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Seattle City Light

September 28, 2022

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

Re: Response to Scoping Document 1 for the Proposed Surrender and Decommissioning of the Newhalem Creek Hydroelectric Project (P-2705-037)

Dear Ms. Bose,

Seattle City Light (City Light) is pleased to provide comments on the Federal Energy Regulatory Commission's (FERC) Scoping Document 1, issued on August 29, 2022, for the proposed license surrender and decommissioning of the Newhalem Creek Hydroelectric Project (Project No. 2705). City Light's comments respond to FERC's request for comments on the preliminary list of issues and alternatives included in Scoping Document 1 to be addressed in FERC's Environmental Assessment, as well as any additional information that will assist FERC in conducting its analysis of effects associated with the license surrender and decommissioning of the Project.

City Light has proposed to surrender its license and partially remove Project works, including the diversion dam and headworks structures, tailrace fish barrier, and certain transmission lines, but to retain the powerhouse and penstock in place (Proposed Action). City Light supports the balanced approach of the Proposed Action, as it decommissions the Project in a manner that best preserves historic properties and protects other cultural resources, while also restoring terrestrial and aquatic habitats and providing for interpretive opportunities.

In this filing, City Light also provides a response to the National Park Service's (NPS) filing on August 30, 2022, and an update with respect to ongoing stakeholder engagement and informal consultation.

Response to Scoping Document 1

<u>Section 3.2: Alternatives to the Proposed Action</u>

City Light appreciates FERC's consideration of alternatives that are technically and economically feasible; City Light considers alternatives economically feasible if they do not outweigh the cost basis of decommissioning this small hydroelectric project. City Light also appreciates FERC's desire to meet the purpose and need of the proposed action and the goals of the applicant. As stated in the Surrender Application, the purpose of surrendering the Project license is "to serve City Light customers by decommissioning a project that no longer provides hydropower. Surrendering the license eliminates the need for relicensing and greatly reduces the maintenance of hydroelectric facilities that can no longer be economically operated." City Light's goals, as provided in Exhibit E, are to "decommission the Project in a manner that best preserves historic properties and protects cultural resources, while also restoring terrestrial and aquatic habitats, and providing for interpretive opportunities. The decommissioning action also needs to meet FERC's license surrender requirements and be consistent with the NPS's purpose for the Ross Lake National Recreation Area (RLNRA), which is to "*conserve the scenic, natural, and cultural values of the Upper Skagit River Valley and surrounding wilderness, including the hydroelectric reservoirs and associated developments, for outdoor recreation and education*." City Light does not oppose FERC's intent to analyze full removal as an alternative to the Proposed Action but believes that City Light's proposal should be selected as the preferred alternative due to its balanced approach in protecting cultural and natural resources and because it best meets the purpose and need for decommissioning.

Section 4.2 Resource Issues

City Light's analysis of effects associated with the Proposed Action are described in Section E.5, Affected Environment and Environmental Effects, within Exhibit E of its January 28, 2022 Surrender Application, and detailed further in the comment response table provided in the Surrender Application and in its July 1, 2022 *Response to Intervenor Comments From FERC Notice of Surrender Application*.

A description of the "Full Removal Alternative," or Alternative B, can be found in Section E.3, "Decommissioning Action Alternatives Considered," within Exhibit E of the Surrender Application. The effects of the Full Removal alternative are summarized in Table E-1 of Exhibit E. The following provides further detail on the potential effects of the Full Removal alternative.

Geology and Soils

The 925-foot-long penstock, 56 supporting saddles, and 6 thrust blocks are situated on an extremely steep slope. Some of the saddles are embedded in soil for approximately 3 feet, while many of the saddles on the slope are mounted to bedrock. To remove the saddles and thrust blocks, an excavator fitted with a jackhammer would be required. Due to the steepness of the slope, switchbacks would be required up the entire slope so that the excavator could utilize relatively level ground to safely access each saddle. (*Note: This is slightly different than described previously in Exhibit E, in which City Light indicated a road would only be required to the lowest thrust block*.) The switchbacks would likely disturb acres of soil and require the removal of many trees. Specialized equipment such as an articulated excavator may be able to traverse the steep slope and perform this operation, but the practicability and safety of that option has not been vetted by City Light. An articulated excavator would likely disturb ground, regardless, as would removal of the penstock sections since a skid road may be required.

Irrespective of the method used to remove the saddles and thrust blocks, the disturbed slope would be subject to erosion and sedimentation. Erosion may be more pronounced in the vicinity of the ephemeral stream that intersects the penstock approximately midpoint along the slope.

There are no known contaminants within the project footprint that would pose unacceptable risk to people or ecological receptors. In 2016 and 2017, a total of 171 tons of contaminated soil was removed from the vicinity of the penstock. The soil removal was completed as a Time Critical Removal Action

(TCRA) under Superfund and an NPS Action Memorandum and Administrative Settlement Agreement and Order on Consent. Following completion of the TCRA, NPS determined that site conditions warranted additional response to evaluate the hazardous substances and the need for cleanup under a Non-Time-Critical Removal Action under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as specified in 40 CFR Section 300.415(b). This determination was formalized in an Engineering Evaluation and Cost Analysis (EECA) Approval Memorandum, signed on December 19, 2017, by the Acting Regional Director, NPS Pacific West Region. In October 2018, an EECA investigation delineated the remaining lateral and vertical extent of contamination in the soil in the impacted area of the penstock and collected data for preparation of the EECA Risk Assessment pursuant to CERCLA. The EECA analyses were completed during 2020 and 2021. The Risk Assessment determined that contaminant concentrations that remain in site soil after the 2017 Removal Action do not pose unacceptable risk to people or ecological receptors and additional removal of contaminated soil is not required. The draft final EECA has been reviewed and approved by the NPS Environmental Compliance and Cleanup Division and North Cascades National Park Complex (NOCA). Removing the saddles, penstock, and thrust block would not change the risk assessment determination that soils in the vicinity of the penstock and associated structures do not pose unacceptable risk to people or ecological receptors.

For areas outside of the penstock, City Light has agreed to complete an evaluation of the materials and potential for toxicological effects for all operational activity centers associated with the Project, including the powerhouse, dam/headworks, adit, and the power tunnel. The NPS will be provided a copy of the evaluation once available, and a copy will be filed with FERC.

Aquatic Resources
The effects of the full removal alternative on aquatic resources would be the same as the Proposed Action, both of which would restore natural stream processes and downstream aquatic habitat.

Following dam removal, installation of a grade control structure is unnecessary because it would prevent full restoration of the creek. The diversion structure itself is a grade control and the stream grade has adjusted to the structure over the past century. The diversion dam is underlain by bedrock which will serve as a grade control after the dam is removed, which will prevent any further downcutting and allow the stream to adjust to the pre-Project base level following its removal. The large substrate in the stream (boulder, cobble) is anticipated to result in a slow adjustment (over several decades) to pre-Project conditions. In contrast, a new grade control in place of the existing diversion dam grade control would not return the stream to a pre-Project condition. A copy of the Draft Geomorphology Considerations Report (Dube 2021) is attached to this filing to provide FERC with further details on the anticipated effects of sediment transport. This report will be updated and finalized following additional field work that occurred in September of 2022, which included sediment substrate sampling, Wolman pebble counts, and evaluating sediment transport following a flood event in the winter of 2021/2022. The final geomorphology report is anticipated in October of 2022 and will be distributed to all intervening Parties for their review. A copy will also be filed with FERC.

Turbidity in the short term following dam removal would be similar to or less than annual gravel passage that City Light conducts as a condition of the FERC license. Nearly annually, City Light passes

200-400 cubic yards of sediment, in which during low flow sediment is scooped from behind the dam with an excavator and placed onto the concrete apron below the dam where sediment interacts immediately with the stream. City Light has monitored downstream turbidity since 2012 while performing this activity. Table 1 provides this data:

Table 1. Turbidity monitoring during gravel passage since 2012.

Monitoring Date	**Baseline NTU**	**Peak NTU**	**Change in NTU** (over background)	**Gravel Volume** (Cubic Yards)
9/17/2012	0.18	30	29.82	125
9/18/2012	0.21	59	+58.79 (max)	100
9/25/2012	N/A	N/A	N/A	30
8/7/2015	0.13	4.5	4.37	250
8/8/2015	0.5	21.1	20.6	
8/9/2015	0.46	16.6	16.14	
8/17/2015	0.2	1.08	0.88	100
8/22/2016	0.35	5.46	5.11	200-400
18/24/2016	0.2	39.5	39.3	
8/24/2018	0.1	18.18	18.08	30
8/25/2018	0.31	18.29	17.98	100
8/26/2018	0.7	17.6	16.9	75
8/27/2018	0.9	9.98	9.08	75
8/28/2018	0.33	11.28	10.95	50
8/29/2018	0.4	13.56	13.16	40
8/30/2018	0.32	13.45	13.13	50

Table 1 demonstrates that the greatest increase in nephelometric turbidity units (NTU) over background was 58.79 NTUs, on September 18, 2012, after placing 100 cubic yards of sediment below the dam in a single day. Notes from that event indicated that the high turbidity was likely due to a pocket of sandy sediment. Since then, during gravel passage the change in turbidity over background ranged from only 0.88 NTU to 17.98 after placing 100 cubic yards of gravel downstream of the dam in a single day.

During each gravel passage event, water quality returns to baseline levels almost immediately, reaching background levels by the next morning when baseline levels are recorded again, as detailed in Table 1. In fact, turbidity returns close to baseline conditions within hours. Table 2 provides detailed notes from a gravel passage event on August 25, 2018, in which following cessation of gravel passage, turbidity peaked at 18.29 NTUs then dropped to 1.83 NTUs (just 1.52 NTUs over background) within 2.5 hours. The rapid return to baseline levels is likely due to a lack of fine sediment and the high-energy, flushing flows of Newhalem Creek, even during the lowest flow conditions.

