BIOLOGICAL ASSESSMENT AND ESSENTIAL FISH HABITAT ASSESSMENT

NEWHALEM CREEK HYDROELECTRIC PROJECT DECOMMISSIONING FERC NO. 2705

Seattle City Light

April 2025

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List of Acronyms and Abbreviations

°C .....degrees Celsius
BA .....biological assessment
BMP .....best management practice
CFR .....Code of Federal Regulations
cfs .....cubic foot per second
City Light .....Seattle City Light
CWA .....Clean Water Act
CY .....cubic yard
dB .....decibel
DPS .....Distinct Population Segment
EAP .....Emergency Action Plan
Ecology .....Washington State Department of Ecology
EFH .....Essential Fish Habitat
ESA .....Endangered Species Act
ESU .....Evolutionary Significant Unit
FERC .....Federal Energy Regulatory Commission
FMO .....foraging, migratory, and overwintering
FR .....*Federal Register*
IPaC .....Information, Planning, and Conservation
LAA .....likely to adversely affect
Magnuson-Stevens Act ....Magnuson-Stevens Fishery Conservation and Management Act
mg/L .....milligram per liter
mm .....millimeter
NA .....not applicable
NE .....no effect
NLAA .....not likely to adversely affect
NMFS .....National Marine Fisheries Service
NPS .....National Park Service
NRF .....nesting, roosting, and foraging

NTU .....nephelometric turbidity units
OHWM .....Ordinary High Water Mark
PBF .....physical and biological feature
PHS .....Priority Habitat Species
Project .....Newhalem Creek Hydroelectric Project
RLNRA.....Ross Lake National Recreation Area
RM .....river mile
Skagit EAP.....*Skagit River Project Emergency Action Plan*
SECP.....Sediment and Erosion Control Plan
TSS.....total suspended solids
USACE .....U.S. Army Corps of Engineers
USFWS .....U.S. Fish and Wildlife Service
USGS .....U.S. Geological Survey
WDFW.....Washington Department of Fish and Wildlife
WRIA.....Water Resource Inventory Area
WSDOT .....Washington State Department of Transportation

1.0 INTRODUCTION

Seattle City Light (City Light) owns and operates the Newhalem Creek Hydroelectric Project (Project), which is licensed by the Federal Energy Regulatory Commission (FERC). The Project is in Whatcom County, immediately west of the town of Newhalem, along Newhalem Creek, a tributary to the Skagit River (Figure 1.1-1). The current license for the Project (FERC No. 2705) expires on January 31, 2027. The Project was in active use until 2010, when a series of equipment and structural problems caused an extended shutdown. Currently, it cannot be operated due to leaks in the power tunnel, maintenance needs at the headworks, and lack of safe access to the dam. Based on an engineering and economic analysis of the necessary repairs, City Light has determined that Project costs far exceed the revenues. For this reason, City Light has decided not to seek a new license for the Project and proposes to decommission the full Project[1]. City Light filed a Notice of Intent with FERC on April 28, 2021, to surrender the license for the Project.

1.1 Existing Project

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 occupies approximately 6.5 acres of land 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 Service Complex. When operational, the Project provides a backup source of power to Gorge Powerhouse and Newhalem, with a generating capacity of 2.125 megawatts. The hydraulic capacity of the one powerhouse turbine (Pelton) is 69 cubic feet per second (cfs).

The Project consists of the following components (Figure 1.1-2):

- Newhalem Creek diversion dam, a run-of-river dam located on the creek at approximately river mile (RM) 1.0, which is a concrete, overflow structure that is 45 feet long by 10 feet high and diverts 69 cfs into an intake structure.
- Combination sluiceway/intake structure on the right bank of Newhalem Creek.
- 55-foot-tall, 5-foot by 5-foot unlined rock vertical shaft that conveys water from the intake to a power tunnel.
- Small gatehouse near the sluiceway/intake structure that contains the control gate and access to the rock shaft.
- Pedestrian bridge across the creek near the dam that provides access to the sluiceway/intake and gatehouse.
- 6-foot-wide by 7-foot-high by 2,452-foot-long unlined rock power tunnel.
- 218-foot-long, 30-inch-diameter steel penstock section within the lower end of the rock tunnel.
- 925-foot-long by 33-inch-diameter steel penstock, supported by saddles, that conveys water from the tunnel to the powerhouse; includes a 218-foot-long, 30-inch-diameter section within the lower end of the rock tunnel and a 707-foot-long, 33-inch-diameter above-ground section supported by concrete saddles.

[1] Full Project decommissioning will completely remove all above-ground buildings, structures, and equipment associated with the Project, including the powerhouse, powerhouse equipment, tailrace fish barrier, penstock, penstock saddles, dam, sluiceway/intake, gatehouse, and pedestrian bridge.

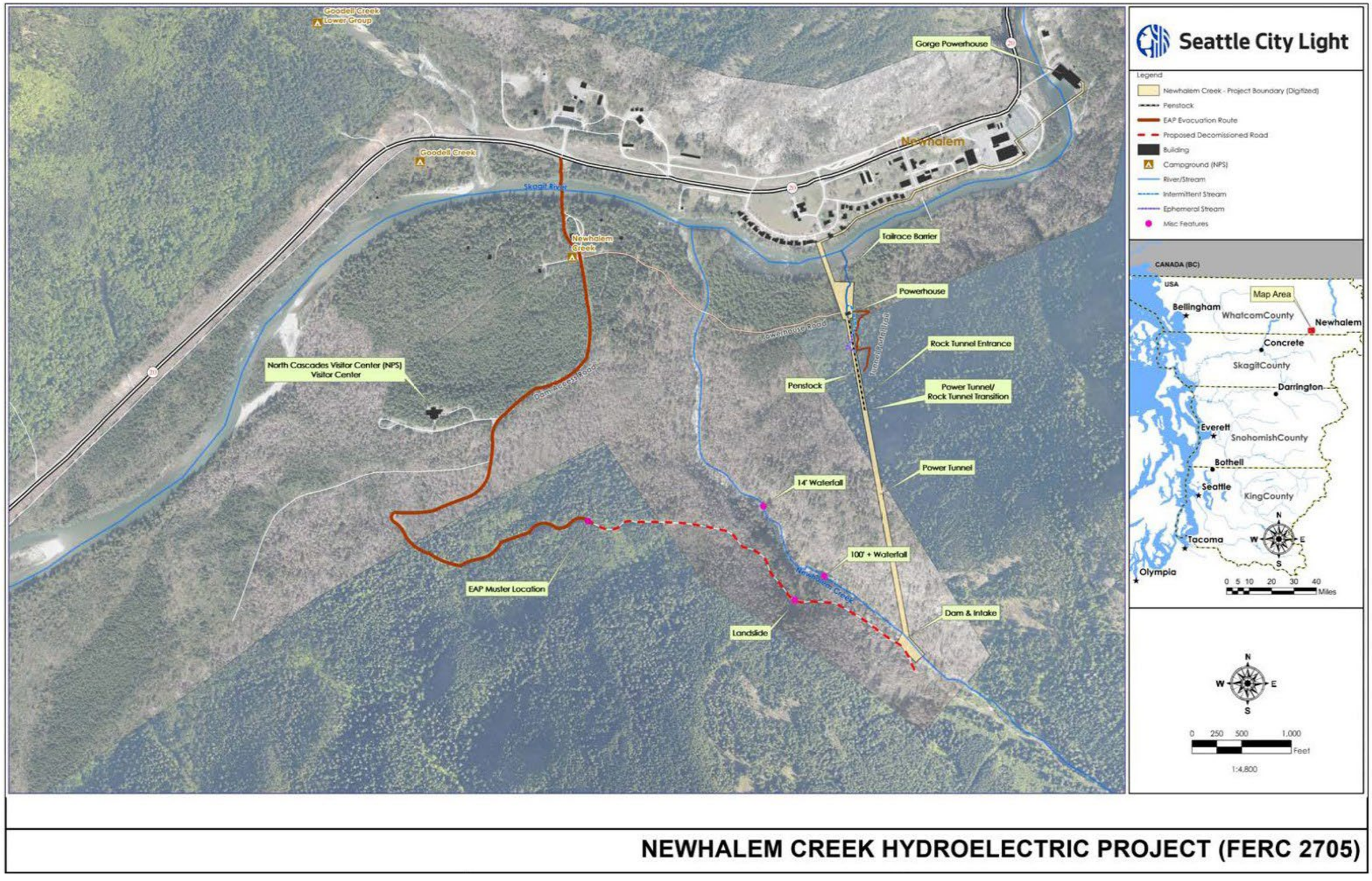


Figure 1.1-1. Prominent features of the Newhalem Creek Project.

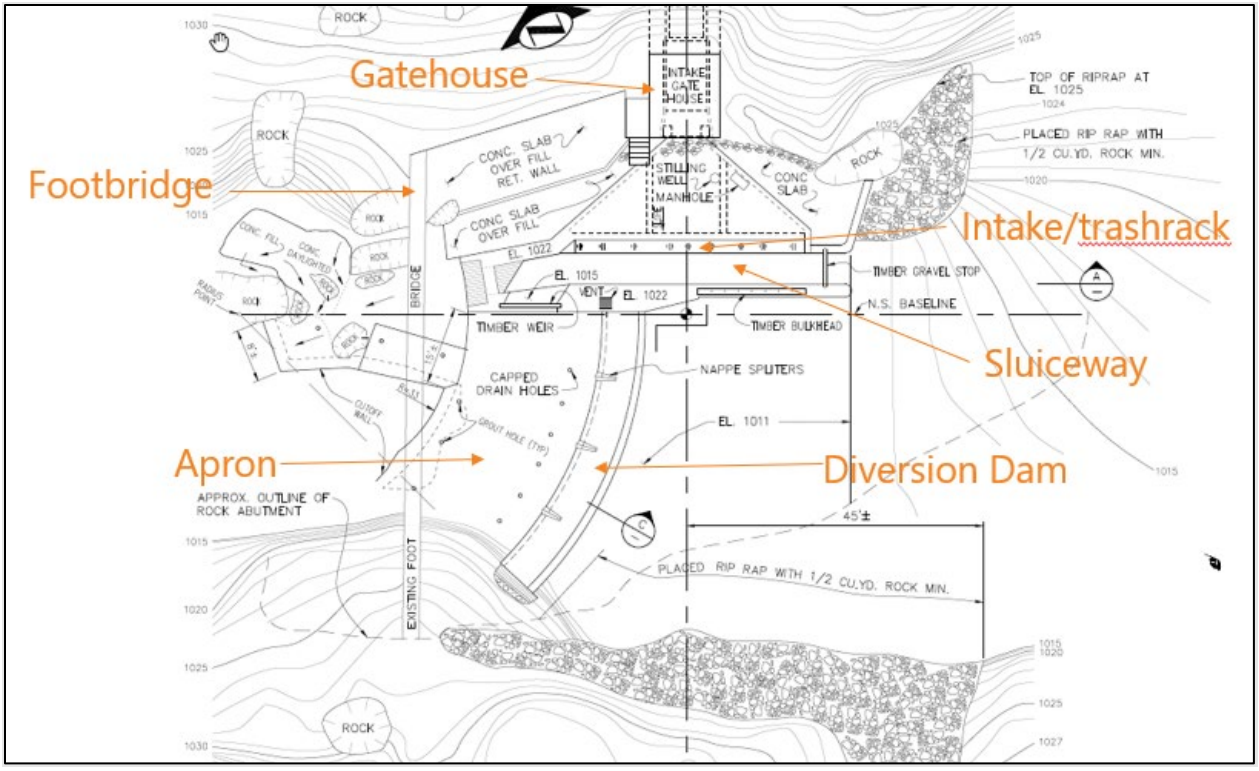


Figure 1.1-2. Newhalem Creek diversion structure – existing features.

- 30-foot by 56-foot wood framed powerhouse with a single generating unit—a double-overhung Pelton impulse turbine rated at 3,000 horsepower connected to a generator rated at 2,125 kilowatts.
- 350-foot-long unlined tailrace channel, varying from 5 to 40 feet wide, that discharges into the Skagit River.
- Concrete tailrace barrier structure, 3.6 feet high by 18 feet wide, with two 22.5-foot-long wing walls to prevent fish from entering the tailrace.
- 4,387-foot-long, 7.2-kilovolt transmission line consisting of four segments: (1) buried cable from the Newhalem Powerhouse to the Skagit River crossing (350 feet); (2) overhead river crossing (400 feet); (3) buried cable through the town of Newhalem (3,000 feet); and (4) overhead river crossing from the town of Newhalem to the Gorge Powerhouse (637 feet).
- Accessory equipment.

Article 403 of the license requires a minimum instream flow of 40 cfs downstream of the dam. Because of this instream flow requirement, the Project typically only operated four to six months per year. Additionally, Conditions 4 and 5 in the license stipulate that City Light must annually move woody debris and accumulated gravel over the dam. The quantity of accumulated gravel authorized to be passed over the dam is 200 to 400 cubic yards (CY) per year., Since 2019, however, a landslide along the access road to the diversion dam has made it impossible to comply with Conditions 4 and 5 and City Light has received exemptions from FERC.

1.2 Proposed Action Summary

City Light's proposed full decommissioning Project includes the following activities:

- Remove the dam, sluiceway/intake structure, gatehouse, and pedestrian bridge;
- Plug the power tunnel and abandon in place;
- Remove the powerhouse, electrical service line to the powerhouse, and six associated poles;
- Remove the penstock and penstock saddles;
- Gate the road to the dam at or near elevation 840 feet and maintain the road up to this point (approximately 0.5 mile) for emergency evacuation per the Skagit River Project Emergency Action Plan (Skagit EAP) in case of failure at Ross Dam; an approximate 0.75-mile section of road above elevation 840 feet will be permanently blocked and placed into storage[2];
- Remove the tailrace fish barrier;
- Remove the transformer and overhead transmission lines and abandon the underground transmission lines; and
- Work with the U.S. Geological Survey (USGS) to remove the stream gage above the dam.

Project features to be retained include a portion of the tailrace from the confluence with an intermittent stream downstream to the Skagit River because this section is part of an intermittent stream. The trail along the penstock is an emergency access route identified in the Skagit EAP, and City Light will continue to maintain it.

1.2.1 Anticipated Benefits of the Project

Following diversion structure removal, the Proposed Action will permanently restore pre-dam instream flow conditions, sediment transport, and nutrient transport to downstream reaches. Dam removal will restore natural riverine processes and will improve spawning gravel recruitment and transport to downstream reaches that may be used by Puget Sound steelhead, Puget Sound Chinook salmon, bull trout, and other salmonid species. Further, infrastructure removal and abandonment of the access road above elevation 840 feet will return areas to a more natural state.

1.3 Location

Newhalem is located between State Route 20 and the Skagit River, just downstream of the Gorge Powerhouse (see Figure 1.1-1) on NPS-managed land within the RLNRA. The powerhouse is reached via a road that traverses NPS's Newhalem Creek Campground and provides access to Newhalem Creek and several hiking trails.

The Newhalem Creek diversion structure, located at RM 1.0 just above a 167-foot waterfall (Newhalem Falls, RM 0.8), is run-of-the-river and impounds very little water (approximately 0.1 acre/0.6 acre-feet). A USGS stream gage is located roughly 200 feet upstream of the dam. Access to the dam is via a 1.4-mile-long gravel section of a former logging road, starting near the parking lot of NPS's Newhalem Visitor Center, and continuing past the dam along the Newhalem Creek

[2] Road storage is a form of abandonment that prevents damage to adjacent resources but preserves the road for future NPS access above the dam.

drainage as an unmaintained trail. This road is currently gated approximately 0.5 mile from the start. The lower road up to the gate is identified as an emergency evacuation route in the Skagit EAP. The upper portion of the road is closed to public access due to a landslide and unstable slope near the dam. The road is not within the Project boundary.

The entire area affected by the Proposed Action is located within Whatcom County on federal land managed by NPS (Table 1.3-1).

Table 1.3-1. Location of Proposed Action.

Description	Location
Section, Township, Range	S28, T37N, R12E
Nearest city	Newhalem
County	Whatcom
WRIA	Upper Skagit: WRIA 4
Hydrologic unit code (8th field)	17110005 (Upper Skagit Watershed)
Latitude/Longitude (dam site)	48°39'36.93"N; 121°14'48.77"W
Land management	NPS

Notes: N = North; R = Range; S = Section; T = Township; W = West; WRIA = Water Resource Inventory Area

1.4 Federal Nexus, Threatened and Endangered Species, and Essential Fish Habitat

Section 7 of the Endangered Species Act (ESA) requires that federal agencies ensure that any action they authorize, fund, or carry out does not jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of designated critical habitat for such species. When a federal action agency authorizes, funds, or carries out an action, it must consult with the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (USFWS; collectively, the Services) if the agency determines that the action may affect ESA-listed species or designated/proposed critical habitat.

For the Proposed Action, FERC is the federal lead as the regulatory authority for decommissioning. FERC will therefore consult with NMFS and USFWS as required under Section 7(a)(2) of the ESA. Additional federal nexus includes the NPS as the federal land manager for lands in the action area, and the U.S. Army Corps of Engineers (USACE), which will issue an authorization for work in waters of the U.S. pursuant to Section 404 of the Clean Water Act (CWA).

In a letter dated July 8, 2021, FERC designated City Light as the non-federal representative for the purpose of conducting informal consultation with the Services pursuant to the regulations at 50 Code of Federal Regulations (CFR) § 402.08 implementing Section 7 of the ESA. The role of the non-federal representative may include conducting studies, developing and supplying information, attending meetings, ensuring that pertinent endangered species information is maintained in a Project file, participating in informal consultation with USFWS and NMFS, developing a draft BA if necessary, and keeping FERC apprised of its actions. However, FERC remains ultimately responsible for all findings and determinations regarding the effects of the Project on any federally listed species or critical habitat.

In July 2021, City Light initiated informal consultation with NMFS, and USFWS and coordination with USACE to solicit early technical assistance for the Project. The initial solicitation consisted of an outreach email and phone call to set up a pre-submittal meeting to discuss the Proposed Action and anticipated consultation needs. City Light hosted a Microsoft Teams webinar on August 18, 2021, to introduce the Project to the Services, identify preliminary concerns and consultation points of contact, and discuss next steps prior to submittal of a BA to initiate consultation.

The ESA-listed species with potential to occur in the action area (see Section 3.0 of this BA) are summarized in Table 1.4-1 below. The ESA listing status and critical habitat designations for fish in Newhalem Creek were obtained from NMFS and the USFWS. An official species list for the action area was obtained from the USFWS Information, Planning, and Conservation (IPaC) System on July 1, 2021 (USFWS 2021). Updated IPaC lists were obtained on November 7, 2022, and February 12, 2025; the February 2025 IPaC is appended to this BA (Appendix A). The potential occurrences of ESA-listed species managed by NMFS and USFWS in the action area (Table 1.4-1) were supplemented with data from previous consultations in the area and by cross-referencing Priority Habitat Species (PHS) and Salmonscape data obtained for the action area (WDFW 2021a, 2022b).

In addition to ESA resources, this document analyzes and determines the effect of the Proposed Action on Essential Fish Habitat (EFH) for Pacific Coast salmon pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and the 1996 Sustainable Fisheries Act. Under this legislation, an evaluation of effects is necessary for activities that may adversely affect EFH. The Magnuson-Stevens Act, in 50 CFR § 600.905-930, defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The lower reach of Newhalem Creek downstream of a 14-foot natural waterfall at RM 0.65 contains EFH for Pacific Coast Salmon including Chinook Salmon (*O. tshawytscha*), Coho Salmon (*O. kisutch*), and Pink Salmon (*O. gorbuscha*). Summer Chinook Salmon and odd-year Pink Salmon are documented in the lower reaches of Newhalem Creek; Coho Salmon presence is assumed (WDFW 2021a).

Table 1.4-1. ESA-listed species with potential to occur in the action area and designated and proposed critical habitats.

Species		Listing Status	Critical Habitat	
Common Name	Scientific Name		Designated or Proposed	In Action Area
Birds				
Marbled Murrelet	*Brachyramphus marmoratus*	Threatened	Final	No
Northern Spotted Owl	*Strix occidentalis caurina*	Threatened	Final	No
Western DPS Yellow-billed Cuckoo	*Coccyzus americanus*	Threatened	Final – None in WA	No
Mount Rainier White-tailed Ptarmigan	*Lagopus leucura rainierensis*	Threatened	No	NA
Mammals				
Gray Wolf	*Canis lupus*	Endangered	No	NA
Canada Lynx[1]	*Lynx canadensis*	Threatened	Proposed	No
Grizzly Bear[1]	*Ursus arctos horribilis*	Threatened	Proposed	No
North American Wolverine[2]	*Gulo gulo luscus*	Threatened	No	NA
Fish				
Bull Trout	*Salvelinus confluentus*	Threatened	Final	Yes
Puget Sound Steelhead	*Oncorhynchus mykiss*	Threatened	Final	Yes
Puget Sound Chinook Salmon	*O. tshawytscha*	Threatened	Final	Yes
Insects				
Monarch Butterfly	*Danaus plexippus*	Proposed Threatened	Proposed	No
Suckley's Cuckoo Bumble Bee	*Bombus suckleyi*	Proposed Endangered	No	NA
Conifers				
Whitebark Pine	*Pinus albicaulis*	Threatened	No	NA

Notes: DPS = Distinct Population Segment; NA = not applicable; WA = Washington

1 The IPaC lists obtained for the action area did not include Canada lynx or grizzly bears; however, these species are included in this BA based on previous consultations completed in the area and the presence of potentially suitable habitat in the action area.

2 The November 2022 IPaC obtained for the action area did not include wolverine; however, the updated February 2025 version included the species as Threatened.

2.0 PROPOSED ACTION

City Light proposes to remove the Newhalem Creek diversion dam and associated headworks structures, tailrace fish barrier, and overhead transmission lines. The rock shaft and power tunnel will be sealed and abandoned, and the access road above elevation 840 feet, a section approximately 0.75 mile long, will be permanently blocked and placed into storage. Two emergency evacuation routes[3] will remain. The buried power lines on the south side of the Skagit River, both of which are underground features, will be removed. The powerhouse, penstock, and penstock saddles will be removed, in addition to the electrical service line to the powerhouse and six associated poles.

Elements of the Proposed Action are described in detail below. A range of feasible means and methods is considered for several elements and will ultimately be determined by the contractor. If any Project element is conducted in a manner not considered in this assessment, City Light will coordinate with the Services to ensure that coverage is provided for ESA-listed species and their critical habitats.

2.1 Elements of Proposed Action

The Proposed Action includes the elements summarized below (Table 2.1-1).

Table 2.1-1. Decommissioning elements summary.

Project Features to be Removed		Project Features to be Abandoned	Existing Project Features to be Retained
Diversion dam, sluiceway, and intake	Powerhouse	Power tunnel (including the rock shaft) and penstock tunnel	Emergency access trail along penstock
Gatehouse	Penstock and saddles	Access road above 840 feet elevation (and 0.25 miles of road accessing the powerhouse)	
Pedestrian bridge over dam	Overhead and underground electrical service lines		Dam access road below elevation 840 feet
Overhead transmission lines	Tailrace fish barrier		
Transformer			

2.2 Decommissioning Approach – Means and Methods

City Light has coordinated with NPS to develop appropriate means and methods to remove the various Project elements, identify best management practices (BMPs) to minimize effects to natural and cultural resources, and restore areas disturbed by decommissioning work. City Light evaluated several possible alternatives for accessing the diversion dam, removing the dam and

[3] Remaining access routes include the Skagit EAP emergency evacuation routes, which include the diversion dam access road to elevation 840 feet and the trail leading to the lower end of the rock tunnel. The EAP road would be placed into storage above the Skagit EAP evacuation muster site at approximately elevation 840 feet following dam removal.

other headworks structures, and resolving the disposition of the access road. City Light will refine these alternatives and work with NPS and the Services to ensure that all proposed actions are covered in the ESA consultation. For the purposes of this draft BA, effects to ESA-listed species (Section 6.0 of this BA) are considered for all actions proposed under all means and methods alternatives. Therefore, the assessment of impacts considers the "worst-case scenario" approaches for all actions to ensure coverage for all possible approaches, for all listed species.

2.2.1 Diversion Dam Access Alternatives

A significant challenge in removing the Newhalem Creek diversion dam and other headworks is access. Currently, the road is blocked with large rocks from an active landslide approximately 1,140 feet (0.2 mile) below the diversion dam (Figure 2.2-1). In addition to the recurring landslide, the road is failing near the landslide in the form of tension cracks and a failing retaining wall on both sides of the landslide.

While the road is the most likely means of accessing the diversion dam and headworks, it is possible that a helicopter assist may occasionally be needed. Therefore, for the purposes of this assessment, two alternative access approaches were evaluated for dam removal: truck access via improvements to the existing access road or use of helicopters (Table 2.2-1). A combination of both access approaches may also be considered (e.g., trucks may primarily be used on improved access road, with helicopter assist as required for some elements such as bridge removal).

Figure 2.2-1. Photos of Dam Access Road showing landslide and embankment instability.

2.2.1.1 Access Alternative 1: Road Repair

The preferred approach to accessing the diversion dam site is to repair the road to the extent needed for safe, short-term use by personnel, equipment, highway-legal dump trucks and other vehicles. Road improvements would require about three weeks to accomplish, and no trees would be removed. For this assessment, City Light assumes any or all proposed methods could be used to improve the existing access road to allow access to the dam site, including:

- Clearing material from the roadway, including using a non-explosive cracking agent to break apart large rocks;

- Using some of the cleared material to construct a catchment structure as a barrier between the road and the failing slope above the road, and using broken-up rocks to armor the slope next to the road (creek side) and scale the slope on the opposite side;
- Repairing the retaining wall and filling roadway tension crack; and
- Scaling the slope above the road, which may involve the use of small explosives to remove large rocks and debris fencing.

For large rock removal, the non-explosive rock cracking method includes drilling a small-diameter hole into rock and adding an expansive chemical agent that will expand and crack the rock over a period of hours, making removal more manageable for large boulders and other materials (e.g., concrete) (Al-Bakri and Hefni 2021). The U.S. Department of Transportation (2006) reports that rock drills equipped with top hammers to bore holes for blasting typically generate a peak noise of 98 decibels (dB) at 50 feet. In a recent blasting event at the Marblemount Quarry, Revey Associates (2019) reported that the drills used for such work contained "down-hole hammers" and generated noise below 90 dB at 50 feet. Relative to the chemical expanding process itself, although some studies indicate that no noise or vibration is associated with the use of chemical expansion agents, other studies report that noise ranges from 60 to 65 dB at 23 feet from the action, making this a relatively quiet approach for boulder fracturing (Hong Kong Government 2016).

Table 2.2-1. Comparison of dam access alternatives.

Alternative	Physical Disturbance	Duration	Noise
Truck (preferred alternative)	• No trees removed • Scaling • Rock breaking • Berm construction	• Mobilization (1 day) • Road improvement (3 weeks) • Scaling (2 weeks) • Dam removal and disposal (3 weeks) • Demobilization (1 day) • Road storage (permanent) • Total duration ≅ 9 weeks	• Scaling – small explosives • Heavy equipment for clearing and improving the road • Breaking existing rock with equipment or expansive materials and building berm between road and slope • Excavator for dam removal loading directly into trucks • Highway legal truck traffic along access road and highway for disposal
Helicopter (if needed)	0–10 trees removed for landing area and temporary stockpile for material disposal	• Mobilization (1 week) • Dam removal (3 weeks) • Helicopter disposal (4 weeks) • Demobilization (1 week) • Road storage (permanent) • Total duration ≅ 10 weeks	• Helicopter noise for mobilization and equipment fuel during dam removal and for disposal material transport • Excavator for dam removal transported by helicopter in pieces and assembled on site • Disposal material stockpiled on site prior to helicopter transport • Helicopter transport to highway • Highway-legal truck traffic along highway for disposal

Note: Disposal and dam removal are parallel timelines for the trucking options since material will be taken from the creek and loaded into the trucks.

2.2.1.2 Access Alternative 2: Helicopter Transport

Helicopter use for access to the diversion dam site is not preferred, but this alternative is included in the BA in case road repair is infeasible. It is also possible that helicopters may occasionally be needed to aid with the decommissioning process at the headworks (i.e., removal of the bridge) even if the road is repaired.

This access alternative will primarily use helicopters to transport equipment to the dam to facilitate removal. It will require use of an existing helipad in Newhalem and a drop zone near the dam to transport the equipment necessary to deconstruct the diversion structure (Figure 2.2-2). Construction equipment will be disassembled and transported in pieces, then reassembled at the dam site. Two types of helicopters may be used, depending on the size of excavator required to conduct the work:

- S64 Skycrane: capacity is 15,000 pounds; will take 16 trips total for mobilization and demobilization of parts for a large excavator; or
- Bell 205: capacity is 8,000 pounds; will take 10 trips total for mobilization and demobilization of a medium-sized excavator.

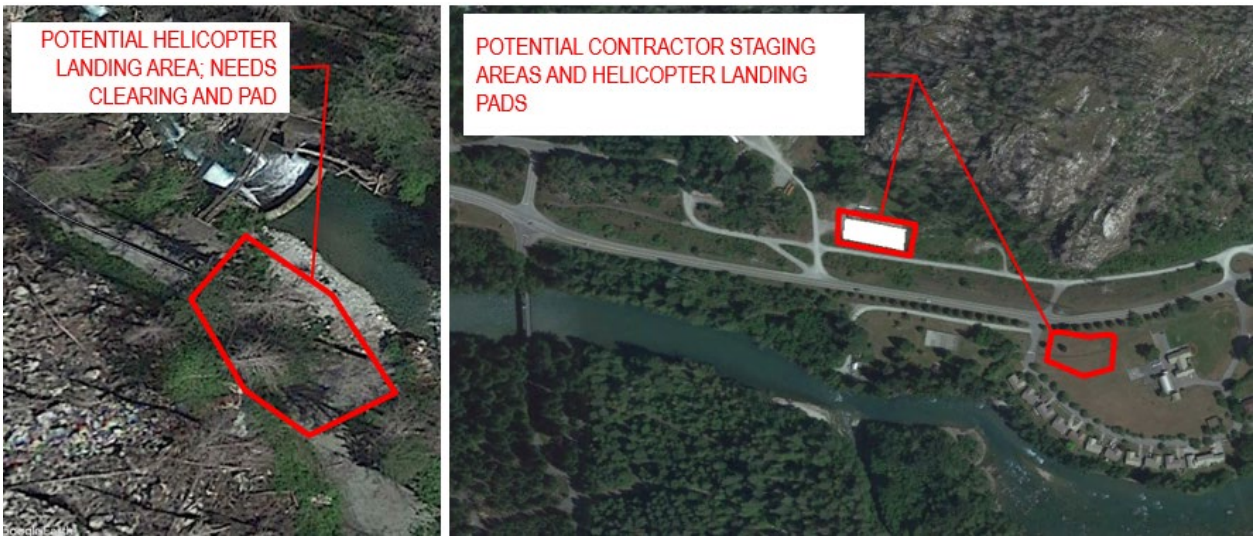


Figure 2.2-2. Existing and potential helicopter landing areas at the dam site (left) and Newhalem (right).

