADMINISTRATIVE AND INITIAL RESOURCE TERMS AND CONDITIONS

USDA FOREST SERVICE
Preliminary 4(e) Administrative and Initial Resource Terms and Conditions
Skagit River Hydroelectric Project, P-553

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PART I: FPA SECTION 4(e) ADMINISTRATIVE CONDITIONS

Condition No. 1 – Reservation of Authority

The Forest Service reserves the right, after notice and opportunity for comment, to require changes in the Project and its operation (where not otherwise precluded by law) on NFS lands through revision of the Section 4(e) conditions to accomplish protection and utilization of NFS lands and resources. This includes reservation of the right to modify these conditions, if necessary, to respond to any significant changes that warrant a revision of these conditions, including but not limited to, modification of conditions for this Project by the National Park Service; any Final Biological Opinion issued for this Project by the National Marine Fisheries Service or United States Fish and Wildlife Service; or any Certification issued for this Project by the State of Washington.

Condition No. 2 – Annual Coordination

For the term of the new License, and any annual Licenses issued by the Commission, the Licensee shall hold an annual coordination meeting with the Forest Service (Annual Coordination Meeting) by the end of February each year. The Forest Service and Licensee may mutually agree to revise the timing and frequency of the Annual Coordination Meeting, or for the Skagit Implementation License Committee annual meeting to serve as a substitute. This mutual agreement shall be documented in writing.

At least 30 days before the Annual Coordination Meeting, the Licensee shall provide to the Forest Service a draft Annual Work Plan consisting of the following elements:

1. summary of the previous calendar year's Project management activities on NFS lands, monitoring results, and compliance with the License terms and conditions;
2. draft current year Work Plan which provides narrative descriptions of planned Project activities underway or to be implemented in the current year on NFS lands; and,
3. draft out-year Work Plan which describes the Project activities planned on NFS lands for the following year, including descriptions of ground or habitat-disturbing activities that require a site-specific plan.

The Licensee's Annual Report(s) prepared for the annual meeting with the SLIC may serve as the Annual Work Plan under this Condition 2.

Discussions will focus on ongoing implementation of the License and may include, but not be limited to:

- Discussion of any foreseeable changes to Project facilities or features on or affecting NFS lands.
- Discussion of any necessary revisions or modifications to management or implementation plans approved as part of this License.
- Discussion of needed protection measures for species newly listed as threatened, endangered, or sensitive, or changes to existing management plans that may no longer be warranted due to delisting of species or, to incorporate new knowledge about a species requiring protection.
- Discussion of needed protection measures for newly discovered cultural resource sites on NFS lands.
- Discussion of elements of current year work plans, *e.g.*, recreation site maintenance on or affecting NFS lands.
- Discussion of any planned pesticide use on or affecting NFS lands.
- Review of any non-compliance or Project safety reports filed with the Commission during the previous year.

A record of the meeting shall be kept by the Licensee and shall include any recommendations made by

the Forest Service for the protection of NFS lands and resources. The Licensee shall file the meeting record, if requested by the Forest Service, with the Commission no later than 60 days following the meeting.

Condition No. 3 – Approval of Proposed Actions in Annual Work Plan

Before implementation of any FERC-authorized Project action on or affecting NFS lands presented in the Annual Work Plan, the Licensee shall obtain prior written approval from the Forest Service. As part of such written approval, the Forest Service may require adjustments to the planned actions to preclude or mitigate impacts and to ensure that the Project is compatible with on-the-ground conditions. Should such adjustments be deemed necessary by the Forest Service, the Commission, or the Licensee to be a substantial change, the Licensee shall follow the procedures of FERC Standard Article 2 of the License.

Condition No. 4 – Approval of Final Design

Before any new construction of the Project occurs on NFS lands, Licensee shall obtain prior written approval from the Forest Service for all final design plans for Project components which the Forest Service deems as affecting or potentially affecting NFS resources. As part of such written approval, the Forest Service may require adjustments to the final plans and facility locations to preclude or mitigate impacts and to ensure that the Project is either compatible with on-the-ground conditions or approved by Forest Service based on agreed upon compensation or mitigation measures to address compatibility issues. Should such necessary adjustments be deemed necessary by the Forest Service, the Commission, or the Licensee to be a substantial change, the Licensee shall follow the procedures of FERC Standard Article 2 of the License. Any changes to the License made for any reason pursuant to FERC Standard Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Agriculture made pursuant to Section 4(e) of the FPA.

Condition No. 5 – Approval of Changes Not Included in Annual Work Plan

Notwithstanding any License authorization to make changes to the Project, when such changes directly affect NFS lands and are not approved in the Annual Work Plan under Condition 3, the Licensee shall obtain written approval from the Forest Service prior to making any changes in any constructed Project features or facilities on NFS lands, or in the uses of Project lands and waters, or updates or revisions to Commission-authorized resource management plans (as listed below), or any departure from the requirements of any approved exhibits filed with the Commission. Following receipt of such approval from the Forest Service, and a minimum of 90 days prior to initiating any such changes, the Licensee shall file a report with the Commission describing the changes, the reasons for the changes, and showing the approval of the Forest Service for such changes. The Licensee shall file an exact copy of this report with the Forest Service at the same time it is filed with the Commission. This condition does not relieve the Licensee from the amendment or other requirements of FERC Standard Article 2 or Article 3 of this License.

Resource Management Plans requiring Forest Service approval for any changes on or affecting NFS lands:

1. Skagit Riverscape Ecosystem Plan
2. Recreation Resource Management Plan
3. Vegetation Management Plan
4. Invasive Plants Management Plan
5. Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan
6. Wildlife Protection and Enhancement Plan
7. Avian Species Management Plan

Condition No. 6 – Ground Disturbing Activities

If the Licensee proposes ground-disturbing activities on or directly affecting NFS lands that were not specifically addressed in the Commission's National Environmental Policy Act (NEPA) processes, the Licensee, in consultation with the Forest Service, shall determine the scope of work and potential for Project-related effects, and whether additional information is required to proceed with the planned activity. Upon Forest Service request, the Licensee shall enter into an agreement with the Forest Service under which the Licensee shall fund a reasonable portion of the Forest Service staff time and expenses for staff activities related to the proposed activities.

Condition No. 7 – Special Use Authorization

If during the term of the License the Commission determines that the Project involves the use of additional NFS lands outside the current Project boundary and the Project boundary is not amended, the Licensee shall obtain a special use authorization from the Forest Service for the occupancy and use of such additional NFS lands. The Licensee shall obtain the executed authorization before beginning any activities on NFS lands outside of the Project boundary covered by the special use authorization and shall file that authorization with the Commission if the activity is related to the Project. The Licensee shall be responsible for the costs of collecting all information directly related to the evaluation of the effects of the proposed occupancy and use that the Forest Service needs in order to make a decision concerning issuance of a special use authorization. No special use authorization is required for FERC-authorized activities on NFS lands within the Project boundary.

Condition No. 8 – Wild and Scenic Rivers

Any changes to Project features, including hydropower project works, such as transmission line, towers, and access roads, and water resource projects, such as habitat enhancement projects, that are below the bed and banks of the designated Skagit Wild and Scenic River system (Skagit, Cascade, Sauk, and Suiattle Rivers) and the Illabot Creek Wild and Scenic River, including below the bed and banks of any tributary within a quarter mile of aforementioned Wild and Scenic Rivers, are subject to the Wild and Scenic Rivers Act Section 7(a) review and determination prior to a federal agency authorizing action (such as a Commission Order or an Army Corps of Engineers permit).

Condition No. 9 – Compliance with Regulations

The Licensee shall comply with the regulations of the Department of Agriculture for activities on NFS lands, and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regard to the area or operations on or directly affecting NFS lands, to the extent those laws, ordinances or regulations are not preempted by federal law.

Condition No. 10 – Maintenance of Improvements on or Affecting NFS Lands

The Licensee shall maintain all its improvements and premises on NFS lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the Forest Service. The Licensee shall comply with all applicable federal, state, and local laws and regulations regarding the Project area or operations on or directly affecting NFS lands, to the extent those laws and regulations are not preempted by federal law. Disposal of all materials shall be at a location approved by the Forest Service.

Condition No. 11 – Existing Claims

The License shall be subject to all valid claims and existing rights of third parties. The United States is not liable to Licensee for the exercise of any such right or claim.

Condition No. 12 – Coordination with Other Authorized Uses on NFS Lands

If portions of the Project area on NFS lands are covered by a special use authorization issued by the Forest Service for other non-Project activities and uses, prior to starting Project activities the Licensee shall consult with the Forest Service to coordinate such Project activities with previously authorized non-Project uses. If the Forest Service determines the Project activities may affect another, previously

authorized activity, the Licensee will work with the Forest Service to resolve potential impacts.

Condition No. 13 – Indemnification

The Licensee shall indemnify, defend, and hold harmless the United States for any costs, damages, claims, liabilities, and judgments arising from past, present, and future acts or omissions of the Licensee in connection with the Licensee's use and occupancy of NFS lands authorized by the License. This indemnification provision includes but is not limited to acts and omissions of the Licensee or the Licensee's assignees, agents, employees, contractors, or lessees in connection with the Licensee's use and occupancy of NFS lands authorized by the License which result in (1) violations of any laws and regulations which are now or which may in the future become applicable; (2) judgments, claims, demands, penalties, or fees assessed against the United States; (3) costs, expenses, and damages incurred by the United States other than costs and expenses of the United States that are expressly covered by the License; or (4) the release or threatened release of any solid waste, hazardous waste, hazardous materials, pollutant, contaminant, oil in any form, or petroleum product into the environment.

Condition No. 14 – Damage to Land, Property, and Interests of the United States

The Licensee has an affirmative duty to protect the land, property, and interests of the United States from damage arising from the Licensee's construction, maintenance, and operation of the Project works or the works appurtenant or accessory thereto under the License. The Licensee's liability for damages caused by fire and other damages to NFS lands shall be determined in accordance with the Federal Power Act and Standard Form L-5 Article 29.

Condition No. 15 – Risks and Hazards on NFS Lands

As part of the use and occupancy of the Project area, the Licensee has a continuing responsibility to identify and report all known or observed hazardous conditions on or directly affecting NFS lands within and adjacent to the Project boundary that could affect improvements or resources or pose a risk of injury or death to individuals. The Licensee shall abate those conditions, except those caused by third parties or not related to the use and occupancy authorized by the License. Any non- emergency actions to abate such hazards on NFS lands shall be performed after consultation with the Forest Service. In emergency situations, the Licensee shall notify the Forest Service of its actions as soon as possible, but not more than 48 hours, after such actions have been taken. Regardless of whether the Licensee notifies or consults with the Forest Service, the Licensee shall remain solely responsible for all abatement measures performed. Other hazards should be reported to the appropriate agency as soon as possible.

Condition No. 16 – Surveys and Land Corners

The Licensee shall avoid disturbance to all public land survey monuments, private property corners, and NFS boundary markers. If any such land markers or monuments on NFS lands are destroyed by an act or omission of the Licensee, in connection with the use and occupancy authorized by the License, depending on the type of monument destroyed, the Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the Manual of Instructions for the Survey of the Public Land of the United States, (2) the specifications of the County Surveyor, or (3) the specifications of the Forest Service. Further, the Licensee shall ensure that any such official survey records affected are amended as provided by law.

Condition No. 17 – Signs

The Licensee shall consult with the Forest Service prior to erecting signs related to safety issues on NFS lands covered by the License, except in cases of an emergency. Unless there is an imminent threat to safety, prior to the Licensee installing any other signs or advertising devices on NFS lands covered by the License, the Licensee must obtain written approval from the Forest Service as to the location, design, size, color, logos, and message. The Licensee shall be responsible for maintaining all Licensee-installed signs and other advertising devices to neat and presentable standards.

Condition No. 18 – Access within the License Area

The Forest Service shall have unrestricted use of any part of the Project area on NFS lands for any purpose, including permitting uses by third parties or members of the public, provided such use does not interfere with the rights and privileges authorized by this license or the Federal Power Act.

The Forest Service shall have unrestricted use of any road over which Licensee has control within the Project area for all purposes deemed necessary and desirable in connection with the protection, administration, management, and utilization of Federal lands or resources. When needed for the protection, administration, and management of Federal lands or resources, the United States shall have the right to extend rights and privileges for use of the right-of-way and road thereon to States and local subdivisions thereof, as well as to other users. The United States shall control such use so as not to unreasonably interfere with the safety or security uses or cause the Licensee to bear a share of costs disproportionate to Licensee's use in comparison to the use of the road by others.

Condition No. 19 – Crossings

The Licensee shall maintain suitable crossings as required by the Forest Service for all roads and trails that intersect the right-of-way occupied by linear Project facilities (powerline, penstock, ditch, and pipeline).

Condition No. 20 – Use of NFS Routes or NFS Lands for Project Access

For Project Routes located on NFS lands within the Project boundary, as identified on the Project Route Inventory included in the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan, including NFS roads and unclassified roads and trails, the Licensee shall be responsible for all road maintenance consistent with the Forest Service road maintenance designation for the applicable route and applicable Forest Service standards. Project Routes are non-general use roads, used almost exclusively to access the Project and are located within the FERC Project Boundary.

For all other NFS roads, including unclassified roads or roads designated as a Non-Project Route, needed for re-occurring Project access that are located outside the Project boundary, the Licensee shall obtain appropriate authorization (*e.g.*, special use permit, road use permit, or maintenance agreement) from the Forest Service. For these shared-use roads, the Licensee's responsibility for road maintenance and repair costs shall be commensurate with the Licensee's use and Project-induced use.

In the event a road requires maintenance, restoration, or reconstruction to accommodate Licensee's needs or to address protection of resources, the Licensee shall perform such work at its own expense after obtaining prior approval and/or authorization from the Forest Service.

The Licensee shall also be responsible for any new construction, realignment, closure, or other road management actions proposed by the Licensee on NFS lands within the Project boundary in the future, subject to Forest Service standards in effect at the time, including related studies, analyses or reviews required by the Forest Service, and Forest Service approval.