Table 2. Turbidity monitoring over a single day period, on August 25, 2018.

8-25-18		NTU
7:30 am	Baseline	0.31
8:00 am	Began passing gravel	---
9:30 am	---	0.68
11:30am	Stopped passing gravel	18.29
2:00 pm	Started again	1.83
3:30 pm	---	8.68
4:00 pm	Stopped passing gravel	12.92
Total gravel passed: 100 cubic yards		

Terrestrial Resources

While the full removal alternative would restore 2.94 acres of terrestrial and aquatic habitat, the Proposed Action would restore all but 0.16 acres of this in order to preserve currently interpreted, historic properties listed on the National Register of Historic Places (NRHP). The Proposed Action achieves this by restoring all but the essential elements necessary to interpret the powerhouse and penstock. For instance, vegetation maintenance will be significantly minimized to restore forested habitat around the penstock, and the powerhouse footprint would be limited to only that which is necessary for interpretive and maintenance purposes.

The Proposed Action would benefit wildlife by restoring a significant amount of habitat. Although long linear features like pipelines may affect the migration patterns of herding animals like caribou, and roads may influence some wildlife movement such as smaller mammals and amphibians, the above-ground section of the penstock is only 700 feet long and the area does not support herding species of wildlife. Also, the area underneath and along the penstock is vegetated and provides cover and forage, and the penstock is elevated from 6 inches to 6 ft above the ground so amphibians and small mammals can easily move along or under the entire penstock. Larger mammals can move around within a short distance or under the many sections that are 3 to 6 feet above the ground surface. There is significant evidence of bear and deer use in the area.

Threatened and Endangered Species

Effects to federally-listed threatened and endangered species would be the same for both the full removal alternative and the Proposed Action, and would be beneficial over the long term.

Recreation and Land Use

The Proposed Action removes some historic properties that are remote and difficult to access but retains the currently interpreted powerhouse and penstock that occur within an interconnected, 1-mile recreational corridor which are a focal point where two short trails from the Newhalem townsite and the Newhalem Creek Campground meet. The former trail, the Trail of Cedars, is one of the busiest trails in the RLNRA. During July of 2022, the Trail of Cedars received a total of 5,488 visitors according to preliminary data from a recent study. Table 3 provides trail count data collected during this study for the Trail of Cedars from May through September 14 of 2022. The data is raw and uncalibrated, but numbers are not expected to change significantly once the adjustment factor is applied.

Table 3. Trail count data for the Trail of Cedars from May through September 14 of 2022. The data is raw and uncalibrated, but numbers are not expected to change significantly once the adjustment factor is applied.

May	Jun	Jul	Aug	Sep 1- 14
1,499	3,230	5,488	3,890	1,629

This interconnected recreational corridor that contains the Trail of Cedars, Linking Trail, and the interpreted powerhouse and penstock consists of many other NPS-designated trails, in addition to recreational facilities such as the Newhalem Creek Campground and the NPS North Cascades Visitor Center. The recreational corridor provides educational and interpretative opportunities covering the full, complex history of the land, from ancestral Tribal use exhibited along the Rock Shelter Trail, to the beginnings of the region's hydropower interpreted at the Newhalem powerhouse, to current management as a National Recreation Area explained at the North Cascades Visitor Center.

As the first hydropower development leading to the eventual establishment of the RLNRA, the powerhouse and penstock are important interpretive resources not only to the recreational corridor they occur within, but also to the greater RLNRA. In fact, "Hydropower Landscapes" is one of the RLNRA's primary "Interpretive Themes" according to the RLNRA General Management Plan (GMP) and NOCA Foundation Document. "Interpretive Themes" connect park unit resources to relevant ideas, meanings, concepts, contexts, beliefs, and values and support the desired interpretive outcome of increasing visitor understanding and appreciation of the significance of the park's resources. Thus, continuing to interpret the powerhouse and penstock is important to maintaining the "Hydropower Landscape." The relevance of the powerhouse and penstock as an Interpretive Theme, and their value to maintaining the RLNRA's significance, is discussed in further detail in City Light's response to the NPS's August 30, 2022 filing in the following section.

In addition, the Proposed Action is consistent with the RLNRA GMP because the Proposed Action achieves the Desired Conditions for Historic Structures and is consistent with the prescription for historic structures in the Front Country Management Zone, which is the zone that the Proposed Action occurs within. The GMP defines the Front Country Management Zone as having the highest level of development to provide a wide variety of high quality recreational and educational visitor opportunities and facilities for a range of visitor abilities. Historic structures in this zone are to be protected, maintained, and functional through established use or adaptive reuse, and, to the extent possible, be visually accessible and interpreted to the public.

The Proposed Action also adds to the variety of day-use recreational opportunities for a range of visitor abilities as prescribed for the Front Country Management Zone and provides enhanced visitor opportunities, such as *"increased interpretive, educational, and hands-on stewardship experiences for visitors with a range of abilities and interests"* in the North Cascades Highway Corridor. The interpreted powerhouse and penstock contribute to encourage people to get out of the car and explore, and provide a more comprehensive experience for visitors, both of which are management focuses for the

North Cascades Highway Corridor. In fact, the powerhouse is only 1/4-mile from the North Cascades Highway, and 1/3-mile along the Trail of Cedars, providing direct access from Newhalem, which according to the GMP is the "hub" and "starting point" for "ranger-led and self-directed resource immersion activities." City Light is proposing to incorporate the powerhouse into its existing tour program, beginning at the Newhalem Visitor Center, to allow for both guided and self-directed tours.

Lastly, the purpose of the RLNRA is to "*complement North Cascades National Park and conserve the scenic, natural, and cultural values of the Upper Skagit River Valley and surrounding wilderness, including the hydroelectric reservoirs and associated developments, for outdoor recreation and education*." Removal of the powerhouse and penstock contradicts the purpose of the RLNRA by removing cultural resources associated with hydroelectric development that provide outdoor recreation and education. The full removal alternative would also eliminate a historic cultural resource listed in the NRHP that provides context to the establishment of the RLNRA. Further detail on the inconsistencies of the full removal alternative in respect to NPS policies, directives, and laws is provided in Comment #2 within City Light's July 1, 2022 *Response to Intervenor Comments From FERC Notice of Surrender Application*.

Historic and Cultural Resources
As discussed in the Geology and Soils section above, the full removal alternative would require significant ground disturbance to remove the concrete saddles that hold the penstock in place. Several pre-contact archaeological sites have been identified in the Project vicinity including one underneath one of the original timber saddles. The full removal of the saddles has a very high potential for affecting archaeological sites that have not yet been identified. The Proposed Action, on the other hand, limits ground disturbance to the headworks and existing road, which in turn limits potential adverse effects to archaeological sites.

The full removal alternative would also adversely affect all built environment resources associated with the Project. The powerhouse, penstock, diversion dam, and power tunnel are listed in the NRHP. The full removal alternative would leave none of these historic properties in place. The Proposed Action, in contrast, retains the powerhouse and penstock, which are on a heavily used recreational trail. The Proposed Action would restore a total of 2.78 acres of the total 2.94 acres to the pre-Project setting, leaving only 0.16 acres for preservation of easily accessible historic properties.

City Light understands that removal of all historic infrastructure (i.e., the full removal alternative) may have a net positive effect on Tribal traditional cultural properties (TCPs) in the Project vicinity. However, City Light believes that the Proposed Action best balances preservation of historic properties with potential improvements to TCPs.

Like the Proposed Action, the Childs-Irving Hydroelectric Project (P-2069) occurred on federal land and was listed in the NRHP with many features contributing to its significance. As part of the surrender of license and subsequent decommissioning, several of the contributing features were removed, such as the dam to benefit the aesthetic and aquatic environment, but other elements such as the Childs Powerhouse were retained. The hydroelectric project owner, Arizona Public Service (APS), had advocated to remove all structures regardless of NRHP status while the U.S. Forest Service had advocated for preservation of several structures due to their historic significance. In its Order Approving Surrender of License on October 8, 2004, FERC provided that:

> *While a license surrender need not be accompanied by the removal of project works, the record here indicates that there would be significant environmental benefits to removing the facilities proposed by APS. Therefore, the settlement agreement's provisions for license surrender and removal of most of the project facilities are in the public interest.*

Arizona Pub. Serv. Co., 109 FERC ¶ 61,036 at P 39 (2004). To arrive at the decision to retain the Childs Powerhouse, FERC's Final EA (March 26, 2004) describes:

> *[pp. 80-81] In its first response to the Settlement Agreement in October 2002, the Forest Service stated that [APS's] Removal and Restoration Plan for project surrender did not address any protection or treatment of adverse effects to eligible structures associated with the Historic Facilities. The Forest Service further stated that the decision on which eligible structures to retain should be framed and influenced by the following criteria: (1) the cost of long-term management; (2) the value of those properties to interpretation of the Childs Irving Project; and (3) the historic significance of the property.*

Like the Childs-Irving Project, City Light believes the powerhouse and penstock are important interpretive resources and retaining them in place would best preserve the historic significance of the property while providing significant benefits to other cultural and natural resources.

Response to NPS' August 30, 2022 FERC filing

City Light acknowledges that the NPS is obligated to conserve and provide for enjoyment of park resources and values, and its mission is to preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations (NPS Management Policies, 2006 and https://www.nps.gov/aboutus). From City Light's perspective the Proposed Action recognizes that leaving intact a small portion of the hydroelectric project, that is currently enjoyed and strongly supported by the public for recreational and interpretive purposes, conserves resources that are fundamental to maintaining the RLNRA's significance.