Personnel can also be transported using the helicopters if the access road improvements do not occur. Alternatively, personnel could reach the site by foot along the road, assuming that the slide area can be crossed safely. Helicopter disposal of dam debris would require about four weeks; up to 10 trees, several of which were burned during a recent wildfire, may be removed to accommodate helicopter landings upstream of the dam site (Figure 2.2-3).

Figure 2.2-3. Potential drop zone location, upstream of dam site on left bank, showing burned trees and limited canopy.

2.2.2 Diversion Dam and Headworks Removal Alternatives

Removal of the diversion dam and headworks will require work within and adjacent to Newhalem Creek. Infrastructure removal will occur in phases to accommodate phased dewatering and an in-channel creek bypass.

2.2.2.1 Dewatering Timing and Overview

All work below the Ordinary High Water Mark (OHWM) for diversion structure removal would be completed in four weeks and within the in-water work period for Newhalem Creek, which is July 16 through August 19 (WDFW 2018). However, for the purposes of this consultation, and in consideration of potential delays to access road repairs required to access the dam site, City Light requests that in-water work be authorized through September 1 of the construction year. Therefore, the requested in-water work window for dam and headworks removal under the Proposed Action is July 16 through September 1[4]. All cofferdam materials will be removed by September 1.

Prior to infrastructure removal, the dam site will be dewatered and isolated from active flow. City Light anticipates the following approach for dewatering:

(1) Establish upstream and downstream water quality monitoring stations.

(2) Identify the portion of the off-channel area to be used for temporary settling of nuisance water from isolation area, if required.

[4] The License Surrender application (City Light 2022b) includes a July 16 – August 19 work window. For ESA consultation purposes, City Light requests a July 16 – September 1 work window, and the analysis of effects of the Proposed Action in this BA consider are commensurate with this extended window.

(3) Install fiber wattles or sediment fences parallel to both creek banks. These features will be positioned to the extent necessary to isolate streamside disturbances, including spoil piles, from the creek.

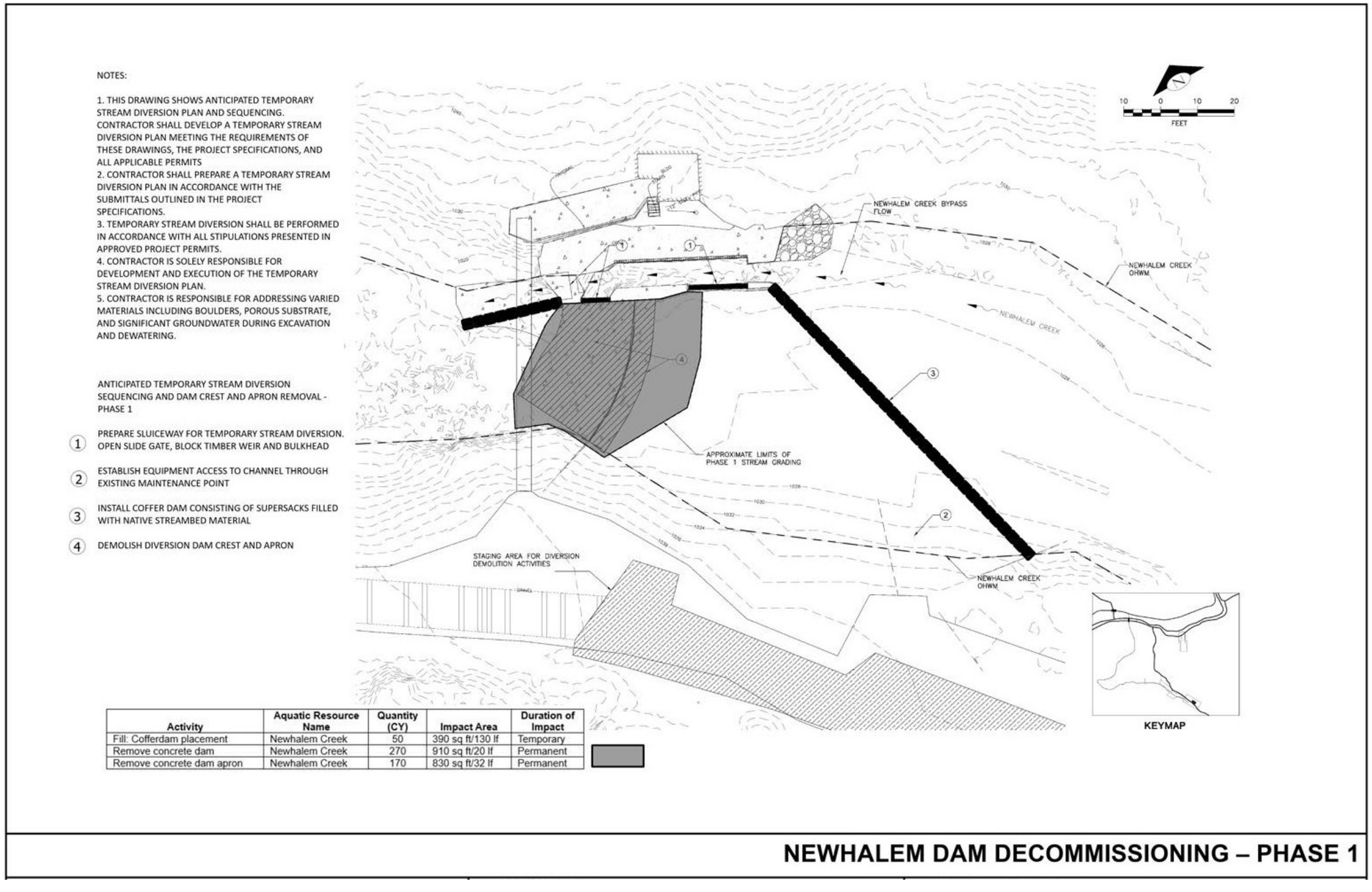
(4) Isolate in-water work areas for each phase of dam removal (see next section) using supersacks (bulk bags) filled with native streambed materials.

Specific dewatering strategies for each phase are discussed in the following sections. Any substantive deviation from the approach presented herein will be coordinated with NPS, NMFS, USFWS, Washington Department of Fish and Wildlife (WDFW), and USACE a minimum of 30 days prior to in-water work for approval.

2.2.2.2 Phase 1: Remove Diversion Dam and Downstream Concrete Apron

During the first phase of dam infrastructure decommissioning, the selected contractor will fill supersacks with native creek sand, gravel, and cobble and place them in the channel upstream of the impoundment, diverting water into the sluiceway to dewater the area around the dam (Figure 2.2-4). Excavators may be used in the wetted channel to place cofferdam materials. During low-flow periods in summer and early fall, the creek flows along the right bank into the intake, and the left side of the channel is dry. This condition will allow for use of an excavator to fill supersacks with streambed gravels "in the dry." Once isolated, the contractor will remove the weir by breaking apart the concrete with an excavator, jack hammer, and/or non-explosive cracking agent (Figure 2.2-5). An alternate method for coffer-damming may include the use of excavators to create a streambed gravel berm for in-water work isolation. If this occurs, excavators will operate on portions of the streambed that are naturally dewatered during the low-flow in-water work period or will use materials placed on the substrate (e.g., timber cribbing) to ensure that excavator tracks are elevated above water level.

Figure 2.2-4. Photos depicting Phase 1 dam removal approach – divert creek into right bank sluiceway.



Activity	Aquatic Resource Name	Quantity (CY)	Impact Area	Duration of Impact
Fill: Cofferdam placement	Newhalem Creek	50	390 sq ft/130 lf	Temporary
Remove concrete dam	Newhalem Creek	270	910 sq ft/20 lf	Permanent
Remove concrete dam apron	Newhalem Creek	170	830 sq ft/32 lf	Permanent

Figure 2.2-5. Phase 1 site plan: Dam and apron removal.

Note: Updated plan set includes supersack cofferdam downstream of concrete apron.

2.2.2.1 Phase 2: Remove Other Headworks

During Phase 2, the selected contractor will re-position the supersacks to direct flow into a culvert or series of culverts (corrugated steel or plastic pipe) that will be placed in the main channel and covered with native creek substrates to allow an excavator to access the channel and isolate the right bank intake/sluiceway area. The culverts will be sized to convey anticipated flows during in-water work, with a 10 percent exceedance. Following isolation, the contractor will remove the trashrack, intake, and sluiceway (Figure 2.2-6 and Figure 2.2-7). An area of right-bank substate armoring (concrete) located under the bridge and extending approximately 20 feet downstream will also be removed. Concrete will be broken apart with an excavator, jack hammer, and/or non-explosive cracking agent.

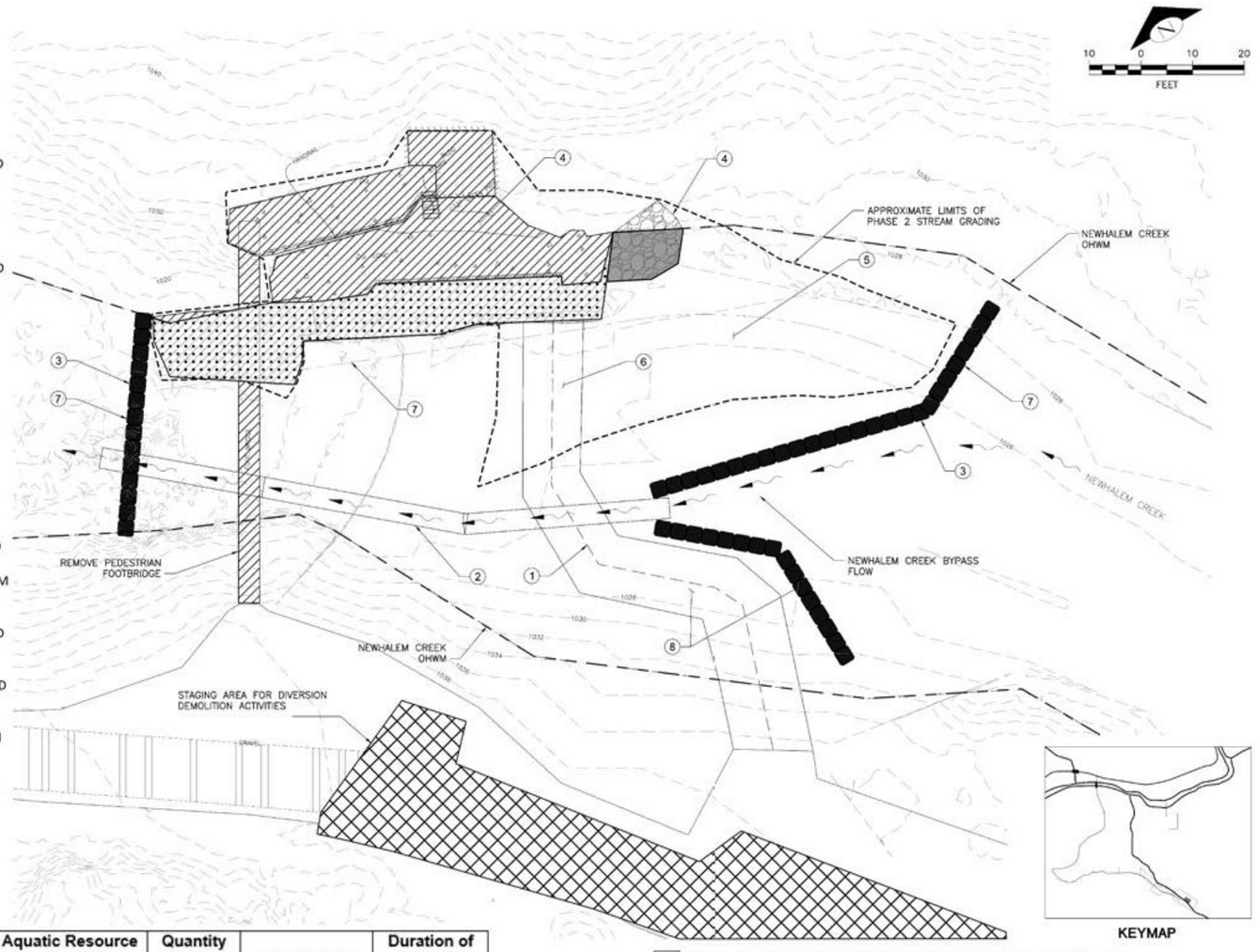
Phase 2 will also include the removal of the gatehouse, pedestrian bridge, and bridge abutments. The pedestrian bridge abutments are located along the streambank atop bedrock, primarily landward of the OHWM (Figure 2.2-8). Therefore, in-water work to remove the bridge will be limited to an excavator that may be positioned within the dewatered area for access to the right bank. If removed, it could be dismantled in pieces, or could be airlifted as a full span depending upon equipment capabilities and availability. The bridge remnants will be transported to an approved upland location to be determined by City Light. Riverbanks will be restored with native vegetation following construction completion. City Light is preparing a restoration plan for the full project in collaboration with the NPS.

Figure 2.2-6. Right bank infrastructure to be removed during Phase 2.

NOTES:
1. THIS DRAWING SHOWS ANTICIPATED TEMPORARY STREAM DIVERSION PLAN AND SEQUENCING. CONTRACTOR SHALL DEVELOP A TEMPORARY STREAM DIVERSION PLAN MEETING THE REQUIREMENTS OF THESE DRAWINGS, THE PROJECT SPECIFICATIONS, AND ALL APPLICABLE PERMITS
2. CONTRACTOR SHALL PREPARE A TEMPORARY STREAM DIVERSION PLAN IN ACCORDANCE WITH THE SUBMITTALS OUTLINED IN THE PROJECT SPECIFICATIONS.
3. TEMPORARY STREAM DIVERSION SHALL BE PERFORMED IN ACCORDANCE WITH ALL STIPULATIONS PRESENTED IN APPROVED PROJECT PERMITS.
4. CONTRACTOR IS SOLELY RESPONSIBLE FOR DEVELOPMENT AND EXECUTION OF THE TEMPORARY STREAM DIVERSION PLAN.
5. CONTRACTOR IS RESPONSIBLE FOR ADDRESSING VARIED MATERIALS INCLUDING BOULDERS, POROUS SUBSTRATE, AND SIGNIFICANT GROUNDWATER DURING EXCAVATION AND DEWATERING.

ANTICIPATED TEMPORARY STREAM DIVERSION AND HEADWORKS REMOVAL SEQUENCING - PHASE 2

1. CONSTRUCT TEMPORARY CONSTRUCTION ACCESS BERM TO DIVERSION INTAKE STRUCTURE BY PLACING STREAMBED MATERIALS ATOP TEMPORARY BYPASS CULVERT.
2. INSTALL TEMPORARY CULVERTS. MIN. DIA 48 INCHES.
3. INSTALL COFFER DAM CONSISTING OF SUPERSACKS FILLED WITH NATIVE STREAMBED MATERIAL. MINOR CHANNEL GRADING ANTICIPATED TO ESTABLISH TEMPORARY STREAM DIVERSION
4. REMOVE REMAINING HEADWORKS INFRASTRUCTURE AND SEAL VERTICAL POWER TUNNEL.
5. PERFORM CHANNEL EXCAVATION TO ESTABLISH PROPOSED NEWHALEM CREEK CHANNEL (SEE SHEET 13)
6. REMOVE ACCESS ROAD AND COMPLETE GRADING WITHIN LIMITS OF NEWHALEM CREEK CHANNEL GRADING
7. REWATER COMPLETED NEWHALEM CREEK CHANNEL IN A GRADUAL, CONTROLLED MANNER BY REMOVING DOWNSTREAM AND THEN UPSTREAM COFFERDAMS
8. REMOVE REMAINING TEMPORARY STREAM DIVERSION MATERIALS AND RESTORE CHANNEL BANKS TO PRE-



Activity	Aquatic Resource Name	Quantity (CY)	Impact Area	Duration of Impact
Fill: Cofferdam placement	Newhalem Creek	60	540 sq ft/180 lf	Temporary
Excavate: Concrete sluiceway and headworks structures	Newhalem Creek	150	870 sq ft/90 lf	Permanent
Excavate: Riprap	Newhalem Creek	20	170 sq ft/20 lf	Permanent

Permanent impact – Excavate concrete sluiceway and headworks
Permanent impact – Excavate riprap
Elements landward of OHWM
Staging area

NEWHALEM DAM DECOMMISSIONING – PHASE 2

Figure 2.2-7. Site plan showing facilities to be removed during Phase 2.

Figure 2.2-8. Newhalem Creek diversion dam pedestrian bridge, showing left bank abutment downstream of the dam.

2.2.2.2 Phase 3: Dispose of Demolished Concrete and Seal Power Tunnel Rock Shaft

Approximately 590 CY of concrete would be removed from the creek if all infrastructure is removed (i.e., the dam, intake/sluiceway, and downstream apron). Concrete would be temporarily stockpiled in uplands in the staging area until removed from the site. At the diversion site, the staging area will include a previously cleared, gravel parking area along the left bank, upstream of the dam. Concrete will be transported to approved upland disposal sites via highway legal dump trucks. Assuming 12 trips per day, disposal using small trucks would require approximately 162 trips over 14 days; large trucks would require approximately 81 trips over 7 days. No material will be disposed in wetlands or waters of the U.S.

If needed, some or all concrete material could be transported off site via helicopter. Concrete debris and other materials could be moved to a temporary upland storage site in Newhalem, then loaded into trucks for transport to an existing and approved disposal area. For disposal of all concrete, a Bell 205 would require approximately 252 trips over 21 days and an S64 Sky Crane would require 151 trips over 13 days, assuming 12 trips per day for both helicopter types.

At the end of Phase 3, the upstream end of the power tunnel will be sealed with a concrete sealing slab; the lower end is already blocked with a concrete plug, which will remain in place. The supersacks will be removed and emptied, and all equipment will exit Newhalem Creek. Areas

disturbed by deconstruction activities and the sites previously occupied by headworks will be graded and replanted. A restoration plan for these areas will be developed in coordination with NPS.

2.2.3 Road Storage or Convert to Trail

Once the concrete is removed from the diversion dam and headworks demolition phase, the access road above the Skagit EAP evacuation muster site (elevation 840 feet), a section approximately 0.75 mile long, either will be permanently blocked, placed into road storage, or converted into a trail. Road storage work will include removing the existing culverts and reshaping the small, ephemeral, and intermittent drainages to re-establish flow. A ”rough and loose” restoration technique would be applied to the compacted roadway surface by scooping soil approximately 2 feet deep with an excavator bucket and placing it back onto the roadway in a nonuniform manner creating uneven pit and mound topography. A road storage plan will be developed based on U.S. Forest Service and/or Washington Department of Natural Resources guidelines. This may include removing the approximately eight existing culverts and restoring natural drainages, scarifying the road surface, reseeding, restoring the roadbed with nature plants, and implementing weed control for five years as needed.

Converting the road to a trail instead of road storage will require more rock scaling and debris clearing at the landslide location to establish permanent access. Conversion of the existing roadbed to a trail will involve construction techniques similar to the full removal. Allowing for a trail bed may preclude the reestablishment of some natural ephemeral and intermittent drainages, although, where appropriate, existing culverts would be removed. In the latter instances, armored swales or drain lenses could be used to allow runoff to flow across the trail. The “rough and loose” restoration technique would be used to restore the majority of the roadway to a natural state, but a minimum 36-inch width of the roadway would be preserved to serve as the trail bed.

2.2.4 Removal of Tailrace Barrier and Restoring Portions of Tailrace Channel

As noted previously, the Project has not been in active operation since 2010. Prior to that time, the Newhalem dam diverted water into a buried shaft under the left-bank gate house. Water was then delivered into a buried tunnel and to a penstock that traversed the Newhalem Creek canyon, ending at the powerhouse located about 3,600 feet northeast of the dam. The powerhouse discharged water diverted at the dam into a 350-foot-long tailrace channel; a concrete barrier at the lower end of the channel prevented fish from the Skagit River from entering the tailrace during high flow (Figure 2.2-9).Currently, no water is diverted from Newhalem Creek; a minor amount of groundwater currently infiltrates into the power tunnel, is collected in the penstock, and discharged into the tailrace.

Under the Proposed Action, the tailrace would be retained from the confluence with an intermittent stream downstream to the Skagit River because this section is part of an intermittent stream. The tailrace fish barrier would be demolished (Figure 2.2-10) with an excavator-mounted jackhammer, assisted by a non-explosive cracking agent, concrete saw, and/or waterjet cutter. Additionally, riprap associated with the tailrace barrier and the spur trail and viewing area would be removed and the channel would be restored with a low-flow channel for approximately 75 feet upstream. The former road used to install the tailrace barrier is still evident and would be re-commissioned

for this work. Dump trucks would haul spoils to an approved upland location. The road will be decommissioned upon the completion of tailrace barrier removal.

Tailrace barrier removal work will involve the following general steps:

- Re-establish the previous access road and staging area: Based on construction drawings of the tailrace barrier, the access road to the site was 200 feet long and utilized approximately 50 feet of the transmission line corridor before veering towards the tailrace barrier. Although revegetated, evidence of this road is still visible. Re-establishing this old road will require removing some small trees and shrubs and establishing erosion-control BMPs. Equipment and truck staging for the tailrace barrier removal work will be in the existing cleared area between the powerhouse and the first set of transmission poles.
- Demolish concrete: The tailrace barrier consists of approximately 50 CY of concrete reinforced with rebar. The tailrace barrier will be demolished with an excavator-mounted jackhammer and/or a non-explosive cracking agent, concrete saw, and/or waterjet cutter. City Light will develop BMPs to ensure that concrete dust or slurry does not enter the Skagit River or any surface water drainage in the area. Dump trucks will transport the waste concrete and rebar to an appropriate disposal site.
- Remove riprap and regrade tailrace outlet: Following removal of the tailrace barrier, a low flow channel would be established by grading the tailrace and placing large woody material in the restored channel as depicted below (Figure 2.2-11). Large woody material would be anchored by embedding into existing channel banks and/or possibly supplemented by boulder ballast. Any boulder ballast would consist of rounded streambed boulders and placed outside of the OHWM. This would create high-flow refugia habitat for anadromous fish and minimize potential stranding potential during 100-year flood events. Tailrace barrier removal and restoration would occur within the 100-year floodplain.

Although a portion of the tailrace barrier is located within the OHWM of the Skagit River, a cofferdam is not proposed for barrier removal due to its location on the right bank of the Skagit River channel, outside the typical wetted perimeter. This approach was verified on-site during a September 13, 2024 field visit to the tailrace with NPS, USFWS, and WDFW. Silt fencing would be used to prevent erosion and to prevent sedimentation into the Skagit River. The tailrace barrier would be removed during drier months of the year, likely in September or October. Because the Skagit River is not hydrologically connected during most flow conditions, work would therefore be conducted in the dry; no stream isolation would be used. Although work is planned to occur during the dry summer/early fall months, during a September 13 site visit to the tailrace, WDFW Habitat Biologists confirmed WDFW would not require work to adhere to an in-water work window. This is because in-water work would not occur; the area is expected to be dry and isolated from the Skagit River by over 40 feet.

During an October 8, 2024 site visit with Beth Fallon (NPS plant ecologist), Curtis Clement (Upper Skagit Indian Tribe geologist), and Scott Luchessa (City Light Lead Restoration Ecologist), the participants conducted a walk-through of the Powerhouse tailrace area to discuss potential vegetation salvage and restoration approaches that would minimize impacts to and loss of native riparian vegetation during tailrace barrier removal. During the site visit, the NPS recommended

salvage and replanting of native trees, shrubs, and herbaceous material as part of riparian habitat restoration following construction..

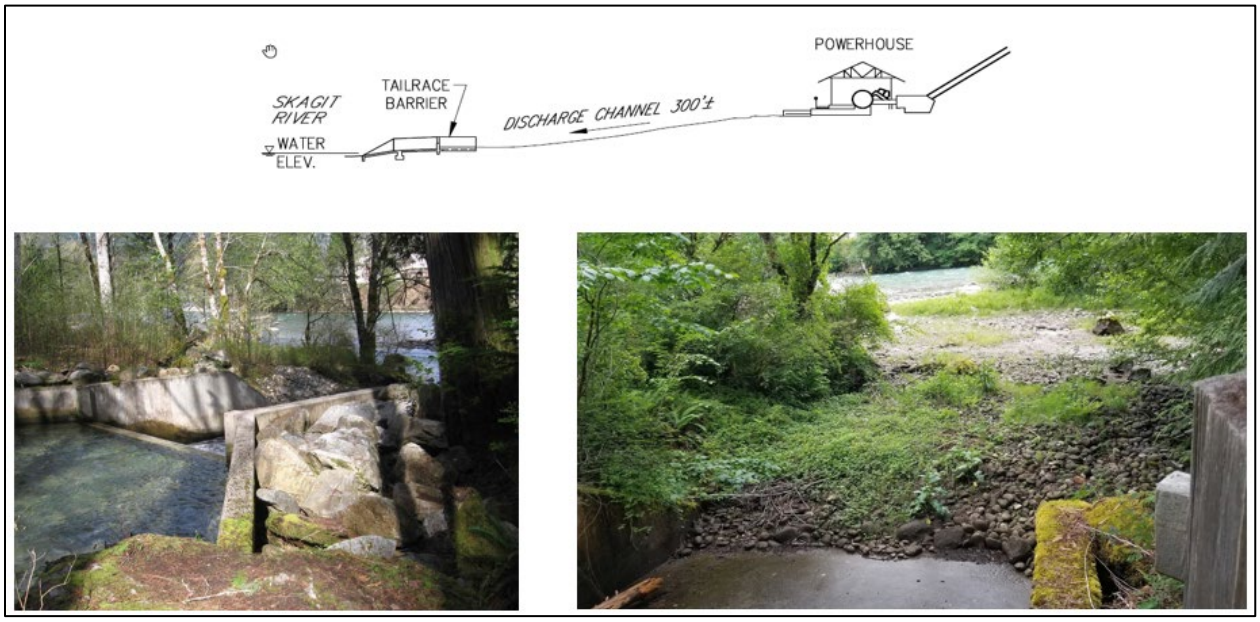
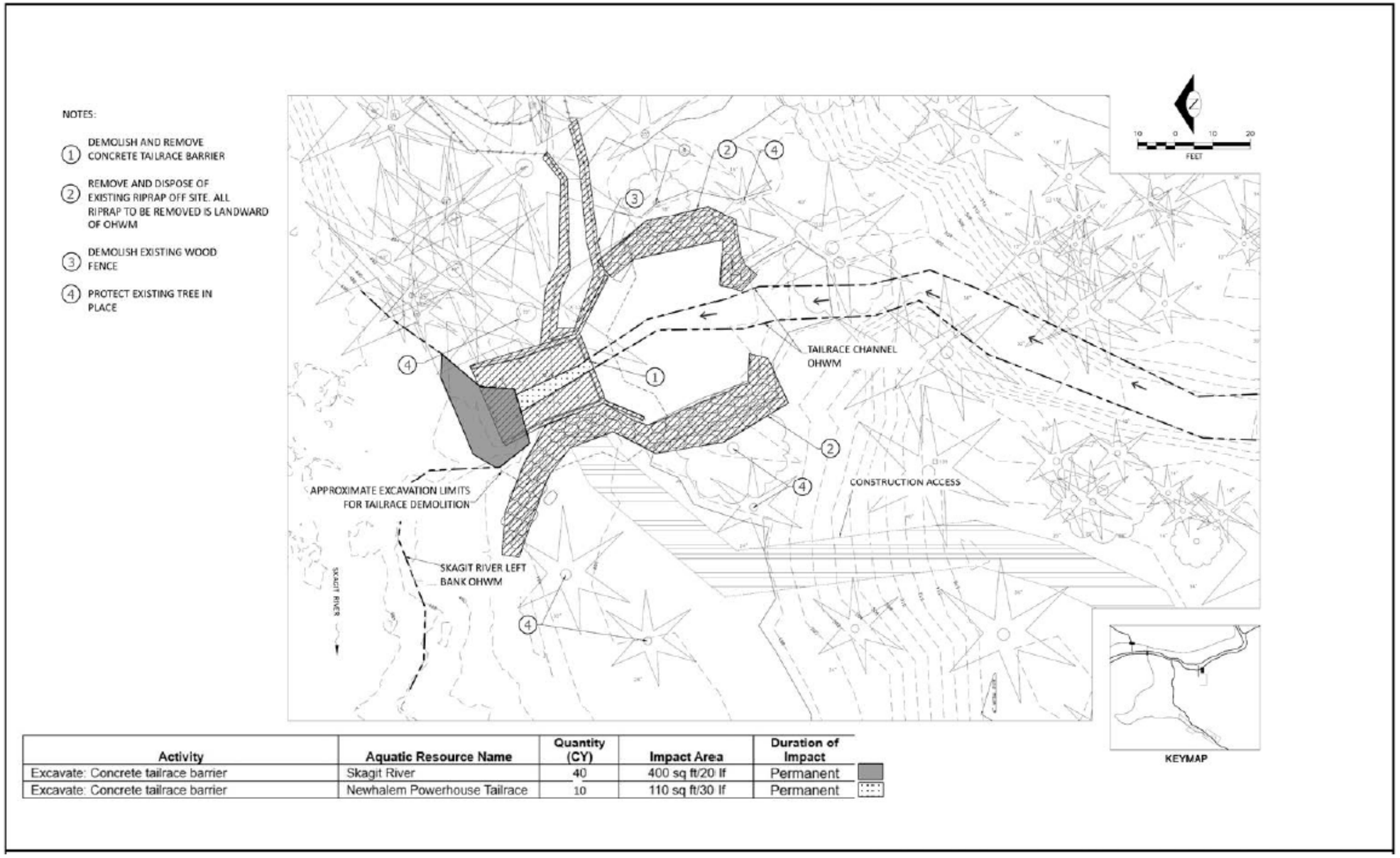
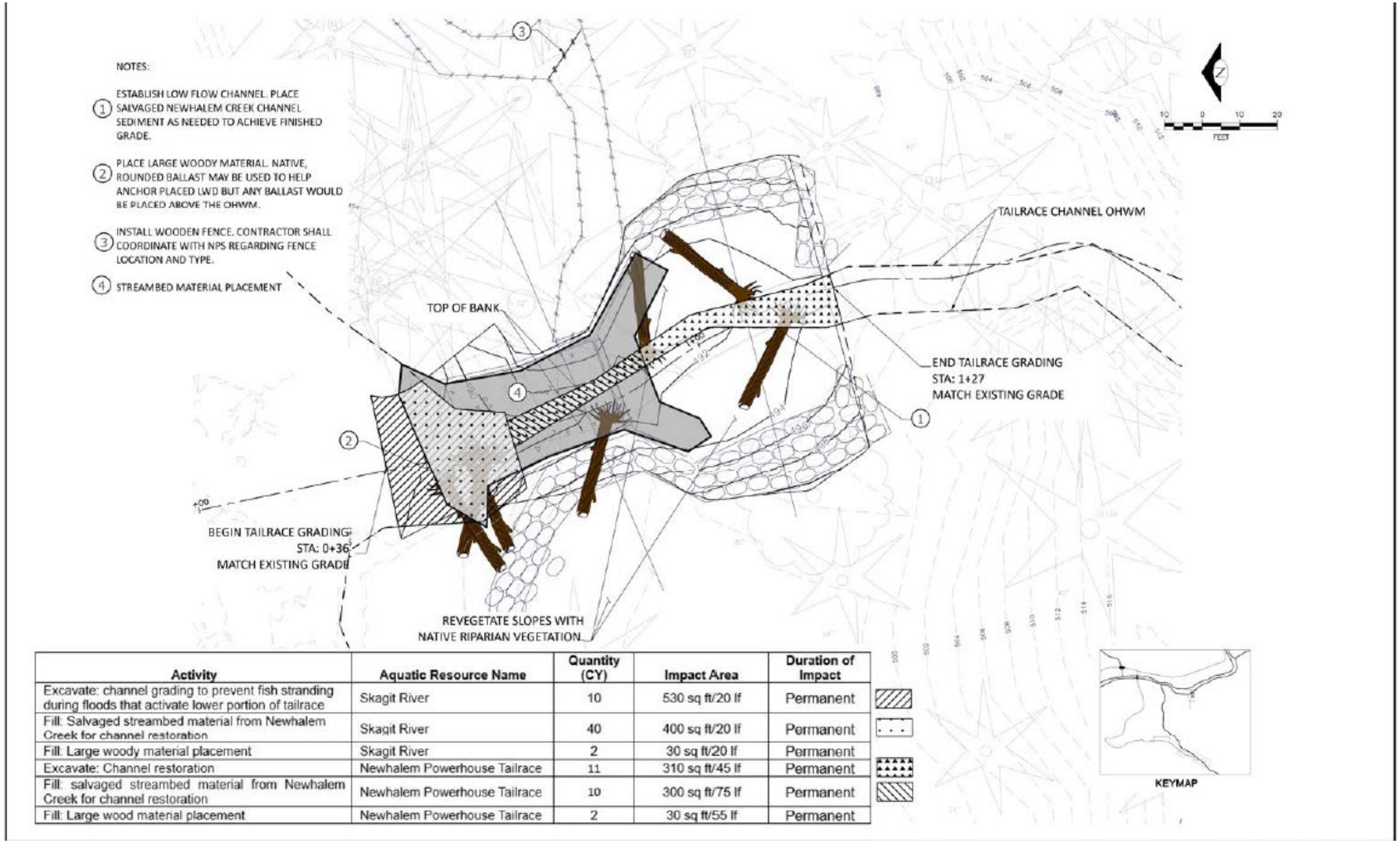


Figure 2.2-9. Tailrace fish barrier (left), showing land separation from Skagit River (right; Skagit River in the distance).