Condition No. 21 – Road Use

The Licensee shall confine all vehicles being used for Project purposes on NFS lands, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes. The Forest Service reserves the right to close Project Routes on NFS lands where damage is occurring to the soil or vegetation, or, if requested by Licensee, to require reconstruction/construction by the Licensee to the extent needed to accommodate Licensee's use. The Forest Service agrees to provide notice to the Licensee and the Commission prior to road closures, except in an emergency, in which case notice will be provided as soon as practicable.

Condition No. 22 – Pesticide Use Restrictions on NFS Lands

Pesticides may not be used on NFS lands or in areas affecting NFS lands to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, non-native fish, etc., without the prior written approval from the Forest Service. During the Annual Coordination Meeting, the Licensee shall submit a request for approval of planned uses of pesticides for the upcoming year. The Licensee shall provide at a minimum the following information essential for Forest Service review and approval:

- Whether pesticide applications are essential for use on NFS lands;
- Specific locations of use;
- Specific herbicides proposed for use;
- Application rates;
- Dose and exposure rates; and
- Safety risk and timeframes for application.

Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated at the time the report was submitted. In such an instance, an emergency request may be submitted for approval by the Forest Service.

Condition No. 23 – Project Boundary Map

Within one year of License issuance, the Licensee shall provide the Forest Service with a map depicting the location of the Project boundary on NFS lands and within the designated Wild and Scenic River corridors. Project boundary location, as well as locations and names of features and facilities where one-time and recurring Licensee activities will occur, also will be identified with Geographic Information System (GIS), compatible with Forest Service GIS, shapefiles with Metadata and other digital data. The Project boundary GIS data will be positionally accurate to ±40 feet, in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. At locations on NFS lands where the Project boundary has been surveyed and monuments placed on the ground, monuments shall be logged using a Global Positioning System with accuracies meeting National Standard for Spatial Data Accuracy standards. This data shall be used to geo-reference the Project boundary within the GIS shapefiles.

Condition No. 24 – Bringing NFS Lands into the Project Boundary

If the Licensee has recurring operations and maintenance obligations or other Project purposes in connection with NFS lands not within the Project boundary, the Licensee shall apply to the Commission to bring the locations of such operations and maintenance obligations into the Project boundary.

Condition No. 25 – Non-Emergency Temporary Variance

If the Licensee anticipates a non-emergency temporary variance may be needed for any Section 4(e) Condition, the Licensee shall provide a written request to the Forest Service at least 45 days prior to the proposed implementation date of such variance, including a description of:

- the 4(e) Condition, the specific temporary change needed, and the expected duration of the temporary change;
- any biological, recreational, and/or cultural resources that may be affected by the variance, and a proposal for additional monitoring of these resources, if not adequately addressed by ongoing License-required monitoring;
- a plan to regularly update the Forest Service until the variance is no longer needed, in the event the duration cannot be identified at the time of the request.

The request shall be sent to the appropriate Forest Service approving official. Upon approval by the Forest Service, and after any other required approvals, the Licensee may implement the temporary change to the 4(e) Condition.

Condition No. 26 - Unattended Construction Equipment

The Licensee shall not place construction equipment on NFS lands prior to actual use or allow it to remain on NFS lands subsequent to actual use, except for a reasonable mobilization and demobilization period agreed to by the Forest Service.

Condition No. 27 – Amendments to the License

If new environmental conditions, new regulatory requirements, or new information from studies on NFS lands trigger the need for the Licensee to modify the license, the Licensee shall file with the Commission for an amendment to the License.[1] The Licensee shall conduct a pre-filing consultation with the Forest Service prior to filing any application for license amendment with the Commission.

Condition No. 28 – Annual License

If the Commission issues an annual license for the Project, the Licensee shall, unless otherwise agreed to by the Forest Service, continue to implement all 4(e) conditions.

Condition No. 29 – Surrender of License

Prior to any surrender of the Project license, the Licensee shall provide assurance acceptable to the Forest Service that the Licensee shall restore any Project area on or directly affecting NFS lands to a condition satisfactory to the Forest Service upon or after Project decommissioning and surrender of the license, as appropriate. To the extent restoration is required, the Licensee shall prepare a restoration plan for Forest Service approval, which identifies the measures to be taken to restore such NFS lands and shall include adequate financial mechanisms to ensure performance of the restoration measures.

Condition No. 30 – Transfer of License or Ownership

In the event of any transfer of the license or sale of the Project, the Licensee shall assure that, in a manner satisfactory to the Forest Service, the proposed transferee can successfully operate, maintain, and surrender and restore the Project area on or affecting NFS lands. In addition, the Forest Service may require the Licensee to pay for an independent audit of the transferee to assist the Forest Service in determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis. The transferee is subject to all Forest Service's 4(e) conditions included in the new License.

[1] This term is consistent with guidance provided in FERC's Division of Hydropower Administration and Compliance's Compliance Handbook, 2015. Should FERC revise its guidance or issue regulations on when a license amendment is required, the Licensee shall comply with such revised guidance or regulations.

SKAGIT RELICENSING SETTLEMENT AGREEMENT
APPENDIX 23

NATIONAL PARK SERVICE PRELIMINARY 4(e)
ADMINISTRATIVE TERMS AND CONDITIONS

Federal Power Act Section 4(e) Standard Administrative Conditions
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Part I: Skagit Standard Administrative Conditions

Condition 1. Revision of National Park Service Conditions and Reservation of Authority
Pursuant to Section 4(e) of the Federal Power Act, the Secretary of the Interior, acting by and through the NPS, considers the preliminary terms and conditions herein to be necessary for the adequate protection and utilization of the lands and waters of Ross Lake National Recreation Area (RLNRA). NPS preliminary terms and conditions are premised on the following considerations:

- The Commission's acceptance and incorporation of the Settlement Agreement's Proposed License Articles and Management Plans as they relate to activities which are on or affect NPS lands and waters without material modification into the new Project license, and
- The Licensee's complete implementation of its obligations in accordance with the Settlement Agreement.

In the event either of these requirements are not met, or material new information (including changes to NPS management plans, NPS management policies, or regulations) or changed conditions emerge, the NPS reserves the right, after notice and opportunity to comment, to supplement or modify these conditions, as necessary to accomplish protection and utilization of NPS lands and waters, before License issuance and throughout the term of the License, including but not limited to, as follows:

- require changes in the Project and its operation (where not otherwise precluded by law) on NPS lands through revision of the Section 4(e) conditions to accomplish the protection and utilization of NPS lands and waters.
- modify the Section 4(e) conditions, if necessary, to respond to any modifications of conditions for this Project by the Forest Service, Final Biological Opinion issued, or any modification of conditions for this Project by the National Marine Fisheries Service or United States Fish and Wildlife Service, or any Certification issued for this Project by the Washington Department of Ecology.

Condition 2. Annual Coordination and Approval of Annual Work Plan
Beginning the first full fiscal year after License issuance for the term of the License and any annual Licenses issued by the Commission, the Licensee shall hold an Annual Coordination Meeting with the NPS by the end of each year (at a mutually agreeable date). The purpose of the Annual Coordination Meeting is to exchange information, coordinate efforts for implementing Project activities, and provide opportunities for approvals by the NPS, as discussed below. The Licensee shall invite members of the Skagit License Implementation Committee (SLIC) to attend the meeting. The NPS and Licensee may mutually agree to revise the timing and frequency of the Annual Coordination Meeting or allow the SLIC annual meeting to serve as a substitute. This mutual agreement shall be documented in writing.

The Licensee shall provide the NPS with a draft Annual Report at least 30 days before the Annual Coordination Meeting, consisting of the following elements:

a) Summary of the previous calendar year's Project activities on or directly affecting NPS lands, monitoring results, and compliance with the License terms and conditions, including but not limited to:

i. A written status report detailing compliance with NPS conditions. The report shall include a summary of each condition and a statement indicating how the Licensee met the condition during the previous year.
ii. Summary of any other License Article and Management Plan completions, revisions, or modifications not addressed in the condition summary.
iii. Summary of results and data of any monitoring and Management Plan implementation measures performed over the previous year pursuant to a FERC License Article or FERC-approved Management Plan.
iv. Summary of any non-routine operation and maintenance activities that may have an effect on NPS lands and waters. Routine operation and maintenance is defined as ongoing actions needed to operate and maintain the Project safely, as licensed or to comply with other laws and regulations. Typical routine operation and maintenance activities would include preventative maintenance, in-kind replacement of parts and structural components, recurring repairs, normal repairs, and related actions. Examples of Routine operation and maintenance include spill gate testing, pothole repair, vegetation brushing of roads, internal building maintenance, powerline maintenance, and snow removal**.** Examples of non-routine operation and maintenance includes any ground disturbance outside existing constructed footprint or resource disturbing activity such as construction of fish passage structures, minimum flow generation unit, boat house construction, bridge replacement, or dredging.
v. Summary of any major non-compliance or Project safety reports, including geologic and seismic reports, filed with the Commission during the previous year.[1]
vi. Summary of the annual flow plan, including the previous year's hydrologic record and any variances in Project operations.
vii. Summary of pesticides used the previous year on or directly affecting NPS lands.

b) A rolling draft two-year work plan documenting a schedule and description of planned non-routine Project activities the Licensee plans to implement for the current calendar year and a summary of actions proposed in the upcoming year (the Out Year). This shall include the elements identified in the Previous Year Work Plan that describe the planned work and operations for the current year and Out year. In addition, it shall include the following:

i. Description of ground-or resource-disturbing Project activities that could reasonably be expected to adversely affect NPS-managed resources, lands, and waters. NPS resources include aquatic, terrestrial, natural, cultural, recreation, aesthetic (visual, light,

[1] This summary will include a list of any reports filed as privileged or critical energy infrastructure information with the Commission, but will not summarize the contents of such filings. NPS may request access to such filings pursuant to FERC's regulations.

sound), visitor experiences, and/or services. Examples of ground- or resource-disturbing activities include construction, maintenance, staging areas, and access.

ii. Description of any site-specific plans that have been filed with or approved by NPS, including any proposed avoidance, protection, mitigation, and enhancement measures for Project activities.

iii. Description of any foreseeable changes to Project facilities or features that could reasonably be expected to adversely affect NPS-managed resources, lands and waters.

iv. Summarize any proposed revisions or modifications to management or implementation plans pursuant to the modification provisions in each plan.

v. Description of any proposed pesticide use on or directly affecting NPS lands.

vi. Description of any anticipated variances from normal operations as described in the License.

vii. Summary of proposed studies, research, or feasibility analyses on or directly affecting NPS lands associated with activities that may require an Archeological Resource Protection Act (ARPA) Permit, or a Scientific Research and Collecting Permit for activities not authorized by the License, as provided in Condition 21.

viii. Summary of any proposed uses of new or emerging technologies for Project purposes on or over NPS lands and waters that are subject to NPS approval under Condition 23.

ix. Anticipated Project-related aircraft needs on NPS lands and waters for areas outside of Licensee's power production facilities (powerhouses, dams, penstocks, switchyards, transmission towers, powerlines, and Project Routes) pursuant to Condition 22.

The Licensee's Annual Report(s) prepared for the annual meeting with the SLIC may serve as the Annual Report and Work Plan under this Condition 2.

The Licensee shall provide the NPS with a draft Annual Report at least 30 days before the Annual Coordination Meeting. If the Licensee and NPS mutually agree not to have an Annual Coordination Meeting, then the Licensee shall provide the NPS a draft Annual Report by end of February of that year. A record of the meeting shall be kept by the Licensee and shall include any recommendations made by the NPS for the protection of NPS lands and waters. At the Annual Coordination Meeting, the Licensee, based on input from the NPS, shall prepare a list of needed modifications to the draft Annual Report and Work Plan. The Licensee shall provide up to thirty (30) days for NPS to provide comments on the draft Annual Report. If NPS requires additional time to provide its comments, NPS and Licensee will mutually agree on a revised deadline. Within thirty (30) days after receipt of NPS's comments on the draft Annual Report, the Licensee shall provide a revised Annual Report to the NPS that incorporates the modifications and responds to NPS comments. The Licensee shall allow 60 days for the NPS to review and approve the revised Annual Report. Upon receipt of NPS approval, the Licensee shall file the Annual Work Plan with the Commission.

The Licensee shall obtain prior written approval from the NPS for any non-routine Project activities presented in the Annual Work Plan that could reasonably be expected to adversely affect NPS-managed resources, lands, and waters. For such activities, the Licensee shall submit a Site-Specific Plan consistent with the requirements in Condition 3 to the NPS for review, input, and approval prior to initiating the activity. The approval in this Condition 2 may serve to meet

any NPS approval requirement of annual activities described in a License Article, Management Plan, or Commission Order, so long as such approval fulfills the requirements of such a License Article, Management Plan, or Commission Order. As part of such written approval, the NPS may require adjustments to the planned actions to preclude or mitigate impacts and to ensure that the Project is compatible with on-the-ground conditions. Should such adjustments be deemed by the NPS, the Commission, or the Licensee to be a substantial change, the Licensee shall follow the procedures of FERC Standard Article 2 of the License. Any changes to the License made for any reason pursuant to FERC Standard Article 2 or Article 3 shall be made subject to any new terms and conditions of the Secretary of Interior made pursuant to Section 4(e) of the FPA and NPS's reserved authority under Condition 1.

Condition 3. Approval of Non-Routine Operation and Maintenance Activities Not Included in Annual Work Plan

The Licensee shall obtain prior written approval from the NPS for non-routine operation and maintenance activities described below that are not included in the Annual Work Plan and could be reasonably expected to adversely affect NPS-managed resources, lands, and waters. The approval in this condition may also serve to meet approval of changes described in a License Article, Management Plan, or Commission Order, so long as such approval fulfills the requirements of such a License Article, Management Plan, or Commission Order. This requirement applies to the following non-routine operation and maintenance activities, except for emergencies:

1. Ground or resource-disturbing activities as defined in Condition 2;
2. Material changes to constructed Project features or facilities;
3. Changes in the use of Project lands or waters; and
4. Material departures from approved exhibits on file with the Commission.