City Light respectfully does not agree with NPS's comments that City Light's July 1, 2022 response filed with FERC was 1) "factually incorrect and materially misleading," and 2) gave an "inflated significance" to hydropower's history in the RLNRA. Firstly, City Light's response to comment #2 lists and quotes the NPS' many laws, policies, and directives for preserving historic properties and conserving recreational and interpreted resources. Secondly, the significance of hydropower to the RLNRA was established by the NPS in their analysis of congressional legislation to prepare the purpose statement in their NOCA Foundation Document (June 2012). In fact, the Foundation Document clarifies that "legislation guides the purpose of the park unit". The Foundation Document further explains that:

> *[Page 6] A park purpose is a statement of why Congress and/or the president established a unit of the national park system. A purpose statement provides the most fundamental criteria against*

which the appropriateness of all planning recommendations, operational decisions, and actions are tested. The purpose of the park is grounded in a thorough analysis of the park's legislation (or executive order) and legislative history. A park purpose statement goes beyond a restatement of the law and details shared assumptions about what the law means in terms specific to the park unit.

According to the Foundation Document (and reiterated in the GMP):

> *[Page 7, emphasis added] The purpose of Ross Lake National Recreation Area is to complement North Cascades National Park and conserve the scenic, natural, and cultural values of the Upper Skagit River Valley and surrounding wilderness, <u>including the hydroelectric reservoirs and associated developments, for outdoor recreation and education</u>."*

During development of this purpose statement, the NPS analyzed both the 1968 enabling legislation and the 1988 Washington Park Wilderness Act, the latter in which Congress reaffirmed the importance of hydropower and FERC's authority, specifically citing the Newhalem Creek Hydroelectric Project.

Because hydropower is included in the purpose statement, preserving the hydropower landscape is critical to maintaining the significance of the RLNRA and achieving the RLNRA's purpose. According to the GMP, "Hydropower Landscapes" is one of the eleven "Fundamental Resources and Values" of the RLNRA (Ross Lake National Recreation Area GMP, 2012). The Foundation Document describes Fundamental Resources and Values as the following:

> *[Page 6] Fundamental resources and values are the most important elements, ideas, or concepts to be communicated to the public about a park unit and are critical to achieving the park's purpose and maintaining its significance. They provide a valuable focus throughout the planning process and the life of the plan and may include systems, processes, features, visitor experiences, stories, scenes, sounds, or other resources and values. They are the reasons for data collection, planning issues, management prescriptions, impact assessments, and value analyses.*

In addition to being a Fundamental Resource and Value, the Foundation Document and GMP have also designated "Hydropower Landscapes" as one of its "primary" "Interpretive Themes." "Interpretive Themes" are guided by park significance statements, which originate from legislation and purpose. Interpretive themes connect park unit resources to relevant ideas, meanings, concepts, contexts, beliefs, and values. They support the desired interpretive outcome of increasing visitor understanding and appreciation of the significances of the park's resources. According to the GMP and the Foundation Document, the basis for the "Hydropower Landscapes" interpretive theme is as follows:

> *[Page 18] The story of creating one of the last great wilderness parks in the lower 48 states and the ongoing struggle about how to provide for wilderness preservation, a national park experience, and Seattle City Light's needs for hydropower development began with the creation of North Cascades National Park Complex and continued through the landmark Federal Energy Regulatory Commission (FERC) negotiation and settlement. The story continues today as the needs for electricity, heritage preservation, and recreation evolve."*

The public expressed support for providing for historic and interpretive resources such as these during the extensive public involvement process that accompanied the Environmental Impact Statement (EIS) for development of the 2012 RLNRA GMP. Specifically, there was strong public support for interpreting the history of hydropower. According to the NPS' summary of public scoping comments in the RLNRA Final GMP and EIS, Volume II, Chapter 7:

> *[Page 191 and 192] There was strong support for an increase in interpretation of cultural resources within Ross Lake NRA, including the history of the hydroelectric projects and Native American history and use…The public also expressed interest in increased interpretation of Seattle City Light activities such as facility tours and interpretation of hydroelectric history.*

Just as hydropower contributes to the significance of the RLNRA, the powerhouse and penstock are significant historic properties under the National Historic Preservation Act (NHPA) and are accordingly listed in the NRHP. In the context of the NHPA, listed historic properties all carry equal weight regardless of their age. Recognizing the equal weight of both potentially significant tribal resources and NRHP-listed historic properties under the NHPA, City Light has proposed a balanced approach to decommissioning via the Proposed Action by restoring 2.78 acres of the total 2.94 acres to the pre-Project setting, leaving only 0.16 acres for preservation of easily accessible historic properties. The 2.78 acres of restored habitat would also greatly improve aquatic and terrestrial habitat.

Although City Light is respectful of the NPS's current position (as stated in NPS' August 30, 2022 FERC filing), City Light continues to believe that complete removal of the first hydropower plant in the RLNRA would eliminate an important chapter of the RLNRA's story and would disconnect visitors from key context and history of a primary Interpretive Theme for which the public has expressed strong support. The historic powerhouse and penstock contribute to the Hydropower Landscape, which is one of the Fundamental Resources and Values that are critical to maintaining the RLNRA's significance and achieving the RLNRA's purpose.

City Light looks forward to additional dialogue with NPS and others to better understand and address NPS's concerns with the Proposed Action.

Updates to the Decommissioning Proceeding

The following section provides an update on the proceeding with respect to ongoing stakeholder engagement and informal consultation.

- **August 8, 2022.** City Light met with intervening Parties to discuss stream restoration goals and concerns related to sediment transport following dam removal. This was an information sharing session only.
- **August 11, 2022.** In accordance with Section 106 of the NHPA, City Light provided a letter to all consulting parties requesting concurrence on the Area of Potential Effects.
- **September 12, 2022.** City Light met with intervening parties at the Newhalem Creek dam as a follow-up to discussions during the August 8, 2022, meeting. An overview of construction was

provided and the potential effects to water quality and sediment transport following dam removal was discussed. The findings within the Draft Geomorphology Considerations Report (Dube 2021) were also discussed.

- **September 12, 2022.** City Light conducted additional fluvial geomorphology field work to 1) evaluate sediment transport in relation to flood flow events during the winter of 2021/2022, 2) collect data not obtained last year due to high flows, and 3) use the 2022 data to finalize the Draft Geomorphology Considerations Report (Dube 2021).

The following is work that City Light will begin in October of 2022:

- Site evaluation to identify potential contaminants of concern at operational activity centers and assessing the potential for toxicological effects as request by the NPS. The report will be provided to the NPS upon completion and a copy will be filed with FERC.
- Finalization of the Draft Geomorphology Considerations Report (Dube 2021). The final report will be distributed to intervening Parties for their review and a copy will be filed with FERC.
- Survey and inventory of the built environment per Section 106 of the NHPA. The report will be provided to all Section 106 consulting parties for their review upon completion.

City Light looks forward to continuing to work with FERC, resource agencies, Tribes, and other interested parties on the license surrender and decommissioning plan for the Project. Should you have any questions, please contact me at 206-386-4571 or the Project Manager, Shelly Adams, at (206) 684-3117.

Sincerely,

Chris Townsend (Sep 28, 2022 13:30 PDT)

Chris Townsend
Director Natural Resources & Hydro Licensing
Seattle City Light

Attachment

Cc: Diana Shannon, FERC
Mark Ivy, FERC
Don Striker, NPS

NEWHALEM DAM DECOMMISSIONING GEOMORPHOLOGY CONSIDERATIONS DRAFT REPORT

NEWHALEM CREEK HYDROELECTRIC PROJECT FERC NO. 2705

Prepared by:
Kathy Vanderwal Dubé
Watershed GeoDynamics

October 2021

List of Acronyms and Abbreviations

BAGS .... Bedload Assessment in Gravel-bedded Streams
City Light .... Seattle City Light
cfs .... cubic feet per second
CM .... creek mile
FERC .... Federal Energy Regulatory Commission
ft .... feet
LiDAR .... Light Detection and Ranging
mm .... millimeter
MW .... megawatt
NPS .... National Park Service
Project .... Newhalem Creek Hydroelectric Project
RLNRA .... Ross Lake National Recreation Area
USGS .... U.S. Geological Survey

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1.0 INTRODUCTION

1.1 Project Description

Seattle City Light (City Light) is licensed by the Federal Energy Regulatory Commission (FERC) to operate and maintain the Newhalem Creek Hydroelectric Project, FERC No. 2705 (Project). The Project is located on Newhalem Creek in northern Washington State in the Cascade Mountains of the upper Skagit River watershed. Newhalem Creek is a tributary to the Skagit River and enters the south side of the river at mile 93.3 (Figure 1.0-1).