Activity	Aquatic Resource Name	Quantity (CY)	Impact Area	Duration of Impact
Excavate: Concrete tailrace barrier	Skagit River	40	400 sq ft/20 lf	Permanent
Excavate: Concrete tailrace barrier	Newhalem Powerhouse Tailrace	10	110 sq ft/30 lf	Permanent

Figure 2.2-10. Tailrace barrier removal plan.



Activity	Aquatic Resource Name	Quantity (CY)	Impact Area	Duration of Impact
Excavate: channel grading to prevent fish stranding during floods that activate lower portion of tailrace	Skagit River	10	530 sq ft/20 lf	Permanent
Fill: Salvaged streambed material from Newhalem Creek for channel restoration	Skagit River	40	400 sq ft/20 lf	Permanent
Fill: Large woody material placement	Skagit River	2	30 sq ft/20 lf	Permanent
Excavate: Channel restoration	Newhalem Powerhouse Tailrace	11	310 sq ft/45 lf	Permanent
Fill: salvaged streambed material from Newhalem Creek for channel restoration	Newhalem Powerhouse Tailrace	10	300 sq ft/75 lf	Permanent
Fill: Large wood material placement	Newhalem Powerhouse Tailrace	2	30 sq ft/55 lf	Permanent

Figure 2.2-11. Tailrace barrier channel restoration plan.

2.2.5 Rock Shaft and Power Tunnel Abandonment

The rock shaft would be abandoned and sealed at the upper end with a concrete sealing slab. The penstock would be cut from the concrete plug separating the power tunnel from the penstock and removed from the rock tunnel. The opening of the rock tunnel would be gated to allow for the drainage of ground water that enters the tunnel through cracks in the rock, and to prohibit human access. Depending on the drainage volume of water, a pipe may be needed to convey water to a different location once the penstock is removed.

2.2.6 Removal of Powerhouse and Electrical Service Lines

The transmission and electrical service lines over the river will be removed, along with the power poles. The transmission lines will be removed with a truck-mounted cable reel, using access from the south side of the river on the same road established for the tailrace barrier work, or from the north side of the river on paved or lawn surfaces in Newhalem. The underground electrical lines and conduits between the power poles on the southwest side of the Skagit River and the powerhouse will be excavated and removed.

The powerhouse and its foundation will be demolished with an excavator and/or other conventional equipment. Equipment inside the powerhouse and the transformers located just outside of the powerhouse will be salvaged or disposed of off-site. The powerhouse site, the cleared area adjacent to the powerhouse, the transmission line right-of-way on the southwest side of the Skagit River, and the parking area will be restored. The access road between the powerhouse and the Rock Shelter Trail will be permanently blocked and decommissioned. A road decommissioning plan will be developed based on U.S. Forest Service (USFS) and/or Washington Department of Natural Resources guidelines and in collaboration with the NPS. This includes removing existing culverts and restoring natural drainages, scarifying the road surface, natural regeneration and/or replanting, and controlling invasive plants for three years as needed.

2.2.7 Removal of Penstock and Penstock Saddles

The lower section of the penstock, saddles, and thrust blocks will be removed with a conventional excavator as allowed by the slope. Upper portions of the penstock may be taken down using cables to control movement or potentially with helicopter assist. The penstock will be separated at the expansion joints and pulled or lowered down the hill using an excavator. The 54 concrete saddles (plus 2 wooden saddles) situated every 20 ft up the hillside will also be removed. The saddles are 6 ft wide, 10 inches (in) thick, range from 4.3 to 6 ft tall, and are either buried approximately 3 ft deep or embedded onto bedrock with four rock anchors. The six concrete thrust blocks range in size from 5 ft long by 5 ft wide to 10 ft long by 7 ft wide, with heights between 5 and 8-ft and varying depths. The saddles and the thrust blocks will be broken apart with an excavator or hand tools and cut and chipped from the bedrock with a jackhammer and moved off the slope. Trucks will be used to remove material to an off-site disposal area. Areas disturbed by the removal of the penstock and saddles will be restored either by natural recovery, seeding, planting, and/or mulching, as appropriate and in coordination with the NPS.

Although access for construction equipment during most of the penstock removal is expected to be accommodated within the previously disturbed corridor adjacent to the penstock (i.e., the area devoid of trees on each side of the penstock), a temporary access road would be needed to access the lower portion of the penstock to initiate removal. The preliminary access concept includes a

temporary 10-15 feet wide road traversing a steep hillside, starting at a point approximately 500 feet down the road from the penstock and following a line to the first penstock saddle (thrust block) (Figure 2.2-12). Construction of this temporary access road would require tree removal. Additional limited tree removal may also be required if a temporary route is needed outside of the existing disturbed corridor to provide equipment access to the upper portions of the penstock and its supports. Vegetation clearing would be kept to the minimum necessary to provide access. City Light will conduct a pre-removal survey of trees to determine habitat suitability for nesting murrelets and northern spotted owls. If any trees suitable for marbled murrelet or spotted owl nesting must be removed for construction access, they would be removed outside of the nesting seasons for both species (March 1 through September 30). Any mature trees suitable for nesting would be maintained if possible.

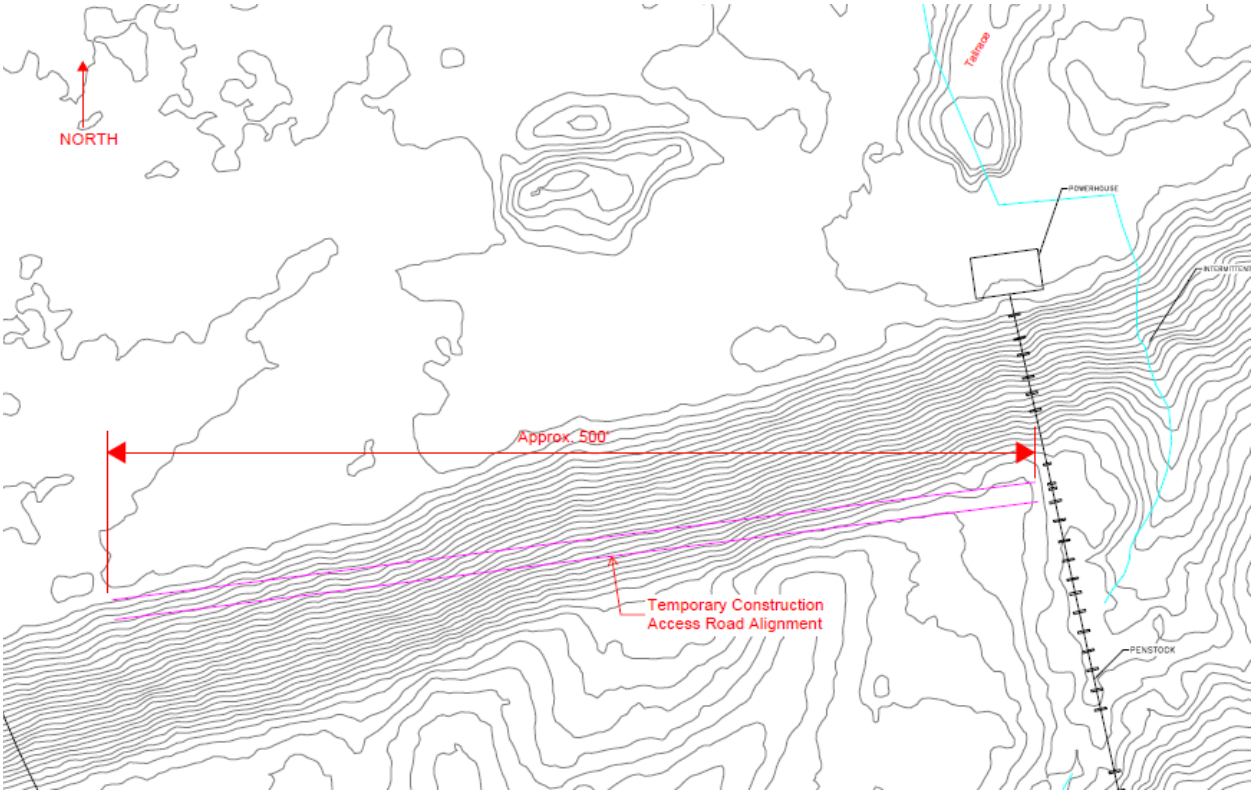


Figure 2.2-12. Preliminary alignment for temporary construction access road for penstock removal.

2.2.8 Removal of Overhead Transmission Lines and Transformer

Once the tailrace barrier is deconstructed, the transformer next to the powerhouse and the transmission lines and poles will be removed, likely using an excavator or crane. The poles on the southern side of the river near the powerhouse will be accessed using the same road established in the transmission line corridor for the tailrace barrier work. The poles on the northern side of the river can easily be accessed from Newhalem; the transmission lines that cross the river can be removed from either side using a truck-mounted cable reel.

After the tailrace barrier, transformer, transmission lines, and poles are removed, the area in front of the powerhouse, which is currently cleared and used for parking and storage, will be revegetated. A restoration plan for this area will be developed in collaboration with NPS.

2.3 Construction Equipment

Equipment use will vary depending on the alternative selected for each element of the Proposed Action. A comprehensive list of equipment is included below (Table 2.3-1).

Table 2.3-1. Construction equipment.

Equipment Description	Potential Equipment Use during Specific Elements of Proposed Action					Average Noise (dB) at 50 Feet from Equipment[1,2]	Maximum Number on Site
	Powerhouse and Dam Removal	Access Road Repair	Tailrace Barrier Removal	Overhead Line Removal	Penstock and Saddle Removal		
Mini-track excavator	X	X	X		X	87	1
12,000-pound excavator	X	X	X		X	87	2
Articulated excavator					X	87	1 to 2
Dump truck or similar	X	X	X	X	X	73	1
Heavy-capacity helicopter	X	X			X	117[2]	1 to 2
Light-weight helicopter	X	X			X	95[2]	1 to 2
Rock trim-blasting		X				94[3]	NA
Light explosives for blockholing boulders		X				60[4]	NA
Grader		X	X			79	1
Jackhammer	X		X		X	95	1
Concrete saw	X		X		X	85	1 to 2
Diesel generators	X	X	X			68	2 to 4
Air compressor	X	X	X			68	1
Dewatering pumps	X		X			74	2 to 4
Rock drill	X	X	X			93	2 to 4
Crane	X	X	X	X		79	1 to 2

1 Sources: Washington State Department of Transportation (WSDOT) 2020; Helicopter Association International 2017; Falzarano and Levy 2007; Hong Kong Government 2016.
2 City Light was unable to locate literature reporting noise levels from blockholing. In the absence of noise data specific to that activity, levels are assumed to be similar to those reported for mitigated rock fracturing (WSDOT 2020). WSDOT (2020) reports that when the charge is small enough, the use of heavy mats to cover the blast can significantly reduce blast energy. Mats will be required for any use of light explosives to fracture boulders along the access road.

Vehicle usage during construction is estimated as follows:

- Employee vehicles (parked at Newhalem or along the existing dam access road) – up to eight per day.
- Total during construction – from a minimum of 4 per day to as high as 10 per day.

Noise during construction will be produced by the following equipment/actions:

- Jackhammers to break up dam, tailrace infrastructure, powerhouse, and penstock saddles.
- Rock drills and small explosives to break up landslide boulders along the access road during repairs.[5]
- Construction equipment such as bulldozers, excavators, and dump trucks.
- Electric pumps used for construction dewatering.
- Concrete saws and other small tools used for concrete demolition.
- Portable diesel generators.
- Employee vehicles arriving for work in the morning and departing in the evening.
- Possible helicopter use if needed during work at the diversion dam or headworks.

2.4 Site Restoration and Monitoring

Following in-water work at the dam site, all construction materials will be removed, and the channel will return to its pre-construction state, which is defined primarily by the bedrock foundation at the dam site and immediately downstream. The banks near the diversion dam and headworks will be returned to pre-construction contours and restored with native plantings, where suitable soils are available. Areas disturbed by the removal of the powerhouse, penstock, saddles, and tailrace fish barrier will be restored either by natural recovery, seeding, planting, and/or mulching, as appropriate and in coordination with the NPS. Additionally, the roads accessing the dam above 840 feet in elevation and the powerhouse from the rock shelter trail will be placed into road storage.

Following project construction and decommissioning activities, restored banks will be monitored for a duration to be determined in coordination with the NPS. Downstream geomorphology, fish passage conditions, and water quality parameters (temperature, turbidity) in Newhalem Creek will be monitored following dam removal for a period to be determined in coordination with the NPS. Monitoring may include the placement of water sondes or similar. In addition, small teams of scientists may collect geomorphologic data (e.g., pebble counts) by foot or kayak. No mechanical equipment will enter the stream channel during any monitoring activities.

5 The use of small explosives to break up rocks typically involves the placement of a light charge covered by wet sand or mud in small drill holes in the boulder, a technique known as blockholing (NPS 1999). If the boulder contains an existing seam, the explosive can be placed directly into the crack or seam.

2.5 Schedule and Sequencing

The Proposed Action will involve construction in phases that optimize weather and soil conditions and cost effectiveness, and minimize environmental effects. The current phasing strategy and level of effort is based upon a one- or two-year construction process (Table 2.5-1), which may begin as early as 2026, but could begin in 2027. Road improvements would occur in dry months, when the danger of landslides and rockfall are at their lowest, and within the same construction season as the diversion removal.

Table 2.5-1. Newhalem Creek Project decommissioning construction schedule.

Work Performed	Period	Construction Year
Dam access road improvements	June – July	Year 1
Dam, intake, sluiceway removal; abandonment of power tunnel; dam access road storage/trail conversion	In-water work July 16 – September 1; other work to extend to mid-October	Year 1
Helicopter use for diversion structure removal and disposal (if needed)	July – mid-October	Year 1
Removal of tailrace barrier	September – October	Year 1 or 2
Removal of overhead transmission lines	Any time throughout the year	Year 1 or 2
Powerhouse removal and site restoration	April - October	Year 1 or 2
Penstock removal and site restoration	April - October	Year 1 and/or 2
Tree removal to access penstock corridor for saddle/penstock removal (if route is required and if pre-construction surveys identify suitable nest trees for marbled murrelets or northern spotted owls within 100m [328 ft] of temporary penstock access route)	October 1 – February 28 (April – October if suitable nest trees are not identified within clearing corridor for temporary access route, or within 100m)	Prior to Year 1 or Year 1

2.6 Effects of the Proposed Action

Regulations for Interagency Cooperation under the ESA (84 *Federal Register* [FR] 44976) define "effects of the action" as follows:

> *…all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (84 FR 45016).*

Consistent with these regulations, in the Draft BA, City Light is analyzing consequences to listed species or critical habitat that are caused by the Proposed Action. The Proposed Action does not cause any consequences of other activities. The Proposed Action is independent from City Light's relicensing effort currently underway for the Skagit River Hydroelectric Project.

2.7 Impact Minimization and Avoidance Measures

2.7.1 General Impact Minimization Measures

Several construction techniques will be employed to minimize effects on listed or proposed species and designated critical habitat. The contractor will be required to adhere to BMPs prescribed in Ecology's most current *Stormwater Management Manual for Western Washington* as well as terms and conditions of all future permits and authorizations. The measures presented below are (1) components of the Proposed Action and (2) requirements of the contractor during Project implementation:

- Prior to work within or adjacent to Newhalem Creek, including the establishment of temporary spoils disposal areas and staging areas, access road improvements, and landslide boulder and debris removal, the selected contractor will install sedimentation and erosion control measures. These may include the use of silt fencing, certified noxious weed-free straw bales, plastic sheeting on erodible soils, jute matting, or mulch along the road embankments or streambanks to prevent sediments from entering waterways. Use of these BMPs should prevent construction stormwater from entering waters of the U.S.
- Clearing limits will be identified on all design drawings and will be fenced prior to initiation of staging or demolition activities. The fence will clearly define the clearing limits and will protect non-Project areas from vehicle intrusion or debris disposal.
- Because the Proposed Action will affect more than 1 acre of land, the contractor will implement a grading plan and Sediment and Erosion Control Plan (SECP) plan prior to site preparation, to ensure that ground disturbing effects are minimized. During clearing, grading, and construction activities, all exposed areas at final grade will be protected from erosion using weed-free straw mulch, coir fabric, plastic covering, or similar method in accordance with the SECP plan.
- Concrete spoils from dam removal will be temporarily stored in a gravel parking area that has been previously cleared, located along the left bank, upstream of the diversion structure. Temporarily stored material will be hauled off site to an approved upland location. Spoils would be removed with dump trucks via the improved dam access road or helicopters if needed.
- All equipment will be inspected daily for fluid leaks before leaving the staging area, and any leaks will be repaired before the vehicle resumes operation. The contractor will be responsible for preparing and implementing a Spill Plan prior to construction.
- Prior to arriving at the construction site, equipment will be washed and treated to remove seeds, plants, and plant fragments. Use of a high-pressure washing system is recommended to remove all seeds, plants, plant fragments, dirt, and debris from construction equipment, taking care to wash the sides, tops, and undercarriages.
- Disturbance of riparian vegetation will be limited to the minimum amount necessary to achieve construction objectives to minimize habitat alteration and limit the effects of erosion and sedimentation.

2.7.2 In-Water Construction Impact Minimization

ESA-listed fish have no access to the dam site due to the presence of two natural waterfall barriers downstream of the dam. Therefore, the primary way to avoid direct effects to aquatic species is to

schedule in-water work during the low-flow window to minimize the potential for sediment transport during sensitive life-history periods in downstream habitats occupied by ESA-listed fish. Additional measures include the following:

- At the Newhalem Creek dam removal site, cofferdam dewatering systems will be in place prior to any dam demolition. Excavators may be operated instream to set cofferdams or create a streambed gravel berm for in-water work isolation. If this occurs, excavators will operate on portions of the streambed that are naturally dewatered during the summer in-water work period or will use materials placed on the substrate (e.g., timber cribbing) so that excavator tracks are elevated above water level.
- Cofferdams will be constructed of an approved combination of streambed materials, including supersacks filled with native material that are placed within the channel by an excavator or other suitable lifting equipment.
- Aside from equipment used to set and reposition the supersack cofferdam, no equipment will be operated in the active flow of the river during any in-water activity. Supersacks would be filled with streambed materials using an excavator positioned on top of gravel bars that are naturally dewatered during low-flow summer conditions.
- The selected contractor will be required to install adequate provisions to limit seepage into the isolation area. However, because in-water work will be limited to infrastructure removal (e.g., concrete, rebar) and no new concrete will be poured, some seepage is acceptable. Measures to limit seepage into the work area could include the use of plastic sheeting aprons upstream of cofferdams, pumped flow from sumps, and isolation of clean versus sediment-laden water in the construction areas.
- Cofferdams will be removed and repositioned cleanly and incrementally to reduce sedimentation pulses downstream.
- Resident fish will be rescued and relocated from the in-water work isolation area, in compliance with future requirements of the Hydraulic Project Approval to be issued by WDFW.
- Fish will be rescued and relocated from the upper portion of the tailrace to be filled prior to filling activities.

Measures to reduce the potential for hazardous/contaminated material release include:

- Washing heavy equipment needed for work below OHWM before it is delivered to the job site.
- Inspecting construction equipment before accessing instream work areas to remove vegetation and dirt clods that may contain noxious weed seeds.
- Inspecting machinery daily for fuel or lubricant leaks.
- Inspecting and cleaning all equipment that will operate below OHWM (flowing or not); replacing all hydraulic fluids with biodegradable fluid (a standard requirement for Ecology 401 water quality certification and WDFW Hydraulic Project Approval terms and conditions).

2.7.3 Boulder Fracturing with Small Explosives

The use of small explosives to break up rocks typically involves the placement of a light charge covered by wet sand or mud in small drill holes in the boulder, a technique known as blockholing (NPS 1999). If the boulder contains an existing seam, the explosive can be placed directly into the crack or seam. Both methods produce noise and flyrock. Therefore, City Light will require the selected contractor to use blast mats to cover any explosives used for boulder fracturing during access road repairs/improvements.

2.7.4 Riparian Corridor Restoration

City Light will require that the selected contractor minimize vegetation clearing along riparian areas. Temporarily disturbed areas adjoining the creek and tailrace barrier location will be revegetated with appropriate plant species, and any mature trees removed will be replaced at a ratio determined by City Light and NPS. A formal riparian restoration/landscaping plan will be prepared during final design. City Light will coordinate with NPS to tailor a mix of appropriate native plant species for each restoration area. All sources of plant material will come from the Project vicinity, within the Skagit River basin, or sourced as approved by the NPS.

2.7.5 Construction Access for Penstock and Saddle Removal

During construction of the 500-foot temporary access road to reach the lower limits of the penstock, and if additional temporary access corridors require tree clearing, the following measures will be applied:

- City Light will attempt to access the penstock and saddles using the existing disturbed corridor adjacent to the penstock (i.e., area devoid of trees).
- If removal of the penstock or saddles requires access via areas outside of the existing disturbed corridor and a temporary route is needed, vegetation clearing (including tree removal) would be kept to the minimum necessary to provide access to equipment.
- If a temporary route is required, City Light will conduct a preconstruction survey of trees along the access route and within 100m (328 feet) of the route to determine habitat suitability for nesting murrelets and northern spotted owls.
- If trees containing suitable nesting characteristics for murrelets or spotted owls are identified during surveys, all tree removal associated with penstock removal and temporary access will occur outside the nesting period for both marbled murrelets and northern spotted owls. The nesting seasons are April 1 – September 23 for murrelets, and March 1 – September 30 for spotted owls.
- To the extent practicable, any mature trees with marbled murrelet nesting platforms would be maintained. If suitable nest trees require removal, City Light will coordinate with the USFWS to determine if further action is necessary.

3.0 ACTION AREA

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR § 402.02). The action area considers all consequences of the action and includes the geographic extent of the effects resulting from the Proposed Action.

3.1 Terrestrial Portion of Action Area

The terrestrial portion of the action area (Figure 3.1-1) is defined by the geographic extent of effects from the Proposed Action and includes all potential helicopter access routes, construction and staging areas, and spoils stockpiling areas adjacent to and within the limits of construction. The three loudest noise-producing activities under consideration for the Proposed Action include jackhammering for concrete removal (95 dB at 50 feet), helicopter use (approximately 95 to 117 dB at 50 feet), and blockholing or other micro-blasting techniques to remove boulders from the access road landslide area (94 dB at 50 feet). These noises will collectively define the terrestrial (in-air) portion of the action area. If helicopters are used to access or transport materials in the action area, helicopter noise will define the extent of the in-air portion of the action area. At other times (e.g., dam removal, powerhouse demolition), jackhammers or micro-blasting for concrete removal and rock fracturing will define the limits of the in-air portion of the action area.

Helicopter noise varies depending on the type of aircraft used. A heavy-duty helicopter will produce noise as high as 117 dB at 50 feet from the source, while a light-duty helicopter will produce noise similar to that of a jackhammer (95 dB at 50 feet) (Helicopter Association International 2017). In an NPS report on light-duty helicopter use at the Grand Canyon, a Bell helicopter was reported to produce noise of approximately 97 dB at 100 feet during takeoff, and 96 dB at 100 feet while hovering (Falzarano and Levy 2007). As a worst-case scenario, City Light assumes a louder heavy-duty helicopter (117 dB at 50 feet) may be used under the Proposed Action.

An ambient sound level of 46 dB was measured in the undisturbed forested areas behind the Gorge Powerhouse by the NPS Natural Sounds Program (NPS 2010). Given the proximity of the Gorge Powerhouse and the similarly remote setting along the Newhalem Creek access road location, ambient noise levels were assumed to be 46 dB for all Project elements (e.g., dam, penstock, dam access road, powerhouse, etc.). At the dam site, ambient sound levels are higher near the creek, likely closer to 60 or more decibels. However, ambient sound along the access road has been used as a conservative measure to estimate the extent of the in-air portion of the action area as defined by noise.

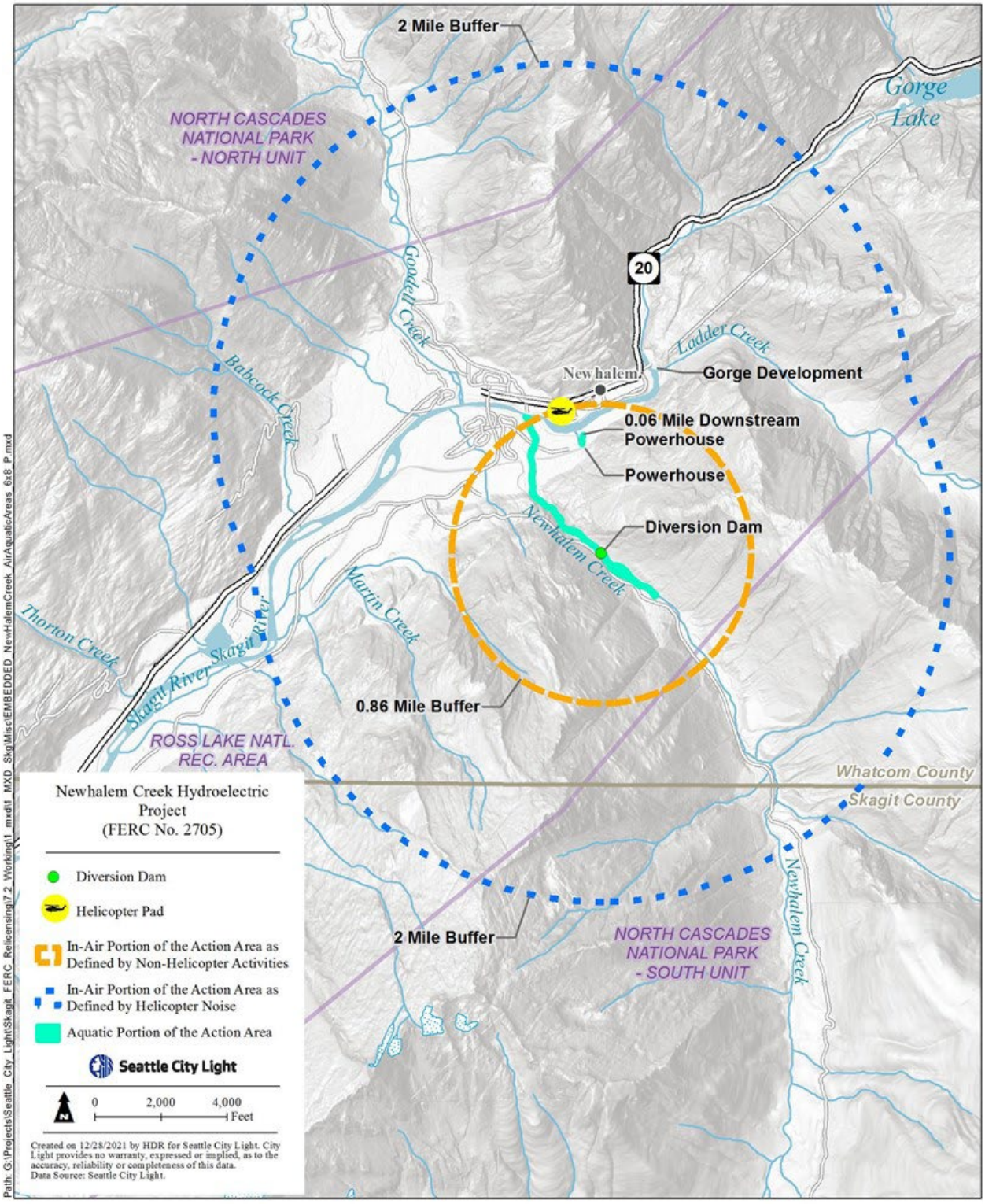


Figure 3.1-1. Action area for Newhalem Creek Hydroelectric Project decommissioning.