Submittal of Site-Specific and Construction Plans

For activities subject to NPS approval under this condition, the Licensee shall submit a Site-Specific Plan to the NPS for the NPS' review, input, and approval prior to initiating the activity. The Site-Specific Plan shall include the following:

- Project description and scope of work
- Proposed design of the activity or facility (if a design is required per engineering standards)
- Maps
- Draft of Licensee-prepared environmental documentation (if applicable)
- Description of additional documentation the Licensee plans to prepare or anticipates the Commission preparing
- Description of resource surveys planned or completed (if applicable)
- List of any planned project meetings and site visits
- Proposed schedule
- Measures to address any potential safety, ground, or resource-disturbing effects
- Consideration of information from any new resource surveys required by NPS plans, regulations, policies, or laws in effect at the time the activity is proposed.

- A Construction Plan.

The Construction Plan identifies potential hazard areas and measures necessary to address public safety and resource protection. The Construction Plan shall include the following:

- Communication protocols including points of contact for the Licensee and NPS, including a project contact to manage visitor complaints and concerns.
- The Licensee's schedule for providing construction updates to the NPS.
- Required timeframes for reporting sensitive resource discoveries, resource damage, and emergencies (e.g., fires, hazardous material spills, road damage, etc.).
- A public notification and communications plan when the construction might impact visitor use or experience; impacts could include, but are not limited to, access, noise, visual/aesthetics, or congestion.
- Best management practices to address noise abatement measures if the activity has the potential to affect noise-sensitive uses, including the high-use visitor season (May-September) and/or Endangered Species Act (ESA)-listed and priority species' nesting and rearing seasons. Standard noise abatement measures and best management practices include the following:
    - Develop a schedule (made in consultation with the NPS) that reduces impacts on adjacent noise-sensitive uses to the extent practicable,
    - Use the best available noise-control techniques wherever feasible,
    - Idle equipment no longer than is necessary for safety or mechanical reasons,
    - Use hydraulically or electrically powered impact tools when feasible,
    - Locate temporary noise sources as far from sensitive uses as possible,
    - Install mufflers and sound attenuation devices on equipment and employ special-purpose pads, liners, and enclosures to reduce noise. Reduce the noise footprint of daily and periodic construction operations by replacing tonal backup alarms on vehicles with next-generation backup alarms such as broadband or variable output level alarms on compatible Licensee equipment.

NPS Review and Approval

The Licensee shall allow up to 60 days after submission of a Site-Specific Plan for NPS approval of a non-routine operation and maintenance activity subject to this Condition 3 unless otherwise agreed to by the NPS in writing. The NPS may require additional resource information or adjustments to the proposed action, facility locations, timing of proposed activity, and other conditions to preclude or mitigate impacts to resources and visitor experiences, and to ensure that the activity is either compatible with on-the-ground resource conditions or approved by NPS based on agreed upon compensation or mitigation measures to address compatibility issues.

Should NPS-required adjustments to the Site-Specific Plan be determined a substantial change in the maps, plans, specifications, and statements described and designated as exhibits in the License, the Licensee shall follow the procedures of FERC Standard Article 2 of the License.

Any changes to the License made for any reason that are subject to FERC approval pursuant to FERC Standard Article 2 or Article 3 shall also be made subject to any new terms and conditions of the Secretary of Interior made pursuant to Section 4(e) of the FPA in the event NPS invokes its reserved authority under Condition 1. The approval in this condition may also serve to meet the NPS approval requirement of adjustments described in a License Article, Management Plan, or Commission Order.

Condition 4. Cultural Resources Planning
The Licensee shall follow the protocols in the Historic Properties Management Plan, including review by the Licensee's and the NPS's cultural resource specialists to consider potential effects of construction on historic properties and/or unevaluated cultural resources.

Condition 5. Construction Inspections
The Licensee shall inspect construction operations for non-routine Project activities while construction is in progress. The Licensee shall perform and document these inspections and deliver such documentation to the NPS on a schedule agreed to by the NPS. The inspections must address compliance with any fire prevention, public safety, and environmental protection measures in the Construction Plan. The Licensee shall act immediately to correct any items found that need correction. A licensed professional engineer or other qualified employee of the appropriate specialty shall regularly conduct construction inspections of structural improvements. The NPS can request to inspect the construction site at any time. Access to the site will not be unreasonably withheld.

Condition 6. Review and Authorization of New Activities on NPS Lands Outside Project Boundary
If, during the term of the License, the Licensee proposes a new temporary or ongoing use of any NPS lands outside of the current Project boundary for any Project-related purpose, the Licensee shall obtain authorization from the NPS for the occupancy and use of such additional NPS lands. The Licensee shall obtain the authorization before beginning any activities on NPS lands outside the Project boundary and shall file that authorization with the Commission. The NPS authorization may include appropriate vegetation management; cultural resource protection; erosion control; the avoidance of Project-related impacts to fish, wildlife, and visitor use and experience with changes to timing and location; and other appropriate mitigation measures as needed to protect NPS lands, resources, and visitor use and experience. The Licensee shall be responsible for the costs of collecting all information directly related to the evaluation of the effects of the proposed occupancy and use that NPS needs in order to make its decision concerning the issuance of the authorization.

A separate NPS authorization, such as a special use permit, is not required for existing non-Project routes currently outside the Project boundary. The maintenance obligations for such non-Project Routes are addressed in Condition 18 and the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan.

COMMENTS:

- Licensee also acknowledges that existing uses that are currently authorized through a right of way authorization (i.e. radio communication towers) would continue to require a right of way authorization.
- Licensee and NPS will meet to address authorization necessary for non-Project uses.
- Hozomeen bunkhouse (and other potentially other facilities) needs further dialogue (including potentially moving into Project boundary).

Condition 7. Compliance with Regulations

The Licensee, including any agents, contractors, or employees of Licensee acting within the scope of their employment, shall comply with the regulations of the NPS for activities on or affecting NPS lands, waters, and resources and all applicable Federal, State, county, and municipal laws, ordinances, or regulations in regards to the area or operations on or directly affecting NPS lands, to the extent those laws, ordinances or regulations are not preempted by federal law.

Condition 8. Maintenance Standards on or Affecting NPS Lands

The Licensee shall maintain all its improvements and premises on NPS lands to standards of repair, orderliness, neatness, sanitation, and safety acceptable to NPS. Disposal of all materials will be at an appropriate site for that material outside of NPS lands except as otherwise agreed by NPS. The Licensee shall comply with all applicable Federal, State, and local laws and regulations, including but not limited to, the Federal Water Pollution Control Act, 33 U.S.C. 1251 *et seq*., the Resources Conservation and Recovery Act, 42 U.S.C. 6901 *et seq*., the Comprehensive Environmental Response, Control, and Liability Act, 42 U.S.C. 9601 *et seq*., and other relevant environmental laws, as well as public health and safety laws and other laws relating to the siting, construction, operation, and maintenance of any facility, improvement, or equipment to the extent those laws and regulations are not preempted by federal law.

Condition 9. Existing Claims

The Licensee shall be subject to all valid claims and existing rights of third parties. The United States is not liable to the Licensee for exercising any such right or claim.

Condition 10. Indemnification

The Licensee shall indemnify, defend, and hold the United States harmless for any costs, damages, claims, liabilities, and judgments arising from past, present, and future acts or omissions of the Licensee in connection with the Licensee's use and occupancy of NPS lands authorized by the License. This indemnification and hold harmless provision applies to any acts and omissions of the Licensee or the Licensee's assigns, agents, employees, affiliates, subsidiaries, fiduciaries, contractors, or lessees in connection with the Licensee's use and occupancy of NPS lands authorized by the License which result in: (1) violations of any laws and regulations which are now or which may in the future become applicable; (2) judgments, claims, demands, penalties, or fees assessed against the United States; (3) costs, expenses, and damages incurred by the United States (other than as contemplated by the License); or (4) the release or threatened release of any solid waste, hazardous substances, pollutant, contaminant, or oil in any form in the environment.

The Licensee's indemnification of the United States shall also include any loss by personal injury, loss of life, or damage to property caused by the construction, maintenance, or operation of the Project works or of the works appurtenant or accessory thereto under the License. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third-party claims and judgments; and all administrative, interest, and other legal costs. Upon surrender, transfer, or termination of the License, the Licensee's obligation to indemnify and hold harmless the United States shall survive for all valid claims for actions that occurred prior to such surrender, transfer, or termination of the License.

Condition 11. Protection of United States Land, Property, and Interests
The Licensee, including any agents, contractors, or employees of the Licensee acting within the scope of their employment, has the affirmative duty to protect the land, property, and interests of the United States from damage arising from the Licensee's construction, maintenance, or operation of the Project works or the works appurtenant or accessory thereto under the License. The Licensee's liability for damages caused by fire and other damages to NPS lands shall be determined in accordance with the Federal Power Act and Standard Form L-5 Article 29.

Condition 12. Risks and Hazards on NPS Lands
As part of the use and occupancy of the Project area, the Licensee has a continuing responsibility to identify and report all known or observed hazardous conditions on or directly affecting NPS lands within the Project boundary that would affect the NPS improvements, resources, or pose a risk of injury to individuals. The Licensee will abate those conditions, except those caused by third parties or unrelated to the occupancy and use of NPS land authorized by the License. The Licensee shall conduct any non-emergency actions to abate such hazards after consultation with and written approval by NPS. In emergency situations, Licensee shall notify NPS of its actions as soon as possible but not more than 24 hours after such actions have been taken. Whether or not NPS is notified or provides consultation, the Licensee shall remain solely responsible for all abatement measures performed.

The Licensee shall provide an annual safety presentation with relevant materials to NPS staff on the hazards associated with the Project, including dam breaches, evacuation routes, and other hazards related to Project operations and maintenance to support NPS staff and visitor safety.

Condition 13. Hazardous Substances
The Licensee shall manage hazardous substances within the Project boundary in conformance with all state, local, and federal regulatory requirements, including but not limited to the Occupational Safety and Health Administration requirements, and in consultation with the NPS. Annually, the Licensee shall provide a report to NPS with a summary of any hazardous material release. Hazardous substances include but are not limited to:

- Fuels, waste oil debris, lubricants,
- Substances released from fires,
- Above-ground bulk storage, and
- Hazardous waste

Licensee shall notify NPS of any hazardous material release or evidence thereof as soon as possible upon discovery but not more than 24 hours from discovery.

Condition 14. Land Survey and Land Corners
Prior to commencing major Project-related construction projects on NPS lands and waters, the Licensee will obtain a survey by a Licensed Land Surveyor of the location of the FERC Project boundary on NPS lands in the immediate vicinity of the construction site. In coordination with NPS, the Licensee shall develop a survey plan and contract for the completion of the boundary survey of the construction site and Project boundary line marking to be conducted by a surveyor licensed in the State of Washington.

Within six months of License issuance, the Parties will meet and confer to review the legal descriptions of lands owned by the Licensee within the RLNRA (between the downstream RLNRA boundary and Ross Dam), and identify a plan to survey high priority areas and mark such Licensee fee-owned land within the RLNRA boundary in order to meet the Parties' respective land management responsibilities. High priority areas are limited to Newhalem between Goodell Creek (including the Thorton Lakes Road corridor) and the Gorge Powerhouse and the area between Highway 20 and Reflector Bar adjacent to Gorge Reservoir and the Skagit River. High priority areas shall be surveyed within 3 years of License issuance. The parties will confer to modify the scope in the event that extenuating considerations (such as safety concerns) are identified. The remaining fee-owned land will be surveyed as needed to resolve management issues (including the protection of NPS resources (including protection from illicit activities)). The Licensee shall contract a licensed surveyor to survey and mark the location of the Licensee-fee owned land. In coordination with NPS, the Licensee shall develop a survey plan and contract for the completion of the survey to be conducted by a surveyor licensed in the State of Washington.

Property corners that are controlling for NPS property boundaries within and outside the Project area will be recovered and/or established and lost corners will be re-established as necessary. All corners to be established, reestablished, and/or recovered will be done in accordance with (1) the procedures outlined in the Manual of Instructions for the Survey of the Public Land of the United States, (2) the specifications of the County Surveyor, and (3) the specifications of NPS. Ties to the Project boundary will be reported to monumented points such as Public Land Survey Corners, project control points, or other property corners with reported survey grade coordinates. The parties will confer to modify the scope in the event that extenuating considerations (such as safety concerns) are identified.

The Licensee will obtain approval from NPS for the scope of work and final survey plats. The survey plats shall be completed in accordance with the Manual of Instructions for the Survey of the Public Land of the United States, County Surveyor specifications and NPS specifications. The Licensee shall be responsible for all NPS administrative costs associated with surveying, marking, and posting of NPS lands resulting from the survey work.

The Licensee shall avoid disturbance to all public land survey monuments, private property corners, and park boundary markers. If any such land markers or monuments on NPS lands are destroyed by an act or omission of Licensee, in connection with the use and/or occupancy

authorized by this License, depending on the type of monument destroyed, the Licensee shall reestablish or reference same in accordance with (1) the procedures outlined in the Manual of Instructions for the Survey of the Public Land of the United States, (2) the specifications of the County Surveyor, or (3) the specifications of NPS. Further, the Licensee shall ensure that any such official survey records affected are amended as provided by law.

Condition 15. Signs
The Licensee shall consult with NPS during the design of any signs requested to be located on NPS lands or waters. The Licensee shall obtain written approval from NPS prior to installation of any permanent signs on NPS lands or waters, including location, design, size, color, and message. The Licensee may, upon NPS approval, include its logo on Licensee-installed signs on NPS lands covered by the License. All signs will follow NPS standards. The Licensee shall maintain all Licensee-erected signs to standards approved by the NPS.

Condition 16. Access within the License Area
The NPS shall have unrestricted use of any part of the licensed Project area on NPS lands for any purpose, including permitting uses by third parties or members of the public, provided such use does not interfere with the rights and privileges authorized for the operation of the Project works or the works appurtenant or accessory thereto under the License.

Condition 17. Crossings
The Licensee shall maintain suitable crossings, as approved by NPS, for all NPS roads and trails that intersect the right-of-way occupied by linear Project facilities (powerline, penstock, ditch, and pipeline).