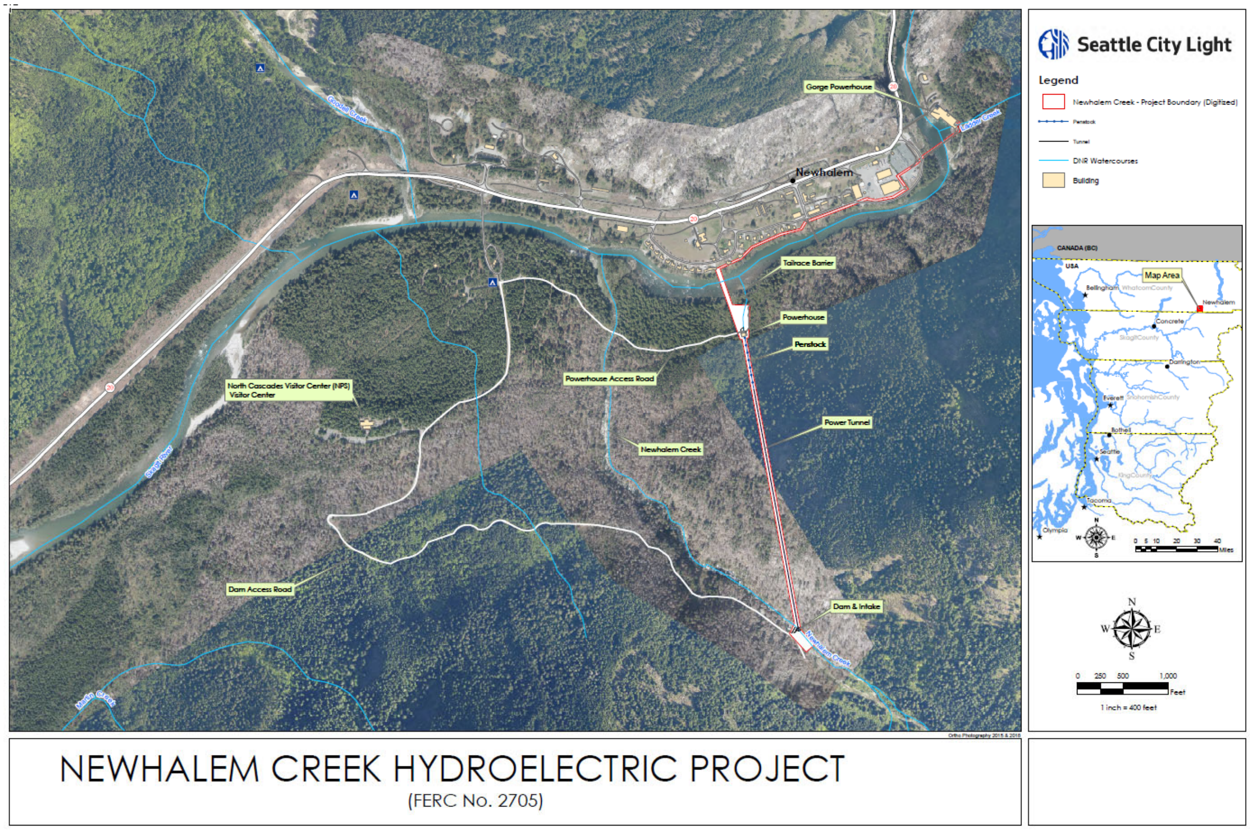


Figure 1.1-1. Newhalem Creek Project location map

The Project began operations in 1921 to supply power to the town of Newhalem and to construct Gorge Dam and Powerhouse, the latter of which are part of the Skagit River Hydroelectric Project (FERC No. 553). The Project has an authorized installed capacity of 2.2 megawatts (MW). The current Project license expires on January 31, 2027. City Light filed a Notice of Intent with FERC on April 28, 2021 to surrender the license and a process plan and schedule to submit a Surrender Application and Decommissioning Plan for the Project by January 31, 2022.

The Project occupies 6.4 acres and is entirely on federal lands within the Ross Lake National Recreation Area (RLNRA), which is managed by the National Park Service (NPS) as part of the North Cascades National Park Complex. The Project's diversion structure is located at Creek Mile (CM) 1.0, above a 100-foot waterfall, and impounds very little water (0.1-acre/0.6 acre-ft).

Newhalem Creek flows are diverted into a power tunnel and penstock that lead to the powerhouse. These flows bypass an approximately 1-mile reach of Newhalem Creek. There is a U.S. Geological Survey (USGS) stream gage just upstream of the diversion.

1.2 Proposed Action and Report Purpose

As part of decommissioning the Project, City Light is proposing to remove the diversion structure and associated facilities. The current proposal is to remove concrete at the current diversion location and grade to elevation 1,009 feet (ft) (Skagit Project datum, approximately equivalent to 1,015 ft NAVD88 datum) at the downstream end of the existing spillway. The new streambed base level at this location would be approximately 10 ft lower than the top of the existing diversion structure.

The purpose of this report is to evaluate potential geomorphic effects of removing the diversion structure on Newhalem Creek. Two primary geomorphic effects identified include:

- Potential for headcutting and incision upstream of the diversion location after diversion is removed due to change in base level of stream; and
- Transport of sediment currently stored in and upstream of the impoundment into downstream reaches of Newhalem Creek and the Skagit River (including potential effects on turbidity levels in Newhalem Creek).

This report relies on existing maps, reports, hydrologic data, and topographic light detection and ranging (LiDAR) information; observations made during two 1-day field visits to the Project; and surficial grain size and cross sections surveyed during the field visits. The results presented in this report should be considered reconnaissance-level. More detailed sediment transport analyses would require additional information that is not currently available.

2.0 METHODS

2.1 Field Data

Observations of site conditions and stream characteristics were made during a site visit on June 14, 2021. Substrate pebble counts were made and a stream cross section was surveyed during a site visit on September 8, 2021. Streamflow at the Newhalem gage (USGS 12178100) was 499 cubic feet per second (cfs) during the June 2021 site visit and 28 cfs during the September 2021 site visit.

Wolman pebble counts were made at four locations upstream of the Newhalem Creek diversion dam. A minimum of 100 pebbles were selected approximately every foot across the channel at two locations (at the Newhalem USGS gage site and approximately 500 ft upstream from the Newhalem Creek diversion dam) and in a grid pattern in deposits just upstream from the diversion and at the head of a point bar approximately 1,000 ft upstream from the diversion. Each particle was passed through a gravelometer to measure the equivalent particle size class in half phi increments (e.g., < 2 mm, 2-4 mm, 4-8 mm, 8-16 mm, 16-32 mm, etc., up to the 512 mm size class). The gravelometer provides the same results as sieving a sample. Pebble count data were entered into a spreadsheet for computation of particle size statistics and graphing of the grain size distribution.

A cross section at the USGS gage site was surveyed using a tape, laser level, and survey rod. The concrete platform at the Project intake was used as a known elevation to allow approximate “real” elevations of the stream to be surveyed and allow correlation of the survey data with LiDAR data to extend the cross section across the valley on each side of the transect.

2.2 Data Analysis

Mean daily and annual instantaneous peak flows for the period of record were obtained from the USGS National Water Information System (NWIS) website for the Newhalem Creek near the Newhalem gage (USGS 12178100). Annual peak flows were entered into a spreadsheet for log-Pearson Frequency Analysis using the Bulletin 17B methods.

The BAGS (Bedload Assessment in Gravel-bedded Streams) spreadsheet transport tool was used to analyze hydraulic characteristics, potential sediment transport/deposition areas, and headcutting in the Newhalem Creek intake area based on the surveyed cross section, pebble count data, and local and reach-averaged stream gradients measured from LiDAR data.

3.0 GEOMORPHIC SETTING AND EXISTING CONDITIONS

The Project is located in the North Cascades of Washington state, a geomorphically active, geologically diverse, and climatically cool and wet area with high mountain peaks and steep valley walls and canyons.

3.1 Geology and Landforms

The North Cascades is a complex mosaic of geologic terranes that were formed as the Pacific Ocean plate and the North American continental plate collided, breaking off pieces of volcanic island arcs, deep ocean sediments, ocean floor, continental rocks, and subcrustal mantle over the past 400 million years (Haugerud and Tabor 2009). These terranes were then uplifted, thrust on top of each other, eroded, or buried to further complicate the geology and form the high peaks of the North Cascades. Newhalem Creek is within the Metamorphic Core Domain of the North Cascades and is underlain by the Skagit Gneiss (labeled TKbg(s) and TKog(s) on Figure 3.1-1). The Skagit Gneiss has a high level of metamorphism and is resistant to weathering and erosion, forming the steep stream canyon with numerous waterfalls downstream from the Newhalem diversion structure. While resistant to erosion, the steep valleys formed in the rocks of the Metamorphic Core are also subject to rockfalls, landslides, and avalanches as evidenced by the mass movements along the western slopes downstream from the diversion (the active rockfall/mass wasting area on the access road is one of these unstable areas).

During the Quaternary Period, starting about 2.6 million years ago, continental and alpine glaciers covered much of the area in the Project vicinity, with several major advances of thick continental ice from the north and smaller alpine glaciers originating from mountain peaks. The most recent continental glacial advance, culminating approximately 15,000 years ago, resulted in many of the surficial geologic features and deposits in the Newhalem Creek vicinity. Following melting of the glaciers, surficial processes further re-shaped the landscape resulting in development of alluvium (river deposits), terraces, and alluvial fans. Surficial geology around Project includes Quaternary and Holocene glacial and stream deposits (Qad and Qa), alluvial fan/debris cone deposits (Qaf), and colluvium derived from local soils and underlying geologic units.

Landforms have been mapped by NPS for areas within the RLNRA (Riedel et al. 2012). Landform mapping provides information on surficial geologic features and processes by grouping areas of the landscape into units formed by discrete geologic processes. Landforms include features that are depositional in nature (e.g., moraines, alluvial fans) or erosional (e.g., horns, bedrock benches). Mapped landforms are shown on Figure 3.1-1 and include the steep valley walls surrounding the Newhalem Creek valley, the floodplain features in the lower gradient area upstream from the diversion, the bedrock canyon downstream from the diversion, and the alluvial fan near the confluence with the Skagit River that has cut into the moraines and terraces in the Skagit River valley. Note that several debris cones control floodplain width in the lower gradient valley upstream from the Newhalem diversion dam; these debris cones control the confined/unconfined reaches of the stream and limit channel movement across the floodplain.