Using a point-source sound attenuation model where a noise reduction of 6 dB occurs per doubling distance from a point source activity, with an additional 1.5 dB of reduction due to soft site characteristics (dense vegetation and hillsides on both sides of the creek), noise from sporadic heavy-duty helicopter use will attenuate to baseline levels approximately 34,591 feet (6.5 miles) from the site. However, because the dam, access road, and majority of the penstock are in a canyon, where steep slopes buffer Newhalem Creek on both sides, hillside topography will block noise transmission at closer distances. Therefore, it is estimated that in-air noise from helicopter use will attenuate to baseline levels within approximately 2 miles of the dam, access road, and penstock work sites, including the helicopter access route from Newhalem to the drop zone. This defines the in-air, or terrestrial, portion of the action area, and encompasses the area that will be impacted by in-air noise during jackhammering and micro-blasting for rock trimming. For context, jackhammering and light-duty helicopter noise will attenuate to baseline levels approximately 4,560 feet (0.86 mile) from the activity. Because helicopters often depart from the Newhalem helipad during the fire season, which will overlap with the low-flow construction period, such noise is considered part of the baseline.

3.2 Aquatic Portion of Action Area

The aquatic portion of the action area considers short-term decommissioning actions and anticipates long-term changes to stream functions (e.g., flow restoration and sediment transport) both upstream and downstream of the dam site and the tailrace barrier location.

3.2.1 Newhalem Creek

The aquatic portion of the action area for Newhalem Creek considers construction-related effects and anticipated changes in stream function following dam removal, including changes in streambed profiles and/or sediment conveyance. The aquatic portion of the action area therefore includes that portion of Newhalem Creek from its confluence with the Skagit River to the extent of the unconfined reach approximately 0.5 mile upstream of the diversion dam (Watershed GeoDynamics 2022). A small portion of the Skagit River just downstream of the confluence with Newhalem Creek is also included in the action area to account for potential gravel transport at the mouth.

3.2.2 Powerhouse Tailrace

Open-cut trenching within the tailrace to remove the existing barrier will be conducted in September and October. The area affected by this work is isolated from the Skagit River. The aquatic portion of the action area at this location will be limited to an approximate 100-foot section of the tailrace in the vicinity of the fish barrier that will be affected by the removal of concrete and riprap.

4.0 BASELINE CONDITIONS IN ACTION AREA AND EFFECTS OF THE PROPOSED ACTION ON ENVIRONMENTAL SETTING

This chapter provides information on existing environmental conditions and the effects of the Proposed Action on aquatic habitat and geomorphology, forest conditions, soundscapes, water resources, and climate change in the action area. The action area is within the RLNRA, which is managed by NPS as part of the North Cascades National Park Complex. Except for in the town of Newhalem, roads, campgrounds, and sites with other recreation amenities, most of the land surrounding the action area is undeveloped wilderness.

4.1 Aquatic Habitat and Geomorphology

Aquatic habitat in the action area includes Newhalem Creek, a small portion of the Skagit River mainstem (at the confluence with Newhalem Creek), and the tailrace downstream of the fish barrier. The following sections focus on conditions in Newhalem Creek and the tailrace.

4.1.1 Existing Conditions – Newhalem Creek

Newhalem Creek is a left-bank tributary that enters the Skagit River at RM 93.3. It is a moderate- to steep-gradient stream characterized by large cobble and boulder substrates. Discharge in Newhalem Creek is highest during the spring snowmelt period from April to June and during the large rainfall events in late fall and early winter. Low flows in Newhalem Creek occur during late summer, early fall, and mid-winter.

A gravel study conducted in 1991 concluded that Newhalem Creek did not have an abundance of habitat for spawning steelhead and salmon (City Light 1992). These species require extensive, stable accumulations of spawning gravel (typically large patches of substrate in the range of 0.5 to 6 inches in diameter). This stream's flows, high gradient, and rapid and frequent flood response combine to create conditions favorable for gravel transport. In other words, Newhalem Creek exhibits a "high streamflow competence." A study done in Newhalem Creek by Morris (1990, included in City Light 1992: Appendix A4) suggests that under these conditions, extensive permanent accumulations of spawning gravels are unlikely. Gravels are routinely flushed from the creek due to the combined effect of steep channel gradient and relatively high flows. This study concluded "it appears that Newhalem Creek is competent, both up and downstream of the diversion dam, to flush the target particle sizes (1/2 to 6 inches in diameter) through the measured cross-sections on an annual basis" (Morris 1990, included in City Light 1992: Appendix A4).

Further evidence of the high competence of Newhalem Creek is the low amount of woody debris accumulation in this stream, the frequent occurrence of large boulder blocks in the active channel, and evidence of extensive historical floodplain rearrangement at the confluence with the Skagit River. This evidence attests to this stream's natural ability to mobilize instream materials. Gravel and wood accumulate behind the diversion dam, but under the current license, these materials have been regularly removed and reintroduced into the stream immediately below the dam. This was done nearly annually when the Project was operating but has not occurred in recent years as the landslide on the road precludes the ability to get an excavator to the site.

At and downstream from the diversion, the stream enters a very high-gradient (10 to 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 the substrate is bedrock with patches of cobble/gravel/boulder. This is a transport reach—sediment supplied from upstream areas moves relatively quickly through the reach into the downstream alluvial fan. The banks of the creek immediately upstream and downstream of the diversion structure are generally steep and composed of bedrock. The impoundment behind the dam is approximately 0.10 acre. During low-flow conditions, flow passes through the right bank intake/sluiceway. Flow passes over the dam during higher flow conditions.

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 River confluence, and has cut through the higher Skagit River valley terraces. Alluvial fans are geomorphologically active areas where the stream deposits the largest 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 from the bridge on the road to the powerhouse 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 section of Newhalem Creek from the confluence of the Skagit River to RM 0.38 includes boulder runs and cascades, broad riffles, shallow pools in association with boulder runs, and deep pools adjacent to single large boulder blocks. The stream becomes more confined from RM 0.27 to RM 0.38 and runs through deeper alluvium. Stream habitat is characterized by plunge pools and lateral scour pools that occur in association with sets of large boulders. Fish habitat cover is abundant because of the large-sized bed materials in this section. At the confluence with the Skagit River, the creek exhibits a lower-gradient fan that provides salmonid spawning habitat.

Although not mapped on WDFW's fish barrier inventory (WDFW 2021b), two natural waterfalls are total barriers to upstream passage at RM 0.65 (14-foot waterfall) and RM 0.8 (Newhalem Falls, 167-foot waterfall). From RM 0.65 to the diversion site at RM 1.0, Newhalem Creek is a transport reach characterized by high gradients with deep plunge pools interspersed by steep cascades and waterfalls.

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 (Figure 4.1-1). Substrate size is generally coarse and characterized by boulders, cobbles, and gravels with very little fines (Watershed GeoDynamics 2022). Results from pebble counts in Newhalem Creek upstream of the diversion dam in 2021 and 2022 show surficial substrate is composed of cobble, boulder, and gravel material. Median (D50) grain sizes ranged from 106-123 mm in 2021 and 89-238 in 2022 following an approximate 20-year return interval peak flow event in November 2021. Sub-surface samples collected at two locations show that sub-armor material is, as expected, finer than the surface armor layer, with median grain sizes from 39-61 mm. However, there was very little (less than 0.5 percent) silt/clay material in the sub-surface samples so high turbidity levels are not expected during streambed disturbing activities or during post dam-removal sediment flushing events. This expectation is consistent with the findings

from other studies, which reported turbidity magnitudes associated with dam removals rarely exceed those of watershed flood events (Tullos et al. 2016; Collins et al. 2024).

As other evidence supporting the general lack of fine materials in accumulated sediments upstream of the dam, while the Project was operating and up until 2019, an average of 200 to 400 CY of material was 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. Because 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. Sediment monitoring during these activities demonstrated that turbidity levels generally returned to background within a few hours of the activity (City Light 2015, 2016, 2018). Peak turbidity levels from 0.88 to 58.79 NTUs over background were measured immediately following gravel placement but reached background levels in less than 24 hours.

Figure 4.1-1. Annual excavation and downstream redeposition of accumulated gravels and cobbles upstream of the Newhalem Creek diversion dam (2005).

4.1.1.1 Fish Presence

Downstream of the lower-most natural barrier, a 14-foot waterfall at RM 0.65, Newhalem Creek is occupied by Rainbow Trout (*O. mykiss*), summer and winter steelhead, Chum Salmon (*O. keta*), Summer Chinook Salmon, Pink Salmon (odd-year), Coho Salmon, resident Coastal Cutthroat Trout (*Oncorhynchus clarki clarki*), Dolly Varden, and Bull Trout (WDFW 2022b). City Light also reports that Mountain Whitefish and various sculpin species are present in the lower reaches. The 3,400-foot reach of the creek from the confluence of the Skagit River to lower-most waterfall provides spawning and rearing habitat for ESA-listed Puget Sound steelhead (winter) and Bull Trout (WDFW 2021a). Typical spawning periods in Newhalem Creek are presumed to be similar to those in the upper Skagit River (Table 4.1-1).

Table 4.1-1. Typical and approximate timing of migratory salmonid life stages in the lower portion of Newhalem Creek.

Species	Spawning Period[1]	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Chum	Nov. 1 – Jan. 6												
Coho	Nov. 1 – Mar. 31												
Pink	Sept. 12 – Oct. 31												
Steelhead	Mar. 15 – June 15												
Bull Trout	Sept. 15 – Nov. 30												
Chinook	Aug. 20 – Oct. 15												

1 Fish windows per the Skagit License (City Light 1992) and Bull Trout Biological Evaluation.

Rainbow Trout are reported to occur in a small reach of the creek between the 14-foot waterfall barrier and the next upstream barrier, Newhalem Falls, a natural 167-foot waterfall at RM 0.8. Upstream of Newhalem Falls, and in the dam reach, WDFW (2022b) reports the presence of Rainbow Trout and resident Cutthroat Trout. Other resident species are presumed present.

4.1.2 Existing Conditions – Skagit River and Tailrace

The tailrace is approximately 350 feet long and ranges from 4 to 40 feet wide. It discharges into a natural ephemeral stream that, during high-flow events, discharges to the Skagit River. The tailrace is a permanent, year-round barrier to upstream passage and is inaccessible to fish from the Skagit River.

As discussed in Section 3.2, the action area includes a small reach of the Skagit River at and immediately downstream of the confluence with Newhalem Creek. Aquatic habitat for spawning and rearing ESA-listed fish in the Skagit River mainstem portion of the action area is generally properly functioning (City Light 2011b). Puget Sound Chinook Salmon, Puget Sound steelhead, Bull Trout, and Dolly Varden are known to use the Skagit River in the area adjacent to the tailrace

and at the confluence of the river and Newhalem Creek. Chinook Salmon and steelhead may spawn or rear in the Skagit River downstream of the Newhalem Powerhouse tailrace.

4.1.3 Effects of the Proposed Action on Geomorphology and Fish Habitat

Overall, decommissioning is expected to have long-term beneficial effects on geomorphology and fish habitat in Newhalem Creek. Removing the dam and headworks will restore natural geomorphological processes to the channel from 0.4 mile upstream of the headworks to the confluence with the Skagit River. Dam removal will also result in more consistent input of wood and sediment to the lower 1 mile of the creek and into the river. Removal of riprap associated with the tailrace barrier will improve shoreline habitat along the Skagit River.

In the short term, potential effects of diversion removal on stream geomorphology and aquatic habitat include (Watershed Geodynamics 2022):

- Higher local stream gradient will temporarily 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, the streambed upstream from the (removed) diversion structure will be lower than under existing conditions
- There will be increases in turbidity immediately following diversion/cofferdam removal and during subsequent peak flow events that disrupt the armor layer; these are expected to be small and short-term increases.

More detail on geomorphic changes and fish habitat is summarized below and in Watershed Geodynamics' *Newhalem Dam Decommissioning Geomorphology Considerations* (2022), available upon request.

4.1.3.1 Changes Downstream from the Diversion

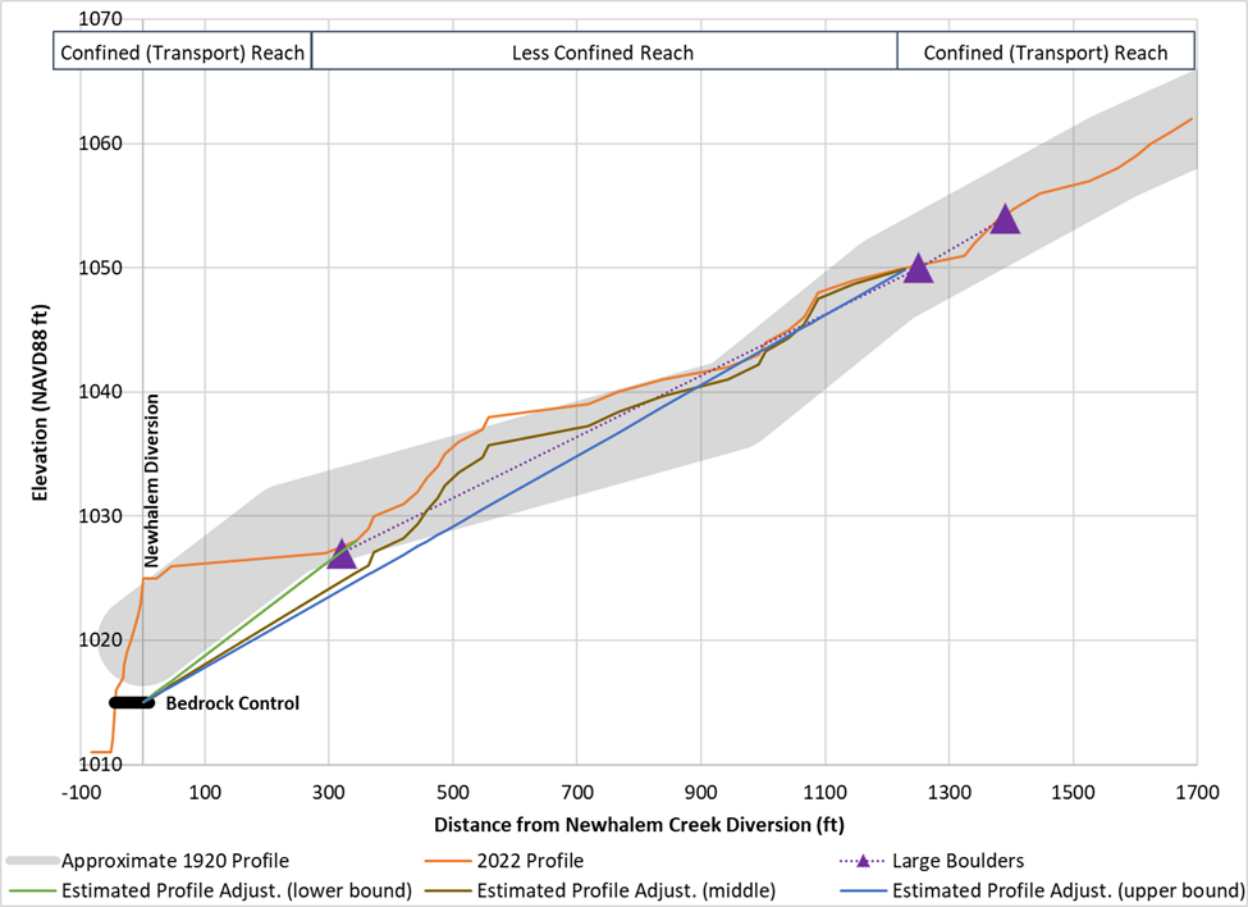
The reach immediately downstream of the dam is a high-gradient bedrock channel, which will limit channel incision at and below the diversion site. Following dam removal, accumulated sediment will be transported rapidly through the high-gradient canyon/waterfall reach to the alluvial fan area at the mouth of the creek, with the potential for short-term effects on fish habitat.

Material from the sediment wedge that has accumulated upstream of the dam to lower reaches of the creek will be transported during high flow events, most likely in late fall, early winter, and spring. Some cobble, gravel, and finer sediment will move farther downstream and eventually reach the Skagit River, augmenting substrate there. The quantity of potential sediment deposition on spawning and rearing areas in Newhalem Creek and the Skagit River is currently unknown.

4.1.3.2 Sediment Transport from Channel Changes Upstream of Diversion Structure

Removal of the diversion structure will result in adjustment of the bed of Newhalem Creek to a base level similar to pre-Project conditions. The existing longitudinal profile upstream from the diversion structure was used to estimate the potential amount of channel downcutting that could take place (Figure 4.1-2).

Change in channel bed elevation was determined by subtracting the 2022 bed elevation from the estimated lower, middle, and upper bounding profile lines. Bed lowering would be greatest just upstream from the removed diversion and at the top of the "steps" in the 2022 profile, with a maximum of 10 feet of bed lowering at the diversion structure (Figure 4.1-2). Estimated bed lowering would extend upstream at varying depths, from the diversion dam for 320 feet (lower estimate, green line) or 1,251 feet (middle and higher estimate, brown dotted and blue dashed lines respectively).



Note: Elevation is North American Vertical Datum of 1988.

Figure 4.1-2. Longitudinal profile of Newhalem Creek upstream from the diversion structure with potential profile adjustments (Watershed Geodynamics 2022).

The total volume of sediment that would be transported out of the adjustment area was calculated based on change in bed elevation and an average channel width of 70 feet (average bankfull width). Total volume of sediment transported is 4,400 cubic yards (lower bounding estimate), 9,000 cubic yards (middle estimate), or 12,900 cubic yards (upper bound estimate). 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 decadal or longer time scale following the initial channel adjustment close to the diversion structure (Watershed Geodynamics 2022).

Following the initial transport of sediment currently accumulated upstream of the dam, the creek will exhibit a natural sediment transport regime that will deliver more spawning gravels to the lower reach. This represents a small but positive effect on fish habitat given the low expected annual volume relative to Skagit River sediment volumes.

4.2 Forest Environment

4.2.1 Existing Conditions

Historically, the lower elevations in the action area consisted of a mosaic of old-growth forest types dominated by western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), and old-growth Douglas fir (*Pseudotsuga menziesii*) stands (Harrington 2003). Mountain hemlock (*T. mertensiana*) and fir (*Abies* spp.) would have been common on higher slopes.

In August 2015, the Goodell Fire burned approximately 7,118 acres in the Newhalem Creek and Skagit River valleys (WDNR 2016; Figure 4.2-1). Much of the forest near the dam site burned, except for some trees immediately adjacent to the creek. Similarly, approximately half of the forest along the penstock corridor was burned. The Goodell Fire burned a mosaic across the landscape, fragmenting what had been a relatively consistent evergreen forest with herbaceous and scrub/shrub land cover types. Figure 4.2-1 is at a large scale and does not illustrate the extent of burnt forests along the southern side of the Skagit River from Ladder Creek to the Newhalem Powerhouse and along the penstock route.

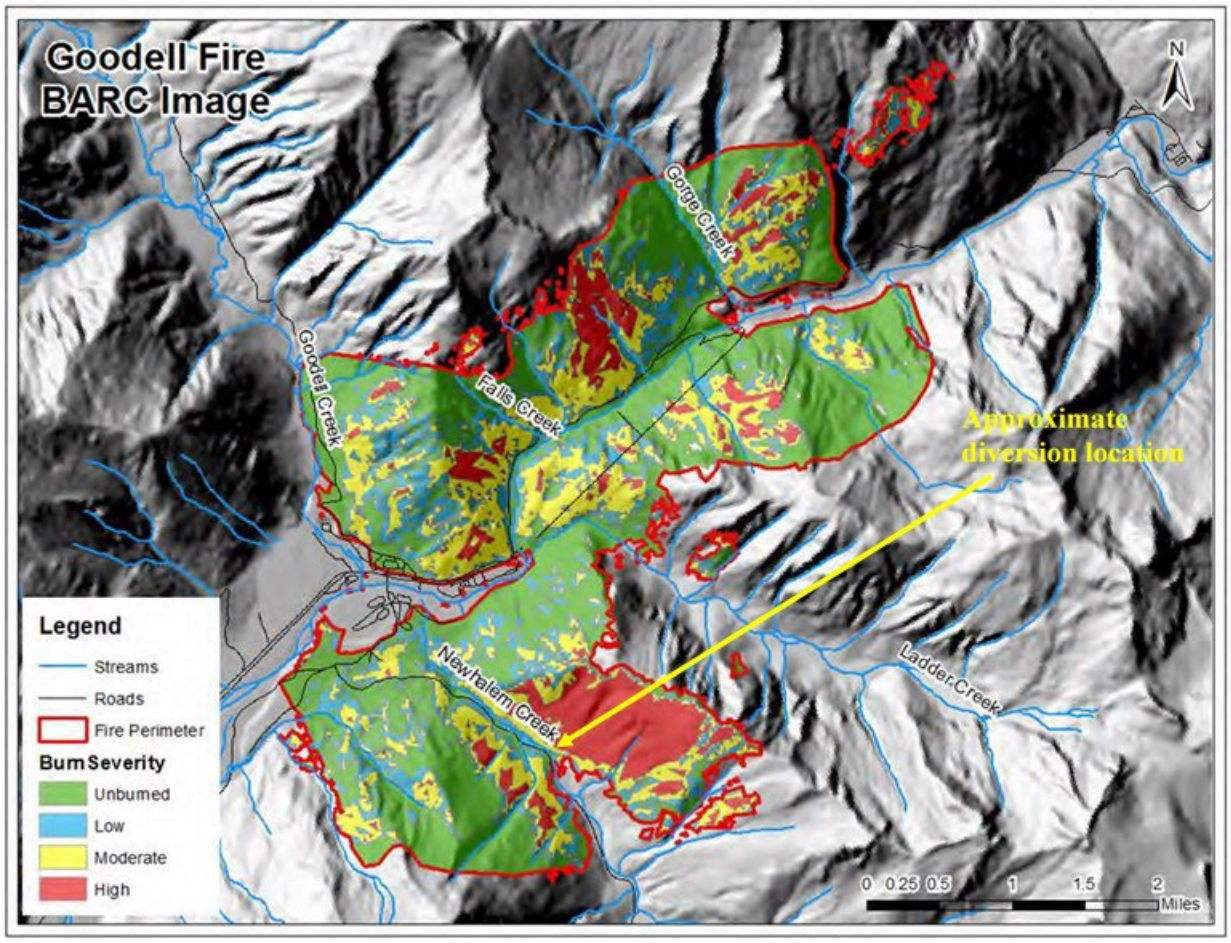


Figure 4.2-1. NPS map of burn intensities near Newhalem Creek; burn intensities in the action area are a mosaic of unburned, low, and moderate burn severity (Source: Oelfke and Siefkin 2015).

As a result of the fire, much of the potential nesting habitat near the dam and southern portion of the penstock corridor was lost to species that require older forest stands, such as northern spotted owls and marbled murrelets. With the exception of northern portions of the penstock corridor and areas surrounding the powerhouse, any remaining large coniferous trees with nesting platforms for murrelets are now isolated among a mosaic forest of dead trees, providing little to no canopy cover for nesting birds, eggs, or chicks.

4.2.2 Effects of Proposed Action

The area upstream of the diversion dam along the left bank is a previously cleared gravel parking lot that was historically used for maintenance vehicles. This area will accommodate staging and temporary storage of concrete and other spoils following diversion structure removal. Up to 10 trees may be removed to accommodate staging if the helicopter access is needed. The contractor would be directed to focus removal on trees that are severely burned or dead as a result of the Goodell Fire or on small trees (less than 8-inch-diameter at breast height) that contribute little to the canopy.

If removal of the penstock or saddles requires access via areas outside of the existing disturbed corridor and a temporary route is needed, vegetation clearing (including tree removal) would be kept to the minimum necessary to provide access to equipment. Preconstruction surveys will be conducted within 100m (328 ft) of the temporary penstock access route to determine suitability for nesting murrelets and spotted owls. If any suitable nest trees are identified along the temporary access route or within 100m, all trees would be removed outside of the nesting season for marbled murrelets and spotted owls. Any mature trees with marbled murrelet nesting platforms would be maintained to the extent practicable.

4.3 Soundscape

4.3.1 Existing Conditions

City Light is unaware of any site-specific ambient sound surveys conducted at the dam site, the access road, southern penstock corridor, or the tailrace barrier location. However, as presented in Section 3.1 of this BA, based on similar remote site conditions, ambient sound levels at all Project sites are assumed to be similar to those measured in the undisturbed forested areas behind the Gorge Powerhouse (46 dB) (NPS 2010). At the dam site, ambient sound levels are higher next to the creek, and are likely closer to 60 dB or higher. At the tailrace, ambient sound levels are likely between 50 and 60 dB and are affected by recreational trail use and vehicular access to the powerhouse and adjacent campground.

4.3.2 Effects of Proposed Action

As shown in Table 2.5-1, temporary construction noise associated with potential access road improvements, diversion dam removal, and concrete hauling will occur over a period of approximately four to five months from June through mid-October. Powerhouse and tailrace barrier removal may occur during the first or second year of construction and would require approximately four weeks of work in September through October. Penstock and saddle removal will occur over a period of seven months from April through October.

Work at the diversion site, powerhouse, penstock, and tailrace barrier will require the use of jackhammers, concrete saws, excavators, small power tools, and small compressors and generators needed to run this equipment. Depending on the alternative selected for dam access, small explosives could be used to fracture boulders that have settled on the road and immediately upslope during recent landslides. These activities will affect the ambient soundscape for up to 0.85 mile from the activity over the course of the construction period at each site. As described in the Environmental Assessment prepared for the Ross Powerhouse Rockslide Stabilization Environmental Assessment (NPS 2012), noise from heavy construction equipment for this Project will be attenuated by steep topography and generally dense forests and will be reduced to background levels well under 1 mile from the activity (See Section 3.1).

Helicopter use would result in the highest levels of in-air noise affecting the soundscape under the Proposed Action. Flights will take place a safe distance above the tops of the tallest trees (no closer than perhaps a few hundred feet). Regardless, takeoff and landing at the diversion site and along the penstock corridor will create sporadic noise that exceeds ambient levels. If helicopters are used for diversion facility access, penstock/saddle access, and removal of concrete spoils, sporadic use would span a period of approximately four months from approximately April through October.

More frequent helicopter trips would be required during this period if the smaller Bell helicopter is used, as it has less capacity for transport.

4.4 Water Quantity and Quality

4.4.1 Existing Conditions

Except for water temperature, relatively little water quality data has been collected in Water Resource Inventory Area (WRIA) 4. However, it is believed that water quality in this area is in good to excellent condition because it is managed primarily as National Park, Provincial Forest, National Forest System, Wilderness Area, and National Recreation Area lands. Some parts of National Forest System and Skagit Provincial Forest lands were historically managed for timber harvest, but the level of harvest management has declined considerably in recent years and currently occurs primarily in portions of the basin downstream of Gorge Dam, in British Columbia, and within the Cascade River and Sauk River basins. Smith (2003) reported that unpublished temperature data collected by NPS in Zander Creek, Taylor Channel, Park Slough, Thunder Creek, Fisher Creek, Logan Creek, and McAllister Creek was generally "good." The temperature range regarded as "good" was not described.

From the mouth to the headwaters, including tributaries, Newhalem Creek provides char spawning and rearing habitat (from Table 604, Chapter 172-201A Washington Administrative Code: accessed July 7, 2021: https://apps.leg.wa.gov/wac/default.aspx?cite=173-201A-602&pdf=true). The current Washington State Water Quality Assessment 303(d)/305(b) list (Ecology 2018) includes no 303(d) listings in the action area; however, Newhalem Creek downstream of the dam is impaired (Category 4C) due to low instream flows (Table 4.4-1).

Table 4.4-1. Water quality categories for Newhalem Creek.

Category	WRIA	Reach Segment	Listing ID	Listed Parameter	Assessment Unit ID
1	4	Mouth to approximately RM 0.8	77187	Chloride	17110005000198
2	4	Mainstem Newhalem Creek upstream of confluence with East Fork	71171	pH	17110005000198
4C[1]	4	Mouth to just downstream of confluence with East Fork	6186	Instream flow	17110005000196

Source: Ecology 2018

1 Category 4C waters are impaired by causes that cannot be addressed through a Total Maximum Daily Load plan.

4.4.2 Anticipated Effects

Cofferdam placement and removal will temporarily and locally affect water quality parameters, primarily turbidity. Given the predominately gravel/cobble substrate, turbidity plumes resulting from cofferdam installation are anticipated to be minor, and the small resulting sediment plume is expected to settle out of the water column within 300 feet of the work site. During construction, downstream sedimentation and required water quality parameters will be monitored and adaptively managed in accordance with future CWA Section 401 permitting conditions to ensure compliance with state water quality standards. As discussed previously, following dam removal, subsequent high-flow events will mobilize aggraded sediments upstream of the dam.

As presented above, Newhalem Creek downstream of the dam is a Category 4C reach for low flow. Decommissioning the diversion dam and other Project works will ensure natural flows in Newhalem Creek in perpetuity and may establish a basis for removal of the Category 4C impairment listing from the lower 1 mile of the drainage.

5.0 STATUS OF SPECIES AND CRITICAL HABITAT

5.1 Species List

Listed and proposed species that have potential to occur in the action area are provided in Section 1.4 of this BA. The following sections discuss those species (Table 1.4-1) and provide the status of listed species in the action area, or rationale for no effect determinations for several species for which suitable habitat is not present in the action area. Section 6.0 of this BA provides an analysis of effects on listed species and critical habitat that are designated or may occur in the action area.

5.2 No Effect Determination

Although identified to occur in the action area (which is generally defined by county-wide data), habitat for the following species is not present in the action area:

- Western Distinct Population Segment (DPS) yellow-billed cuckoo
- Mount Rainier white-tailed ptarmigan
- Whitebark pine
- Monarch butterfly.

Therefore, a **no effect** determination or a provisional **no effect** determination for these species is recommended. Critical habitat for each of these species is either not designated or proposed (Mount Rainier white-tailed ptarmigan and whitebark pine) or not designated or proposed within the action area (yellow-billed cuckoo and monarch butterfly). A brief discussion of each species and the rationale for a **no effect** determination are provided below.

5.2.1 Western DPS Yellow-billed Cuckoo

Yellow-billed cuckoos breed in large (greater than 40 hectares), wide (more than 100 meters), contiguous blocks of riparian habitat, particularly woodlands with cottonwoods and willows (USFWS 2016a). They are considered extirpated in Washington, but they appear rarely during summer (Seattle Audubon Society 2020). Yellow-billed cuckoos breed in dense willow and cottonwood stands in river floodplains (USFWS 2016a) but are not believed to breed in Washington. The last confirmed breeding records from Washington are from the 1930s. The nearest recently recorded breeding sites to the action area included a few scattered nesting pairs in southern Idaho (WDFW 2012). The only detection of a yellow-billed cuckoo in Whatcom County occurred prior to 1950 near Bellingham. Between 1990 and 2016, several scattered observations occurred in the eastern slope of the Cascades (Wiles and Kalasz 2017).