Condition 18. Use of NPS Roads Within NPS Boundaries
The Licensee shall confine all vehicles being used for Project purposes on NPS lands, including but not limited to administrative and transportation vehicles and construction and inspection equipment, to roads or specifically designed access routes. The NPS reserves the right to close Project Routes and non-Project Routes within NPS boundaries where damage occurs to the soil, water, or vegetation or, if requested by the Licensee, to require reconstruction/construction by the Licensee to the extent needed to accommodate the Licensee's use. The NPS agrees to provide notice to the Licensee and the Commission prior to road closures, except in an emergency, in which case the NPS will provide notice as soon as practicable. Notwithstanding such closures, NPS will not prevent the Licensee and its contractors access to Project facilities.

For purposes of this document, a Project Route means roads and trails maintained by Licensee and exclusively used by Licensee for Project purposes. A non-Project Route means shared use roads and trails within NPS boundaries necessary for Project purposes.

The Licensee shall perform maintenance for all Project Routes in the Routes Inventory per the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan.

The maintenance obligation of the Licensee for non-Project Routes within NPS boundaries shall be proportionate to total use and commensurate with its use. All Project Routes and non-Project Routes identified as being maintained by the Licensee in Exhibit E, Appendix H of the final

license application (dated April, 2023) (Routes Inventory) will continue to be maintained by the Licensee. The Licensee will update the 2023 Routes Inventory to include non-Project Routes within NPS boundaries (including the roads near Hozomeen) and update the Routes Inventory as needed through the term of the License. Any maintenance to be performed by the Licensee shall be authorized by and shall be performed in accordance with the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan. If a non-Project Route within NPS boundaries requires restoration or reconstruction work to accommodate the Licensee's needs, the Licensee shall perform such work at its own expense after securing NPS authorization; however, NPS pre-authorization is not required in the case of an emergency. When performing such restoration or reconstruction, the Licensee shall document the road width and location (to mutually agreed standard). Emergency is defined as an imminent threat to life or property. In emergency situations, Licensee shall notify NPS of its actions as soon as possible but not more than 24 hours after such actions have been taken. The Licensee will seek authorization, as soon as possible, from NPS to conduct additional work to respond to an emergency beyond the initial 24 hours. If the Licensee requests authorization, the work can continue unless NPS objects to such work in writing.

> Note: City Light has revised the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan (dated November 2025) to address non-Project roads used by City Light, in Section 3.3, 3.4 in a similar way that is currently applied to the Project Routes.

For non-Project Routes not covered by the Roads, Trails, and Transmission Line Right-of-Way Erosion Management Plan, the Licensee shall complete a condition assessment and proposed maintenance plan subject to NPS review and written approval as appropriate once every five years. The Licensee's proposed maintenance plan may take the form of a road maintenance agreement provided all the above conditions are met and the conditions set forth in the proposed agreement.

In addition, for all non-Project Routes within NPS boundaries included in the Routes Inventory, the Licensee shall coordinate with NPS to ensure each has the following:

- Current condition survey.
- Map at a scale to allow identification of specific routes or segments.
- NPS-assigned road numbers and names are used for reference on the maps, tables, and in the field.
- GIS-compatible files of GPS alignments of all roads used for Project access are provided to NPS.
- As needed, signage approved by NPS and installed and maintained by the Licensee at each road, identifying the road by NPS road number and/or name.

Except for the construction of the Ross Access Road (which will be addressed through the Fish Passage Program), the Licensee shall also be responsible for any new construction, realignment, closure, or other road management actions proposed by the Licensee in the future, subject to NPS standards in effect at the time, including related studies, analyses or reviews required by the NPS, and any required NPS approval.

Condition 19. Road, Trail, and Recreation Area Closures
Except in emergency situations, the Licensee shall not close any roads, trails, recreation areas, or other sites on or affecting NPS lands and waters without prior written approval from NPS. For emergency closures, the Licensee shall notify FERC and NPS of the closure and plans to reopen the road, trail, recreation area, or other site within 24 hours. The Licensee may extend the emergency closure longer than 24 hours unless NPS objects.

NPS retains its authority to close any roads, trails, recreation area, or other sites on or affecting NPS lands and waters for administrative or emergency purposes. Notwithstanding such closures, NPS will not prevent the Licensee and its contractors access to Project facilities.

Condition 20. Pesticide-Use Restrictions
Pesticides may not be used on NPS lands or in areas affecting NPS lands and waters to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, non-native fish, etc., without the prior written approval of NPS.

During the annual meeting and annual report, as described in Condition 2, the Licensee will submit a request for approval of planned uses of pesticides on or affecting NPS lands and waters for the upcoming calendar year. The Licensee shall ensure pesticide use conforms to all state, local, and federal regulatory requirements and relevant NPS management plans, including the North Cascades National Park (NOCA) Non-Native Plant Management Plan, as amended. The Licensee shall provide, at a minimum, the following information essential for NPS review and approval:

- A determination as to whether pesticide applications are essential for use on NPS lands;
- Specific locations of use;
- Specific pesticides proposed for use;
- Application rates;
- Safety risk and timeframes for application;
- Target plant species or pests;
- Confirm the herbicide is approved in the NOCA Non-Native Plant Management Plan;
- Record of the environmental compliance conducted as part of the proposed use; and
- Requests to use new pesticides must be submitted as part of the annual report, separated by calendar year, unless otherwise agreed to by the NPS. Exceptions to this schedule may be allowed only when unexpected outbreaks of pests require control measures that were not anticipated. In such an instance, an emergency request and approval may be made. On NPS lands, the Licensee shall only use those materials registered by the U.S. Environmental Protection Agency and the State of Washington, consistent with those applied by NPS and approved through NPS review for the specific purpose planned. The Licensee must strictly follow label instructions in preparing and applying pesticides and disposing excess materials and containers.

Condition 21. Studies on NPS lands
If the Licensee proposes studies, research, or feasibility analyses on or directly affecting NPS lands, the Licensee shall consult with the NPS to determine if a Scientific Research and Collecting Permit or Archeological Resource Protection Act (ARPA) is needed. A Scientific

Research and Collecting Permit is needed for natural resources or social science studies not authorized by the License and conducted by the Licensee within the park that involve fieldwork and specimen collection and/or have the potential to affect park resources or visitors. An ARPA Permit is needed for an archeological investigation conducted by the Licensee on NPS lands. If the NPS determines a Scientific Research and Collecting or ARPA permit is necessary, the Licensee must obtain the permit from NPS and abide by any conditions of the permit. The NPS will make a good faith effort to timely process and approve Licensee's applications for Scientific Research and Collecting Permit or ARPA permit for studies, research, or feasibility analysis necessary for understanding the effects of Project operations on NPS lands and waters.

Condition 22. Use of Aircraft

If the Licensee proposes to use an aircraft (including the use of manned or unmanned aircraft) on or over NPS lands and waters to perform routine Project operation and maintenance activities, Licensee must provide at least 1 week advance notice and, at a minimum, provide the location, timing and flight path, purpose of the planned aircraft use, and identify the Licensee staff responsible for the aircraft flight. Licensee must comply with the additional requirements in ordering paragraph (C) of FERC's June 27, 2024 Declaratory Order (187 FERC ¶ 61,210 (2024)) or the applicable NPS statutes, regulations or policies governing aircraft (including the use of manned or unmanned aircraft) use on or over NPS lands and waters, whichever is more restrictive to protect the lands and waters of the NPS. NPS approval is not required for Licensee's use of aircraft on NPS lands and waters for O&M activities on or immediately adjacent to Licensee's power production facilities (powerhouses, dams, penstocks, switchyards, transmission towers, powerlines, and Project Routes). For all other uses of aircraft for Project purposes on or over NPS lands and waters, such use and NPS written approval shall be addressed through the Annual Work Plan (including the location, timing and scope of the use) in Condition 2. A special use permit will be required for non-Project related aircraft flights on or over NPS lands and waters.

Condition 23. Use of New or Emerging Technologies on NPS Lands or Waters

If the Licensee proposes to use new or emerging technologies in the maintenance and operation of the Project that is likely to affect NPS lands or waters, the Licensee shall notify the NPS a minimum of one week before such use for O&M activities on or within Licensee's power production facilities (powerhouses, dams, penstocks, switchyards, transmission towers, powerlines, and Project Routes). The Licensee shall not use new or emerging technologies that are likely to affect ESA-listed and agency-priority species during agency-established breeding, rearing, and wintering seasons at potentially sensitive locations where such use could impact protected species. For all other uses of new or emerging technologies for Project purposes on or over NPS lands and waters, such use and NPS written approval shall be addressed through the Annual Work Plan (including the location, timing and scope of the use) in Condition 2. A special use permit will be required for non-Project related uses of emerging technologies on or over NPS lands and waters.

Condition 24. Fire Suppression and Post-Fire Restoration Activities

The Licensee shall immediately notify 911 and NPS of unplanned fire activities within the Project boundary on or affecting NPS lands and waters following standard emergency reporting procedures. This is essential for a timely response and appropriate allocation of resources by the

Puget Sound Interagency Dispatch Center, which is responsible for coordinating emergency response among Federal, State, and local emergency first responders. Unless otherwise agreed to in writing or in emergency situations, the Licensee shall make best efforts to seek approval from NPS before conducting any fire suppression or post-fire restoration activities on or affecting NPS lands or waters. In the event that Licensee activities initiate a fire, and the Licensee can safely put out the fire quickly, the Licensee shall put the fire out and then notify the NPS of the fire event. At a minimum, the Licensee shall conduct all suppression activities consistent with NPS Fire Management Plan guidelines.

Condition 25. Emergency Response

The Licensee shall immediately notify 911 and NPS of emergency response activities on or affecting NPS lands or waters. Unless otherwise agreed to in writing, the Licensee shall make best efforts to seek approval from NPS before conducting any emergency response activities besides providing first aid or other measures to protect life or property on or affecting NPS lands or waters.

Condition 26. Visitor Services and other Nonpower Services Not Authorized or Addressed

The Licensee shall obtain NPS authorization or approval, as determined by NPS, in writing before conducting non-power related visitor programs or services not otherwise authorized or addressed by the License, Management Plans, and/or cooperative management agreements (or other inter-governmental agreements), including but not limited to tours, interpretation, education, and fundraising activities on or affecting NPS lands and waters. This approval will follow current authorization mechanisms in place at the time the programs or services are being implemented. Authorization or approval shall be in place before visitor or other non-power programs or services can be conducted.

The Licensee shall submit in writing information about the proposed visitor programs or services, including a description of the proposed action, audience, duration, locations, purpose, fees, and planned program, to the NPS for review no less than 60 days before it is advertised to partners, participants, or the public unless otherwise agreed to by the NPS. The Licensee shall obtain prior NPS approval for all marketing and advertising of new visitor and other non-power programs or services on NPS lands and waters. The Licensee shall provide any additional information as requested by NPS. The Licensee shall implement the visitor program or services only after approval by the NPS, including any conditions of that approval.

Condition 27. Public Communication on Changes in Water Levels, River Flows, or Public Access

No later than one year after License issuance, the Licensee shall develop public communications protocols for changes in water levels and downstream river flows, or public access that would limit or impact visitor access to the reservoirs, river, or recreational opportunities associated with the Project. The protocols will be updated by the Licensee and reviewed and approved by NPS periodically. The Licensee's communications protocols will include notification timelines (including review and approval of project-specific public communications products by NPS) and a communications strategy template (who, what, when, and how).

Condition 28. Temporary Variance Requests
If the Licensee anticipates that a non-emergency temporary variance may be needed for any Section 4(e) Condition, the Licensee shall provide a written request to the NPS at least 45 days before the proposed implementation date of such variance, including a description of:

- the 4(e) Condition, the specific temporary change needed, and the expected duration of the temporary change.
- any natural or cultural resources or recreational facilities, uses, and experiences that may be affected by the variance, and a proposal for additional monitoring of these resources, if not adequately addressed by ongoing license-required monitoring.
- a plan to regularly update the NPS until the variance is no longer needed if the Licensee cannot identify the duration at the time of the request.

The Licensee shall send the request to the appropriate approving official, the park Superintendent or designee. Upon written approval by the NPS and after any other required approvals, the Licensee may implement the temporary change to the 4(e) Condition.

Condition 29. Amendments to the License
If new environmental conditions, new regulatory requirements, or new information from studies on NPS lands trigger the need for the Licensee to modify the License, the Licensee shall file with the Commission for an amendment to the License. The Licensee shall conduct a pre-filing consultation with the NPS for any amendments that are on or affect NPS lands and waters prior to filing any application for License amendment with the Commission.

Condition 30. Annual License
If the Commission issues an annual license for the Project, the Licensee shall, unless otherwise agreed to by the NPS, continue to implement all 4(e) conditions.

Condition 31. Surrender of License or Transfer of License
Prior to any surrender of this License, the Licensee shall provide assurance acceptable to the NPS that the Licensee shall restore any Project area directly affecting NPS lands to a condition satisfactory to the NPS upon or after Project decommissioning and surrender of the License, as appropriate. To the extent restoration is required, the Licensee shall prepare a restoration plan for NPS review and written approval, which shall identify the measures to be taken to restore such NPS lands and shall include adequate financial mechanisms to ensure the performance of the restoration measures.

In the event of any transfer of the License or sale of the Project, the Licensee shall assure that, in a manner satisfactory to NPS, the proposed transferee can successfully operate, maintain, and surrender and restore the Project area on or affecting NPS lands. If deemed necessary by the NPS to assist it in evaluating the Licensee's proposal, the Licensee shall conduct an analysis, using experts approved by the NPS, to estimate the potential costs associated with the surrender and restoration of any Project area on or directly affecting NPS lands to NPS specifications. The Licensee or transferee will provide for the costs of surrender and restoration. In addition, the NPS may require Licensee to pay for an independent audit of the transferee to assist the NPS in

determining whether the transferee has the financial ability to fund the surrender and restoration work specified in the analysis.

Condition 32. Revision of Management Plans.
When modifying a Management Plan, the Licensee shall consult with NPS to update such Management Plan in response to changes to NPS General or Resource Management Plans that affect NPS lands and waters impacted by the Project and revise the Management Plans accordingly.