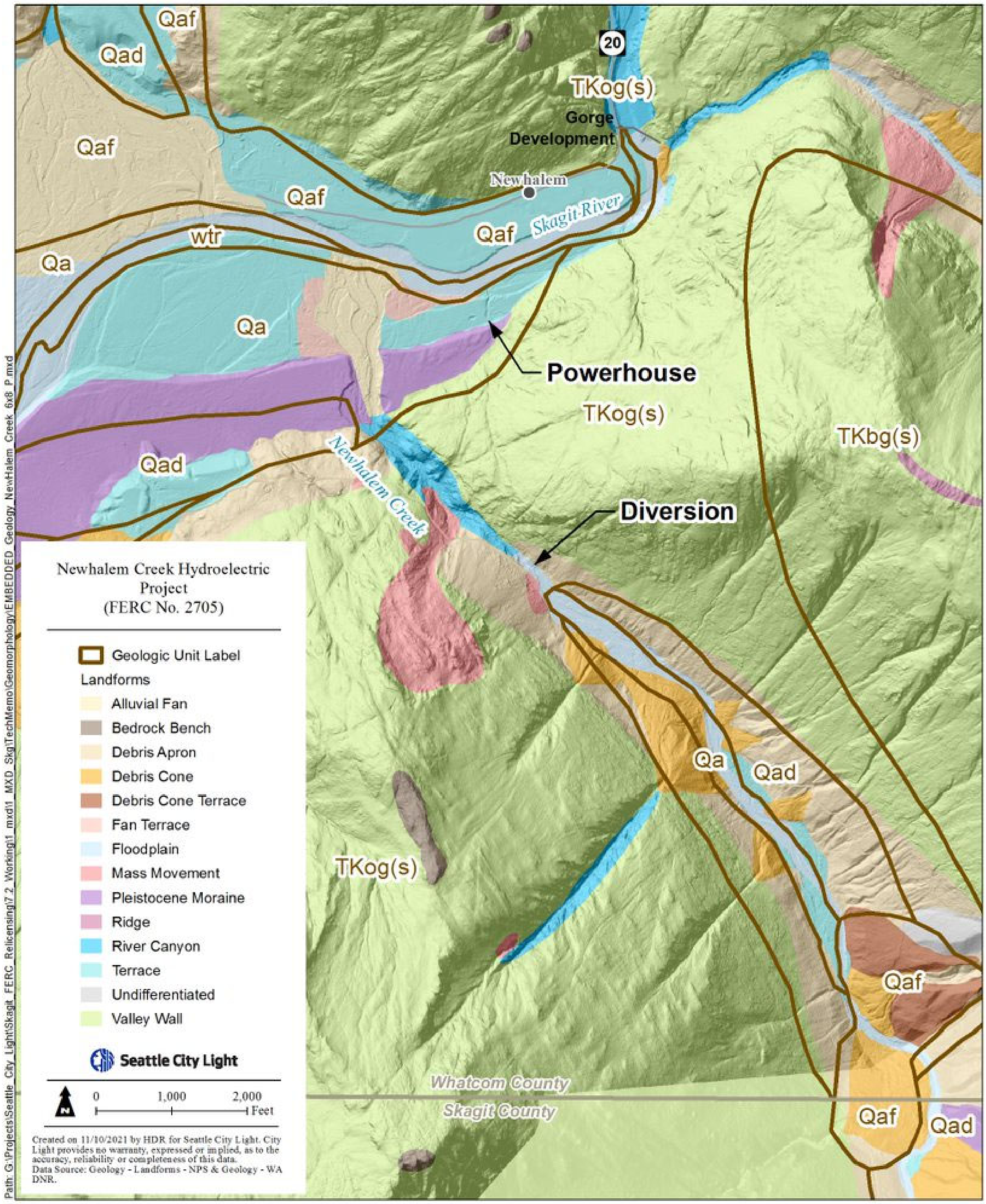


Figure 3.1-1. Geologic units and landforms in the Newhalem Project vicinity.

3.2 Newhalem Creek Hydrology

Newhalem Creek has a drainage area of 26.9 square miles at the Project intake. Mean daily flows typically range from a low of 20-30 cfs in September to peaks of 1,000 to 3,000-4,000 cfs during rain, rain-on-snow, and snowmelt from November through late June (Figure 3.2-1).

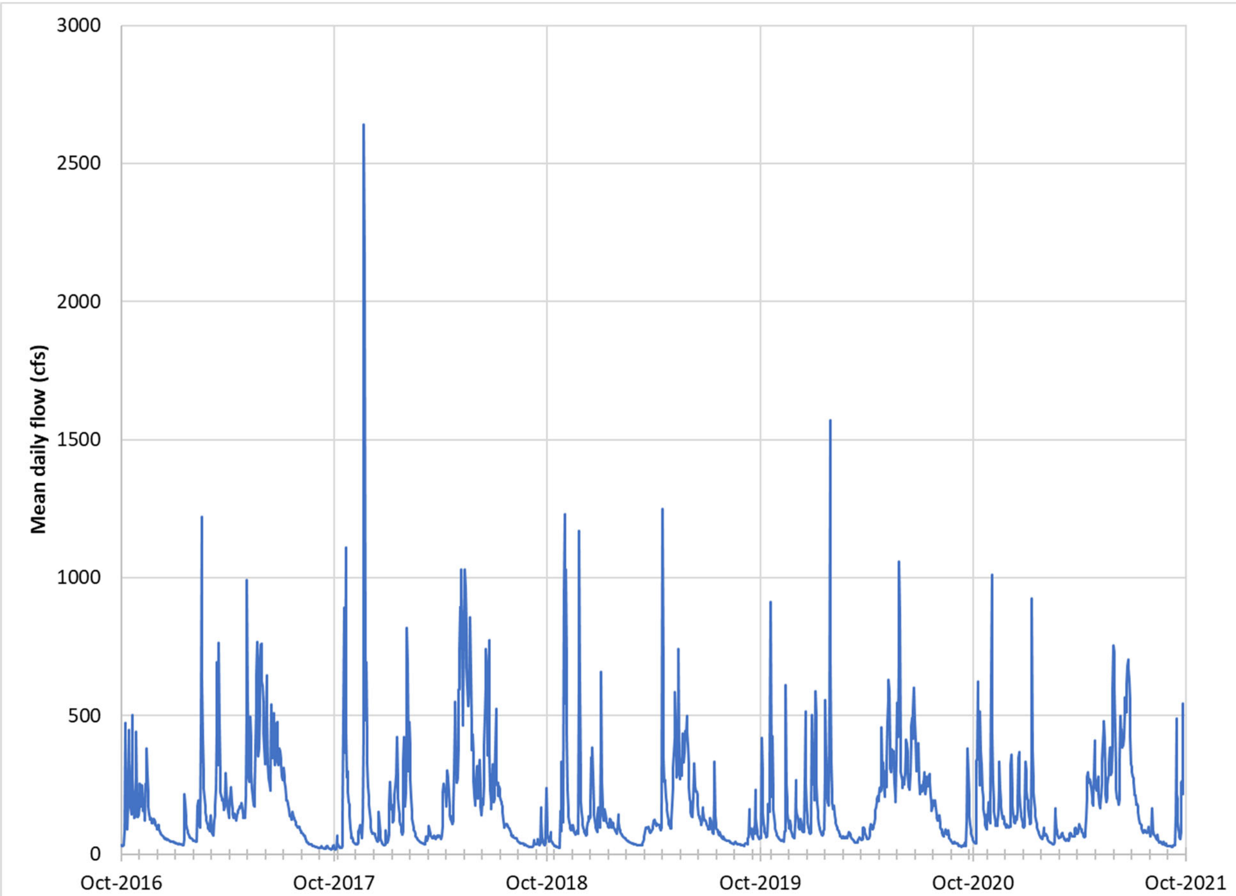


Figure 3.2-1. Daily flow at Newhalem Creek Gage (USGS 12178100) Water Years 2017-2021.

The majority of bedload transport and geomorphic "work" is done during high flows when stream energy is high enough to break up the coarser armor layer on the bed of the stream and transport gravel/cobble/boulder downstream. Annual instantaneous peak flows recorded at the Newhalem gage range from less than 1,000 cfs to 9,000 cfs (Figure 3.2-2). The highest peak flows occur during the November to February timeframe as a result of rain-on-snow events (**Error! Reference source not found.**). Smaller magnitude peak flows between October and March are the result of rainfall events. Peaks during May-July are driven by snowmelt from the higher elevations in the watershed.

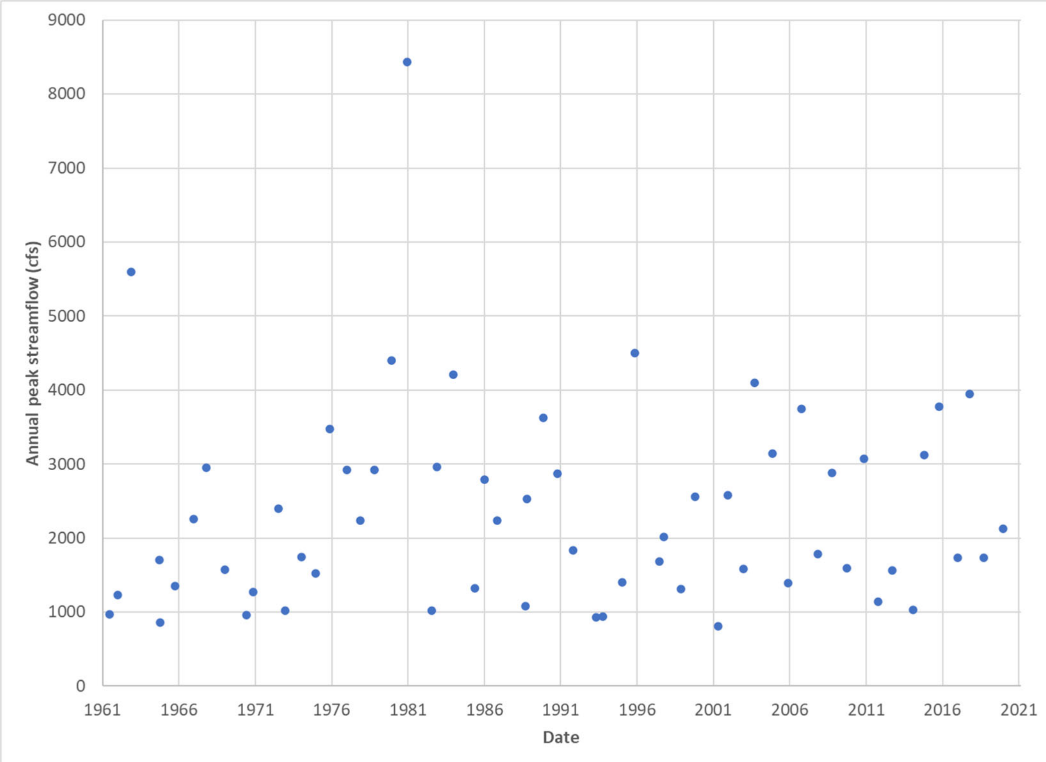


Figure 3.2-2. Annual peak streamflow at Newhalem Creek gage (USGS 12178100; 1961-2020).