No yellow-billed cuckoos are expected to occur within or near the action area. Riparian habitat that is suitable for nesting and foraging either does not exist in sufficient quantities to support the species or has been burned. Therefore, the Proposed Action will have **no effect** on western DPS yellow-billed cuckoos.

Critical habitat was designated for the western yellow-billed cuckoo in 2021 (86 FR 20798). Critical habitat is not located in Washington state; therefore, the Proposed Action will have **no effect** on designated critical habitat for the yellow-billed cuckoo.

5.2.2 Mount Rainier White-tailed Ptarmigan

The Mount Rainier white-tailed ptarmigan is a small alpine grouse that spends nearly all of its lifecycle in alpine ecosystems. The species consists of resident or short-distance elevation migrants with various adaptations for snow and extreme cold in winter. White-tailed ptarmigans are intolerant of heat and remain close to cool microsites in the summer, such as the edges of snowfields, the shade of boulders, or near streams where temperatures are cool (USFWS 2023).

Although specific habitat use by the Mount Rainier white-tailed ptarmigan is largely unknown, one observational study conducted in July and August in the North Cascades noted that the species occupies snowfields, boulders, and short-stature alpine vegetation (less than 25 centimeters in height) such as red and white heather (*Phyllodoce empetriformes* and *Cassiope mertensiana*, respectively) and dwarf huckleberry (*Vaccinium deliciosum*) (USFWS 2023). Breeding and brood-rearing habitat is located within the alpine zone, defined by the treeline (i.e., the highest elevation with upright trees) at its lower elevational limit and by permanent snow or barren rock at its upper elevational limit (USFWS 2023). In the North Cascades, the lower limit of the alpine zone typically ranges from approximately 6,400 feet on the west side of the mountains to 6,900 feet on the east side (Douglas and Bliss 1977). The boundaries of the subalpine zone in the western North Cascades are extremely irregular due to the rugged geography; typically, the continuous forest ends at an upper elevation of roughly 4,200 feet on northern slopes and 5,200 feet on southern slopes (Douglas 1972, USFWS 2023).

The elevation at the diversion site, the highest elevation at which construction would occur under the Proposed Action, is approximately 1,019 feet (311 meters), far below the subalpine and alpine zones and the habitat known to support the Mount Rainier white-tailed ptarmigan. Therefore, the Proposed Action will have **no effect** on the Mount Rainier white-tailed ptarmigan. Critical habitat has not been designated or proposed for the species.

5.2.3 Whitebark Pine

Whitebark pine communities in the Cascade Range are often mixed with sagebrush (*Artemisia* spp.) and mountain grassland communities at elevations from approximately 5,000 feet to tree line. At lower elevations, whitebark pine is often found among subalpine and Douglas fir. Whitebark pine are an important component of alpine larch communities at tree line, where they often persist as krummolz (Lillybridge et al. 1995). Whitebark pine are found in scattered stands above 5,900 feet (1,800 meters) in the southeastern portion of the North Cascades National Park Service Complex.

The elevation at the diversion site, the highest elevation at which construction would occur under the Proposed Action, is approximately 1,019 feet (311 meters), well below the elevation known to support this species. Further, no known stands are located in or near the action area (Rochefort et al. 2018). Therefore, the Proposed Action will have **no effect** on the whitebark pine. Critical habitat has not been designated or proposed for the species.

5.2.4 Monarch Butterfly

Monarch butterfly reproduction is dependent on the presence of milkweed (*Asclepias* spp.), the species' larval host plant; as a result, habitat use is primarily driven by the presence of milkweed species. In Washington, milkweed occurs east of the Cascades in the Columbia River Basin,

although in patchy distribution (Xerces Society 2012, WDFW 2022a). Breeding habitat for monarchs does not occur in western Washington, due to a lack of native and naturalized milkweeds (Xerces Society 2012, Pyle 2015, WAFWA 2019). Further, the action area is considered to have no to very low (0 – 10%) potential to support monarch breeding habitat (WAFWA 2019).

The closest reported single monarch observations (2) are located near Darrington and Burlington, approximately 36.2 and 54.2 miles from Newhalem, respectively. The closest reported milkweed observations (2) are near Winthrop and Twisp, located on the east side of the Cascades approximately 53.5 and 56.1 miles southeast of Newhalem, respectively (Western Monarch and Milkweed Occurrence Database 2022).

In 2021, City Light conducted multiple biological studies in and adjacent to the action area to support ongoing relicensing efforts for the Skagit River Hydroelectric Project (City Light 2022a). No incidental observations of monarch butterflies or signs of monarch butterflies, nor any milkweed, were noted during City Light's relicensing studies.

Individual adult monarch butterflies could rarely occur in the Project vicinity during migration or as vagrants. However, due to a lack of breeding habitat and the distance to known observations of monarch butterflies in the region, use of the action area by the species is unlikely. Therefore, as a proposed species, the Proposed Action **will not jeopardize the continued existence** of the monarch butterfly because habitat supporting breeding and larval monarchs is not present in the construction footprint; therefore, habitat will not be reduced, disturbed, or eliminated. The Proposed Action will not reduce the survival or recovery of the species by reducing reproduction, numbers, or distribution. If monarch butterflies become listed prior to the completion of the project, considering no breeding habitat is present in the footprint of decommissioning activities and the closest breeding habitat is well outside the action area, no monarchs are expected to occur within or near the action area. Therefore, the Proposed Action will have **no effect** on the species.

Critical habitat for the monarch butterfly was proposed on December 12, 2024 (89 FR 100662) and consists of approximately 4,395 acres of overwintering sites in coastal California. The action area is not included in the proposed critical habitat designation; therefore, the Proposed Action **will not destroy or adversely modify** proposed critical habitat. Should critical habitat be designated prior to the completion of the Proposed Action, the provisional determination is **no effect**.

5.3 Species and Critical Habitats that May Be Affected by the Proposed Action

Based on habitat conditions and/or documented species use of the action area, ten species could potentially be affected by the Proposed Action: gray wolf, Canada lynx, grizzly bear, North American wolverine, marbled murrelet, northern spotted owl, Puget Sound steelhead, Puget Sound Chinook salmon, Bull Trout, and Suckley's cuckoo bumble bee. Information on the listing status, life histories, and potential for occurrence in the action area for each species is provided in the following sections. Potential Project-related effects on these species and their designated critical habitat (if applicable) are analyzed in Section 6.0 of this BA.

5.3.1 Gray Wolf

5.3.1.1 Listing Status and Distribution

The gray wolf has been federally listed as an endangered species since the 1970s. Effective January 4, 2021, USFWS delisted the gray wolf throughout the lower 48 states and relinquished management authority in Washington to WDFW outside of tribal lands (85 FR 69778). However, on February 10, 2022, a U.S. District Court vacated the delisting rule and restored endangered species protections. In November 2023, the USFWS published a final rule to comply with the court order, which reinstated endangered species status for the gray wolf in all or portions of 44 U.S states, including the western two-thirds of Washington state (88 FR 75506).

As of January 2021, there were at least 132 wolves in 24 known packs, including at least 13 breeding pairs in portions of Washington State managed by WDFW. In addition, there were 46 wolves reported on Confederated Tribes of the Colville Reservation (WDFW et al. 2021). Wolves are habitat generalists but occupy mostly forests and nearby open habitats with sufficient prey. Most known packs occur in northeastern and southeastern Washington, but increasing numbers are present in the north-central region.

5.3.1.2 Occurrence in the Action Area

The action area is in the North Cascades recovery region, which has six packs located primarily on the eastern slope of the Cascade Mountains. The pack nearest to the action area is the Diobsud Creek Pack. WDFW winter surveys documented only a single wolf from this pack during winter 2020–2021; denning status is unknown. Territory for this pack is generally in the area between Baker Lake and the Skagit River, southwest of the action area (WDFW et al. 2021).

5.3.1.3 Critical Habitat

Critical habitat is not designated or proposed for gray wolves in the action area.

5.3.2 Lynx

5.3.2.1 Listing Status and Distribution

The Canada lynx was state listed as threatened in Washington in 1993 and federally listed as threatened in 2000. Primary threats to the species include habitat loss and overutilization (trapping) (65 FR 16051).

Lynx are closely associated with boreal forests because of their near-dependence on a single prey species—the snowshoe hare—which is mostly limited to this habitat type. In Washington, most records of lynx are from the northeastern and north-central portions of the state, in the Selkirks, Kettle Range, and North Cascades east of the crest (Stinson 2000). Lynx typically occupy high-elevation forests but can travel over 300 miles when dispersing during prey declines. Lynx populations in the northern boreal forest fluctuate on an approximate 10-year cycle in response to changes in snowshoe hare numbers. Cyclic variations in snowshoe hare-lynx populations are dramatic in Alaska and Canada but tend to be more moderate in Washington (Stinson 2000).

5.3.2.2 Occurrence in the Action Area

Lynx are considered uncommon in the general area; however, City Light reported a 2019 observation of a single lynx near the Aggregate Ponds just west of Newhalem (City Light 2022b). Therefore, it is possible that Canada lynx may occasionally move through the area during dispersal, but they would not be expected to occupy the action area for long periods because of the lack of suitable habitat for their primary prey, snowshoe hares.

5.3.2.3 Critical Habitat

Critical habitat for Canada lynx was designated in 2006 (71 FR 53355) and revised in 2009 (74 FR 86160) and 2014 (79 FR 54782). On November 29, 2024, the USFWS proposed to again revise the critical habitat designation to include a total of approximately 19,112 square miles in Colorado, Idaho, Montana, New Mexico, Washington, and Wyoming (89 FR 94656). Newly-proposed critical habitat for lynx in Washington consists of approximately 2,354 square miles in portions of northern Chelan, Okanogan, and eastern Skagit and Whatcom Counties (89 FR 94665)but does not overlap the action area. The nearest critical habitat unit is approximately 10.5 miles from Newhalem.

5.3.3 Grizzly Bear

5.3.3.1 Listing Status and Distribution

Grizzly bears were listed by the USFWS as threatened in 1970 (35 FR 16047). Remnant populations are currently managed in Washington and three other states. The Grizzly Bear Recovery Plan (USFWS 1982) includes the North Cascades as one of the six ecosystems in which grizzly bears are known to have occurred within the decade prior to listing. Recovery goals for the North Cascades region are to (1) maintain the current population, (2) provide protection under state and federal laws, and (3) collect baseline data on population status and habitat (USFWS 1982).

The North Cascades National Park Service Complex and adjacent wilderness areas are believed to have suitable habitat to support at least 90 grizzly bears, which is the number that USFWS considers necessary for statistical population viability (Almack 1986). Suitable spring forage areas in the North Cascades include marshes, riparian areas, and low elevation shrubfields. Upper elevation shrubfields and grass sidehill parks and alpine ridges represent suitable summer foraging habitat. Densely forested areas with downfall are considered to be important for cover. No den sites have been identified in the North Cascades. However, suitable denning habitat—in excavated chambers or natural caves—is not considered a limiting factor in the North Cascades (Almack 1986).

Between 1950 and 1991, there were 20 confirmed grizzly bear observations in the Washington North Cascades and 80 additional sightings that are considered highly probable. A photograph of a grizzly bear track was taken in 1991 in the Thunder Creek drainage, which is a tributary to Diablo Lake (Western Wildlife Outreach 2008). The current estimated population in the North Cascades is between 5 and 20 grizzly bears, with some of these ranging between Washington and British Columbia (Western Wildlife Outreach 2008). However, natural recovery of grizzly bears in this region is considered unlikely due to the demographic and environmental stochastic events associated with small populations (Romain-Bondi et al. 2004).

5.3.3.2 Occurrence in the Action Area

The action area contains suitable foraging habitat for grizzly bears but is too low in elevation for denning. No observations have been reported in the vicinity of Newhalem Creek at or near the Project, suggesting the action area is not typically used by grizzly bears. Grizzly bears have not been observed west of the Cascade crest in many years. The USFWS has periodically considered reintroduction of the grizzly bear to the North Cascades ecosystem over the last several decades, but the most recent planning process was terminated in July 2020. Potential habitat for this species would be expected in the upper reaches of the Newhalem Creek drainage, above the Project headworks.

5.3.3.3 Critical Habitat

Critical habitat has not been designated for the grizzly bear. Critical habitat for the grizzly bear was proposed in November 1976 (41 FR 48757); the action area does not overlap areas of proposed critical habitat included in the 1976 proposal.

5.3.4 North American Wolverine

5.3.4.1 Listing Status and Distribution

In February 2013 (78 FR 7863), the USFWS proposed to list the North American DPS of wolverine as a threatened species, but the petition to list the species was withdrawn in 2014. The withdrawal was vacated as a result of court order, which returned the process to the proposed rule stage and initiated a new status review of the species in 2016. In 2020, the USFWS withdrew the proposed rule (85 FR 64618) and concluded that the species was neither threatened nor projected to be threatened in the near future. However, a federal District Court ruled in May 2022 that the species should be restored to the candidate species list while USFWS reconsiders its 2020 decision. On November 30, 2023, the USFWS listed the North American DPS of wolverine as a threatened species under the ESA, effective January 2, 2024 (88 FR 83726).

Wolverines are wide-ranging, with documented long-distance dispersals across habitats far from the high mountains near the timberline where known populations reside in Washington, Idaho, Montana, and Wyoming (USFWS 2018). The Cascade Range in Washington is the southernmost extent of the current wolverine range along the Pacific coast (Aubry et al. 2007), although individual wolverines have been found as far south as California and the species is more widely distributed in Washington than once thought (Aubry et al. 2014). Wolverines have recently been documented in the Teanaway Valley and east of Mt. Rainier National Park. In 2018, a wolverine was photographed near Fall City, Washington and was thought to be the same one killed crossing I-90 near Bandera in June 2018.

In the northern Cascades region of Washington and Canada, researchers tracked activity areas for 14 wolverines via satellite telemetry from 2007 through 2015, and found that the region supports a resident population, with 9 of 11 study animals documented primarily within Washington (Aubry et al. 2016). In Idaho, Wolverines were found to be associated with high elevations (2,200 to 2,600 m (7,218 to 8,530 ft)) with a slight downward shift in summer (Copeland et al. 2007). These movements correspond with a shift in cover types, from high-elevation whitebark pine communities in summer to mid-elevation Douglas fir (*Pseudotsuga menziezii*) and lodgepole pine (*Pinus contorta*) in winter (Copeland et al. 2007).

Remote camera surveys throughout the North Cascades National Park Complex in 2005 and 2006 did not capture images of wolverine, but incidental observations indicated their presence in the in portions of the Skagit River basin, including Ross Lake (Christophersen 2006). Activity areas of radio-tracked wolverines reported by Aubry et al (2016) were mostly east of Ross Lake but included one individual that ventured to the east shore of Ross Lake. During 2012 surveys, a successful reproductive den site was found in the North Cascades National Park with a second just northeast of the Park (Aubry et al. 2012).

In the spring of 2019, a wolverine was filmed foraging on an elk (*Cervus elaphus*) carcass along the east shore of Ross Lake by City Light contractors conducting snow surveys by helicopter. Recent radiotelemetry studies of wolverine in the North Cascades Ecosystem indicate that several individuals use habitat in the upper Skagit River basin, particularly the mountainous areas around Ross Lake, as part of their home range.

5.3.4.2 Occurrence in the Action Area

No observations of wolverine are reported in the action area, and the elevation of the highest portions of the action area near the dam site (approximately 1,019 feet msl) is considerably lower than elevations typically occupied by the species. However, given the remote nature of the site, the wide home ranges used by the species, and the proximity of the action area to known observations to the east (i.e., Ross Lake), it is possible that individuals may occasionally transit through the action area.

5.3.4.3 Critical Habitat

Critical habitat has not been designated or proposed for the North American wolverine.

5.3.5 Marbled Murrelet

5.3.5.1 Listing Status and Distribution

The marbled murrelet is a small, diving seabird that breeds in old-growth forests from central California to the Aleutian Islands of Alaska. It occurs in highest abundance between Vancouver Island, British Columbia, and the Alexander Archipelago in Southeast Alaska. In Washington, murrelets occur in the greatest numbers in Puget Sound and the Strait of Juan de Fuca. Historical records and observations indicate that murrelets were common and seen regularly along Washington and Oregon coastlines (USFWS 1997). The USFWS listed the Washington, Oregon, and California population as a threatened species under the ESA in 1992 (57 FR 45328).

The principal threats to marbled murrelet populations include the loss or modification of nesting habitats by commercial timber harvest of older forests, along with effects of coastal oil spills and gill-net fishing operations off the Washington coast (USFWS 1997). Extensive harvest of late-successional and old-growth forest was the primary reason for listing the murrelet as threatened. It is estimated that timber cutting over the past 150 years has removed at least 82 percent of the old-growth forests existing in western Washington and Oregon prior to the 1840s (USFWS 1997, 2019). Mortality associated with gill-net fishing and oil spills was also a cause for listing under the ESA (57 FR 45328). Predation of marbled murrelet adults, chicks, and eggs by various avian predators also inhibits their recovery (USFWS 2019).

5.3.5.2 General Life History and Habitat Requirements

The marbled murrelet spends most (greater than 90 percent) of its time on the ocean, resting and feeding, but flies inland to nest in old-growth forest stands. Marbled murrelets forage just beyond the breaker-line and along the sides of river mouths where greater upwelling and less turbulence occurs. At these locations, they feed on invertebrates and small fish such as anchovy, herring, and sand lance (Burkett 1995). Murrelets fly between foraging areas off the coast and inland nesting habitat. In Washington, the marbled murrelet nesting season is April 1 through September 23.

In their terrestrial environment, the presence of nesting platforms (large branches or deformities) is the most important characteristic of nesting habitat. Nesting platforms can be composed of a wide bare branch, moss or lichen covering a branch, mistletoe, witches' brooms, or other deformities (Evans Mack et al. 2003). Adults nest on mossy-limbed branches of large conifers such as coast redwood (*Sequoia sempervirens*), western hemlock, Douglas fir, and Sitka spruce (*Picea sitchensis*), in mainland mature stands typically located within 60 kilometers (37 miles) of marine waters (USFWS 2019). Murrelets have been recorded nesting at greater distances inland (Lorenz et al. 2017), and projects occurring up to 70 miles inland should consider the potential for marbled murrelet occurrence (WSDOT Fish and Wildlife Program and FHWA 2015). Murrelet habitat use during the breeding season is positively associated with the presence and abundance of mature and old-growth forests, large core areas of old-growth forest, low amounts of edge habitat, reduced habitat fragmentation, proximity to the marine environment, and forests that are increasing in stand age and height (USFWS 2019).

Suitable marbled murrelet nesting trees are mature conifers (greater than 15 inches diameter at breast height) situated in contiguous conifer-dominant (greater than 60 percent) stands with at least one suitable nesting platform at least 33 feet off the ground (WSDOT Fish and Wildlife Program and FHWA 2015). These conifer-dominated stands may vary in size from several acres (at least 5 acres) to thousands of acres, with large unfragmented stands of old growth composing the highest-quality habitat. Marbled murrelets have a limit on their inland breeding distribution because of the energetic requirements of flying inland to incubate eggs and feed young. They forage at sea, carrying single prey items to the nest to feed their young several times per day during the late stages of nesting. Nesting greater distances from the coast may have developed over time to avoid higher nest predation by corvids and gulls, whose population numbers may be much higher in food-rich coastal areas (Hamer and Nelson 1995).

A successful breeding pair fledges only one chick per year. Nests are not built, but rather the egg is placed in a small depression or cup made in moss or other debris on the limb. Incubation lasts approximately 30 days, and chicks fledge approximately 28 days after hatching. Both sexes incubate the egg in alternating 24-hour shifts. The chick is fed up to eight times daily and is usually fed only one fish at a time. The young are semi-precocial, capable of walking but not leaving the nest. Fledglings fly directly from the nest to the ocean. During the nesting season (April through September) marbled murrelets fly inland from the coast, often using waterways as flight corridors to nesting areas.

5.3.5.3 Occurrence in Action Area

The action area is located approximately 57 miles inland from the nearest marine coastline (Samish Bay). In 2011, suitable nesting habitat was identified in the upper Newhalem Creek drainage and

along the Skagit River south of Newhalem, where older forest stands were present (City Light 2011a). During May and June 2008, radar surveys conducted downstream of the town of Newhalem recorded possible detections of marbled murrelet flying along the Skagit River (Hamer Environmental 2008). The WDFW PHS database has no records of marbled murrelet sightings within 10 miles of the Project site (WDFW 2022b). Per WDFW (2022b), the closest section mapped as reporting a murrelet detection is 11.5 miles south of Newhalem.

Regardless of past data regarding nesting habitat suitability in the Newhalem Creek area, the Goodell Fire destroyed most forest stands that could be used by marbled murrelet within and adjacent to the dam access road and diversion site. Although a few scattered conifers of suitable size with potential nesting platforms exist in portions of the action area that were not severely burned (e.g., northern portion of penstock corridor, powerhouse near the Trail of Cedars, approximately 4,000 feet northeast of the diversion dam site [Hamer Environmental 2021]), such habitat is not present near the diversion site or access road. Any remaining suitable nest trees within several hundred feet of the diversion dam or access road are isolated and surrounded by dead trees with little to no cover. Such trees are highly unlikely to support nesting. At these locations, most of the remaining conifer trees have lost their needles and provide little to no canopy. Therefore, portions of the action area that were severely burned near the dam and access road landslide location do not provide the dense canopy typically required for nesting and predatory cover.

Some suitable nesting habitat may persist outside the burned area in the Newhalem Creek drainage near the powerhouse and along the northern half of the penstock corridor. Radar surveys conducted in 2021 along the Skagit River in Newhalem recorded seven "murrelet-type" targets flying towards or away from the creek. Although concurrent audio/visual surveys did not confirm whether these radar detections were indeed murrelets, use of the drainage by murrelets cannot be ruled out (Hamer Environmental 2021). In general, however, the radar surveys of the upper Skagit River (Newhalem to Ross Lake) suggest very low use of the RLNRA area by murrelets, particularly on the upper Skagit River (Hamer Environmental 2021).

The radar detection surveys conducted in 2021 did record two murrelet calls along the Skagit River mainstem (Hamer Environmental 2021). This indicates that the river may provide a migratory corridor for murrelets transiting to and from marine foraging grounds to suitable nesting habitat outside of the action area during the nesting season. Radar detections have also been reported up Thornton and Bacon Creeks, downriver from Newhalem.

5.3.5.4 Critical Habitat

Critical habitat was designated for the marbled murrelet in 1996 and revised in October 2011 (76 FR 61599). Designated critical habitat includes forested areas around Puget Sound. The preservation of both marine foraging habitat and terrestrial nesting habitat is important to the recovery of the species; however, only terrestrial nesting habitat has been designated as critical habitat for the marbled murrelet and includes forested stands with trees generally more than 32 inches in diameter that have potential nesting platforms at least 33 feet above the forest floor (USFWS 1997).

Marbled murrelet critical habitat is not designated within the action area. The nearest block of designated critical habitat is located approximately 6 miles southeast of the action area.

5.3.6 Northern Spotted Owl

5.3.6.1 Listing Status and Distribution

The northern spotted owl was federally listed as threatened in June 1990 (55 FR 26114). It is believed to have historically inhabited most forests throughout southwestern British Columbia, western Washington and Oregon, and northwestern California as far south as the San Francisco Bay. The primary causes of spotted owl population declines are loss and adverse modification of nesting, roosting, and foraging (NRF) habitat due to timber harvesting; land conversions; natural disturbances such as fire, windstorms, and insect outbreaks; and competition with encroaching barred owls (USFWS 2016b, 2020). An estimated 60 percent reduction of habitat has occurred over the last 190 years. Owl numbers appear to have declined annually since 1985, when many studies began. Range-wide, spotted owls are currently declining at an average rate of 2.9 percent each year (USFWS 2013).

5.3.6.2 General Life History and Habitat Requirements

The northern spotted owl is strongly associated with old-growth forests that are characterized by multi-storied canopies; several species of trees, sizes, and ages; and standing and downed dead trees. Northern interior forests typically require 150 to 200 years to attain the attributes important for nesting and roosting habitat (USFWS 1990). Suitable owl habitat has moderate to high canopy closure (60 to 80 percent); a multilayered, multi-species canopy dominated by large (greater than 30 inches in diameter at breast height) overstory trees; a high incidence of large trees with various deformities (e.g., large cavities, broken tops, dwarf-mistletoe infections, and other evidence of decadence); numerous large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for owls to fly (USFWS 1990; Thomas et al. 1990). Northern spotted owls prey primarily on small mammals, particularly flying squirrels (*Glaucomys sarbinus*) and woodrats (*Neotama* spp.) (USFWS 2008).

Stands dominated with trees as young as 50 years that contain remnant large-diameter trees or snags that survived, or were created by, a previous disturbance (e.g., fire; windstorm; or, in some cases, timber harvest) are sometimes used as nesting habitat (USFWS 1990; Gutiérrez et al. 1995; Courtney et al. 2004). Recent field investigations in northern California documented the presence of northern spotted owls in 30- to 80-year-old forests that contain suitable structural characteristics. In some instances, nesting pairs of northern spotted owls were found in stands that developed 60 to 80 years after either selective or clear cutting (USFWS 1990).

Northern spotted owls require large amounts of suitable habitat for nesting. Median home range sizes are typically on the order of 3,000 to 5,000 acres per pair. Spotted owls are territorial and remain on their home range throughout the year (77 FR 71876). Home range size varies geographically, generally increasing from south to north with a corresponding geographic shift in available small mammals, which compose most of their diet. Each home range generally contains a core area, which is most intensively used and tends to include the nesting site, and a larger surrounding area used for roosting and foraging. Habitat quality in the core area is more strongly related to habitat occupancy, survival, and reproductive success than habitat quality in the roosting and foraging area (77 FR 71876).

Spotted owls nest in cavities or platforms in trees, and pairs are typically spaced approximately 1 to 2 miles apart. Nests are usually found in forests in lower elevations (less than 5,000 feet) and

river valleys, and nest trees typically include Douglas-fir, mountain hemlock, western hemlock, or Pacific silver fir (*Abies amabilis*) (USFWS 2011). The northern spotted owl breeding season is characterized by the early nesting season and the late nesting season (Forsman et al. 1984). During the early nesting season, defined as March 1 to July 15 (WSDOT 2020), nesting owls are engaging in nest site selection, egg laying, incubation, and brooding of nestlings (Forsman et al. 1984). In the late breeding season, July 16 to September 30 (WSDOT 2020), juvenile spotted owls have fledged, are able to thermoregulate, can fly short distances, and are no longer completely dependent on adults for feeding (Forsman et al. 1984). By November or December, the young disperse from the nest site (Courtney et al. 2004; USFWS 2011).

Spotted owl dispersal habitat does not typically contain the same characteristics as NRF habitat. However, such habitat provides an important linkage among blocks of nesting habitat both locally and over the range of the northern spotted owl. Dispersal habitat, at a minimum, consists of forest stands with adequate tree size and canopy closure to provide some degree of protection to spotted owls from avian predators and to allow the owls to forage at least occasionally. In addition to forest structure, location proximate to home range habitat is an important characteristic of dispersal habitat. The most important habitats support all spotted owl life requisites, whereas some habitats provide only certain resources (e.g., prey) and not others (e.g., nest sites). Studies have indicated that owls select mature stands in rough proportion to their availability for roosting and use young and pole-sized stands less, indicating the importance of mature forests within the owl's range (USFWS 1990). In addition to habitat requirements for resident owls, suitable habitat for dispersing owls, particularly juveniles, is important for maintaining spotted owl populations. Dispersing owls require forests that support movement to unoccupied suitable habitat.

5.3.6.3 Occurrence in Action Area

Northern spotted owls are considered an uncommon resident in the North Cascades National Park Complex. It is thought that competition with barred owls for suitable habitat may be limiting spotted owl distribution and abundance (Kuntz and Christopherson 1996) as this species is frequently observed. Surveys conducted by NPS identified a single spotted owl nest in the Newhalem Creek drainage approximately 2 miles south of the dam in 2009, but it was not relocated in 2010 (City Light 2011b).

In 2011, the late seral stage conifer forests near Newhalem were identified as potential nesting habitat for northern spotted owls (City Light 2011a). Carroll (2008) mapped the action area and surrounding habitat as having a 40 to 60 percent chance for northern spotted owl occupancy, based on current climatic conditions. However, in 2015 the Goodell Fire eliminated most, if not all, suitable NRF habitat in the action area. But for the powerhouse and northern half of the penstock corridor, the action area no longer contains forest stands with moderate to high canopy closure, nor multi-species canopies of trees to provide habitat for thermal refuge and predator avoidance. The upper reaches of the Newhalem Creek drainage were severely burned, and a substantial amount of previously suitable NRF habitat is no longer present or has been significantly altered (see Figure 4.2-1). Nonetheless, spotted owls could potentially use portions of the action area for dispersal, particularly along the northern half of the penstock corridor that was not burned. Dispersal habitat may persist in burned forested areas if they contain areas with canopy cover greater than or equal to 40 percent (77 FR 14093). However, such cover is no longer present near the diversion site and the access road, as most areas were severely burned and have limited, if any,

remaining canopy. Further, the very low numbers of spotted owls in the North Cascades suggests that use of the action area is unlikely.

5.3.6.4 Critical Habitat

Critical habitat was designated for the spotted owl in 1991 and has since been revised multiple times, most recently on July 20, 2021 (85 FR 38246). No critical habitat for the northern spotted owl is designated within the action area. The closest designated critical habitat is approximately 5.5 miles southwest of the action area.

5.3.7 Puget Sound Steelhead

5.3.7.1 Listing Status and Distribution

Puget Sound steelhead were listed as threatened on May 11, 2007. The Puget Sound DPS includes more than 50 stocks of naturally spawned anadromous steelhead populations originating below natural and human-made impassable barriers of rivers that flow to Puget Sound. This includes all rivers east of the Elwha River, including rivers in Hood Canal, South Sound, North Sound, and the Strait of Georgia. Steelhead from six hatchery programs are also included in the DPS but are not applicable to the Skagit River watershed. Resident *O. mykiss* (i.e., Rainbow Trout) are not part of this DPS (NMFS 2006).

Puget Sound steelhead have two distinct forms: inland and coastal (Scott and Gill 2008). Skagit River steelhead belong to the coastal form found west of the Cascade Mountains. WDFW (2002) identifies three winter stocks (Skagit Mainstem, Sauk, and Cascade) and three summer stocks (Finney Creek, Sauk, and Cascade) in the Skagit River.

Most Puget Sound steelhead populations, including those in the Skagit River, experienced severe declines in the early 2000s (NMFS 2005). The DPS continues to be at very low viability, and trends in abundance of spawners remain predominantly negative. This DPS remains at moderate risk of extinction (NMFS 2016).