SKAGIT RELICENSING SETTLEMENT AGREEMENT
ATTACHMENT A

OFF-LICENSE AGREEMENT BETWEEN THE CITY OF SEATTLE AND THE U.S. NATIONAL PARK SERVICE

SKAGIT RIVER HYDROELECTRIC PROJECT (FERC PROJECT NO. 553)

OFF-LICENSE AGREEMENT BETWEEN THE CITY OF SEATTLE AND THE U.S. NATIONAL PARK SERVICE

This Off-License Agreement ("OLA" or "Agreement") is made and entered into this _____ day of _____ 2026, by and between the City of Seattle, through its City Light department, a Washington municipal corporation ("Seattle") and U.S. National Park Service, a federal agency under the U.S. Department of the Interior ("NPS" or "Park Service"). Seattle and the Park Service individually may be referred to as "Party" or collectively as "Parties."

RECITALS

WHEREAS,

A. Seattle owns and operates the Skagit River Hydroelectric Project, Federal Energy Regulatory Commission ("FERC") Project No. 553 ("Project") and is the licensee for the Project. The proposed FERC Project Boundary will encompass federal lands (as listed in the Final License Application for the FERC relicensing of the Project) administered by the Park Service within North Cascades National Park Service Complex ("NOCA") (including the Ross Lake National Recreation Area).

B. The Project is located on the Skagit River in Whatcom, Skagit, and Snohomish counties in Washington State.

C. Seattle's FERC Project License was issued in 1995 ("1995 License") based on a series of settlement agreements negotiated by Seattle, state and federal resource agencies, Indian Tribes and others, and expired on April 30, 2025. Seattle is currently operating the Project on an Annual License issued by FERC on May 6, 2025. NPS is a signatory party to the 1995 License Comprehensive Settlement Agreement.

D. On April 28, 2023, Seattle filed with FERC a final application for a new License to continue operating the Project ("New License").

E. Seattle and NPS are signatories to the new comprehensive FERC Relicensing Settlement Agreement ("Relicensing Settlement Agreement") for the Project. The Relicensing Settlement Agreement is being executed concurrently with this Agreement. The other signatories to the Relicensing Settlement Agreement are the National Marine Fisheries Service, the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Bureau of Indian Affairs, the Washington State Department of Ecology, the Washington Department of Fish and Wildlife, Sauk-Suiattle Indian Tribe, the Swinomish Indian Tribal Community, the Upper Skagit Indian Tribe, and Skagit County.

F. Seattle and NPS are entering into this Agreement as part of the overall settlement process leading to issuance by FERC of a New License for the Project. For purposes of this OLA, "New License" means the new license to be issued by FERC to Seattle for the continued operation and maintenance of the Project pursuant to Section 15 of the Federal Power Act ("FPA"), 16 U.S.C. § 808 replacing the 1995 License. The Parties' obligations under this

OLA shall be interpreted independently of the Relicensing Settlement Agreement, except as provided herein in Section 6.

G. Seattle and NPS agree that FERC's issuance of a New License that incorporates – without Material Modification – the proposed license articles and management plans, as set forth in the Relicensing Settlement Agreement, together with NPS's and Seattle's agreement to and execution of this OLA, resolve all issues between Seattle and the NPS pertaining to FERC's issuance of a New License for the Project (including but not limited to the FPA Section 4(e) conditions) and the operation and maintenance of the Project pursuant to the New License.

TERMS OF AGREEMENT

NOW THEREFORE, in consideration of the mutual covenants set forth herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. General Provisions:

1.1 Incorporation of Recitals

The Recitals stated above are hereby incorporated into and made a part of this Agreement.

1.2 Effective Date

This OLA shall become effective upon the effective date of a New License for the Project issued by FERC (the "Effective Date"), unless the New License is stayed by FERC or by the United States Court of Appeals. In the event of a stay, the Effective Date will become the date the stay of the New License is lifted. The OLA shall have no force or effect in the event that FERC declines or fails to issue Seattle a New License, and such determination becomes a Final Order.

1.3 Term of the OLA

The term of this OLA commences on the Effective Date and will continue through the term of the New License, including any subsequent annual license(s) unless terminated as provided in Section 6 herein.

2. Purpose of the OLA:

2.1 Purpose

The Parties acknowledge and agree that Seattle and NPS have entered into this OLA to resolve issues between Seattle and NPS regarding the relicensing of the Project that are not otherwise addressed through the Relicensing Settlement Agreement and to memorialize the Parties' joint commitments (as specified in Section 3) to mitigate or enhance Project-related coordination impacts within the Ross Lake National Recreation Area (RLNRA).

The Parties agree that this OLA is fair and reasonable and in the public interest. The Parties agree that Seattle's performance of its obligations under the OLA and the Relicensing Settlement Agreement is consistent with and is intended to fulfill Seattle's statutory and regulatory obligations to NPS relating to the relicensing of the Project.

2.2 No Precedent for Other Proceedings

This OLA is made upon the express understanding that it constitutes part of a negotiated resolution of issues between the Parties relating to operation of the Project under the New License for the full term of the New License. Accordingly, this OLA shall not be offered against Seattle or NPS as argument, admission, or precedent in any mediation, arbitration, litigation, or other administrative or legal proceeding that does not involve or relate to the New License or the operation of the Project.

2.3 Future Relicensing or License Amendments

Nothing in this OLA is intended or shall be construed to affect or restrict Seattle or NPS's participation in or comments about the provisions of any future license amendment or relicensing of the Project subsequent to the current relicensing.

2.4 Partnership

This OLA reflects the Parties' interest in actively and successfully balancing public hydropower production and conservation of natural resources within RLNRA. This OLA is intended to memorialize coordination, conservation actions, and associated funding, and to allow the Parties to accomplish more efficient coordination and cooperation as well as better resource management outcomes for current and future generations, including tangible benefits to and enduring trust between the Parties.

3. The Parties' Joint Commitments:

3.1 Capital Improvements for Facilities Within RLNRA

3.1.1 Within one year of the Effective Date, Seattle shall establish a Capital Improvements Funding obligation in the total amount of two million one hundred forty-five thousand dollars ($2,145,000) (2025 dollars).

3.1.2 Through the term of the New License, NPS shall use this fund to enhance, rehabilitate, or replace recreation facilities. NPS intends to use the Capital Improvement Funding as matching funding for design, rerouting, and construction upgrades to the Thunder Knob Trail and Trailhead. Otherwise, NPS may prioritize where the funds from the Capital Improvement Funding Obligation are spent so long as the funds are used for capital improvements for new or existing facilities located within RLNRA.

3.1.3 The $2,145,000 (2025 dollars) is a funding obligation, not a set aside fund, and is not dependent upon an annual funding contribution requirement. Seattle will allocate in its budget $2,145,000 (2025 dollars) that will be

spent over time by NPS, and account for any expenditure from the budget and additions/reductions to reflect adjustment according to the Consumer Price Index as described in Section 8.

3.1.4 At the request of NPS and with agreement of Seattle, Seattle may fund and implement major capital improvement projects if NPS is unable to undertake such projects. The value of such capital improvement projects undertaken by Seattle shall be deducted from the capital improvement fund for the year the project is completed.

3.1.5 Upon the Effective Date or at a minimum of two years prior to commencing capital improvement projects, NPS shall provide Seattle with a Five-Year Capital Improvement Plan, which includes the schedule, budget, and plans for capital improvement projects to be undertaken by NPS during the five-year period. The Five-Year Capital Improvement Plan will include specific and measurable objectives and a disbursement schedule for funding of each project. Upon approval of the Five-Year Capital Improvement Plan and budget by Seattle, and said approval shall not be unreasonably withheld, Seattle shall pay or make available to NPS sufficient funds pursuant to a memorandum of agreement (or similar instrument) for the capital improvement projects on the schedule provided in the Five-Year Capital Improvement Plan.

3.2 Operation and Maintenance Recreation Facilities Within RLNRA

3.2.1 Upon the Effective Date, Seattle shall provide an annual payment to NPS for the term of the New License (and any subsequent annual licenses) in the amount of one million one hundred and ninety-five thousand dollars ($1,195,000) (2025 dollars) per year to support NPS's operations and maintenance (O&M) for recreation facilities within RLNRA (anticipated total to be $59,750,000 (2025 dollars) over the 50-year new license term.

3.2.2 Starting License Year 1, Seattle shall make the first annual payment by September 30 and make subsequent payments by September 30 annually thereafter through the term of the New License and any subsequent annual license(s) or until this Agreement terminates. License Year 1 shall commence on October 1 following the Effective Date. This O&M funding shall be adjusted annually as prescribed in Section 8.

3.2.3 Operation and maintenance is defined as activities that support daily operations of the Park, Park management, contracts and agreements, safety, security and emergency response, and includes any costs related to visitor use management including but not limited to: staff costs for operation and maintenance implementation, law enforcement, visitor resource protection, compliance for activities related to operation and maintenance, contract services for accomplishing operation and maintenance, resource protection related to recreation use, and equipment and materials needed to support

these activities. NPS intends to use the O&M funding to enhance, rehabilitate, or replace transportation system and recreation facilities within RLNRA. NPS may prioritize where funds will be spent so long as the payments are used for O&M of new or existing NPS facilities located within RLNRA.

3.2.4 NPS will provide Seattle with an annual report on the status of implementing O&M in RLNRA. The annual report will include a summary of the previous fiscal year's work, schedule of current fiscal year's work and anticipated work in the following fiscal year. The annual report will be provided on a mutually agreed date.

3.2.5 At the request of NPS and with agreement of Seattle, Seattle may fund and implement major O&M projects if NPS is unable to undertake such projects. The value of such O&M projects undertaken by Seattle shall be deducted from the O&M fund for the year the project is completed.

3.3 If Seattle fails to make all or a portion of an annual payment under Section 3.2.1 because of an event described in Section 9.10, Seattle shall make up the annual payment, or portion thereof, the following year to support the deferred NPS O&M when an event described in Section 9.10 concludes. Communication System. Seattle will collaborate with NPS on upgrades to NPS's communications systems when Seattle updates its own system including implementing fiber optic cables that NPS can tie into and towers that are usable by both Parties.

4. Final Agreement:

4.1 Except for the Relicensing Settlement Agreement and 4(e) conditions for the Project, this OLA is the full and final agreement between the Parties pertaining to the relicensing of the Project and obligations to mitigate and enhance Project related impacts within NOCA. This OLA cannot be changed except by mutual agreement of the Parties. Any and all claims or demands relating to this OLA shall be governed by Section 7 of this agreement. Upon the effective date, this OLA supersedes and replaces any contractual obligation between the Parties related to recreation Project impacts under the current License within NOCA.

5. Representations and Warranties:

The Parties hereby represent and warrant as follows:

5.1 Authority of Seattle

Seattle has full power and authority to execute and deliver this Agreement, to perform its obligations hereunder, and to consummate the transactions contemplated hereby. The execution and delivery by Seattle of this Agreement, and the performance by Seattle of its obligations hereunder have been duly and validly authorized by the City of Seattle's Mayor and Seattle City Council pursuant to Ordinance # _____. This Agreement has been duly and validly executed and delivered by Seattle and constitutes legal, valid, and binding

obligations of Seattle, enforceable against Seattle in accordance with its terms. The Mayor and Seattle City Council's approval and authorization of this Agreement shall be conclusively evidenced by an effective ordinance of the Seattle City Council.

5.2 Authority of the NPS

NPS has full power and authority to execute and deliver this Agreement, to perform its obligations hereunder, and to consummate the transactions contemplated hereby.

6. Termination of the OLA:

6.1 Termination

6.1.1 This OLA may be terminated at any time by mutual written consent of Seattle and the NPS.

6.1.2 This OLA may be terminated by either Party, in its sole discretion, only if concurrently or subsequently to the Effective Date of this OLA, FERC imposes a Material Modification as defined in the Relicensing Settlement Agreement in the New License or through a license amendment and for that reason, a Party then terminates the Relicensing Settlement Agreement pursuant to the terms of the Relicensing Settlement Agreement. Prior to termination under this Section 6.1.2, the Parties shall commence dispute resolution as defined in Section 7 below.

6.2 Parties' Actions Upon Termination

Upon termination, this OLA shall become null and void and there shall be no liability or obligation under this OLA on the part of either Party or any of its respective elected officials, officers, directors, commissioners, employees, agents, or other representatives or affiliates.

7. Dispute Resolution:

7.1 In the event of any dispute between the Parties concerning the interpretation or implementation of any aspect of this OLA, or prior to termination of the OLA under Section 6.1.2, the Parties agree to engage in good faith negotiations for a period of at least sixty (60) days in an effort to resolve the dispute. Notification of the dispute must be in writing to the other Party, and the 60-day negotiating period will begin upon notification as described in Section 8.5. During the 60-day period, either Party may request the services of a professional mediator to assist. The Party requesting such services shall cover the costs unless there is an agreement among the Parties to share costs. The 60-day time period may be extended for a mutually agreed upon amount of time at the request of either Party.

7.2 In the event that resolution cannot be reached within the 60-day negotiating period or a longer negotiating time period otherwise agreed to by the Parties, then either Party may seek a remedy for alleged violations as described in Section 9.4.

8. Monetary Indexing and Adjustments:

All dollar amounts in this Agreement are stated as of the year 2025 and shall be adjusted according to Proposed License Article OPS LA 04 (Annual CPI Adjustment) (and as may be amended through the term of the new license and any subsequent annual license).

9. Miscellaneous:

9.1 Non-Severable Terms of OLA

The terms of this OLA are not severable. This OLA is made in the understanding that each term is in consideration and support of every other term, and each term is a necessary part of the entire OLA. However, if a court of competent jurisdiction rules that any provision in this OLA is invalid, this OLA is deemed modified to conform to such ruling, unless Seattle or the NPS objects. If Seattle or the NPS objects, the other agrees to meet and confer regarding the continued viability of this OLA. If agreement cannot be reached on the impact of the court's ruling, either Party may terminate this OLA.

9.2 Seattle's Recourse for NPS Substantial Noncompliance

If, based on the annual reports and invoices provided by the NPS under Section 3 or visual inspection, Seattle believes that NPS has not substantially complied with its obligations to implement or perform one or more of the Seattle-funded actions identified in this OLA, the Parties shall follow the dispute resolution requirements pursuant to Section 7. Seattle shall provide timely notice to NPS of any alleged noncompliance. This notice shall describe the OLA activity with which NPS has failed to substantially comply. NPS shall have 60 days to respond to Seattle's notice.