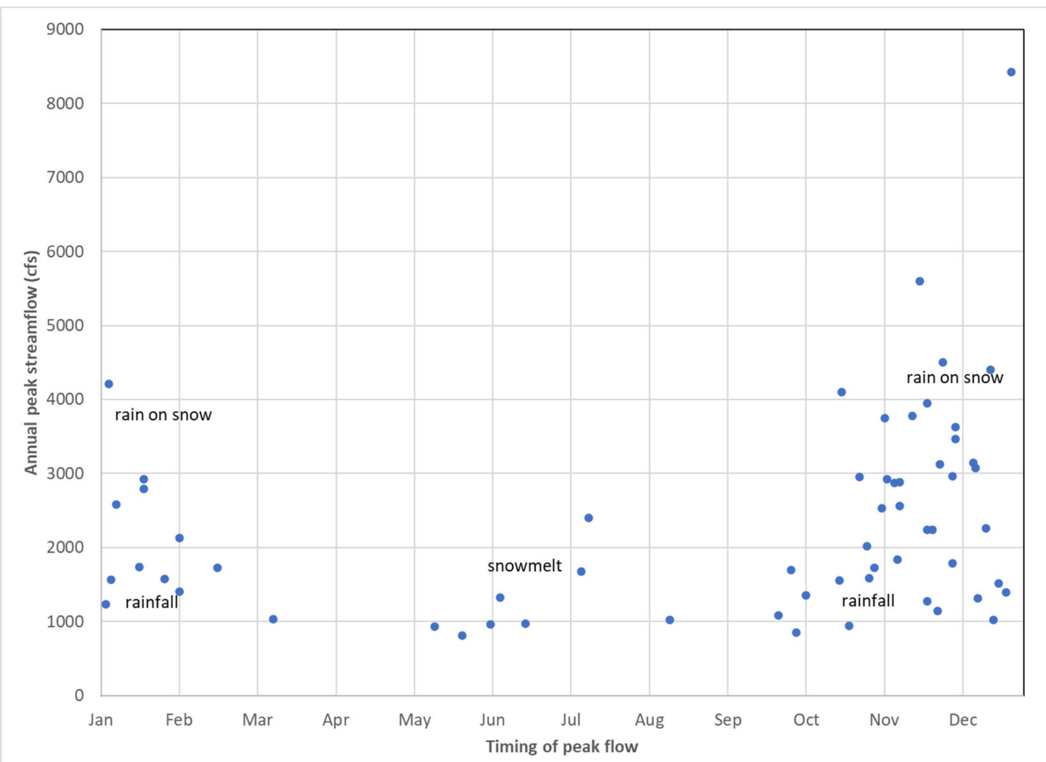


Figure 3.2-3. Timing and cause of peak streamflows at Newhalem Creek gage (USGS 12178100; 1961-2020).

Computed peak flow recurrence intervals at the diversion dam range from 881 cfs for the 1.05-year recurrence interval to 7,680 cfs for the 100-year event (Table 3.2-1). The 1.25- to 2-year recurrence interval event is often considered to be the formative discharge for stream channel shape and bedload transport and often corresponds to the bankfull discharge in alluvial streams.

Table 3.2-1. Peak flow recurrence intervals, Newhalem Creek gage (USGS 12178100; 1961-2020).

Recurrence interval (years)	Annual percent chance	Peak discharge (cfs)	95% Confidence upper limit (cfs)	95% Confidence lower limit (cfs)
100	1	7,680	10,000	6,260
50	2	6,470	8,220	5,370
25	4	5,370	6,640	4,550
10	10	4,060	4,820	3,530
5	20	3,150	3,630	2,790
2	50	1,990	2,230	1,770
1.25	80	1,290	1,460	1,120
1.05	95	881	1,030	727

3.3 Newhalem Creek Existing Geomorphic Characteristics

Newhalem Creek has several distinct geomorphic reaches between the confluence with the Skagit River and the valley upstream from the diversion dam that influence how the stream processes water and sediment moving through the system and ultimately affects instream habitat characteristics (Figure 3.3-1, Figure 3.3-2).

Upstream from the diversion structure the stream has a relatively consistent gradient (2-3 percent) with a cobble/boulder/gravel bed, bankfull channel width of approximately 75 ft, and valley widths of 500 ft in relatively unconfined reaches and 150-200 ft in areas where the stream is confined by debris cone deposits coming off the valley walls. There is a confining debris cone approximately

0.25 miles upstream from the diversion and another, larger cone approximately 0.5 miles upstream from the diversion. These two features limit channel movement across the valley.

At and downstream from the diversion, the stream enters a very high gradient (10-25 percent) bedrock canyon with numerous waterfalls. This area was not visited but based on observations just downstream from the diversion it is likely that substrate is bedrock with patches of cobble/gravel/boulder. This reach is a transport reach – sediment supplied from upstream areas moves relatively quickly through the reach into the downstream alluvial fan.

Downstream from the canyon reach Newhalem Creek encounters the Skagit River valley terraces and forms an alluvial fan with numerous relict channels. The stream averages 5 percent gradient with gradients decreasing closer to the Skagit confluence and has cut through the higher Skagit valley terraces. Alluvial fans are geomorphically active areas where the stream deposits the largest sized material near the top of the fan and finer-grained sediment near the distal (downstream) portion of the fan as the stream gradient/power drops. Observations at the Powerhouse Road crossing show a boulder/cobble bed with what appear to be lag boulders (moss-covered boulders indicating infrequent transport) interspersed with fresh gravel/cobble material.

The Newhalem Creek alluvial fan appears to be forcing the Skagit River to the North; the Skagit River narrows and has a locally higher gradient at the confluence with the creek. Gravel and cobble material transported from Newhalem Creek provides a source of spawning-sized material to the Skagit River.

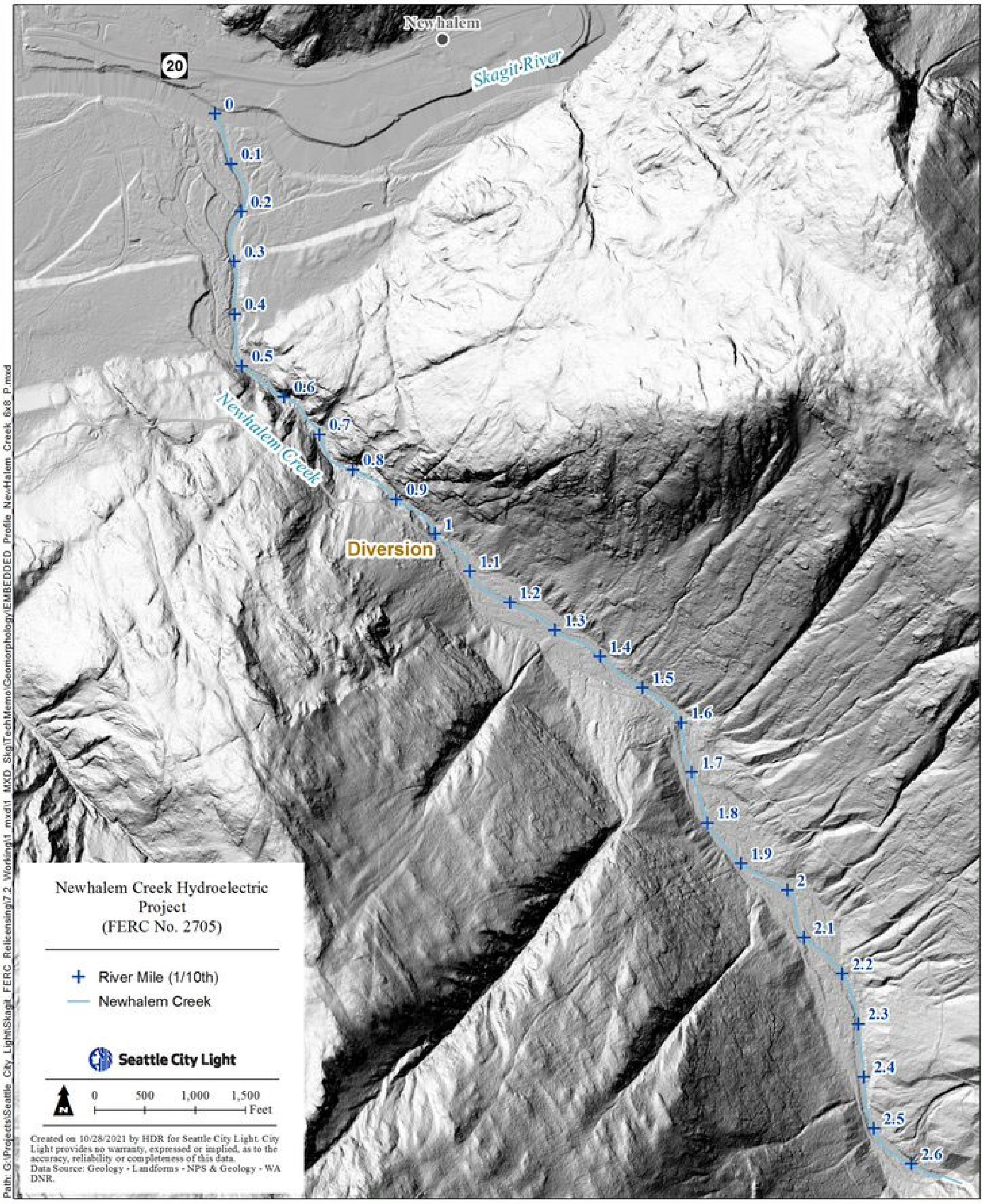


Figure 3.3-1. Topography of Newhalem Creek and Skagit River in Project area (2016 LIDAR hillshade).