5.3.7.2 Life History of Skagit River Steelhead Stocks

Winter steelhead enter the Skagit River in November (NMFS 2005) and spawn from March through June, with peak spawning in May. Incubation of steelhead eggs occurs during spring and early summer, when flows are primarily from annual winter snowpack melt. Fry emergence peaks in early August (WDFW 2004). Most winter steelhead undergo smoltification and outmigration at age 2 and approximately 18 percent outmigrate at age 3 (NMFS 2005). Outmigration occurs primarily from late April through early June (WDFW 2004), with peak densities occurring in late April and early May (Kinsel et al. 2008).

Approximately 57 percent of Skagit River winter steelhead return to spawn after just one winter in the ocean, while approximately 42 percent do so after two winters (Scott and Gill 2008). Although most Skagit River winter steelhead die after spawning, as many as 14 percent may return to the ocean and spawn again.

Steelhead use a variety of habitat types, but generally use higher velocity water than other salmon. This allows them to migrate farther into higher gradient headwater streams than Chinook, Coho, Pink, or Chum Salmon. Juvenile steelhead tend to move away from stream edges and towards

faster moving water as they grow. They may also move to larger streams if crowding occurs in headwaters. During winter, many steelhead juveniles will move back into smaller tributaries to avoid high flows and utilize structures such as boulders, large woody material jams, root-wads, and undercut banks as cover (Scott and Gill 2008).

There is very little information on Skagit River steelhead egg to fry or fry to smolt survival rates in the Skagit River. It is generally understood that peak river flows and fine sediment are important factors that may adversely affect these life stages (Bjornn and Reiser 1991). However, the magnitude or frequency of adverse effects of peak flows and scour on steelhead is likely to be less than for Chinook Salmon because of the location and timing of spawning and incubation.

5.3.7.3 Occurrence in Action Area

The Skagit River mainstem and lower reaches of Newhalem Creek downstream of the lower waterfall at RM 0.65 provide spawning and rearing habitat for winter steelhead from the Puget Sound DPS. Summer steelhead presence is documented in the Skagit River at the confluence of Newhalem Creek, and the 1992 license application states that steelhead and Rainbow Trout were the most abundant species recorded in surveys of Newhalem Creek below the barriers (City Light 1992).

As depicted in Table 4.1-1, Puget Sound steelhead may spawn in the action area from March through June, and eggs are likely to present from March through early August. Rearing juveniles could be present year-round.

5.3.7.4 Critical Habitat

NMFS designated critical habitat for Puget Sound steelhead in February 2016 (81 FR 9251). Critical habitat is designated within the lower Skagit River from Puget Sound to Newhalem. The lowest 0.6 mile of Newhalem Creek is also designated as critical habitat due to known spawning (81 FR 9251).

Critical habitat consists of physical and biological features (PBFs) that are essential for the conservation of a species. Within designated critical habitat, six PBFs are considered essential for the conservation of Puget Sound steelhead. Of the six PBFs, only three apply to freshwater environments. These are listed below, along with descriptions of their condition in the action area:

- Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning incubation and larval development:

  Existing Condition: The lower reach of Newhalem Creek and that portion of the Skagit River within the action area provide sufficient water quantity and quality to support steelhead spawning and incubation (WDFW 2021a, 2022b).

- Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks:

Existing Condition: Newhalem Creek downstream of the lower waterfall at RM 0.65 contains complex juvenile rearing habitat that supports rearing juvenile steelhead.

- Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival:

  Existing Condition: Although Newhalem Creek and the Skagit River provide migratory habitat for multiple life histories, passage in the action area is fully impeded at RM 0.65 due to the presence of a natural waterfall that is impassable to fish.

5.3.8 Puget Sound Chinook Salmon

5.3.8.1 Listing Status and Distribution

Chinook Salmon in the Puget Sound Evolutionary Significant Unit (ESU) were listed as threatened in March 1999 (64 FR 14308). The status was reaffirmed following a status review in June 2005 (70 FR 37160). The ESU includes all naturally spawned populations of Chinook Salmon from streams and rivers flowing into Puget Sound, the Straits of Juan de Fuca from the Elwha River eastward, and 26 hatchery programs. The Puget Sound Technical Recovery Team identified 22 independent Chinook Salmon populations within five biogeographic regions (Nooksack, Hood Canal, South/Central, Whidbey, and Strait of Juan de Fuca) in the Puget Sound ESU (Ruckelshaus et al. 2006).

5.3.8.2 Life History of Skagit River Chinook

Chinook Salmon juvenile life history patterns are typically grouped into "ocean-type" and "stream-type" (Healey 1991). Ocean-type juveniles out-migrate to marine waters as sub-yearlings, while stream-type juveniles rear in freshwater for at least a year. In the Skagit River ocean-type Chinook Salmon juvenile life history forms have been further refined to four life history strategies: fry migrants, delta rearing migrants, parr migrants, and yearlings (SRSC and WDFW 2005). Fry migrants are juveniles that outmigrate shortly after emergence and spend relatively little time in the Skagit River mainstem and delta, but some may spend a significant amount of time in a limited number of pocket estuaries situated along Skagit Bay. Delta rearing migrants emerge at the same time as fry migrants and move rapidly to the delta region, but then spend several weeks to months rearing in the Skagit River delta before moving into Skagit Bay at an average size of 74 millimeters (mm; range 49 to 126 mm). Parr migrants (also referred to as "fingerling" or "riverine" life history forms) rear in freshwater for several months, then move through the delta relatively quickly and enter Skagit Bay at about the same size as delta rearing migrants. Yearlings rear in freshwater for over 1 year and outmigrate from late March through May at an average size of 120 mm (range 92 to 154 mm) (SRSC and WDFW 2005).

Wild Chinook Salmon fry enter Skagit Bay in February and March at an average size of 39 mm (range 30-46 mm) (Beamer et al. 2005). Farther upstream, trapping at RM 17 during 2007 (at the Burlington Northern Railroad crossing in Mount Vernon) indicated that some fry may begin out-migrating in mid-January and peak fry migration is usually in mid-March (Kinsel et al. 2008). Median migration dates between 1997 and 2006, when 50 percent of the fry have passed the trap, averaged March 27 and have ranged from March 10 (1999) to May 2 (1998) (Kinsel et al. 2008).

5.3.8.3 Occurrence in Action Area

The Skagit River mainstem provides spawning and rearing habitat for summer Chinook Salmon from the Puget Sound ESU. WDFW (2021a) indicates that summer Chinook Salmon presence has been documented in the lower reaches of Newhalem Creek, and the creek is accessible to Chinook Salmon downstream of the lower waterfall located at RM 0.65. WDFW has not documented spawning or rearing in Newhalem Creek; however, the lower reaches of the creek are accessible from the Skagit River and therefore could be used for spawning and occupied by rearing juveniles spawned there or in the Skagit River, particularly during high-flow periods when the creek could provide high-velocity refuge from the Skagit River mainstem. Based on spawn timing (Table 4.4-1), pre-spawn adults may be present as early as June within the action area. Spawning begins in late August and extends through mid-October. Juveniles are likely to emerge from spawning gravels from December through February and will rear in the Skagit River mainstem year-round.

A limited number of Chinook Salmon adults were seen during surveys in 1982 and 1983, with two possible redds noted. Study results for the 1992 license application noted that of the salmon species that potentially use Newhalem Creek, rearing conditions appear most suitable for Chinook Salmon, because they prefer riffle and run habitat types and cobble and boulder substrates (City Light 1992).

5.3.8.4 Critical Habitat

Critical habitat for the Puget Sound Chinook Salmon ESU was designated by the NMFS on September 2, 2005 (70 FR 52630). The entire Skagit River mainstem up to Gorge Dam is designated as critical habitat, as well as portions of tributaries draining to the Skagit River. However, Newhalem Creek is not included in the designation. As with Puget Sound steelhead, critical habitat consists of six PBFs that are essential for the conservation of a species. Of the six PBFs, three are present in the action area: (1) freshwater spawning sites, (2) freshwater rearing sites, and (3) migratory corridors.

5.3.9 Bull Trout

5.3.9.1 Status and Distribution

In November 1999, the USFWS listed all populations of Bull Trout within the coterminous United States as a threatened species pursuant to the ESA (64 FR 58910). Bull Trout are distributed throughout the cold, clear waters of the high mountains and coastal rivers of northwestern North America, including Yukon, British Columbia, Washington, Oregon, Idaho, and western Montana. Bull Trout are threatened by the combined effects of habitat degradation, fragmentation, and alteration, including dewatering, road construction, mining, grazing, dams, entrainment, poor water quality, and introduced non-native species (65 FR 58910).

The most recent Bull Trout Recovery Plan (USFWS 2015a) delineates Bull Trout into six recovery units, parsed into 109 core areas. Core areas are expected to function similarly to Bull Trout metapopulations, in that spatial and temporal interactions between Bull Trout within a core area are more likely than between Bull Trout from separate core areas (USFWS 2015b).

5.3.9.2 Life History and Habitat Requirements

Bull Trout express both resident and migratory life history strategies (Rieman and McIntyre 1993). Resident forms of Bull Trout complete their entire life cycle in the tributary streams in which they spawn and rear, while migratory Bull Trout spawn in tributary streams for 1 to 4 years before migrating to either a lake or river (Fraley and Shepard 1989). Anadromous Bull Trout are found only in the Coastal Recovery Unit (USFWS 2015b), which includes the Newhalem Creek local population. Both resident and migratory Bull Trout may be found together, and offspring from either form may exhibit either behavior (Rieman and McIntyre 1993).

Those populations below dams are typically fluvial (i.e., migrating between mainstem rivers and tributaries). Most populations spawn from mid-September to mid-October, but several spawn between August and early September and late October to early November (USFWS 2015b). Juveniles typically remain in the tributaries in which they were spawned and begin migratory movements as subadults.

Bull Trout have some of the most demanding habitat requirements of all salmonids (Rieman and McIntyre 1993). To successfully spawn and rear, Bull Trout need specific physical habitat characteristics that are not necessarily present even in pristine watersheds (Rieman and McIntyre 1993). These include the following (USFWS 2015a):

- Water temperatures ranging from -2 degrees Celsius (ºC) to 22ºC, depending on life history stage and form, geography, elevation, diurnal and seasonal variation, and local groundwater influence.
- A natural hydrograph, including peak, high, low, and base flows within historic ranges or if regulated, according to an opinion that supports Bull Trout populations by minimizing daily and day-to-day fluctuations.
- Migratory corridors with no physical, biological, or chemical barriers between spawning, rearing, overwintering, and foraging habitats.
- An abundant food base, including prey items such as macro-invertebrates of aquatic or terrestrial origin and forage fish.
- Permanent water of sufficient quantity and quality such that normal reproduction, growth, and survival are not inhibited.

5.3.9.3 Occurrence in Lower Skagit River Core Area

The action area is in the lower Skagit River core area, in the Puget Sound region of the Coastal Recovery Unit. The lower Skagit River core area defined as the river downstream of Gorge Dam (USFWS 2004), has been identified as a current population stronghold because of plentiful intact habitat and an abundant population (USFWS 2015b). This core area likely supports the largest population of Bull Trout in the state, numbering in the thousands. Long-term monitoring indicates that the Bull Trout population trend in the lower Skagit River core area is stable or increasing (USFWS 2006). The lower Skagit core area consists of 19 local populations, including Newhalem Creek, and 2 potential populations based primarily upon their spawning distribution.

Lowery (2009) conducted winter snorkeling in the lower Skagit River core area between Newhalem and Rockport during 2008 and estimated a population size of 1,602 Bull Trout greater

than 300 mm (age 4-plus) and 179,265 Bull Trout less than 300 mm (age 1 through 3). There appears to be consensus that Bull Trout populations in the lower Skagit River core area are generally healthy, and abundance is at least on the order of thousands of fish (USFWS 2004). In the early 2000s, the lower Skagit River core area spawning population may have been on the order of tens of thousands of individuals (Kraemer 2008, personal communication, as cited in City Light 2011a).

In the upper Skagit River core area (upstream of Gorge Dam), movement of mature fluvial Bull Trout towards staging and spawning areas occurs in July and August (peak in mid-July), while anadromous fish migrate through the lower river during June and July (Connor et al. 2009). Bull Trout spawning occurs in mid-September through mid- to late November as water temperatures decline to below 8°C, with peak spawning occurring in October (Downen 2006). The specific duration of incubation and emergence timing for Bull Trout in the lower Skagit River core area has not been determined. Bull Trout generally have a relatively long incubation period such that the time to fry emergence may take more than 200 days and occurs from early April through May (USFWS 2004).

After spawning, Bull Trout in the lower Skagit River core area disperse downstream to overwintering and foraging areas during October through November (Connor et al. 2009). Overwintering and foraging habitat for fluvial populations includes predominately larger pools and deep runs in the upper reaches of the Skagit River mainstem but may also include the Sauk River (USFWS 2004). Post spawning, anadromous Bull Trout outmigrate to the estuary during February through April with peak movements in mid-March (Connor et al. 2009). Goetz et al. (2004) report that some Bull Trout may switch between fluvial and anadromous behavior patterns in alternate years.

In the upper Skagit River core area, young Bull Trout may rear in tributary streams until age 4 and become predominately piscivorous after age 2 (Lowery 2009). After age four, larger fluvial Bull Trout move into the Skagit River mainstem (Lowery 2009). However, Goetz et al. (2004) report that 2- and 3-year-old Bull Trout with a mean size of 144 mm (range 91 to 198 mm) is typical for the first migration from the Skagit River to an estuarine environment. While the overall timing for migration into the estuary is broad, from mid-February to early September, most outmigration occurs during May and June (Goetz et al. 2004).

5.3.9.4 Occurrence in Action Area

Newhalem Creek from its confluence with the Skagit River upstream to a 14-foot natural waterfall barrier at RM 0.65 provides spawning and rearing habitat that is deemed essential for maintaining the distribution, abundance, and productivity of the Newhalem Creek local population of Bull Trout (Kraemer 2003; USFWS 2010; WDFW 2022b). Spawning and incubation periods are presumed to be similar to those presented previously for the upper Skagit River population. As depicted in Table 4.1-1, Skagit River Bull Trout may spawn in the action area from September through November, and eggs may be present from September through approximately February, depending on water temperature. It is unknown if Bull Trout overwinter in Newhalem Creek, but overwintering is assumed. Rearing juveniles could be present in Newhalem Creek year-round, and subadults and amphidromous adults could occur at any time in the Skagit River mainstem portion of the action area.

Although Bull Trout are relatively abundant in the lower Skagit River core area and most local populations include more than 100 adults, adult abundance in Newhalem Creek is unknown (USFWS 2006). During surveys conducted for the previous license application, Bull Trout were not observed in the creek, although native char were documented (City Light 1992). Bull Trout have been reported staging in the lower reaches of Newhalem Creek (Kraemer 2003 as cited in USFWS 2010); City Light also has documented this species in the lower portions of the creek in fall.

No Bull Trout have been observed above the 14-foot-tall waterfall located approximately 3,400 feet upstream from the mouth, which is considered a migration barrier to anadromous fish (Ebasco Environmental 1991). Because Bull Trout cannot access habitat upstream of the lower waterfall (RM 0.65), they are not present in the reach above the dam at RM 1.0.

5.3.9.5 Critical Habitat

The USFWS designated critical habitat for Bull Trout in the coterminous United States in September 2005 (70 FR 56212) and revised designated critical habitat for the species in October 2010 (75 FR 63898). The lower reaches of Newhalem Creek to the 14-foot waterfall barrier at RM 0.65 provide spawning and rearing habitat, and this is the area designated as critical habitat. Newhalem Creek is essential for maintaining distribution, abundance, and productivity in the Lower Skagit River core area (USFWS 2010).

The nine PBFs of Bull Trout critical habitat as revised in 2010, along with their status in the action area, are as follows:

- Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia:

  Existing Condition: Shallow springs, seeps, and groundwater sources occur throughout the Newhalem Creek subbasin and may contribute to water quality and thermal refugia for Bull Trout in the Skagit River mainstem. Relative to this PBF, the action area is believed to be functioning properly.

- Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers:

  Existing Condition: The lower reach of Newhalem Creek downstream of a natural waterfall at RM 0.65 is used by migrating adults and subadults. Although PBF 2 is absent from the upper portion of the action area due to the presence of two natural waterfalls that are impassable, these waterfalls are upstream of designated critical habitat.

- An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish:

  Existing Condition: PBF 3 is likely functioning properly and contributes to foraging, migratory, and overwintering (FMO) and spawning habitat in the Newhalem River, and FMO habitat in the Skagit River.

- Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks, and unembedded substrates to provide a variety of depths, gradients, velocities, and structure:

  Existing Condition: PBF 4 is present in the action area; however, until the diversion ceased operations 10 years ago, the PBF was not functioning fully, as habitat complexity was reduced by flow regulation associated with the Project. This condition has improved, however, since the Project ceased diversions.

- Water temperatures ranging from 2 to 15ºC, with adequate thermal refugia available for temperatures that exceed the upper end of this range; specific temperatures within this range will depend on Bull Trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence:

  Existing Condition: PBF 5 is present and fully functioning in the action area. No reaches of the action area are identified as temperature-impaired on the 303(d) list (see Section 4.4.1 of this BA).

- In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival; a minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions; the size and amounts of fine sediment suitable to Bull Trout will likely vary from system to system.

  Existing Condition: WDFW's PHS database reports that Bull Trout may spawn and rear in Newhalem Creek (WDFW 2022b). Although no spawning surveys have been conducted recently to confirm if this is occurring (E. Lowery, City Light, personal communication, August 15, 2021), this PBF is likely functioning properly.

- A natural hydrograph, including peak, high, low, and base flows within historical and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph:

  Existing Condition: Although flow impairment is still reported from the mouth of the creek to the confluence with the East Fork due to surface water diversion at the Project site (see Section 4.4.1 of this BA), the Project ceased operations 10 years ago. A natural hydrograph is now present, and this PBF is therefore likely functioning properly.

- Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited:

  Existing Condition: The baseline condition of this PBF is likely functioning fully in the action area.

- Sufficiently low levels of occurrence of nonnative predators (e.g., Lake Trout, Walleye, Northern Pike, Smallmouth Bass), interbreeding (e.g., Brook Trout), or competing (e.g., Brown Trout) species that, if present, are adequately temporally and spatially isolated from Bull Trout:

Existing Condition: Currently, there are naturally reproducing populations of Brook Trout in the Skagit River basin. However, it is not known to what degree this species predates on Bull Trout in the action area. This PBF is likely functioning properly.

5.3.10 Suckley's Cuckoo Bumble Bee

5.3.10.1 Listing Status and Distribution

On December 17, 2024, the USFWS proposed to list Suckley's cuckoo bumble bee (*Bombus suckleyi*) as an endangered species under the ESA (89 FR 102074). In their most recent *Species Status Assessment*, USFWS (2024) notes there is significant uncertainty about the range of Suckley's cuckoo bumble bee, in part due to previous misidentification of the species based on its similarity in appearance to the gypsy cuckoo bumble bee (*B. bohemicus*). Literature suggests, historically, Suckley's cuckoo bumble bee was broadly distributed across North America and occurred in prairies, grasslands, meadows, savannahs, and agricultural landscapes. The species has been found in eleven western U.S. states, with Colorado, Montana, Washington, and Utah having the largest number of historic records (CBD 2020). In Canada, the historic distribution for Suckley's cuckoo bumble bee included the southern portions of British Columbia, Alberta, and Saskatchewan with a disjunct population documented in Newfoundland (CBD 2020). The number of observations has declined steadily since the 1950s and, according to the USFWS (2024), the species has not been observed within the United States since 2016.

5.3.10.2 General Life History and Habitat Requirements

Suckley's cuckoo bumble bee is a generalist pollinator and represents a rare group of obligate parasitic cuckoo bumble bees. In contrast to social bumble bees, which build nests and live in colonies of related individuals, cuckoo bumble bees in the subgenus *Psithyrus* invade the nests of a different species of bumble bee and rely upon its host workers to rear their young (CBD 2020, Martin et al. 2023). Only two species have been confirmed as hosts of Suckley's cuckoo bumble bee: western bumble bee (*B. occidentalis*) and Nevada bumble bee (*B. nevadensis*) (USFWS 2024). Due to this unique life history strategy, Suckley's cuckoo bumble bee, along with other cuckoo bumble bees, are at a particular risk of decline and potential extinction as their host species are also declining in abundance and range in recent years (CBD 2020).

Based on data compiled for the 2024 *Species Status Assessment*, Suckley's cuckoo bumble bee has been found at elevations ranging from approximately 2 to 3,200 meters (6 to 10,500 feet) (USFWS 2024). Like other bumble bees, Suckley's cuckoo bumble bees require suitable nesting sites for host colonies; nectar and pollen resources during the colony and rearing period (spring, summer, and fall); and suitable overwintering habitat (Goulson 2010, CBD 2020, USFWS 2024). Host nests are typically located in abandoned underground rodent burrows or other dry natural hollows in a variety of habitats including open meadows and prairies, farms and croplands, urban areas, boreal forest, and montane meadows (COSEWIC 2019). Suckley's cuckoo bumble bees are generalist nectar foragers, with grasslands, meadows, developed areas, and forests representing important foraging habitat (Martin et al. 2023). The species has been reported on a wide variety of flowers, including Russian knapweed (*Centaurea repens)* and species from the following genera: *Aster*, *Chrysothamnus*, *Cirsium*, *Solidago*, and *Trifolium* (CBD 2020). Specific overwintering habitat requirements for Suckley's cuckoo bumble bee are currently unknown; however, like other bumble bees, females typically overwinter underground in mulch or other decomposing vegetation, and in rotting logs near nesting sites (COSEWIC 2019, Martin et al. 2023, USFWS 2024).

5.3.10.3 Occurrence in the Action Area

As noted previously, Suckley's cuckoo bumble bee has not been observed within the United States since 2016 (USFWS 2024), despite considerable survey efforts. The Xerces Society, in collaboration with WDFW and the Idaho Department of Fish and Game, launched the Pacific Northwest Bumble Bee Atlas in 2018 for Oregon, Washington, and Idaho. From 2018 to 2020, over 1,500 standardized surveys were conducted across all three states, gathering a total of 21,514 bumble bee observations from 25 different species. Suckley's cuckoo bumble bee was not detected as part of the project (Hatfield et al. 2021). Survey efforts are ongoing and, as of January 2025, the Bumble Bee Atlas has gathered over 44,000 bumble bee observations from over 3,500 surveys in Oregon, Washington, and Idaho, including multiple surveys within 20 miles of the action area, with no detections of Suckley's cuckoo bumble bee (Xerces Society 2025).

In the absence of site-specific surveys, and because the species is a generalist pollinator found in a variety of habitats, the possibility exists, albeit low, that individual Suckley's cuckoo bumble bees and suitable habitat for foraging, nesting sites for host colonies, and overwintering habitat could potentially occur in the action area. However, based on a lack of recent detections within the region, coupled with the fact that the species has not been observed in the United States since 2016, potential use of the action area is highly unlikely.

5.3.10.4 Critical Habitat

Critical habitat has not been designated or proposed for Suckley's cuckoo bumble bee.

6.0 EFFECTS OF THE PROPOSED ACTION ON LISTED SPECIES AND CRITICAL HABITAT

The following sections analyze potential effects of the Proposed Action on ESA-listed species and critical habitat located within or in close proximity to the action area.

6.1 Gray Wolf

The Diobsud Pack is currently thought to consist of a single wolf with a territory that does not overlap the action area. However, wolves are highly mobile, and transients may enter the action area during decommissioning. Noise levels (including noise from possible helicopter use) associated with the Proposed Action, including equipment use to demolish the powerhouse, remove the penstock/saddles, remove the dam and improve the dam access road may result in temporary avoidance of the action area but are highly unlikely to result in behavioral changes. Effects from the Proposed Action would be insignificant and may affect, but are **not likely to adversely affect,** gray wolves.

6.2 Canada Lynx

The action area does not contain suitable lynx habitat, although individuals may occasionally move through. The transitory nature of use and lack of typical prey items suggests that the likelihood of encountering a lynx during implementation of the Proposed Action is remote and considered discountable. Therefore, the Proposed Action **may affect,** but **is not likely to adversely affect**, Canada lynx.

6.3 Grizzly Bear

The action area contains suitable foraging habitat for grizzly bear, but there have been no confirmed observations of this species in or near the action area in decades. The human presence and noise from the Proposed Action would likely result in avoidance behavior by any individual bear moving through the action area. For these reasons, the chances of encountering a grizzly during implementation of the Proposed Action is remote and considered discountable. Therefore, the Proposed Action **may affect,** but is **not likely to adversely affect**, grizzlies.

6.4 Wolverine

Available information from areas surrounding Ross Lake, though outside of the action area, suggests that the potential to encounter wolverine near the action area is rare. Wolverines are wide ranging animals mostly using habitats at higher elevations than prevail within the action area, but are known to sometimes travel through lower elevation areas. The Proposed Action is not expected to negatively affect occasional individuals that may transit through the action area.

In the highly unlikely event that an individual occupied the action area during implementation of the Proposed Action, human presence and noise would likely result in avoidance behavior by any individual moving through the action area. Because the chances of encountering a wolverine during implementation of the Proposed Action are remote, effects are considered discountable. A The Proposed Action **may affect,** but are **not likely to adversely affect**, North American wolverine.

6.5 Marbled Murrelet

Considering the construction schedule presented in Section 2.5 of this BA, implementation of some elements of the Proposed Action will overlap with the marbled murrelet nesting season (April 1 to September 23). Potential effects of the Proposed Action on murrelets and their habitat are discussed below.

6.5.1 Effects on Suitable Nesting Habitat

Habitat within the action area is predominately unsuitable for murrelet nesting, except for patches of unburned forest near the tailrace barrier, powerhouse, and along the northern half of the penstock route (see Section 5.3.5.3). In the location of the dam and associated access road, most of the forest is now comprised of dead coniferous trees. At the dam removal site, if any trees are required to be cleared (see Section 4.2.2), City Light will direct the contractor to remove only dead trees or those that lack suitable nest platforms.

For removal of the penstock and saddles, City Light will attempt to access the construction area using the existing disturbed corridor adjacent to the penstock (i.e., area devoid of trees) to the extent possible. However, a temporary access road will likely be required for removal of the penstock and saddles. As discussed in Section 2.7.5, City Light will conduct a pre-removal survey of trees within and 100m (328 feet) adjacent to the temporary access route for penstock removal to determine habitat suitability for nesting murrelets (and northern spotted owl). If any trees suitable for murrelet nesting are located during pre-construction surveys along or within 100m of the temporary access route, all trees in this area would be removed outside of the nesting season for marbled murrelets and northern spotted owls (i.e., removed from October 1 – February 28). To the extent possible, any mature trees with marbled murrelet nesting platforms (or suitable nest trees for spotted owls) will be maintained.

Through implementation of these impact minimization measures, the Proposed Action is not expected to remove trees that may be suitable for marbled murrelet nesting. Although tree removal along the penstock access route, if required, may extend beyond the existing disturbed corridor, the creation of canopy gaps would be limited because gaps exist in the canopy under baseline conditions and adjacent habitat is fragmented as a result of the Goodell Fire. Considering these factors, project-related effects on suitable nesting habitat for marbled murrelets are considered **insignificant**.

6.5.2 Effects on Individuals Transiting through or Using the Action Area

Radar surveys indicate that adult marbled murrelets may use Newhalem Creek and the Skagit River as flight corridors to and from marine foraging areas and suitable nesting habitat outside the action area. Therefore, if present, adult murrelets could be exposed to in-air noise from construction equipment, particularly helicopters, during their morning and evening trips to and from marine foraging grounds. Decommissioning activities that generate the most noise will be scheduled in spring through fall; however, noise-producing activities will not typically occur at pre-dusk and pre-dawn hours when adults transit to and from marine foraging grounds. If suitable nest trees are observed during preconstruction surveys along the penstock corridor, tree removal will take place outside of the nesting season for murrelets (and northern spotted owl, if suitable nest trees are located). This timing will avoid impacts on marbled murrelets in the highly unlikely

event that nesting individuals occupy any of the trees required for removal along the temporary penstock access route.

The USFWS has implemented standard threshold distances for Washington State Department of Transportation (WSDOT) construction projects to aid in the determination of potential effects on murrelets (WSDOT 2020). Disturbance, disruption, and/or physical injury distance thresholds for marbled murrelet during the nesting season (April 1 to September 23) are listed below (Table 6.5-1) and may be considered for the Proposed Action. Distances provided are from the activity to suitable habitat or a known occupied marbled murrelet stand. Because suitable nesting habitat is largely absent from the action area or fragmented from the Goodell Fire, instead of distance to suitable habitat, distances are considered from the Skagit River mainstem because it may be used as a flyway between ocean foraging grounds and nesting sites.

Table 6.5-1. Disturbance, disruption, and physical injury distance thresholds for marbled murrelet during the nesting season, April 1 – September 23.

Activity	ESA Effect Determination – Marbled Murrelet			
	No Effect	**NLAA**	**LAA – Disruption**	**LAA – Direct Injury or Mortality**
Light maintenance (e.g., road brushing and grading) and heavily used roads	>0.25 mile	<0.25 mile	NA	NA
Heavy equipment use	>0.25 mile	328 feet (110 yards) to 0.25 mile	<328 feet	NA
Pile driving, rock crushing equipment	>0.25 mile	363 feet (121 yards) to 0.25 mile	<363 feet (121 yards)	<15 feet (5 yards) injury
Blasting	>1 mile	0.25 to 1 mile	<0.25 mile	<300 feet (100 yards) injury

Note: NA = not applicable; NLAA = not likely to adversely affect; LAA = likely to adversely affect
Source: Adapted from WSDOT 2020

Although small explosives may be used to fracture rocks along the landslide area, these activities do not produce noise that is equivalent to large-scale blasting (see Table 2.3-1 of this BA, light blasting). Regardless, the landslide location is more than 0.25 mile from the Skagit River and, based on the threshold distances provided in Table 6.5-1, a **not likely to adversely affect** determination is appropriate for the Proposed Action's effects on marbled murrelets from in-air noise disturbance.

Although helicopters may be used for some portion of the Proposed Action, disturbance of fledglings or nest feedings is unlikely given the lack of suitable nesting habitat in the action area. If a helicopter is used, it will be staged at the Newhalem helipad, more than 6 miles up valley from the nearest known nesting habitat in the Bacon Creek and Cascade River drainages (City Light 2016). If required for spoils removal, helicopter flights up the Skagit Valley will occur less frequently and at relatively high altitude and should not directly affect migratory, feeding, or rearing activities. Noise levels at nests outside the action area will be at background levels, as suitable nesting habitat is several miles north or south of the flight path up the valley. However, depending on the flight patterns of adults in the valley, helicopter flights to and from the Project could have a minor, short-term, disturbance-related effect on transiting marbled murrelets. The

possibility that helicopter noise will alter transitory behavior to a point that triggers prey loss or nest abandonment is discountable.