Substantial Noncompliance means that absent an event described in Section 9.10, NPS has failed to undertake one or more of the Seattle-funded actions of this OLA for the year.

9.2.1 If NPS disputes whether it is in substantial noncompliance, Seattle shall still make timely payments for the subsequent year and separately initiate the dispute resolution requirements pursuant to Section 7.

9.2.2 If NPS agrees with Seattle that NPS is in substantial noncompliance, Seattle shall continue to make timely payments if NPS represents in writing that it shall: (1) address, where possible, past noncompliance, and (2) achieve future substantial compliance with the sections of the OLA where NPS has failed to comply.

9.2.3 Where NPS does not take action under Section 9.2.1 or Section 9.2.2, Seattle may withhold future payment if Seattle meets the following conditions:

9.2.3.1 Seattle provides NPS a full field season to remedy the substantial noncompliance, using previously provided funds, once it has

given notice to NPS that it believes NPS is in substantial noncompliance;

9.2.3.2 Seattle does not unreasonably withhold payments;

9.2.3.3 The amount withheld by Seattle is commensurate with the degree of noncompliance.

9.2.4 Seattle shall resume full payment for any substantial noncompliance action(s) to NPS within sixty (60) days of NPS achieving substantial compliance.

9.2.5 By withholding payment under this section, Seattle shall not be deemed in breach of this OLA.

9.3 NPS Recourse for Seattle Substantial Noncompliance

If NPS believes Seattle has not substantially complied with its obligations identified in this OLA, the Parties will follow the dispute resolution requirements pursuant to Section 7. NPS shall provide Seattle timely notice of the alleged noncompliance that shall include a description and documentation of the specific way(s) in which NPS considers Seattle to be out of compliance. Substantial Noncompliance means that Seattle has failed in any federal fiscal year to provide timely and/or complete funding as required by this OLA, or if Seattle has agreed to undertake a capital improvement project under Section 3.1.4, substantial noncompliance means that Seattle has failed to fund or complete such project. Seattle shall have sixty (60) days to respond to NPS' notice.

9.4 Remedies for Substantial Noncompliance

No Party shall seek relief in any forum for substantial noncompliance of this OLA unless and until the requirements of Section 7 – Dispute Resolution and Sections 9.2 and 9.3 have been met. If dispute resolution is not successful, either Party may seek judicial enforcement of the terms of this OLA in a forum of competent jurisdiction. The Parties reserve all remedies and affirmative defenses for substantial noncompliance of this OLA under applicable federal law. Nothing in this Section is intended to limit a Party's right to initiate dispute resolution pursuant to Section 7 of this OLA or limit the type of relief that a Party may seek through the dispute resolution process.

9.5 Notice

Unless otherwise provided herein, all notices given by either Party to the other in connection herewith shall be in writing and shall either be delivered in person or by email to the contact person's email listed below with telephonic confirmation. Notice delivered in person shall be deemed to have been properly given and received on the date delivered, so long as delivered during normal business hours. Notice delivered by email is complete on transmission when made prior to 5:00 p.m. PT on a business day. Notice delivered by email transmitted on a Saturday, Sunday, holiday, or after 5:00 p.m. PT on any other day shall be deemed complete at 9:00 a.m. PT on the first business day thereafter. Notification

of changes in the contact person must be made in writing and delivered to all other contact persons.

For Seattle:

Chris Townsend
Director
Natural Resources and Hydro Licensing
Seattle City Light
Email: Chris.Townsend@seattle.gov

For NPS:

Superintendent
North Cascades National Park Service Complex
810 State Route 20
Sedro Woolley, WA 98284

9.6 No Third-Party Beneficiaries

Without limiting the applicability of rights granted to the public pursuant to applicable law, this OLA shall not create any right or interest in the public, or any member thereof, as a third-party beneficiary hereof, and shall not authorize any entity other than Seattle and the NPS to maintain a suit at law or equity pursuant to this OLA. The duties, obligations, and responsibilities of Seattle and the NPS with respect to third parties shall remain as imposed under applicable law.

9.7 Expenses

Unless otherwise provided by this OLA, each Party shall use its own resources in asserting its rights and performing its obligations under this OLA, and no Party shall be required to reimburse the other Party for any expense or cost incurred hereunder.

9.8 Successors and Assigns

This OLA shall apply to, be binding on, and inure to the benefit of Seattle and the NPS and their successors and assigns, unless otherwise specified in this OLA.

9.9 Change in Ownership of Project

No change in ownership of the Project or transfer of the New License by Seattle shall in any way modify or otherwise affect the NPS's interests, rights, benefits, responsibilities, or obligations under this OLA as to the new owner of the Project.

9.10 Notice of Delay or Inability to Perform – *Force Majeure*

No Party shall be in substantial noncompliance of its obligations or liable to the other Party for substantial noncompliance of this OLA as a result of a failure to perform if said performance is made impracticable due to an event of *Force Majeure*. The term "*Force Majeure*" means any cause reasonably beyond the Party's control, whether unforeseen, foreseen, foreseeable, or unforeseeable, including but not limited to: acts of God, fire, war,

insurrection, civil disturbance, epidemic, pandemic, or explosion; adverse weather conditions that could not be reasonably anticipated causing unusual delay in transportation and/or field work activities; restraint by court order or order of public authority; inability to obtain, after exercise of reasonable diligence and timely submittal of all applicable application, any necessary authorizations, approvals, permits, or licenses due to action or inaction of any governmental agency or authority; governmental shutdown, lack of available appropriated funds, cancelation of government contracts, hiring freezes, legal restrictions, or related reasons; or labor disputes or strikes which are reasonably beyond the control of the Party seeking excuse from performance. The Party whose performance is affected by *Force Majeure* shall notify the other Party as soon as reasonably practicable. This notice shall include: (1) a description of the event causing the delay or anticipated delay; (2) an estimate of the anticipated length of the delay; (3) a description of the measures taken or to be taken to avoid or minimize the delay; and (4) a proposed timetable for the implementation of the measures or performance of the obligation. The affected entity shall make all reasonable efforts to promptly resume performance of the obligation. It shall provide verbal and written Notice when it resumes performance of the obligation.

9.11 Waiver

The failure of Seattle or the NPS to insist, on any occasion, upon strict performance of any provision of this OLA shall not be considered a waiver of any obligation, right, or duty of, or imposed upon, such entity.

9.12 Governing Law

The OLA shall be governed, construed, and enforced in accordance with federal law and regulation.

9.13 Availability of Funds

Nothing in this OLA shall be interpreted as, or constitute, a commitment or requirement that the NPS obligate or pay funds in violation of the Anti-Deficiency Act, 31 U.S.C. § 1341 and other applicable law. Nothing in this OLA is intended to or shall be construed to commit a federal official to expend federal funds not appropriated by Congress. Seattle's obligations in this OLA are subject to adequate funds being appropriated by the Seattle City Council.

9.14 Amendment of the OLA Upon Agreement of the Parties

This OLA may be amended at any time from the Effective Date through the term of the New License and any subsequent annual license(s), by written agreement of Seattle and the NPS, including any successors.

9.15 Section Titles for Convenience Only

The titles for the Sections of this OLA are used only for convenience of reference and organization, and shall not be used to modify, explain, or interpret any of the provisions of this OLA or the intentions of Seattle and the NPS. This OLA has been jointly drafted by

Seattle and the NPS and therefore shall be construed according to its plain meaning and not for or against any Party.

9.16 License Term

The parties have negotiated the provisions of the Relicensing Settlement Agreement and this OLA, including the financial calculations, under the assumption that FERC will issue a New License with a fifty-year (50-year) term. Accordingly, Seattle may actively advocate for a 50-year New License, and the NPS would not be opposed to a 50-year New License term. In the event that the New License includes a shorter term, the Parties agree to meet and confer about adjustments to payment schedules and each Party's obligations. Notwithstanding any provision of this OLA or the Relicensing Settlement Agreement, Seattle may seek rehearing and/or judicial review of any FERC order granting a New License term of less than 50 years.

9.17 Entire Agreement

This OLA contains the complete and exclusive agreement of Seattle and NPS with respect to the subject matter thereof, and supersedes all discussions, negotiations, representations, warranties, commitments, offers, contracts, agreements in principle, and other writings made prior to the Effective Date of this OLA, with respect to its subject matter.

9.18 Signatory Authority

Each signatory to this OLA certifies that they are authorized to execute this OLA and to legally bind the entity they represent, and that such entity shall be fully bound by the terms hereof upon such signature without any further act, approval, or authorization by such entity.

9.19 Lobbying Prohibition

18 U.S.C. §1913, Lobbying with Appropriated Moneys, as amended by Public Law 107-273, Nov. 2, 2002 - No part of the money appropriated by any enactment of Congress shall, in the absence of express authorization by Congress, be used directly or indirectly to pay for any personal service, advertisement, telegram, telephone, letter, printed or written matter, or other device, intended or designed to influence in any manner a Member of Congress, a jurisdiction, or an official of any government, to favor, adopt, or oppose, by vote or otherwise, any legislation, law, ratification, policy, or appropriation, whether before or after the introduction of any bill, measure, or resolution proposing such legislation, law, ratification, policy, or appropriation; but this shall not prevent officers or employees of the United States or of its departments or agencies from communicating to any such Members or official, at his request, or to Congress or such official, through the proper official channels, requests for legislation, law, ratification, policy, or appropriations which they deem necessary for the efficient conduct of the public business, or from making any communication whose prohibition by this section might, in the opinion of the Attorney General, violate the Constitution or interfere with the conduct of foreign policy, counter-intelligence, intelligence, or national security activities. Violations of this section shall constitute violations of section 1352(a) of title 31. In addition to the above, the related

restrictions on the use of appropriated funds found in Div. F, § 402 of the Omnibus Appropriations Act of 2008 (P.L. 110-161) also apply.

9.20 Member of Congress

Pursuant to 41 U.S.C. § 22, no Member of Congress shall be admitted to any share or part of any contract or agreement made, entered, or adopted by or on behalf of the United States, or to any benefit to arise thereupon.

9.21 No Employment Relationship

This Agreement is not intended to and shall not be construed to create an employment relationship between NPS and Seattle or its representatives. No representative of Seattle shall perform any function or make any decision properly reserved by law or policy to the Federal government.

9.22 Agency

Seattle is not an agent or representative of the United States, the Department of the Interior, NPS, or NOCA, and Seattle will not represent itself as such to third parties. NPS employees are not agents of Seattle and will not act on behalf of Seattle.

IN WITNESS THEREOF,

Seattle and NPS, through their duly authorized representatives, have caused this OLA to be executed as of the date set forth in this OLA.

CITY OF SEATTLE

Date: _____ By: _____

Name: _____

Title: _____

U.S. NATIONAL PARK SERVICE

Date: _____ By: _____

Name: Randy Lavasseur

Title: Regional Director (Acting)
Regions 8, 9, 10, 12

SKAGIT RELICENSING SETTLEMENT AGREEMENT
ATTACHMENT B

OFF-LICENSE AGREEMENT BETWEEN THE CITY OF SEATTLE AND THE USDA FOREST SERVICE

SKAGIT RIVER HYDROELECTRIC PROJECT (FERC PROJECT NO. 553)

OFF-LICENSE AGREEMENT BETWEEN THE CITY OF SEATTLE AND THE USDA FOREST SERVICE

This Off-License Agreement ("OLA" or "Agreement") is made and entered into this _____ day of _____ 2026, by and between the City of Seattle, a Washington municipal corporation acting through its City Light department ("Seattle") and the U.S. Department of Agriculture Forest Service ("USFS" or "Forest Service") under the Granger-Thye Act of 1950, the Agricultural Market Transition Act, and other appropriate authorities. Seattle and the Forest Service individually may be referred to as "Party" or collectively as "Parties."

RECITALS

WHEREAS,

A. Seattle owns and operates the Skagit River Hydroelectric Project, Federal Energy Regulatory Commission ("FERC") Project No. 553 ("Project") and is the Licensee for the Project. The proposed FERC Project Boundary will encompass federal lands (as listed in Final License Application Exhibit A) administered by the Forest Service within the Mount Baker-Snoqualmie and Okanogan-Wenatchee National Forests ("National Forests").

   The Project is located on the Skagit River in Whatcom, Skagit, and Snohomish counties in Washington State and both upstream of and within the Skagit Wild and Scenic River System and the Illabot Creek Wild and Scenic River.

   Seattle has a current FERC Project License issued in 1995 ("1995 License") based on a series of settlement agreements negotiated by Seattle, state and federal resource agencies, Indian Tribes and an environmental non-profit organization, which expired on April 30, 2025. USFS is a signatory party to the 1995 License Comprehensive Settlement Agreement. On April 28, 2023, Seattle filed a Final License Application with FERC seeking a New License for the Project ("New License").

B. Seattle and USFS are signatories to the new comprehensive FERC Relicensing Settlement Agreement ("Relicensing Settlement Agreement") for the Project. The Relicensing Settlement Agreement is being executed concurrently with this Agreement. The other signatories to the Relicensing Settlement Agreement are the National Marine Fisheries Service, the National Park Service, the U.S. Fish and Wildlife Service, the Bureau of Indian Affairs, the Washington State Department of Ecology, the Washington Department of Fish and Wildlife, the Sauk-Suiattle Indian Tribe, the Swinomish Indian Tribal Community, the Upper Skagit Indian Tribe, and Skagit County.

C. Seattle and USFS are entering into this Agreement as part of the overall settlement process leading to issuance by FERC of a New License for the Project. For purposes of this OLA, "New License" means the New License to be issued by FERC to Seattle for the continued operation and maintenance of the Project pursuant to Section 15 of the Federal Power Act ("FPA"), 16 United States Code (USC) § 808 replacing the 1995 License.

D. Seattle and USFS intend that FERC's issuance of a New License that incorporates – without Material Modification – the Proposed License Articles and Management Plans, as set forth in the Relicensing Settlement Agreement, together with USFS's and Seattle's agreement to and execution of this OLA, resolve all issues between Seattle and the USFS pertaining to FERC's issuance of a New License for the Project (including but not limited to the FPA Section 4(e) conditions).