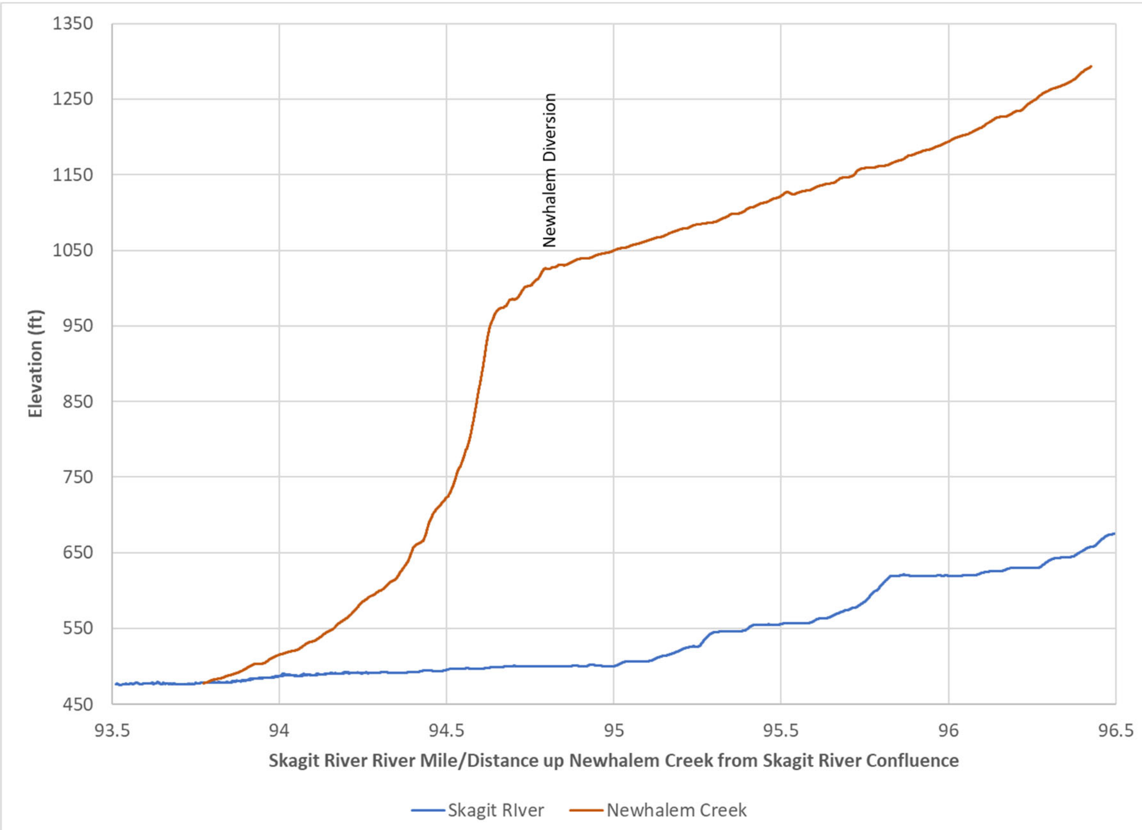


Figure 3.3-2. Longitudinal Profile of Newhalem Creek and Skagit River

3.4 Existing Effects of Newhalem Project on Newhalem Creek Geomorphology

The Newhalem Project started operation over 100 years ago; the primary geomorphic effects on the Newhalem Creek have been:

- Diversion structure (8-10 ft tall) that provides a grade control for the stream;
- A small impoundment that retains some portion of the bedload transported from upstream reaches; and
- Diversion of water through the intake and out of Newhalem Creek when the Project was operating.

Over the 100 years since the Project began operating, Newhalem Creek has re-adjusted its profile upstream from the diversion structure to the new base level provided by the diversion dam. The small impoundment retains at least some portion of the bedload coming from the watershed upstream from the diversion. City Light reports that while the Project was operating, an average of 200-400 cubic yards of material were removed from the impoundment and placed in the channel downstream from the diversion dam on an annual basis to keep the area near the intake clear of sediment for Project operations. This provides a minimum estimate of the annual bedload transport volume in the stream. Since the removed sediment was placed downstream from the dam and the impoundment is very small, the Project did not cause a net change in sediment supply to downstream reaches of Newhalem Creek.

3.5 Grain Size Data

Pebble counts in Newhalem Creek upstream of the diversion show substrate is composed of cobble, boulder, and gravel material (Figure 3.5-1, Figure 3.5-2, Table 3.5-1). Median (D_{50}) grain sizes ranged from 106-123 mm. This information was used to evaluate bed mobility and headcutting potential.

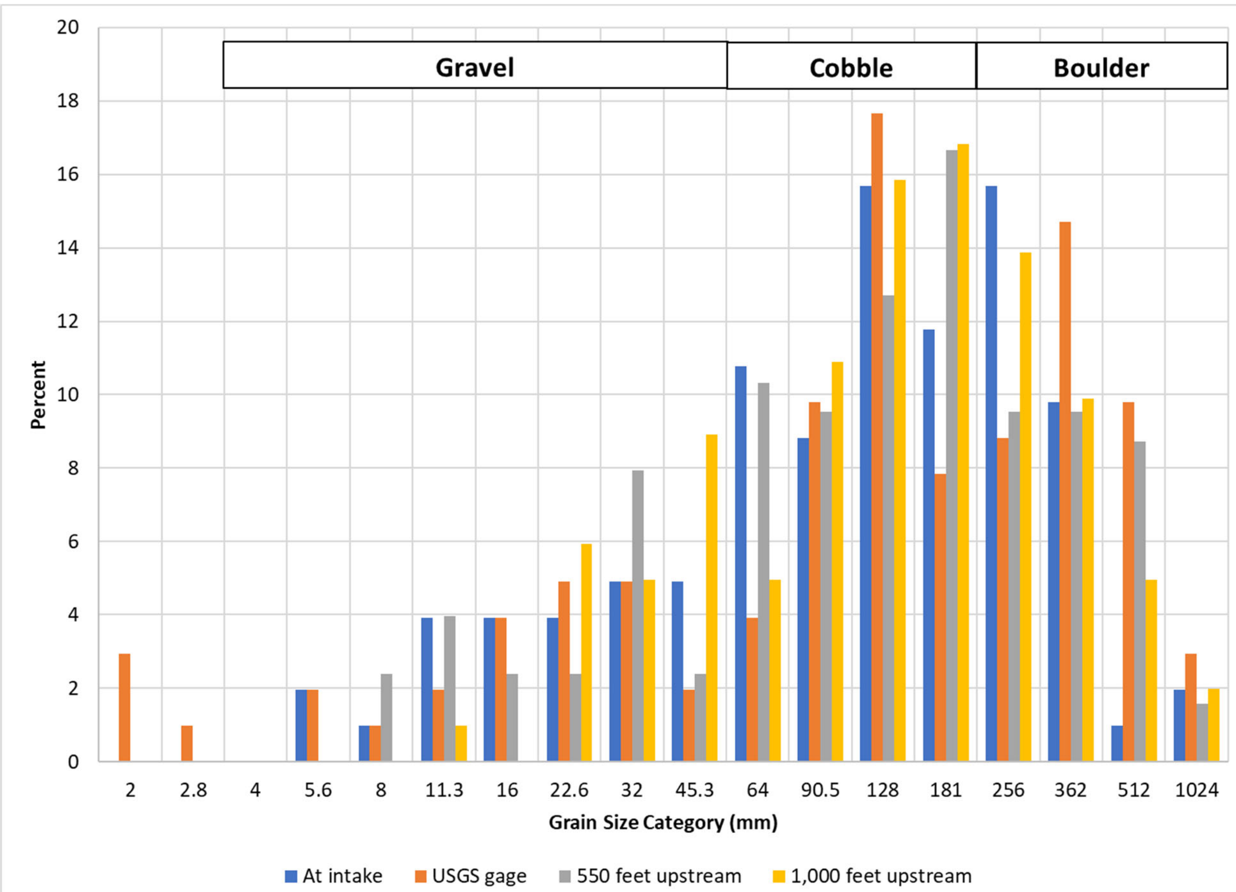


Figure 3.5-1. Grain size distribution of substrate upstream from Newhalem Creek diversion structure.

Figure 3.5-2. Newhalem Creek 500 ft upstream from diversion structure.

Table 3.5-1. Grain size characteristics of substrate upstream from Newhalem Creek structure.

Location	**D_{16} (mm)**	**D_{50} (mm)**	**D_{84} (mm)**	**Percent Gravel**	**Percent Cobble**	**Percent Boulder**
50 ft upstream from diversion	25	106	242	25%	47%	28%
USGS gage (180 ft upstream from diversion)	21	117	341	25%	39%	36%
550 ft upstream from diversion	29	118	312	21%	49%	29%
1,000 ft upstream from diversion	40	123	265	21%	49%	31%
AVERAGE	**29**	**116**	**290**	**23%**	**46%**	**31%**

4.0 DISCUSSION

The primary geomorphic effect associated with decommissioning the Newhalem Project will be the response of the stream to removal of the diversion structure. Current plans are to remove the diversion structure and re-grade to an elevation of 1,015 ft NAVD88 (1,009 ft Project datum), approximately 10 ft below the top of the diversion. This will lower the base level of Newhalem Creek at the diversion location and the stream will adjust to the new base level.