Based on the disturbance threshold distances presented above, adverse effects from helicopter use will not occur because the helipad is located more than 328 feet from the Skagit River, where transiting murrelets may occur during the post-dawn and pre-dusk hours. Noise from the Newhalem helipad will be audible to murrelets if they are transiting along the Skagit River mainstem at the same time helicopters are taking off or landing, which is unlikely at pre-dusk or pre-dawn. Further, given the low numbers of murrelet detections along the Skagit River as recorded during recent radar surveys, the potential for this concurrent occurrence is considered discountable. For these reasons, the Proposed Action **may affect,** but is **not likely to adversely affect,** marbled murrelets.

6.5.3 Critical Habitat

The nearest block of designated critical habitat for the marbled murrelet is approximately 6 miles southeast of the action area. The Proposed Action will have **no effect** on critical habitat for marbled murrelets.

6.6 Northern Spotted Owl

6.6.1 Effects on Suitable Nesting Habitat

The 2015 Goodell Fire eliminated most, if not all, suitable NRF habitat in the action area (see Section 5.3.6.3), and dispersal habitat is limited to a remnant unburned coniferous forest stands with suitable canopy (i.e., greater than or equal to 40 percent) along the northern portion of the penstock corridor. Any trees removed during dam removal will be limited to those that are dead or live ones that do not contain the characteristics to support nesting (see Section 4.2.2). Therefore, dam removal and associated actions (e.g., dam access road improvements) will not remove trees that may be suitable for spotted owl dispersal or create new canopy gaps in dispersal or NRF habitat.

As discussed for murrelets (Section 6.5), City Light will conduct a pre-construction survey of trees within and 100m adjacent to the temporary access route for penstock removal to determine habitat suitability for nesting northern spotted owl. If any trees suitable for spotted owl (or murrelet) nesting are located during pre-construction surveys along or within 100m of the temporary access route, all trees in this area would be removed outside of the nesting season for marbled murrelets and northern spotted owls (i.e., removed from October 1 – February 28). To the extent possible, any mature trees suitable for spotted owl nesting would be maintained.

Through implementation of these impact minimization measures, the Proposed Action is not expected to remove trees that may be suitable for nesting spotted owls. Although tree removal along the penstock access route, if required, may extend beyond the existing disturbed corridor, the creation of canopy gaps would be limited because gaps exist in the canopy under baseline conditions and adjacent habitat is fragmented because of the Goodell Fire. Considering these factors, project-related effects on suitable northern spotted owl nesting trees are considered **insignificant**.

6.6.2 Effects on Individuals in the Action Area

Suitable nesting habitat for spotted owls is not expected to occur in any portion of the action area. Regardless, as discussed in Section 6.5, prior to tree removal along the temporary penstock access route, City Light will conduct a survey of trees within and adjacent to the route to determine habitat suitability for nesting northern spotted owl. Based on USFWS standard threshold distances for construction projects (WSDOT 2020) and the assumed lack of suitable nesting habitat within 0.25 mile of decommissioning activities (to be confirmed during pre-construction surveys), noise from the Proposed Action is not expected to affect nesting northern spotted owls. Table 6.6-1 provides disturbance, disruption, and/or physical injury distance thresholds for spotted owls. No activities under the Proposed Action are expected to meet or exceed "likely to adversely affect" threshold distances from suitable nesting trees.

Table 6.6-1. Disturbance, disruption, and/or physical injury distance thresholds for spotted owls.

Activity	ESA Effect Determination – Spotted Owls				
	No Effect (March 1 – Sept 30)	**NLAA (March 1 – Sept 30)**	**LAA – Harass Early Nesting Season Disruption Distance (March 1 – July 15)**	**LAA – Harass Late Nesting Season Disruption Distance (July 16 – Sept 30)**	**LAA – Direct Injury or Mortality (March 1 – Sept 30)**
Heavy equipment use, including chainsaws	>0.25 mile	>195 feet to 0.25 mile	≤195 feet	NA[1]	NA
Pile driving	>0.25 mile	360 feet to 0.25 mile	≤360 feet	NA[1]	≤15 feet (injury)
Blasting	>1 mile	0.25 to 1 mile	≤0.25 mile	NA[1]	≤300 feet (injury)

Note: Distances are to known, occupied spotted owl nest tree or suitable nest trees in unsurveyed nesting habitat (USFWS 2015, adapted from WSDOT 2020); this disturbance guidance applies to NRF habitat; disturbance to dispersal habitat is NLAA.

1 During the late nesting season, disturbance effects are considered discountable; therefore, they qualify for informal coverage.

If spotted owls use remnant forest stands in or near the action area for dispersal, noise from construction, including helicopter use, might cause an individual to avoid the affected area. However, considering the limited amount of dispersal habitat remaining in the action area, and because most spotted owl activity occurs at night when construction would not occur, noise from heavy equipment or helicopter use is highly unlikely to affect dispersal. Considering the information presented in this section, the Proposed Action **may affect,** but is **not likely to adversely affect,** northern spotted owls. This determination is also supported by the unlikely occurrence of spotted owls in the action area, as discussed in Section 5.3.6.3.

6.6.3 Critical Habitat

No critical habitat for the northern spotted owl is designated within the action area. The closest designated critical habitat is located approximately 5.5 miles southwest of the action area. The Proposed Action will have **no effect** on critical habitat for the northern spotted owl.

6.7 Puget Sound Steelhead

Over time, the Proposed Action will restore pre-dam sediment and nutrient transport conditions to occupied habitat downstream of the dam. The Proposed Action will result in more natural riverine processes that provide benefits to Puget Sound steelhead from improved habitat conditions in Newhalem Creek. Such conditions may also benefit macroinvertebrate prey species in the action area. Therefore, over the long-term the Proposed Action is expected to benefit Puget Sound steelhead and may contribute to the overall recovery of the species in the lower Skagit River core area, particularly in Newhalem Creek. In the short term, however, the Proposed Action includes several construction and post-construction elements that could potentially affect Puget Sound steelhead; these are discussed in the following sections.

6.7.1 Newhalem Creek Diversion Removal

Instream work to decommission the diversion dam and headworks structure will occur from July 16 to September 1 (see Section 2.5). The work will occur approximately 2,000 feet upstream of a full passage barrier at RM 0.65 and outside habitat potentially occupied by Puget Sound steelhead (see Section 5.3.7). This species would therefore not be exposed to potential harm or harassment from instream excavator use, the placement and removal of cofferdams, fish salvage and relocation, or in-water noise or vibration during infrastructure removal. Although the proposed dam removal using jackhammers or non-explosive rock fracturing agents will occur "in the dry" behind cofferdams, such actions will produce noise that could transfer to the active channel. However, the creek's sinuosity and steep gradient downstream of the dam will truncate the area affected by elevated in-water noise levels. Upon hitting a land mass, noise transmission will stop, as sound waves do not transmit around river bends. Therefore, in-water noise from dam removal will not be perceptible in the lower reaches of the creek occupied by ESA-listed steelhead.

Downstream water quality degradation caused by construction-related turbidity from cofferdam installation and removal will be localized and will comply with Washington State water quality standards for turbidity in rivers exceeding 100 cfs. The substrate in the action area is dominated by gravels and cobbles, with few fines. It is expected that fine sediments in the water column will settle out to the streambed in a distance less than 300 feet downstream of the cofferdams. Therefore, Puget Sound steelhead, which are blocked from upstream passage at the lower natural waterfall at RM 0.65, will not be exposed to measurable levels of construction-related turbidity.

Puget Sound steelhead may be present year-round in the lower reaches of the creek, and in the Skagit River mainstem portion of the action area. If rearing juveniles are present in the lower reaches of Newhalem Creek during in-water work, construction presents risks associated with potential releases of fuel or oil into the creek from equipment and machinery. Sources of fuel and oil spills or leakage into the stream channel include heavy equipment, portable water pumps, or products stored on site throughout the duration of the Project. In the event of a spill, fish could be adversely affected by released chemicals or contaminants. The likelihood of spills will be greatly reduced with the implementation of the Spill Plan to be prepared by the contractor selected for the Project. Specific minimization measures have been established regarding fuel storage, fueling of equipment, and spill containment (see Section 2.7). These measures will reduce or eliminate the potential for spill events, and therefore reduce or eliminate the likelihood of adverse effects on this listed species. Hydraulically operated equipment that may work below the OHWM will be

retrofitted with biodegradable fluid in the hydraulic system. This measure will minimize the potential for deleterious effects on fish should a hydraulic line failure occur.

6.7.2 Dam Access Road Improvements

The existing diversion structure access road is located along a steep ridge that slopes toward Newhalem Creek. A steep, vegetated, rocky hillside separates the road from the creek below. Access road improvements will involve the use of excavators and other machinery to grade the surface, armor the slopes, remove landslide boulders, and stabilize the road embankments. These actions have the potential to cause erosion and introduce sediment and loose rocks and debris into the creek below. To minimize the potential for downslope erosion, the selected contractor would be required to implement sediment and erosion control measures, including the use of straw bales, fiber wattles, silt fencing, or similar. The timing of access road improvements will also minimize erosion potential (see Table 2.5-1), improvements are proposed to occur a few months prior to diversion structure removal, in summer, when drier conditions should reduce the potential for erosion and runoff.

The landslide along the access road is adjacent to Newhalem Falls, well upstream of the lowermost waterfall at RM 0.65 that constitutes a full fish passage barrier. Therefore, no steelhead spawning or rearing occurs in the reach of the river immediately downslope of the landslide. Any effects on instream water quality from access road improvements are expected to be insignificant and will not adversely affect any life stage of Puget Sound steelhead in occupied portions of the action area over 1,000 feet downstream.

6.7.3 Tailrace Barrier Removal and Filling of Portions of Tailrace

Because the tailrace barrier fully excludes all fish and would be removed during the low-flow period when it is disconnected from the Skagit River and isolated from any flow, activities associated with its removal will have no effect on Puget Sound steelhead.

6.7.4 Post-Construction Effects – Changes in Sediment and Nutrient Transport

Steelhead do not occur upstream of the diversion dam due to the presence of two impassable waterfall barriers at RM 0.65 and RM 0.8. However, geomorphologic changes in the channel upstream of the dam following decommissioning will influence the amount of sediment transported downstream to habitats occupied by steelhead.

Accumulated sediment will be transported downstream during high-flow periods and is expected to reach equilibrium over approximately 10 years (Watershed GeoDynamics 2022). Sediment transported through the high-gradient reach below the dam will be deposited on the Newhalem Creek fan upstream of the Skagit River confluence (see Section 4.1.3). If a high-flow event transports sediments accumulated upstream of the dam and coincides with peak steelhead spawning periods, sediment transport may increase turbidity to levels that are perceptible to juveniles, adults, and eggs in the lower reaches of Newhalem Creek. Because accumulated sediments upstream of the dam contain exceedingly few fine sediments, the potential for adverse effects on any lifestage associated with sediment transport following dam removal is highly unlikely, as presented in the following sections. This conclusion is supported by studies that found turbidity magnitudes associated with dam removals rarely exceed what a watershed is capable of producing during flood events (Tullos et al. 2016; Collins et al. 2024). Because flood events in

Newhalem Creek regularly transport sediments, and juvenile salmonids have evolved to survive in such systems (Gregory and Northcote 1993), Project-related effects are highly unlikely to cause harm or significant behavioral changes that rise to the level of take.

6.7.4.1 Potential Effects on Juveniles and Adults

In northwestern watersheds, natural background turbidity varies on a seasonal basis depending on when precipitation and runoff occur (Servizi and Martens 1987). High rainfall and storm events usually cause some erosion and a pulse of sedimentation in streams. Removal of the Newhalem Creek diversion structure will provide the opportunity for natural high-flow events to transport sediments that have accumulated upstream of the dam since its inception. Individual high-flow events will therefore transport more sediment compared to baseline conditions for up to 10 years post construction compared to previous years. Although the quantity of sediment may increase until the channel reaches equilibrium, as discussed in Section 4.1, accumulated sediments contain few fine sediments.

Studies of the effects of increased turbidity on salmonids suggest a range of potential impacts on their physiology and behavior (Lloyd 1987; Everest et al. 1987; Newcombe and MacDonald 1991; Gregory and Northcote 1993). Newcombe and MacDonald (1991) grouped effects of sediment on salmonids into three categories: lethal, sublethal, and behavioral. Lethal effects may kill individual fish, while sublethal effects may result in injury that leads to an individual's decline in fitness over time. Behavioral effects are those that result in a change in activity typically associated with an organism in an undisturbed environment.

Lloyd (1987) suggested high levels of suspended solids may be fatal to salmonids, while lower levels of suspended solids and turbidity may cause episodic sublethal effects such as loss or reduction of foraging capability, increased stress, and interference with cues necessary for orientation in homing and migration. Newcombe and Jensen (1996) demonstrated that behavioral changes for both adult and juvenile salmonids began to occur at relatively low total suspended solids (TSS) levels at around 20 milligrams per liter (mg/L) after one hour of exposure (avoidance response). If individuals remained exposed to elevated TSS levels, sublethal effects began to occur, and major physiological stress occurred at approximately 1,100 mg/L after 24 hours of exposure.

Salmonid populations not normally exposed to high levels of natural turbidity or exposed to anthropogenic sediment sources may be negatively affected by levels of turbidity considered to be relatively low (18 to 70 nephelometric turbidity units [NTU]) (Gregory 1992). Still, it is apparent that salmonids can cope with some level of turbidity at certain life stages (Gregory and Northcote 1993). Evidence of this is the presence of juvenile salmonids in turbid estuaries prior to leaving for the ocean, and in local streams characterized by high natural levels of glacial silt and therefore high turbidity and low visibility (Gregory and Northcote 1993). Juveniles in Newhalem Creek are likely habituated to some level of turbidity exposure during the fall through spring months when higher flows regularly transport sediment.

Turbidity is most likely to affect rearing steelhead if it reaches a level that alters typical behaviors. In laboratory settings, salmonids will move to less turbid waters, if available, after a short-term pulse (Berg and Northcote 1985). Bisson and Bilby (1982) illustrated the displacement of salmonids in water with turbidities greater than 70 NTU. Behavioral effects from short-term sediment pulses exhibited altered territory structure and feeding behavior in juvenile Coho Salmon

(Berg and Northcote 1985). Following a sediment pulse, a breakdown in social organization among juvenile Coho Salmon occurred but was re-established when turbidity decreased to 20 NTU (Berg 1982). These results suggest that salmonids in a river system might seek out turbidity refugia when subjected to short-term pulses of sediment, such as those that could occur as sediment accumulated upstream of the dam is moved downstream during high-flow events following dam removal.

Under the Proposed Action, the increase in turbidity levels over baseline due to the transport of accumulated sediments during flood events following dam removal is expected to be low. This is because accumulated sediments upstream of the dam are primarily coarse in nature with few fines. As discussed in Section 4.1, peak turbidity levels from 0.88 to 58.79 NTUs over background were measured immediately following gravel placement during annual removal of sediments accumulated upstream of the dam. These levels returned to background levels in one to two hours. Such turbidity levels are unlikely to alter fish behavior in Newhalem Creek, considering the studies cited above. Although sediments accumulated upstream of the dam will be transported during high-flow events, background turbidity will be naturally elevated from runoff and other sediment transport that are not related to the Project, and therefore, not effects of the action. Indeed, other studies found turbidity magnitudes associated with dam removals rarely exceed those of watershed flood events (Tullos et al. 2016; Collins et al. 2024).

The effects on steelhead from the transport of accumulated sediment caused by the Proposed Action are expected to be insignificant in nature and difficult, if not impossible, to discern from the natural turbidity occurring during flood flows that transport streambed materials. If a sediment plume could be directly tied to the sediments accumulated upstream of the dam, it is unlikely that turbidity will affect the entire channel, and suitable corridors for movement and rearing will remain available. Because fine sediment composition is low, effects will most likely be limited to mobile juveniles and adults who would either swim through any plume or make evasive movements to avoid high levels of turbidity. These effects would be temporary and are unlikely to harm individuals and would result in behaviors consistent with those individuals exhibit during high-flow events in the action area. Based on the best available information, increased suspended sediment transport resulting from the Proposed Action **may affect,** and is **not likely to adversely affect,** Puget Sound steelhead in the action area. The insignificant effects of the Proposed Action on habitats in lower Newhalem Creek will continue until accumulated sediments reach equilibrium upstream of the dam. Effects would be short term and episodic, associated with seasonal high-flow events that have the capacity to transport accumulated sediments to the lower reaches of Newhalem Creek and, ultimately, to the Skagit River.

6.7.4.2 Effects on Spawning Habitat and Incubating Eggs

Organic matter deposition on substrates supporting redds may reduce dissolved oxygen concentrations, harming eggs (Spence et al. 1996). The greater the proportion of fine sediments in redds, the greater likelihood that egg survival may be lowered (Lloyd 1987) or that hatched fry could be entrapped (Everest et al. 1987). Lloyd (1987) summarized the results of numerous studies on sedimentation effects on salmonids and reported reduced egg survival of Chum Salmon at turbidity levels of 97 mg/L and of Rainbow Trout at 110 mg/L. Coho and Chinook salmon egg fatalities were observed at much higher turbidity levels, ranging from 488 to 1,200 mg/L. In addition to direct effects on incubating eggs or newly emergent fry, the infiltration of fines into

streambed gravels can alter the quality of the bed for future spawning or for use by instream biota that may provide prey to juvenile salmonids (Everest et al. 1987).

Assuming that spawning times in Newhalem Creek are similar to those in the Skagit River mainstem, Puget Sound steelhead may spawn in Newhalem Creek from March through June; eggs would be present from March through early August (see Section 5.3.7.3 of this BA). Flows increase during the later portion of the incubation period, from May through July, and may transport larger quantities of accumulated sediment from the wedge developed upstream of the dam. Because substrates accumulated upstream of the dam generally consist of boulders, cobbles, and gravels (Dube 2021), the potential for fine sediment deposition on downstream redds in the lower reach of Newhalem Creek is low and is not likely to affect egg survival. Sands carried downstream are unlikely to be deposited in sufficient quantities to smother eggs and deplete them of oxygen.

6.7.5 Critical Habitat

The Proposed Action has the potential to affect PBFs for Puget Sound steelhead critical habitat as described below. Only those PBFs related to freshwater life history periods are likely to be affected.

6.7.5.1 PBF 1: Freshwater Spawning Sites

In-water work to remove the Newhalem Creek diversion structure and the tailrace barrier will have insignificant to no effect on spawning sites in the lower reaches of Newhalem Creek. Steelhead have no access to the tailrace barrier, which is isolated from the Skagit River (see Figure 2.2-11). Steelhead do not occur near the dam reach, as passage is completely blocked by two downstream waterfalls. Construction-related turbidity from cofferdam removal and placement would not be measurable within designated critical habitat, which includes the lower reach of Newhalem Creek up to approximately RM 0.65.

Following removal of the Newhalem Creek diversion, the transport of sediments that have accumulated upstream of the dam to downstream reaches may affect spawning substrates. However, because accumulated sediments are primarily coarse in nature, fine sediment deposition is expected to be low, resulting in insignificant effects on this PBF. The transport of coarse substrates suitable for spawning may ultimately benefit Puget Sound steelhead critical habitat in the action area over time.

Under the Proposed Action, permanent removal of the diversion will continue the current condition for perpetuity (i.e., flow from Newhalem Creek will not be diverted upstream of critical habitat). Over the long term, and consistent with current conditions, this could benefit spawning habitat by increasing flow during the early portions of the late-winter spawning period by increasing wetted width and available spawning habitat. Because the lower portion of Newhalem Creek is flow-impaired, the Proposed Action will permanently address a water quality degradation that has existed for 100 years.

In summary, because fine sediments are unlikely to be transported in quantities that may adversely affect spawning habitats, the Proposed Action is **not likely to adversely affect** PBF 1.

6.7.5.2 PBF 2: Freshwater Rearing Sites

Ultimately, elements of the Proposed Action will benefit PBF 2. Over time, the Proposed Action will restore natural sediment and nutrient transport processes. However, because juveniles rear in the action area year-round, the downstream transport of accumulated sediment may result in episodic turbidity increases that may affect foraging, territorial behaviors, or predatory responses. These effects are expected until the creek reaches equilibrium following dam removal, which is expected approximately 10 years post construction. However, based on the turbidity studies presented in this section, levels of fine sediments are expected to be low, and sublethal or greater impacts are not likely. The Proposed Action will not alter the conservation value of designated critical habitat for Puget Sound steelhead in the lower reach of Newhalem Creek. Considering this information sediment transport associated with the Proposed Action is **not likely to adversely affect** PBF 2 during high-flow events that increase downstream turbidity in critical habitat; long-term benefits from increased nutrient transport will outweigh insignificant short-term effects.

6.7.5.3 PBF 3: Freshwater Migration Corridors

The action area, which includes the Skagit River and lower reaches of Newhalem Creek to approximately RM 0.65, serves as a migration corridor for upstream migrating adults and downstream migrating kelts and smolts. The action area also supports local movements of rearing juveniles. Because steelhead do not occur upstream of RM 0.65, the existing Newhalem Creek diversion dam (RM 1.0) is not a barrier to migration (and is not located within critical habitat). Regardless, dam removal and the permanent cessation of flow diversion will improve flow conditions in Newhalem Creek over the long term, which could benefit staging adults during spawning, or outmigrating smolts in spring/early summer.

The levels of turbidity expected from the downstream transport of accumulated sediments could temporarily alter migration patterns if an individual fish became disoriented. However, high levels of turbidity that could cause fish to abandon migratory routes, or that block accessible reaches, will not occur. Therefore, the Proposed Action **may affect,** but is **not likely to adversely affect**, PBF 3 in the action area.

6.8 Puget Sound Chinook

Use of lower Newhalem Creek by spawning Chinook Salmon has been reported (see Section 5.3.8.3) but this area is not considered high-use or ideal habitat. The lower reaches of the creek may provide refuge for rearing juveniles during high-flow events in the Skagit River. The Proposed Action will restore natural riverine processes in the creek that will benefit aquatic habitat and macroinvertebrate prey species in the action area. Therefore, the Proposed Action is expected to benefit Chinook Salmon over the long-term. In the short term, however, several construction and post-construction elements could potentially affect Chinook Salmon; these are discussed in the following sections.

6.8.1 Newhalem Creek Diversion Removal

Instream work to decommission the diversion dam and headworks structure will occur from July 16 to September 1 (see Section 2.5). Potential dam-removal effects on juvenile Puget Sound Chinook Salmon that may occupy habitat 2,000 feet downstream of the in-water work site will be similar to those described previously for juvenile Puget Sound steelhead (see Section 6.7.1).

The timing of in-water work will overlap with adult upstream migration and spawning periods for adult Chinook Salmon. Although lower Newhalem Creek is unlikely to be used for spawning (see Section 5.3.8.3), in the remote event that spawning adults are present, they could be exposed to downstream water quality degradation caused by turbidity from cofferdam removal. However, considering cofferdams would be removed by September 1, when flows are typically low, and because the substrate in the action area contains few fines, turbidity levels in spawning areas more than 2,000 feet downstream of the in-water work area are expected to be insignificant and well below sublethal limits for adults or incubating eggs.

6.8.2 Post-Construction Effects

The Proposed Action has the potential to affect Puget Sound Chinook Salmon in the lower reaches of Newhalem Creek during seasonal high-flow events that transport accumulated sediment from upstream of the dam. The lower reaches of the creek may provide refuge for rearing juveniles during high-flow events in the Skagit River (see Section 5.3.8.3). Juveniles present in Newhalem Creek during high-flow periods could be exposed to increased levels of turbidity as accumulated sediment is transported downstream. Effects on juvenile Chinook Salmon would be like those presented for juvenile steelhead. Therefore, the Proposed Action **may affect,** and is **not likely to adversely affect,** Puget Sound Chinook Salmon.

The mainstem Skagit River is used by Chinook salmon for spawning and rearing. Lower Newhalem Creek may also be used for these purposes although habitat conditions appear to be more suitable for rearing than spawning (see Section 5.3.8.3). If Newhalem Creek is used by summer Chinook Salmon for spawning, adults are unlikely to be affected by increased turbidity associated with mobilized sediments because they typically enter the action area and spawn at times when high flows are unlikely (Table 4.1-1). Post-dam removal and subsequent transport of sediment accumulated upstream of the dam may result in sediment deposition on incubating eggs in the creek if flows during the incubation period are sufficient to mobilize sediments. Effects on incubating eggs, in the unlikely event they are present, will be insignificant because fine sediments are exceedingly low upstream of the dam.

For those individuals that spawn in the Skagit River, increased levels of turbidity from the transport of accumulated sediment under the Proposed Action are unlikely to be discernible from background levels beyond the immediate confluence with Newhalem Creek. Therefore, unless a redd was created at or just downstream of the confluence, Project-related effects on adults and incubating eggs would be insignificant.

6.8.3 Critical Habitat

Within the action area, critical habitat for Puget Sound Chinook Salmon is only designated in the Skagit River. Given that the Skagit River will experience seasonal pulses of sediment during seasonal high-flow events regardless of the Proposed Action, turbidity associated with accumulated sediment transport in Newhalem Creek is unlikely to be measurable beyond the immediate confluence with the Skagit River. Effects on all PBFs for Puget Sound Chinook Salmon from the Proposed Action are anticipated to be insignificant, and it is highly unlikely that the Proposed Action will measurably affect the conservation value of critical habitat in the Skagit River mainstem. Therefore, the Proposed Action **may affect,** but is **not likely to adversely affect,** critical habitat for Puget Sound Chinook Salmon.

6.9 Bull Trout

Bull Trout may spawn or rear in Newhalem Creek downstream of the lowermost waterfall at RM 0.65 (see Section 5.3.9.4). Further, amphidromous adults and subadults use the Skagit River as a migratory corridor. Over the longer term, the Proposed Action will contribute to the restoration of more natural riverine processes that improve habitat conditions in Newhalem Creek. Therefore, the Proposed Action is expected to benefit Bull Trout and may contribute to the overall recovery of the species in the lower Skagit River core area. In the short term, however, several construction and post-construction elements that could potentially affect Bull Trout; these are discussed in the following sections.

6.9.1 Newhalem Creek Diversion Removal

Potential dam-removal effects on juvenile Bull Trout that may occupy habitat 2,000 feet downstream of the in-water work site will be similar to those described previously for juvenile Puget Sound steelhead (see Section 6.7.1).

The timing of in-water work overlaps with the potential upstream migration period for pre-spawning adult Bull Trout. Effects from turbidity from cofferdam removal would be expected to be similar to those for Chinook Salmon and would not result in adverse effects to pre-spawning, staging adults.

6.9.2 Post-Construction Effects

The Proposed Action has the potential to affect Bull Trout in the lower reaches of Newhalem Creek during seasonal high-flow events that transport sediment accumulated upstream of the dam. Bull Trout may rear in the Skagit River mainstem and may possibly spawn and rear in Newhalem Creek (see Section 5.3.9.4). Juveniles present in Newhalem Creek during high-flow periods could be exposed to elevated turbidity as accumulated sediment upstream of the former dam site is transported downstream. Sublethal and behavioral effects on juvenile Bull Trout would be similar to those presented for juvenile steelhead (see Section 6.7.5). Therefore, the Proposed Action **may affect,** and is **not likely to adversely affect,** Bull Trout.

If Newhalem Creek is used by Bull Trout for spawning, adults are unlikely to be affected by increased turbidity associated with mobilized sediments because they typically enter the action area and spawn at times when flows are lower (Table 4.1-1). The Proposed Action may result in some sediment deposition on incubating eggs in the creek if flows during the incubation period are sufficient to mobilize sediments accumulated upstream of the dam.

6.9.3 Critical Habitat

Post-construction changes in stream function resulting from diversion cessation and infrastructure removal under the Proposed Action will affect designated critical habitat for Bull Trout in the lower reaches of Newhalem Creek and the Skagit River. The anticipated effects on Bull Trout critical habitat PBFs from the Proposed Action are as follows:

- Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia:

Effect: In-water work to remove the diversion structure and tailrace barrier will take place in areas that are not designated as critical habitat for Bull Trout. However, following the removal of the Newhalem Creek diversion structure and the permanent cessation of flow diversion, this PBF may improve, over time, particularly if such springs and seeps are hyporheic in nature. The permanent cessation of flow diversion, especially during base flow conditions, could improve thermal refugia for Bull Trout in lower reaches of Newhalem Creek during the low-flow summer months. Therefore, the proposed Action **may affect,** but is **not likely to adversely affect,** this PBF.

- Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers:

  Effect: Designated critical habitat in the action area, which includes the Skagit River and the lower reaches of Newhalem Creek to approximately RM 0.65, provides a migration corridor for amphidromous adults and subadult Bull Trout. The action area also supports local movements of rearing juveniles. Because Bull Trout do not occur upstream of the waterfall barriers at RM 0.65 and RM 0.8, the existing Newhalem Creek diversion dam (RM 1.0) is not a barrier to migration (nor located within critical habitat).

  The levels of turbidity expected from the downstream transport of accumulated sediments could temporarily alter migration patterns if an individual became disoriented. However, high levels of turbidity that could cause fish to abandon migratory routes, or that block accessible reaches, will not occur. Therefore, the Proposed Action **may affect,** but is **not likely to adversely affect,** this PBF in the action area.

- An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish:

  Effect: Rearing juvenile Bull Trout may occur in the lower reaches of Newhalem Creek. Although episodic increases in turbidity during seasonal high-flow events could temporarily affect prey species, turbidity levels are not expected to be high enough to result in chronic harm or mortality. Restoration of the natural nutrient and sediment transport regimes could improve natural productivity in the lower reaches of Newhalem Creek, which would benefit this PBF. Therefore, the Proposed Action **may affect,** but is **not likely to adversely affect,** this PBF in the action area.

- Complex river, stream, lake, reservoir, and marine shoreline aquatic environments as well as processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks, and unembedded substrates to provide a variety of depths, gradients, velocities, and structure:

  Effect: The Proposed Action will restore sediment connectivity to downstream reaches and remove a barrier to large wood transport at the diversion structure. This may ultimately increase the complexity of instream and side channel features. The Proposed Action is expected to improve stream functions, including those related to geomorphology and biologic parameters, which should ultimately benefit this PBF. Therefore, the Proposed Action **may affect,** but is **not likely to adversely affect,** this PBF in the action area.

- Water temperatures ranging from 2 to 15ºC, with adequate thermal refugia available for temperatures that exceed the upper end of this range; specific temperatures within this range will depend on Bull Trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence:

  Effect: When in operation, the Project diverted up to 69 cfs into the power tunnel for hydroelectric production. Although this has not occurred in more than 10 years, the Proposed Action will remove the dam and make the current natural flow regime permanent. Therefore, the Proposed Action will have **no effect** on this PBF in the action area.