TERMS OF AGREEMENT

NOW THEREFORE, in consideration of the mutual covenants set forth herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. General Provisions:

1.1 Incorporation of Recitals

The Recitals stated above are hereby incorporated into and made a part of this Agreement.

1.2 Effective Date

This OLA shall become effective upon the Effective Date of a New License for the Project issued by FERC (the "Effective Date"), unless the New License is stayed by FERC or by the United States Court of Appeals. In the event of a stay, the Effective Date will become the date the stay of the New License is lifted. The OLA shall have no force or effect in the event that FERC declines or fails to issue Seattle a New License, and such determination becomes a Final Order.

1.3 Term of the OLA

The term of this OLA commences on the Effective Date and continues through the term of the New License, including any subsequent annual license(s) unless terminated as provided in Section 7 herein.

2. Purpose of the OLA:

2.1 Purpose

The Parties acknowledge and agree that Seattle and USFS have entered into this OLA to resolve all issues between Seattle and USFS regarding the relicensing of the Project that are not addressed through the Relicensing Settlement Agreement and to memorialize the Parties' joint commitments (as specified in Section 3) to mitigate or enhance Project-related coordination impacts within the National Forest System ("NFS") and Skagit River Wild and Scenic River System. As used in this OLA, the "Skagit Wild and Scenic River System" means the waters and land designated as Wild and Scenic under 16 USC § 1271 *et seq.* (as amended), for the Skagit River and its tributaries, the Sauk, Suiattle, and Cascade rivers, and the Illabot Creek Wild and Scenic River.

The Parties agree that this OLA is fair and reasonable and in the public interest. The Parties agree that Seattle's performance of its obligations under the OLA and the Relicensing Settlement Agreement is intended to be consistent with and fulfill Seattle's statutory and regulatory obligations to USFS relating to the relicensing of the Project.

2.2 No Precedent for Other Proceedings

This OLA is made upon the express understanding that it constitutes part of a negotiated resolution of issues between the Parties relating to operation of the Project under the New License for the full term of the New License. Accordingly, this OLA shall not be offered against Seattle or USFS as argument, admission, or precedent in any mediation, arbitration, litigation, or other administrative or legal proceeding that does not involve or relate to the New License or the operation of the Project.

2.3 Future Relicensing or License Amendments

Nothing in this OLA is intended or shall be construed to affect or restrict Seattle or USFS's participation in or comments about the provisions of any future license amendment or relicensing of the Project subsequent to the current relicensing.

2.4 Partnership

This OLA reflects the Parties' spirit of partnership and interest in actively and successfully balancing public hydropower production and conservation or enhancement of natural, cultural, and social resources on NFS land and the Skagit Wild and Scenic River System. This OLA is intended to create collaborative commitments for coordination, conservation actions, and associated funding, and to allow the Parties to accomplish more efficient coordination and cooperation as well as adaptive resource management outcomes over the term of the New License.

3. The Parties' Joint Commitments:

3.1 Capital Improvements for Recreation Facilities Within the Skagit Wild and Scenic River System

Within one year of the Effective Date of the New License, Seattle shall establish a Recreation Capital Improvements Fund in the amount of one million dollars ($1,000,000) (2025 dollars, adjusted as prescribed in Section 9.18). Through the term of the New License, USFS shall use this fund to enhance, rehabilitate, or replace recreation facilities within the Skagit Wild and Scenic River System and along Highway 20, east of Ross Lake to, and including, Washington Pass. USFS may prioritize where the funds from the Recreation Capital Improvements Fund shall be applied so long as the funds are used for capital improvements for new or existing facilities located within the Skagit Wild and Scenic River System.

The $1,000,000 is a funding obligation, not a set aside fund, and is not dependent upon an annual funding contribution requirement. Seattle shall allocate in its budget $1,000,000

(2025) that shall be spent over time by USFS, and account for any expenditure from the budget and additions to reflect adjustments prescribed in Section 9.18.

Funding shall be through a Collection Agreement or other instrument consistent with USFS regulations in effect at the time the capital improvement project is proposed.

In order to qualify for payment from the fund, prior to commencing the capital improvement project, USFS shall provide Seattle with a capital improvement plan and budget. Upon approval of the plan and budget by Seattle, and said approval shall not be unreasonably withheld, Seattle shall pay or make available to USFS sufficient funds to complete the capital improvement.

3.2 Operation and Maintenance of Recreation Facilities Within the Skagit Wild and Scenic River System and Highway 20 East of Ross Lake

Seattle shall provide the following financial support for USFS's operations and maintenance of recreation facilities within the Skagit Wild and Scenic River System and along Highway 20, east of Ross Lake to, and including, Washington Pass, according to the following schedule:

Schedule - License Year	**Annual Payment Amount (2025)**
License Years 1-10	$ 61,000
License Years 11-20	$ 65,000
License Years 21-30	$ 69,000
License Years 31-40	$ 73,000
License Years 41-50	$ 78,000
Annual License(s)	License Year 50 Amount

License Year 1 shall commence on October 1 following the issuance of the New License.

This operation and maintenance (O&M) funding shall be adjusted annually as prescribed in Section 9.18. Seattle shall make the first payment by September 30 following the issuance of the New License and make subsequent advanced payments by September 30 annually thereafter through the term of the New License and any annual license(s).

Through the term of the New License, USFS shall use the O&M funding to operate and maintain recreation facilities within the Skagit Wild and Scenic River System. USFS has sole discretion to prioritize where funds will be spent so long as the payments are used for O&M of new or existing USFS facilities located within the Skagit Wild and Scenic River System.

3.3 Skagit Wild and Scenic River System Recreation Management and Enhancement Measures

By September 30 following the issuance of the New License and annually thereafter through the term of the New License and any annual license(s), Seattle shall provide USFS

one hundred and twenty-five thousand dollars ($125,000) (2025) to support measures to manage and enhance recreation in the Skagit Wild and Scenic River System Corridor (SWSR Corridor) during the following license year or as otherwise agreed by the Parties.

USFS shall use this funding, in its sole discretion, for law enforcement in the SWSR Corridor, employment of a USFS Skagit River Restoration Coordinator, implementation of the Skagit River Stewards Program, and/or other measures to manage or enhance recreation in the SWSR Corridor.

3.4 Wild and Scenic River Interpretative Signage

3.4.1 Updates and Replacement of Interpretative Signage

Within one year of the Effective Date of the New License, Seattle shall establish a Wild and Scenic River Interpretative Signage Fund in the amount of one hundred and thirty-five thousand dollars ($135,000) (2025). Funding shall be through a Collection Agreement or other instrument consistent with USFS regulations on a project-by-project basis. Through the term of the New License, USFS shall use this fund to update and replace interpretative signage within the Skagit Wild and Scenic River System. USFS will coordinate the signage to the extent possible to build on the aesthetic and themes used in new signage developed by and in consultation with North Cascades National Park and by Seattle within the Project Boundary. USFS may prioritize where the funds from the Wild and Scenic River Interpretative Signage Fund will be applied so long as the funds are used for signage located within the Skagit Wild and Scenic River System. USFS shall include Seattle's logos on the signs when requested at Seattle's discretion.

3.4.2 Maintenance and Subsequent Replacement

Seattle shall pay USFS sixty-seven thousand five hundred dollars ($67,500) (2025, to be adjusted annually as prescribed in Section 9.18.), once every ten (10) years to support USFS's maintenance and subsequent replacement of interpretative signage within the Skagit Wild and Scenic River System. Seattle shall make the first payment within one (1) year of the Effective Date of the New License and make subsequent payments every ten (10) years thereafter through the term of the New License and any annual license(s) (by way of example, if the license is issued in June 2027, Seattle shall make a first payment by June 2028, second payment by June 2038, and every ten years thereafter). USFS shall use these payments to enhance, maintain, rehabilitate, or replace signage within the Skagit Wild and Scenic River System. USFS has sole discretion to prioritize signage projects to which these annual payments will be applied so long as the payments are used for maintenance and replacement of signage within the Skagit Wild and Scenic River System.

3.5 Recreation Guide

Within one year of New License issuance, Seattle shall pay USFS a one-time amount of one hundred and fifty thousand dollars ($150,000) (2025) to develop a Wild and Scenic River Recreation Guide. The Forest Service shall use this payment to develop a guide to river-based recreation opportunities and dispersed campsites within the Skagit Wild and Scenic River System from Gorge Powerhouse to the confluence with the Sauk River, including opportunities on the Cascade, Sauk, and Suiattle rivers. USFS shall provide Seattle the opportunity to review the guide and provide edits specifically regarding any language mentioning the City of Seattle or Seattle City Light and its role managing the river, prior to publication. At a minimum, the brochure will recognize Seattle as a funder of the publication and include its logo at Seattle's discretion.

3.6 Jackita Ridge Bridge Replacement

Within two years of New License issuance, Seattle shall provide a one-time not-to-exceed payment to USFS in the amount of eight hundred and ten thousand dollars ($810,000) (2025) to replace the Jackita Ridge bridge. USFS shall use this payment solely to replace the Jackita Ridge bridge and for no other purpose. USFS shall submit a report to Seattle at the completion of bridge construction.

If USFS determines that the Jackita Ridge bridge must be replaced prior to the deadline for Seattle's payment to USFS under this Section 3.6, USFS shall replace the bridge at its own expense and submit a report to Seattle with the costs incurred for bridge construction. Upon the deadline for Seattle's payment to USFS under this Section 3.6, Seattle shall provide a payment in the amount of the bridge construction up to $810,000 (2025) into the Recreation Capital Improvements Fund under Section 3.1.

3.7 Adaptive Management Flexible Funding

Seattle shall provide the following financial support for USFS's adaptive management of the National Forests downstream of the Project or the Skagit Wild and Scenic River System and along Highway 20, east of Ross Lake to, and including, Washington Pass to address changed or unforeseen conditions. Seattle shall provide payments to support such adaptive management according to the following schedule:

Schedule	**One Time Payment (2025)**
License Year 10	$ 100,000
License Year 20	$ 340,000
License Year 30	$ 1,000,000
License Year 40	$ 340,000
License Year 51, 52, etc. (for each year of annual license, if any)	$ 34,000

This adaptive management flexible funding shall be adjusted annually as prescribed in Section 9.18. Seattle shall make the first payment within ten (10) years of the Effective

Date of the New License and make subsequent payments every ten (10) years thereafter through the term of the New License and once per year pro rata after the term of the New License for each annual license(s). By way of example, if the New License is issued in June 2027 with a 50-year term, Seattle shall make a first payment by June 2037, second payment by June 2047, third payment by June 2057, with final payment by June 2067; and if FERC issues an annual license in 2077, 10 percent ($34,000) in each annual license year.

Through the term of the New License, USFS shall use the adaptive management funding to rehabilitate, maintain, or enhance recreation.

The Forest Service may prioritize where the funds from the Adaptive Management Flexible Fund will be applied so long as the funds are used for future capital improvements to new and existing facilities, and on-going O&M within the National Forests downstream of the Project and/or Skagit Wild and Scenic River System.

4. Forest Service Annual Report:

On or before October 31 of each year following the Effective Date of the New License, and any subsequent annual license(s), the USFS shall provide Seattle with an annual report. The annual report shall describe in detail USFS work completed and include an itemized breakdown of funds expended the previous federal fiscal year for the USFS commitments and work performed described in Section 3 above. The report shall also include an annual expenditure plan for the use of the funding provided by Seattle pursuant to Section 3.

5. Final Agreement:

Except for the Relicensing Settlement Agreement for the Project, this OLA is the full and final agreement between the Parties pertaining to the relicensing of the Project and obligations to mitigate and enhance Project-related coordination impacts within the NFS and Skagit River Wild and Scenic River System. This OLA supersedes and replaces any contractual obligation between the Parties related to Project impacts under the current License within the National Forests or Skagit Wild and Scenic River System. This OLA cannot be changed except by mutual agreement of the Parties pursuant to Section 9.15. Any and all claims or demands relating to this OLA shall be governed by Section 8.

6. Representations and Warranties:

The Parties hereby represent and warrant as follows:

6.1 Authority of Seattle

Seattle has full power and authority to execute and deliver this Agreement, to perform its obligations hereunder, and to consummate the transactions contemplated hereby. The execution and delivery by Seattle of this Agreement, and the performance by Seattle of its obligations hereunder have been duly and validly authorized by the City of Seattle's Mayor and Seattle City Council pursuant to Ordinance # _____. This Agreement has been duly and validly executed and delivered by Seattle and constitutes legal, valid, and binding obligations of Seattle, enforceable against Seattle in accordance with its terms. The Mayor

and Seattle City Council's approval and authorization of this Agreement shall be conclusively evidenced by an effective ordinance of the Seattle City Council.

6.2 Authority of the USFS

Subject to Sections 9.13, 9.14, and any other applicable provisions of this OLA, USFS has full power and authority to execute and deliver this Agreement, to perform its obligations hereunder, and to consummate the transactions contemplated hereby.

7. Termination of the OLA:

7.1 Termination

7.1.1 This OLA may be terminated at any time by mutual written consent of Seattle and the USFS.

7.1.2 This OLA may be terminated by either Party, in its sole discretion, only if (1) concurrently or subsequently to the Effective Date of this OLA FERC imposes a Material Modification as defined in the Relicensing Settlement Agreement in the New License or through a license amendment, and (2) for that reason, a Party then terminates the Relicensing Settlement Agreement pursuant to the terms of the Relicensing Settlement Agreement. Prior to termination under this Section 7.1.2, the Parties shall commence as defined in Section 8, below.

7.2 Parties' Actions Upon Termination

Upon termination, this OLA shall become null and void and there shall be no liability or obligation on the part of either Party or any of its respective elected officials, officers, directors, commissioners, employees, agents, or other representatives or affiliates. In the event that at the time of termination Seattle has provided funds (either by direct payment or by making funds available) under this OLA for a particular project and the Forest Service has initiated the project, the Parties shall complete the funding and actions the funding is intended to cover and no return of funding or other abrogation of funding obligations shall be pursued. In the event of a termination, the Parties shall meet, confer, and agree on a set of actions to minimize any adverse impacts or other undesirable effects of the termination.