4.1 Potential Geomorphic Effects

Potential geomorphic effects of diversion removal include:

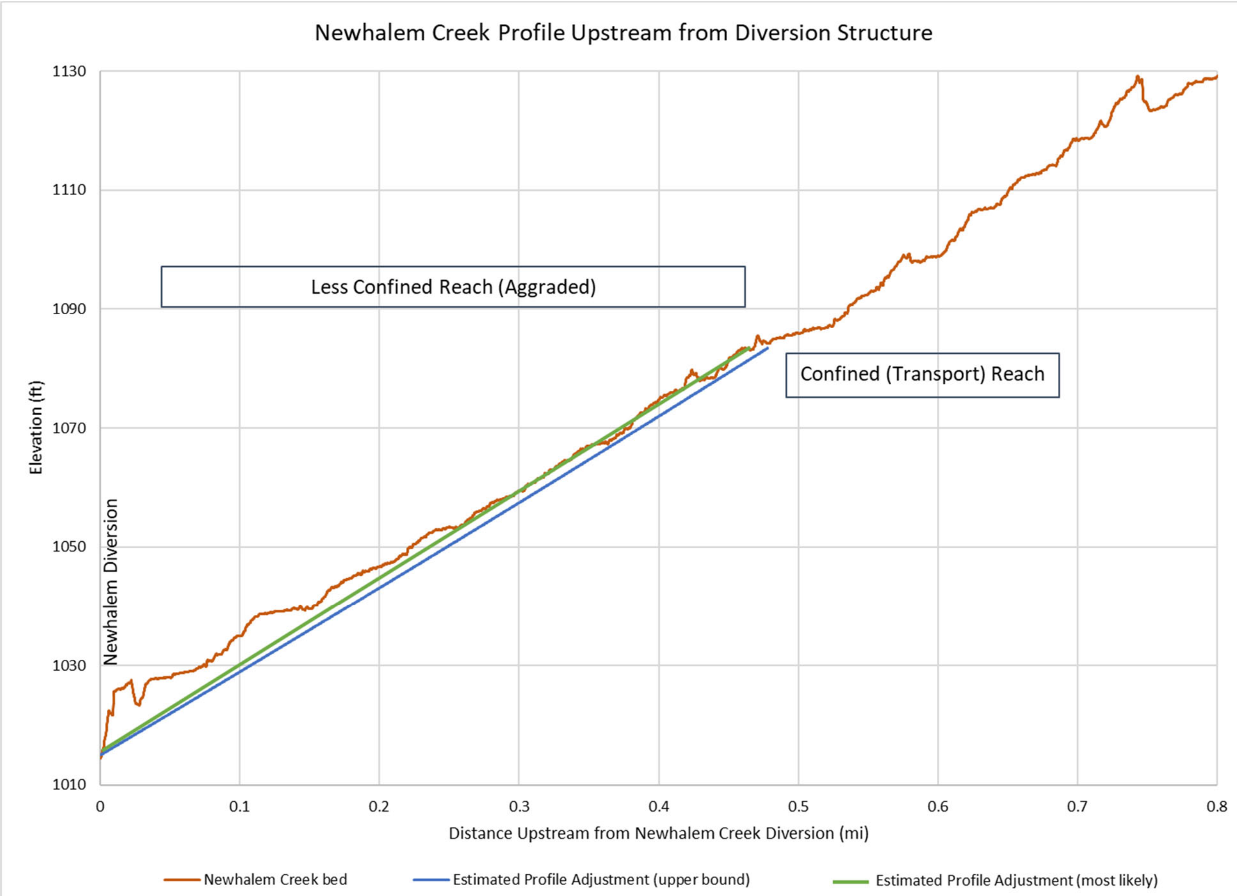
- Higher local stream gradient will increase sediment transport capacity immediately upstream from the diversion location in the short term.
- Existing sediment in the impoundment area will be transported downstream.
- As the channel adjusts to the lower base level over the longer term, there is a potential for headcutting and channel incision as the higher stream gradient works upstream.
- There will likely be minimal increases in turbidity following diversion removal since the majority of substrate in the channel appears to be relatively coarse-grained, however sub-surface samples were not collected to verify this assumption. Any turbidity increases will likely be short-term and transient.

Site conditions will minimize the amount of geomorphic change. The channel immediately downstream of the diversion is a high gradient, bedrock channel. The bedrock will limit further channel incision at the diversion site and the high gradient channel will quickly transport sediment from the impoundment to the alluvial fan and Skagit River.

4.1.1 Changes to Stream Profile Upstream of Diversion Structure

Removal of the diversion structure will result in adjustment of the bed of Newhalem Creek to the new base level. Assessment of the amount of channel change due to base level lowering in coarse-bedded streams is not an exact science; the existing longitudinal profile upstream from the diversion structure was used to estimate the potential amount of channel downcutting that could take place (Figure 4.1-1). Note that the existing profile includes several "steps," especially in the 0.25-mile reach just upstream from the diversion/intake pool. A major step is located approximately 0.1 miles (550 ft) upstream from the diversion. This step is visible in the field as a steep cobble/boulder riffle located at the downstream end of a split high flow channel/island area. It is possible that this is a relic of sediment accumulation upstream of a past log jam or an accumulation resulting from the adjustment of the channel to the diversion structure during extreme high flow events (e.g., the 9,000 cfs peak flow in 1981).

The streambed gradient is relatively consistent between 0.25 and 0.5 miles upstream from the diversion structure, and in fact if this gradient is extended downstream it fits with the streambed elevation at the top of the bedrock area just downstream of the diversion structure (see, the green line on Figure 4.1-1) suggesting that perhaps the area is upstream of the adjustments the stream made as a result of original diversion dam construction. This line was used as one estimate of the total (long-term) amount of channel change that could occur following diversion removal. A second bounding estimate was made based on the blue line in the figure which assumes that the stream would continue to adjust up to the confined reach approximately 0.5 miles upstream from the diversion.



Elevation is NAVD88

Figure 4.1-1. Longitudinal profile of Newhalem Creek upstream from diversion structure with potential profile adjustments.

Change in channel bed elevation would be greatest just upstream from the removed diversion and at the top of the "steps" in the profile, with 4-7 ft of bed lowering extending approximately 1,000 ft upstream from the diversion.

The total volume of sediment that would be transported out of the adjustment area was calculated based on change in bed elevation and average channel width of 75 ft (existing channel width) and 100 ft (potential wider channel width if incision results in widening of the channel) to give bounding estimates. Total volume based on these methods is 12,600-16,800 cubic yards (green line, Figure 4.1-1) and 22,500-30,000 cubic yards (blue line, Figure 4.1-1). Assuming an average bedload transport rate of 400 cubic yards/year, this represents 30-75 years of average bedload movement. Because of the coarse nature of the streambed (cobble/boulder/gravel), the re-adjustment to the new base level would likely take place relatively slowly - over a decadal or longer time scale following the initial channel adjustment close to the diversion structure.

4.1.2 Sediment Transport Analysis

Based on stream hydraulics and the current stream substrate size, the flow that could initiate substrate movement was calculated under current conditions (reach-averaged stream gradient 2.8 percent) and under conditions with the diversion removed (Table 4.1-1). Frequencies listed in the table reflect the values calculated for the peak flow recurrence intervals at the USGS gage just upstream from the diversion (see, Table 3.2-1 in previous discussion of stream hydrology).

Table 4.1-1. Calculated discharge required to transport substrate upstream of diversion structure under existing conditions and following diversion removal.

Stream Gradient	Discharge and frequency of median (D_{50}) grain size transport	Discharge and frequency of larger (D_{84}) grain size transport
2.8% (reach average over long term)	250 cfs; every year	3,000 cfs; 5 years
1.3% (existing local slope just upstream from diversion)	1,500 cfs; 1.5 years	over 9,000 cfs; 100+ years
3.9% (short term local slope upstream from diversion with diversion removal and drop in base level)	120 cfs (many times/year)	1,500 cfs; 1.5 years

In the short-term, immediately following diversion removal, the local stream gradient just upstream of the diversion would increase from 1.3 percent to 3.9 percent which would increase the sediment transport frequency of the median (D_{50}) sized substrate from every 1.5 years to many times per year. Transport of larger particles (e.g., D_{84}) would increase from very infrequently (over 100-year recurrence frequency) to movement under a 1.5-year peak flow event. This analysis suggests that the bed immediately upstream from the diversion structure would respond quickly to diversion removal. As material on the bed is transported downstream, the locally high stream gradient would migrate upstream (often referred to as headcutting), resulting in transport of substrate from the top of the headcut. As the headcut progresses farther upstream, the local gradient increase is less and less until a new long-term average slope condition is reached. As the local gradient increase becomes less and less, the corresponding energy to move particles becomes less, resulting in less frequent bedload movement and a slowing of the process. Headcuts can migrate upstream fairly rapidly in fine-grained sediments, but the large particle sizes in Newhalem Creek will form an armor layer and further reduce the speed of headcut migration and limit channel incision. It is anticipated that as an armor layer forms, the larger substrate will be mobile much less frequently and channel adjustments will take several decades. Over time, a new equilibrium channel gradient will develop and the average reach gradient will be approximately 2.8 percent.

4.2 Changes Downstream from the Diversion

Sediment that is moved out of the diversion area will be transported rapidly through the high gradient canyon/waterfall reach to the alluvial fan area. Boulders and large cobble will be deposited at the upstream end of the fan; actual deposition locations will reflect gradient and stream conditions on the fan (no channel dimensions were measured on the fan to calculate actual transport capacity for different sizes of particles, but particles will accumulate in areas where similar sized particles are currently accumulating). Some cobble, gravel and finer sediment will be transported farther downstream and eventually reach the Skagit River, augmenting substrate there.

5.0 REFERENCES

Haugerud, R. and R. Tabor. 2009. Geologic Map of the North Cascade Range, Washington. USGS Scientific Investigations Map 2940.

Riedel, J., S. Brady, S. Dorsch, N. Bowerman, and J. Wenger. 2012. Geomorphology of the Upper Skagit watershed: Landform mapping at North Cascades National Park Service Complex, Washington. Natural Resource Technical Report NPS/NCCN/NRTR—2012/568. National Park Service, Fort Collins, Colorado.