- In spawning and rearing areas, a substrate of sufficient amount, size, and composition to ensure the success of egg and embryo overwinter survival:

  Effect: In-water work to remove the Newhalem Creek diversion structure and the tailrace barrier will have insignificant to no effect on spawning substrates in the lower reaches of Newhalem Creek. Bull Trout have no access to the tailrace barrier, which is isolated from the Skagit River, particularly during low-flow summer periods (see Figure 2.2-11). Bull Trout do not occur near the dam site, as passage is completely blocked by two downstream waterfalls. Construction-related turbidity from cofferdam removal and placement would not likely be measurable within designated critical habitat, which includes the lower reach of Newhalem Creek up to approximately RM 0.65.

  Following removal of the Newhalem Creek diversion, the transport of sediments that have accumulated upstream of the dam to downstream reaches may affect spawning substrates. However, because accumulated sediments are primarily coarse in nature, fine sediment deposition is expected to be low, resulting in insignificant effects on this PBF. The transport of coarse substrates suitable for spawning may ultimately benefit Bull Trout critical habitat in the action area over time.

  In summary, because fine sediments are unlikely to be transported in quantities that may adversely affect spawning habitats, the Proposed Action is **not likely to adversely affect** this PBF.

- A natural hydrograph, including peak, high, low, and base flows within historical and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph:

  Effect: Because the Project has not diverted flows for more than 10 years, the Proposed Action would have **no effect** on this PBF except to make this relatively recent change (i.e., no surface water diversion) a more permanent condition.

- Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited:

  Effect: Ultimately, elements of the Proposed Action will benefit this PBF. Over time the Proposed Action will restore natural sediment and nutrient transport processes. However, because juveniles rear in the action area year-round, the downstream transport of accumulated sediment may result in episodic turbidity increases that may affect foraging, territorial behaviors, or predatory responses. These effects will occur seasonally until the creek reaches

equilibrium following dam removal, which is expected approximately 10 years post construction. Although the quantity of sediments mobilized to lower reaches of Newhalem Creek may increase over baseline conditions until the creek reaches equilibrium, based on the turbidity studies presented for steelhead (Section 6.7.4), levels of fine sediments are expected to be low, and sublethal or greater impacts on Bull Trout life stages are not likely. The Proposed Action will not alter the conservation value of designated critical habitat for Bull Trout in the lower reach of Newhalem Creek. Considering this information sediment transport associated with the Proposed Action is **not likely to adversely affect** this PBF during high-flow events that increase downstream turbidity in critical habitat; long-term benefits from increased nutrient transport will outweigh insignificant short-term effects.

- Sufficiently low levels of occurrence of non-native predators (e.g., Lake Trout, Walleye, Northern Pike, Smallmouth Bass), interbreeding (e.g., Brook Trout), or competing (e.g., Brown Trout) species that, if present, are adequately temporally and spatially isolated from Bull Trout:

  Effect: The Proposed Action will have **no effect** on this PBF.

6.10 Suckley's Cuckoo Bumble Bee

Suckley's cuckoo bumble bee is a generalist pollinator found in a variety of habitats; therefore, the possibility exists that individual bees and suitable habitat for foraging, nesting sites for host colonies, and overwintering habitat could potentially occur in the action area. As noted in Section 2.7.4, temporarily disturbed areas adjoining Newhalem Creek and the tailrace barrier location will be revegetated with appropriate plant species. City Light will coordinate with NPS to tailor a mix of appropriate native plant species for each restoration area.

Due to a lack of recent detections within the region, coupled with the fact that Suckley's cuckoo bumble bee has not been observed in the United States since 2016, potential use of the action area is highly unlikely. For these reasons, the chances of encountering a Suckley's cuckoo bumble bee during implementation of the Proposed Action are exceedingly remote and considered discountable.

Based on the information provided above, the Proposed Action is not likely to significantly impact populations, individuals, or suitable habitat. Therefore, as a proposed species, the Proposed Action **will not jeopardize the continued existence** of Suckley's cuckoo bumble bee. In the event that the species becomes listed prior to completion of the Proposed Action, the provisional determination is **may affect,** not **likely to adversely affect** based on the discountable effects described above.

7.0 CUMULATIVE EFFECTS

The ESA defines cumulative effects (50 CFR § 402.02) as the additive effects of future state and private activities that are reasonably certain to occur in the action area. Federal actions are not considered because they require separate cumulative effects analysis consultation pursuant to Section 7 of the ESA.

Within the action area, the following non-federal actions may contribute to effects, both positive and negative, on ESA-listed fish:

- Presence and use of roads adjacent to waterbodies included in the action area
- WDFW and Skagit River System Cooperative, Skagit Chinook Recovery Plan
- Puget Sound Partnership, Salmon Recovery Plan
- Skagit Watershed Council Strategic Plan
- WDFW/Tribal Hatchery and Harvest Programs.

In the Skagit River mainstem, activities near the action area (e.g., upstream dams, roads, and bridge crossings) have altered the flow regime, decreased sediment transport, degraded the connection between river and riparian habitats, increased sedimentation in streams, and altered floodplain function. However, the Proposed Action is compatible with and additive to other aquatic habitat and fish management programs in the region intended to improve habitat for ESA-listed fish. When combined with ongoing and reasonably certain future activities in the Skagit River basin, the Proposed Action is unlikely to contribute to adverse cumulative effects on ESA-listed species or designated critical habitat. Over the long term, because the Proposed Action will restore sediment and nutrient conveyance to reaches downstream of the current diversion structure, measurable cumulative effects on ESA-listed species or designated critical habitat are expected to be positive in nature and will improve aquatic habitat baseline conditions in the action area.

8.0 SUMMARY OF EFFECTS DETERMINATIONS

8.1 Species-Specific Determinations

Species-specific effect determinations and supporting rationale are summarized below and in Table 8.1-1.

Table 8.1-1. Effect determinations for ESA-listed and proposed species and designated and proposed critical habitats.

Species	Status	Effect Determination for Species	Effect Determination for Critical Habitat
NMFS			
Puget Sound steelhead	Threatened	NLAA	NLAA
Puget Sound Chinook Salmon	Threatened	NLAA	NLAA
USFWS			
Gray Wolf	Endangered	NLAA	NA
Canada Lynx	Threatened	NLAA	Will not destroy or adversely modify Provisional determination: NE
Grizzly Bear	Threatened	NLAA	Will not destroy or adversely modify Provisional determination: NE
North American wolverine	Threatened	NLAA	NA
Marbled Murrelet	Threatened	NLAA	NE
Northern Spotted Owl	Threatened	NLAA	NE
Yellow-billed Cuckoo	Threatened	NE	NE
Mount Rainier white-tailed ptarmigan	Threatened	NE	NA
Bull Trout	Threatened	NLAA	NLAA
Monarch Butterfly	Proposed Threatened	Will not jeopardize continued existence Provisional determination if listed prior to project completion: NE	Will not destroy or adversely modify Provisional determination: NE
Suckley's cuckoo bumble bee	Proposed Endangered	Will not jeopardize continued existence Provisional determination if listed prior to project completion: NLAA	NA
Whitebark Pine	Threatened	NE	NA

Note: NA = not applicable; NE = no effect; NLAA = may affect, not likely to adversely affect.

8.1.1 Gray Wolf

Based on the analysis presented in Section 6.1 of this BA, the Proposed Action **may affect,** but is **not likely to adversely affect,** gray wolves.

The Proposed Action **may affect** gray wolves because a gray wolf has been observed in the general vicinity of the action area in recent years. Therefore, the potential that transitory individuals may be present and therefore exposed to Project-related noise or increased human presence associated with decommissioning efforts is not completely discountable.

The Proposed Action is **not likely to adversely affect** gray wolves because increased noise associated with Project decommissioning, including possible helicopter use, is highly unlikely to result in behavioral changes that affect foraging or movement through or near the action area. No denning is known to occur in the action area. Therefore, effects from the Proposed Action would be insignificant.

Critical habitat for gray wolves has not been designated or proposed.

8.1.2 Canada Lynx

The Proposed Action **may affect** Canada lynx because the action area contains suitable dispersal for lynx, and individuals may occasionally move through the area.

The Proposed Action is **not likely to adversely affect** Canada lynx because the transitory nature of use and lack of prey suggest that the likelihood of encountering a lynx during implementation of the Proposed Action is remote and therefore discountable.

The action area is not included in the proposed revision to critical habitat for Canada lynx; therefore, the Proposed Action **will not destroy or adversely modify** proposed critical habitat. Should critical habitat be designated prior to the completion of the Proposed Action, the provisional determination is **no effect**.

8.1.3 Grizzly Bear

The Proposed Action **may affect** grizzlies because the action area contains suitable foraging habitat for grizzly bears.

The Proposed Action is **not likely to adversely affect** grizzlies because the action area is too low in elevation for denning. No observations have been reported at or near the dam, access road, powerhouse, penstock, or tailrace barrier, suggesting that the action area is not typically used by grizzly bears, nor is it a travel corridor. For these reasons, the likelihood of encountering a grizzly during implementation of the Proposed Action is remote and considered discountable.

The action area is not included in the 1976 proposal for grizzly bear critical habitat; therefore, the Proposed Action **will not destroy or adversely modify** proposed critical habitat. Should critical habitat be designated prior to the completion of the Proposed Action, the provisional determination is **no effect**.

8.1.4 North American Wolverine

The Proposed Action **may affect** wolverines because the action area contains suitable foraging habitat. The Proposed Action is **not likely to adversely affect** wolverine because the action area is too low in elevation for typical occupancy. No observations have been reported at or near the dam, access road, or tailrace barrier, suggesting that the action area is not used by wolverines, nor

is it a travel corridor. For these reasons, the likelihood of encountering a wolverine during implementation of the Proposed Action is remote and considered discountable.

Critical habitat for the North American wolverine has not been designated or proposed.

8.1.5 Marbled Murrelet

The Proposed Action **may affect** marbled murrelets because:

- Some blocks of unburned forest near the tailrace barrier, powerhouse, and northern half of the penstock corridor may contain trees with suitable nesting characteristics.
- Elements of the Proposed Action will occur during the marbled murrelet nesting season (April 1 to September 23), and a few adults may use the Skagit River as a migratory corridor between marine foraging areas and nests outside of the action area, in suitable habitat upriver from the Project.

The Proposed Action is **not likely to adversely affect** marbled murrelets because:

- Suitable nesting habitat is not present near the diversion structure and access road because the 2015 Goodell Fire burned most of the forest, leaving only scattered live conifers with little to no canopy for nesting and predator avoidance. For dam removal and associated access to the dam site, tree removal will be limited to dead trees or those that do not have suitable platforms for nesting murrelets.
- Considering the distance of the Newhalem Creek diversion structure and access road from the Skagit River mainstem, which may be used as a flyway for adults to and from suitable nesting habitat upriver, in-air noise from most construction activities will not reach adverse disturbance threshold distances presented in Table 6.5-1.
- Noise from helicopter take offs and landings at the Newhalem helipad will be audible to murrelets if they are transiting along the Skagit River mainstem at the same time helicopters are taking off or landing (e.g., pre-dawn and dusk hours, when helicopters are highly unlikely to operate). However, given the low numbers of murrelet detections along the Skagit River near the action area, the potential for this occurrence is considered discountable.
- For penstock and saddle removal, City Light will conduct a pre-construction survey to determine if suitable nesting trees are present along the temporary construction access route or within 100m of the route. If suitable nest trees are present, the selected Contractor will be advised to retain such trees to the extent possible.
- If trees containing suitable nesting characteristics are identified during pre-construction surveys along the temporary penstock access route, all tree removal associated with penstock removal and temporary access will occur outside the nesting period for both marbled murrelets and northern spotted owls (i.e., from October 1 – February 28).

The Proposed Action will have **no effect** on critical habitat for marbled murrelets because critical habitat is not designated in the action area, and there will be **no effect** on the nearest critical habitat located approximately 6 miles southeast of the action area.

8.1.6 Northern Spotted Owls

The Proposed Action **may affect** northern spotted owls because:

- Remnant pockets of suitable dispersal habitat are present in portions of the action area that could be exposed to construction noise, including helicopter use.

The Proposed Action is **not likely to adversely affect** northern spotted owls because:

- Suitable NRF habitat is not present in the action area because the 2015 Goodell Fire burned much of the forest. Within 0.25 mile of the diversion site and dam access road, the action area contains scattered live conifers with little to no canopy for foraging and predator avoidance.
- For elements of the Proposed Action related to dam removal and associated access, no suitable nesting trees will be removed; tree removal, if any, would be limited to trees burned during the Goodell Fire. These trees do not contribute to canopy structure; therefore, removal would not create canopy gaps or affect dispersal habitat.
- Although spotted owls may be active during the day, they are primarily nocturnal, and construction (and related noise) would not occur at night.
- The lack of known nesting sites and the presence of barred owl in the action area indicate that the likelihood of encountering spotted owl is so remote as to be discountable.
- For penstock and saddle removal, City Light will conduct a pre-construction survey to determine if suitable nesting trees are present along the temporary construction access route or within 100m of the route. If suitable nest trees are present, the selected Contractor will be advised to retain such trees to the extent possible.
- If trees containing suitable nesting characteristics are identified during pre-construction surveys along the temporary penstock access route, all tree removal associated with penstock removal and temporary access will occur outside the nesting period for both marbled murrelets and northern spotted owls.

The Proposed Action will have **no effect** on critical habitat for the northern spotted owl because critical habitat is not designated within the action area. The Proposed Action will have **no effect** on the nearest critical habitat, located approximately 5.5 miles to the southwest of the action area.

8.1.7 Puget Sound Steelhead

The Proposed Action **may affect** Puget Sound steelhead because:

- Adult steelhead are reported to spawn in the lower reaches of Newhalem Creek.
- Rearing juveniles may be present year-round in both the lower reaches of Newhalem Creek and the portion of the Skagit River in the action area.
- Although steelhead do not occur at the Newhalem Creek diversion site (RM 1.0) due to the presence of two downstream waterfalls at RM 0.65 and 0.8 that are full-passage barriers, the Proposed Action will affect downstream sediment transport and nutrient transport processes in the action area.

The Project is **not likely to adversely affect** Puget Sound steelhead because:

- Diversion structure removal will facilitate the movement of sediments accumulated upstream of the dam to downstream habitats potentially occupied by Puget Sound steelhead. Compared to baseline conditions, such sediment transport may elicit temporary, episodic effects on adult and juvenile steelhead behaviors and in-channel occupancy. However, effects are expected to be insignificant and are unlikely to be discernible from effects expected during natural high flow events that mobilize sediments in the action area.
- Because accumulated sediments upstream of the dam contain exceedingly few fine sediments, the potential for adverse effects on any lifestage is highly unlikely from sediments mobilized to downstream reaches of Newhalem Creek following dam removal. Any transport of fine sediments will be low, and similar to fine sediment transport associated with natural high flow events; effects will be insignificant. .
- In-water work to remove the tailrace barrier and the Newhalem Creek diversion structure will not require handling of Puget Sound steelhead during fish salvage and relocation because steelhead cannot access these locations.
- Considering the relatively coarse nature of sediments upstream of the dam, sediment transport to downstream reaches during seasonal high flows should not deposit fine sediments that measurably affect spawning habitat or incubating eggs.
- Beneficial effects associated with dam removal could improve spawning and rearing habitat in the lower reaches of Newhalem Creek. Diversion removal would restore natural sediment regimes over time and improve nutrient transport to the Skagit River and the lower reaches of Newhalem Creek.

Based on the PBF analysis presented in Section 6.7.6 of this BA, the Proposed Action **may affect,** and is **not likely to adversely affect** designated critical habitat for Puget Sound steelhead in the action area in the short term. Turbidity-related effects of the Proposed Action on critical habitat will be temporary and episodic in nature and will not reduce the conservation value of critical habitat designated in the Action Area. Following a period of approximately 10 years, the reach immediately upstream of the diversion is expected to reach equilibrium, and turbidity levels associated with the transport of sediments that have accumulated upstream of the diversion will no longer be measurable above background levels.

8.1.8 Puget Sound Chinook Salmon

The Proposed Action **may affect** Puget Sound Chinook Salmon because:

- Spawning and rearing is reported in the Skagit River mainstem portion of the action area and, although not mapped as spawning or rearing habitat, juvenile Chinook Salmon may occur in the lower reaches of Newhalem Creek because there are no barriers to entry from the Skagit River mainstem.
- Although access to the Newhalem Creek diversion site (RM 1.0) is blocked by two downstream waterfalls at RM 0.65 and 0.8, the Proposed Action will affect downstream sediment transport and nutrient transport processes in the action area.

The Project is **not likely to adversely affect** Puget Sound Chinook Salmon for the same rationale presented above for Puget Sound steelhead. In addition, although the proposed in-water work window (July 16 – September 1) overlaps with periods of potential adult migration and spawning periods in areas 2,000 feet downstream of the in-water work area, construction-related turbidity during cofferdam installation and removal is expected to be low considering the lack of fine sediments in the construction reach. In the highly unlikely event individual Chinook Salmon spawn in Newhalem Creek, construction-related effects will be insignificant.

Within the action area, critical habitat for Puget Sound Chinook Salmon is only designated in the Skagit River. Based on the analysis presented in Section 6.8 of this BA, the Proposed Action **may affect,** but is **not likely to adversely affect,** designated critical habitat for Puget Sound Chinook Salmon. Effects on all PBFs for Puget Sound Chinook Salmon from the Proposed Action are anticipated to be insignificant and will not measurably affect the conservation value of critical habitat in the Skagit River mainstem.

8.1.9 Bull Trout

The Proposed Action **may affect** Bull Trout because:

- Bull Trout are reported to spawn in the lower reaches of Newhalem Creek.
- Rearing juveniles may be present year-round in both the lower reaches of Newhalem Creek and the small portion of the Skagit River in the action area. It is unknown if Bull Trout overwinter in the action area.
- Although Bull Trout do not occur at the Newhalem Creek diversion site (RM 1.0) due to the presence of two downstream waterfalls at RM 0.65 and 0.8 that are full passage barriers, the Proposed Action will affect the downstream sediment transport and nutrient transport processes in occupied portions of the action area.

The Project is **not likely to adversely affect** Bull Trout because:

- Cofferdams would be removed by September 1, when flows are typically low. Therefore, turbidity levels associated with cofferdam removal in areas more than 2,000 feet downstream of the in-water work area are expected to be insignificant and below sublethal limits for pre-spawn, staging adults if present in the action area.
- Diversion structure removal will facilitate the movement of sediments accumulated upstream of the dam to downstream habitats potentially occupied by Bull Trout. Compared to baseline conditions, such sediment transport may elicit temporary, episodic effects on adult and juvenile behaviors and in-channel occupancy. However, effects are expected to be insignificant and are unlikely to be discernible from effects expected during natural high flow events that mobilize sediments in the action area.
- Because accumulated sediments upstream of the dam contain exceedingly few fine sediments, the potential for adverse effects on any lifestage is unlikely from sediments mobilized to downstream reaches of Newhalem Creek following dam removal.
- In-water work to remove the tailrace barrier and Newhalem Creek diversion will not require handling of individuals during fish salvage and relocation because Bull Trout cannot access these locations.

- Considering the relatively coarse nature of sediments upstream of the dam, sediment transport to downstream reaches during seasonal high flows should not deposit fine sediments that affect spawning habitat or incubating eggs.
- Beneficial effects associated with dam removal could improve spawning and rearing habitat in the lower reaches of Newhalem Creek. Diversion removal would restore natural sediment regimes over time and improve nutrient transport to the Skagit River and lower reaches of Newhalem Creek.

Based on the PBF analysis presented in Section 6.9.3 of this BA, the Proposed Action **may affect,** and is **not likely to adversely affect** designated critical habitat for Bull Trout in the action area. Turbidity-related effects of the Proposed Action on critical habitat will be temporary and episodic in nature and will not reduce the conservation value of critical habitat designated in the Action Area. Following a period of approximately 10 years, the reach immediately upstream of the diversion is expected to reach equilibrium, and Project-related turbidity levels associated with the transport of sediments that have accumulated upstream of the diversion will no longer be measurable above background levels.

8.1.10 Suckley's Cuckoo Bumble Bee

The Proposed Action **will not jeopardize the continued existence** of Suckley's cuckoo bumble bee because:

- The Proposed Action is not likely to significantly impact populations, individuals, or suitable habitat. Therefore, the Proposed Action will not reduce the survival or recovery of Suckley's cuckoo bumble bee by reducing reproduction, numbers, or distribution.

A provisional determination is provided should the species become listed prior to the completion of the Proposed Action. The Proposed Action **may affect,** but is **not likely to adversely affect** Suckley's cuckoo bumble bee**.**

The Proposed Action **may affect** Suckley's cuckoo bumble bee because:

- In the absence of site-specific surveys, and because the species is a generalist pollinator found in a variety of habitats, the possibility exists that individual Suckley's cuckoo bumble bees and suitable habitat for foraging, nesting sites for host colonies, and overwintering habitat could potentially occur in the action area.

The Proposed Action is **not likely to adversely affect** Suckley's cuckoo bumble bee because:

- Due to a lack of recent detections within the region, coupled with the fact that the species has not been observed in the United States since 2016, potential use of the action area is highly unlikely. Therefore, effects on individual Suckley's cuckoo bumble bees are considered discountable.
- Temporarily disturbed areas adjoining Newhalem Creek and the tailrace barrier location will be revegetated with appropriate plant species and City Light will coordinate with NPS to tailor a mix of appropriate native plant species for each restoration area.

9.0 ESSENTIAL FISH HABITAT

The objective of this EFH assessment is to determine whether the Proposed Action "may adversely affect" designated EFH for relevant commercial, federally managed fisheries species within the action area. It also describes measures proposed to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the Proposed Action. The Proposed Action is described in Section 2.0 of this BA and cross-referenced for this assessment.

EFH is defined by the Magnuson-Stevens Act in 50 CFR § 600.905-930 as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Pacific Salmon EFH includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California. Salmon EFH excludes areas upstream of longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for several hundred years).

City Light reviewed NMFS's online EFH mapper (NMFS 2021) to determine the extent of EFH in the action area. The mapper, which is Geographic Information System based, includes the full Newhalem Creek subbasin as EFH (NMFS 2021). However, EFH does not include waters upstream of naturally impassable barriers such as waterfalls. City Light believes that the presence of two natural waterfalls that are impassable to fish precludes EFH in Newhalem Creek upstream of RM 0.65.

In summary, the lower reach of Newhalem Creek within the action area and the Skagit River at the confluence with Newhalem Creek (Section 3.0 of this BA) contains EFH for Pacific Coast Salmonids including Chinook, Coho, and Pink Salmon (Table 9.0-1). The powerhouse tailrace is not EFH.

Table 9.0-1. Species of fish and life-history stages with designated EFH in the action area.

Species	Adult Migration or Presence		Spawning		Eggs		Juvenile Rearing	
	Skagit River	Newhalem Creek	Skagit River	Newhalem Creek	Skagit River	Newhalem Creek	Skagit River	Newhalem Creek
Chinook Salmon (summer)	X	X	X		X		X	Possible
Coho Salmon	X	Presumed	X		X		X	Possible
Pink Salmon	X	X	X	X	X	X	X	X

Source: WDFW 2021a

9.1 EFH Species Description

9.1.1 Summer Chinook

Summer Chinook Salmon have been documented in the lower reach of Newhalem Creek downstream of the lower-most waterfall (WDFW 2021a; StreamNet 2021). Summer Chinook Salmon spawn and rear in the Skagit River at the confluence of Newhalem Creek and possibly in the creek. Fall Chinook Salmon do not occur in the action area. Based on spawn timing (Table 4.1-1), pre-spawn adults may be present as early as June within the action area. Spawning begins in late August and extends through mid-October. Juveniles are likely to emerge from spawning

gravels from December through February and will rear in the Skagit River mainstem year-round. As described in Section 5.3.8.2 of this BA, juvenile outmigrants exhibit several strategies and may outmigrate as fry beginning in March. Yearling smolts outmigrate from the Skagit River from late March through May.

9.1.2 Coho Salmon

WDFW (2021a) presumes Coho Salmon may occur in the lower reaches of Newhalem Creek, but spawning and rearing has not been documented. Coho Salmon spawning habitat occurs in the Skagit River at and downstream of the confluence with Newhalem Creek, and rearing habitat is mapped upstream of the confluence.

Although Coho Salmon are not documented to spawn in the lower reach of Newhalem Creek downstream of natural barriers, occasional spawning and limited rearing cannot be completely discounted. As reported in Table 4.1-1, Coho Salmon spawn in the Skagit River tributaries from November 1 through March 31 and may therefore enter the action area as early as late September. Juveniles may be present year-round in areas of the Skagit River that are suitable for rearing (e.g., side channels and low-velocity pools), and may use Newhalem Creek for rearing, particularly as a high-flow refugia.

9.1.3 Pink Salmon

Odd-year Pink Salmon reportedly spawn in the lower reaches of Nehalem Creek (WDFW 2021a). As reported in Table 4.1-1, Pink Salmon spawn in the Skagit River from approximately mid-September through October 31 and may enter the action area as early as late August. Juveniles will be present year-round in spawning reaches of the Skagit River and Newhalem Creek.

9.2 Effects of Proposed Action

The effects of the Proposed Action on EFH for Chinook Salmon, Coho Salmon, and Pink Salmon will be similar to those described above for Puget Sound steelhead (Section 6.7.1 of this BA) and will be primarily driven by post-Project changes in stream function following diversion structure removal. No EFH species can access the tailrace barrier construction location or the Newhalem Creek diversion site. Therefore, construction-related effects on EFH downstream of the natural waterfall barriers will not occur or will be insignificant.

Following diversion removal, EFH in the lower reaches of Newhalem Creek and the Skagit River portion of the action area will experience episodic increases in sediment transport during seasonal high-flow events with sufficient capacity to mobilize sediments that have accumulated upstream of the dam. These increases in sediment may affect rearing individuals from temporary turbidity spikes; however, considering the relatively coarse nature of sediments upstream of the dam, sediment transport to downstream reaches should not deposit fine sediments that alter EFH functions related to spawning and rearing in the action area. Following a period of approximately 10 years, the reach upstream of the diversion is expected to reach equilibrium, and downstream turbidity levels associated with the transport of sediments that have accumulated upstream of the diversion will no longer be measurable above background levels.

9.3 Determination of Effect

Potential effects on Pacific Salmon EFH in the action area will be temporary in nature and primarily related to the transport of accumulated sediment to designated EFH downstream of Newhalem Falls during seasonal high flows following dam removal. Such transport is not expected to measurably alter use of lower portions of Newhalem Creek or degrade EFH functions. Therefore, the Proposed Action **will not adversely affect** Pacific Salmon EFH. The temporary, and minor transport of sediment into rearing habitat in Newhalem Creek during seasonal high flows will be offset by the Project-related benefits to various stream functions (see Sections 4.1 and 4.4 of this BA). Beneficial effects will include long-term restoration of the hydrologic, sediment transport, and nutrient transport regimes downstream of the current diversion dam. Temporary effects on EFH will be minimized through implementation of measures presented in Section 2.7 of this BA.

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BIOLOGICAL ASSESSMENT AND EFH ASSESSMENT

APPENDIX A

2025 USFWS IPAC LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
Phone: (360) 753-9440 Fax: (360) 753-9405

In Reply Refer To: 02/12/2025 18:26:14 UTC
Project Code: 2025-0055552
Project Name: Newhalem Creek Hydroelectric Project Decommissioning (2705)

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
(360) 753-9440

PROJECT SUMMARY

Project Code: 2025-0055552

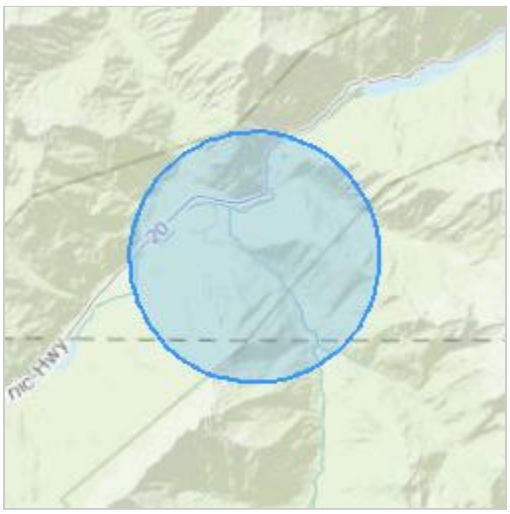
Project Name: Newhalem Creek Hydroelectric Project Decommissioning (2705)

Project Type: Dam - Removal

Project Description: Seattle City Light owns and operates the Newhalem Creek Hydroelectric Project, which is licensed by the Federal Energy Regulatory Commission (FERC). The Project is in Whatcom County, Washington, immediately west of the town of Newhalem, along Newhalem Creek, a tributary to the Skagit River. The current license for the Project (FERC No. 2705) expires on January 31, 2027. The Project was in active use until 2010, when a series of equipment and structural problems caused an extended shutdown. Currently, it cannot be operated due to leaks in the power tunnel, maintenance needs at the headworks, and lack of safe access to the dam. Based on an engineering and economic analysis of the necessary repairs, City Light has determined that Project costs far exceed the revenues. For this reason, City Light has decided not to seek a new license for the Project and proposes to decommission the full Project. City Light filed a Notice of Intent with FERC on April 28, 2021, to surrender the license for the Project. Full Project decommissioning will completely remove all above-ground buildings, structures, and equipment associated with the Project, including the powerhouse, powerhouse equipment, tailrace fish barrier, penstock, penstock saddles, dam, sluiceway/intake, gatehouse, and pedestrian bridge.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@48.65999865,-121.24684391585009,14z



Counties: Skagit and Whatcom counties, Washington

ENDANGERED SPECIES ACT SPECIES

There is a total of 11 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Gray Wolf *Canis lupus* Population: U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, IA, IN, IL, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, ND, NE, NH, NJ, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, and WV; and portions of AZ, NM, OR, UT, and WA. Mexico. There is **final** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/4488	Endangered
North American Wolverine *Gulo gulo luscus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5123	Threatened

BIRDS

NAME	STATUS
Marbled Murrelet *Brachyramphus marmoratus* Population: U.S.A. (CA, OR, WA) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Mt. Rainier White-tailed Ptarmigan *Lagopus leucura rainierensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9234	Threatened
Northern Spotted Owl *Strix occidentalis caurina* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1123	Threatened
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

FISHES

NAME	STATUS
Bull Trout *Salvelinus confluentus* Population: U.S.A., coterminous, lower 48 states There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened
Dolly Varden *Salvelinus malma* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1008	Proposed Similarity of Appearance (Threatened)

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Suckley's Cuckoo Bumble Bee *Bombus suckleyi* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10885	Proposed Endangered

CONIFERS AND CYCADS

NAME	STATUS
Whitebark Pine *Pinus albicaulis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1748	Threatened

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Bull Trout *Salvelinus confluentus* https://ecos.fws.gov/ecp/species/8212#crithab	Final

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Shelby Pace
Address: 555 110th Ave NE
Address Line 2: Suite 1200
City: Bellevue
State: WA
Zip: 98004
Email shelby.pace@hdrinc.com
Phone: 4252334413

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Energy Regulatory Commission