8. Dispute Resolution:

8.1 In the event of any dispute between the Parties concerning the interpretation or implementation of any aspect of this OLA, or prior to termination of the OLA under Section 7.1.2, the Parties agree to engage in good faith negotiations for a period of at least sixty (60) days in an effort to resolve the dispute. Notification of the dispute must be in writing to the other Party, and the 60-day negotiating period shall begin upon notification as described in Section 9.5. During the 60-day period, either Party may request the services of a professional mediator to assist. The Party requesting such services shall cover the costs unless there is an agreement among the Parties

to share costs. The 60-day time period may be extended or reduced by mutual agreement of the Parties.

8.2 In the event that resolution cannot be reached within the 60-day negotiating period or a longer negotiating time period otherwise agreed to by the Parties, then either Party may seek a remedy for alleged violations as described in Section 9.4.

9. Miscellaneous:

9.1 Non-Severable Terms of OLA

The terms of this OLA are not severable. This OLA is made in the understanding that each term is in consideration and support of every other term, and each term is a necessary part of the entire OLA. However, if a tribunal of competent jurisdiction rules that any provision in this OLA is invalid, this OLA is deemed modified to conform to such ruling, unless Seattle or the USFS objects. If Seattle or the USFS objects, the other agrees to meet and confer regarding the continued viability of this OLA. If agreement cannot be reached on the impact of the Court's ruling, either Party may terminate this OLA.

9.2 Seattle's Recourse for USFS Substantial Noncompliance

If, based on the annual report provided by the USFS under Section 4 or visual inspection, Seattle believes that USFS has not substantially complied with its obligations to implement or perform one or more of the Seattle-funded actions identified in this OLA, the Parties shall follow Section 8. Seattle shall provide timely notice of the believed noncompliance to USFS, which shall describe the OLA activity, including but not limited to photo, video, or other image documentation as appropriate, and an adequate description of the specific way(s) in which Seattle considers USFS to be out of compliance. USFS shall have sixty (60) days to respond to Seattle's notice.

Substantial noncompliance means that USFS has failed to undertake one or more of the Seattle-funded actions of this OLA for the year of annual reporting.

9.2.1 If USFS disputes whether it is in substantial noncompliance, Seattle shall still make timely payments for the subsequent year.

9.2.2 If USFS agrees with Seattle that USFS is in substantial noncompliance, Seattle shall continue to make timely payments if USFS represents in writing that it shall: (1) address, where possible, past noncompliance, and (2) achieve future substantial compliance with the sections of the OLA where USFS has failed to comply.

9.2.3 Where USFS does not take action under Section 9.2.1 or does not achieve substantial compliance under Section 9.2.2, Seattle may withhold future payment if Seattle meets the following conditions:

9.2.3.1 Seattle provides USFS a reasonable period of time to remedy the substantial noncompliance, using previously provided funds,

once it has given notice to USFS that it believes USFS is in substantial noncompliance;

9.2.3.2 Seattle does not unreasonably withhold payments;

9.2.3.3 The amount withheld by Seattle is commensurate with the degree of noncompliance.

9.2.4 Seattle shall resume full payment for any substantial noncompliance action(s) to USFS within sixty (60) days of USFS achieving substantial compliance.

9.2.5 By withholding payment under this section, Seattle shall not be deemed in substantial nonperformance of this OLA.

9.2.6 USFS pausing, delaying, or otherwise being unable to complete agreed-upon action(s) under this OLA due to lack of funding or other legal restriction shall not be deemed substantial noncompliance.

9.3 USFS Recourse for Seattle Substantial Noncompliance

If USFS believes that Seattle has not substantially complied with its obligations identified in this OLA, the Parties shall follow Section 8. USFS shall provide timely notice of the believed noncompliance to Seattle, which shall include an adequate description and documentation of the specific way(s) in which USFS considers Seattle to be out of compliance. Seattle shall have sixty (60) days to respond to USFS's notice.

9.4 Remedies for Substantial Noncompliance

No Party shall seek relief in any forum for substantial noncompliance with this OLA unless and until the requirements of Section 8 – Dispute Resolution and Sections 9.2 and 9.3 have been met. If dispute resolution is not successful, either Party may seek enforcement of the terms of this OLA in a forum of competent jurisdiction, and must seek enforcement within two (2) years of the completion of dispute resolution. The Parties reserve all remedies for substantial nonperformance of this OLA under applicable federal law. Nothing in this section is intended to limit a Party's right to initiate dispute resolution pursuant to Section 8 of this OLA or limit the type of relief that a Party may seek through the dispute resolution process.

9.5 Notice

Unless otherwise provided herein, all notices given by either Party to the other in connection herewith shall be in writing and shall either be delivered in person or by email to the contact person's email listed below. Notice delivered in person shall be deemed to have been properly given and received on the date delivered, so long as delivered during normal business hours. Notice delivered by email is complete on transmission when made prior to 5:00 p.m. PT on a business day. Notice delivered by email transmitted on a Saturday, Sunday, holiday, or after 5:00 p.m. PT on any other day shall be deemed

complete at 9:00 a.m. PT on the first business day thereafter. Notification of changes in the contact person must be made in writing and delivered to all other contact persons.

For Seattle:

Chris Townsend
Director
Natural Resources and Hydro Licensing
Seattle City Light
Email: Chris.Townsend@seattle.gov

For USFS:

Erin Uloth (or Current Forest Supervisor)
Forest Supervisor
Mt. Baker-Snoqualmie National Forest
1000 SE Everett Mall Way, Suite 410
Everett, WA 98208
Email: Erin.uloth@usda.gov

9.6 Material Modification

The Parties do not intend for the measures in the OLA to be incorporated into the New License; however, if FERC does include obligations in this OLA in the New License, that inclusion shall not be a Material Modification as defined in the Relicensing Settlement Agreement.

9.7 No Third-Party Beneficiaries

Without limiting the applicability of rights granted to the public pursuant to applicable law, this OLA shall not create any right or interest in the public, or any member thereof, as a third-party beneficiary hereof, and shall not authorize any entity other than Seattle and the USFS to maintain a suit at law or equity pursuant to this OLA. The duties, obligations, and responsibilities of Seattle and the USFS with respect to third parties shall remain only as imposed under applicable law.

9.8 Expenses

Unless otherwise provided by this OLA, each Party shall use its own resources in asserting its rights and performing its obligations under this OLA, and no Party shall be required to reimburse the other Party for any expense or cost incurred hereunder.

9.9 Successors and Assigns

This OLA shall apply to, be binding on, and inure to the benefit of Seattle and the USFS and their successors and assigns, unless otherwise specified in this OLA.

9.10 Change in Ownership of Project

No change in ownership of the Project or transfer of the New License by Seattle shall in any way modify or otherwise affect the USFS's interests, rights, benefits, responsibilities, or obligations under this OLA as to the new owner of the Project.

9.11 Notice of Delay or Inability to Substantially Perform – *Force Majeure*

No Party shall be in substantial nonperformance of its obligations or liable to the other Party for substantial nonperformance of this OLA as a result of a failure to substantially perform if said performance is made impracticable due to an event of *Force Majeure*. The term "*Force Majeure*" means any cause reasonably beyond the Party's control, whether unforeseen, foreseen, foreseeable, or unforeseeable, including but not limited to: acts of God, fire, war, insurrection, civil disturbance, epidemic, pandemic, or explosion; adverse weather conditions that could not be reasonably anticipated causing unusual delay in transportation and/or field work activities; restraint by court order or order of public authority; inability to obtain, after exercise of reasonable diligence and timely submittal of all applicable applications, any necessary authorizations, approvals, permits, or licenses due to action or inaction of any governmental agency or authority; inability to obtain due to shortage, after exercise of reasonable diligence, materials, supplies, contractors, workers, or other necessities of an obligation; governmental shutdown, lack of available appropriated funds, or related reasons; or labor disputes or strikes which are reasonably beyond the control of the Party seeking excuse from performance. The Party whose performance is affected by *Force Majeure* shall notify the other Party as soon as reasonably practicable. This notice shall include: (1) a description of the event causing the delay or anticipated delay; (2) an estimate of the anticipated length of the delay; (3) a description of the measures taken or to be taken to avoid or minimize the delay; and (4) a proposed timetable for the implementation of the measures or performance of the obligation. The Parties will engage in dispute resolution or otherwise cooperatively develop reasonable adjustments and responses to the *Force Majeure* circumstances that are acceptable to both Parties. The entity whose substantial performance is affected by the *Force Majeure* shall make all reasonable efforts to promptly resume performance of the obligation. It shall provide verbal and written Notice when it resumes performance of the obligation.

9.12 Waiver

The failure of Seattle or the USFS to insist, on any occasion, upon strict performance of any provision of this OLA shall not be considered a waiver of any obligation, right, or duty of, or imposed upon, such entity.

9.13 Governing Law

The OLA shall be governed, construed, and enforced in accordance with federal law and regulation. Nothing in this OLA constitutes a waiver of the sovereign immunity of the United States or Seattle.

9.14 Availability of Funds

Nothing in this OLA shall be interpreted as, or constitute, a commitment or requirement that the USFS obligate or pay funds in violation of the Anti-Deficiency Act, 31 USC § 1341 and other applicable law. Nothing in this OLA is intended to or shall be construed to commit a federal official to expend federal funds not appropriated by Congress.

9.15 Amendment of the OLA Upon Agreement of the Parties

This OLA may be amended at any time from the Effective Date through the term of the New License and any subsequent annual license(s), by written agreement of Seattle and the USFS, including any successors.

9.16 Section Titles for Convenience Only

The titles for the sections of this OLA are used only for convenience of reference and organization, and shall not be used to modify, explain, or interpret any of the provisions of this OLA or the intentions of Seattle and the USFS. This OLA has been jointly drafted by Seattle and the USFS and therefore shall be construed according to its plain meaning and not for or against any Party.

9.17 License Term

The Parties have negotiated the provisions of the Relicensing Settlement Agreement and this OLA, including the financial calculations, under the assumption that FERC will issue a New License with a fifty-year (50-year) term. In the event that the New License includes a shorter term, the Parties agree to meet and confer about adjustments to payment schedules and each Party's obligations. Seattle may seek rehearing and/or judicial review of any FERC order granting a New License term of less than 50 years.

9.18 Monetary Indexing and Adjustments

All dollar amounts in this Agreement are stated as of the year 2025 and shall be adjusted according to Proposed License Article OPS LA-04 (Annual CPI Adjustment).

9.19 Entire Agreement

This OLA contains the complete and exclusive agreement of Seattle and USFS. This OLA supersedes all discussions, negotiations, representations, warranties, commitments, offers, contracts, agreements in principle, and other writings made prior to the Effective Date of this OLA, with respect to the terms of this OLA.

9.20 Signatory Authority

Each signatory to this OLA certifies that they are authorized to execute this OLA and to legally bind the entity they represent, and that such entity shall be fully bound by the terms hereof upon such signature without any further act, approval, or authorization by such entity.

IN WITNESS THEREOF,

Seattle and USFS, through their duly authorized representatives, have caused this OLA to be executed as of the date set forth in this OLA.

CITY OF SEATTLE

Date: _____ By: _____

Name: _____

Title: _____

USDA FOREST SERVICE

Date: _____ By: JACQUELINE BUCHANAN Digitally signed by JACQUELINE BUCHANAN Date: 2026.02.05 14:38:03 -08'00'

Name: Jacqueline Buchanan

Title: Regional Forester

SKAGIT RELICENSING SETTLEMENT AGREEMENT
ATTACHMENT C

JOINT COMMITMENTS ON THE NPS FUNDING FOR NPS COMPLIANCE REVIEW OF THE SKAGIT FISH PASSAGE PROGRAM

SETTLEMENT AGREEMENT ATTACHMENT C

Joint Commitments on the National Park Service (NPS) Funding for NPS Compliance Review of the Skagit Fish Passage Program

- Prior to issuance of the New License, NPS agrees to make a good faith effort to pursue and obtain additional federal funding to fund reasonable NPS staff time and expenses related to fish passage implementation compliance review. Seattle and the Tribes (Sauk-Suiattle Indian Tribe, the Swinomish Indian Tribal Community, and the Upper Skagit Indian Tribe) agree to advocate, in a good faith effort, on NPS's behalf to support such requests for additional funding.
- If additional federal funding for NPS staff time and expenses has not been obtained by issuance of the New License and NPS demonstrates that it made a good faith effort to obtain such funding, the Parties agree to meet and confer at the time the Federal Energy Regulatory Commission (FERC) issues the New License to determine, by consensus, whether to agree to designate not more than two hundred and fifty thousand dollars ($250,000) (2025) per year, in any year, out of existing Skagit Fish Passage Program Funding described in Section 5.2 of the Settlement Agreement to cover reasonable NPS staff time and expenses related to New License compliance review limited to the implementation of the project design, planning, development, construction and reconfiguration of the fish passage program facilities.
- If consensus is reached, the Settlement Agreement would be revised at Section 5.2.1 to specify that "capital costs" includes NPS reasonable License compliance review costs (not to exceed two hundred and fifty thousand dollars ($250,000) (2025) in any year) limited to "project design, planning, development, construction and reconfiguration of the [fish passage program] facilities".
- To qualify for cost reimbursement, NPS will provide an annual report, on a yearly basis, to Seattle that includes a summary of the previous fiscal year's NPS compliance review work and costs, a schedule of current fiscal year's compliance review work and costs, and anticipated compliance review work and costs in the following fiscal year. The annual report will be provided on a mutually agreed date.
- If consensus is reached, the maximum amount that may be used from the Skagit Fish Passage Program Funding for NPS compliance review over the life of the new license (including annual licenses) is two million five hundred thousand ($2,500,000) (2025).
- Payments to NPS for NPS staff time and expenses would be deducted from Seattle's maximum financial contribution of nine hundred and seventy nine million dollars ($979,000,000) (2025) as well as the minimum contribution of five hundred and five million dollars ($505,000,000) (2025) for the Skagit Fish Passage Program.